

# D5.1 - Digital repository for carbon & environmental models, methods and tools

Deliverable 5.1

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#### List of Abbreviations

CFD Climate Farm Demo

NC National Coordinator

WP Work Package

KO Knowledge Object

**UI** User Interface

**SLR** Systematic Literature Review

AUA Agricultural University of Athens

**BIOS** Biosense

**CSA** Climate Smart Advisors



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#### **Abstract**

The Climate Farm Demo (CFD) project's WP5 aims to develop a digital repository for carbon and environmental models, methods and tools that have been widely used and implemented across the EU for climate change mitigation and adaptation. The repository's ambition is to span across the entire agricultural sector, covering all crop, livestock and mixed production systems while also accounting for inherent differences between the highly variable pedoclimatic zones of Europe. Following the first task of WP5, namely Task 5.1 "Inventory/mapping of the existing carbon and climate methodologies/tools used in the EU" that launched an online survey for National Coordinators (NCs) in February (M5) and successfully collected 51 replies from NCs across the EU (Milestone 5.11), the first Deliverable of the WP "Digital repository for carbon & environmental models, methods and tools" essentially presents the methodology used to collect, analyse, categorise, deploy and ultimately materialise the first version of the open-to-all repository of the CFD project. This online repository has already been launched by the writing of this Document (Month 18), hosted on the project website<sup>2</sup> in a dedicated space under the "Resources" section<sup>3</sup>. The repository constitutes a "living" entity, as it will implement extensive bi-annual updates adding new models, methods and tools developed to the repository from both within and outside the project's activities throughout the project's duration, available to all users. The ultimate objective of the CFD Repository is to constantly provide an accurate and scientific overview of "current state" information, curate and compile them, thus enabling a benchmark analysis of all tools/methods used across the continent and throughout various agricultural systems within the sector.

This Deliverable is divided into three (3) main sections. It starts with an introductory chapter, explaining the methodology followed to gather all Knowledge Objects (KOs) entries from within the project's activities, as well as the international scientific and grey literature, alongside their curation process. The second chapter presents a general characterisation of the KOs and their distribution, providing general information as an overview of the entire repository's contents. A third and final Section explains various basic functionalities developed as part of the User Interface (UI) of the online repository on the project's website. Finally, a Conclusions section gathers all the important ideas discussed throughout the document and outlines insights, future steps and ambitions.

The most recent version (as of writing this deliverable, exported on March 20<sup>th</sup> 2024) of the CFD repository in tabular form, is also accompanying this Deliverable as an Appendix, which alongside its online counterpart is available to all CFD partners on the project's Sharepoint (titled '*CFD Repository Task 5.1.xlsx*').

<sup>3</sup> https://climatefarmdemo.eu/cfd/en/#/resources



¹ https://actaassofr.sharepoint.com/:b:/r/sites/h-eu/Documents%20partages/General/Deliverables%20%26%20Milestones/WP5%20-%20Carbon%20%26%20Climate%20Tool%20Box/WP5%20Milestones/MS.41%20First%20benchmark%20of%20the%20EU%20carbon%20and%20climate%20methodologies%20tools/CFD\_WP5\_Milestone1\_V1.1.pdf?csf=1&web=1&e=VWcRq4

<sup>&</sup>lt;sup>2</sup> https://climatefarmdemo.eu/



#### Chapter 1

# Repository Collection

An overview of the data acquisition strategies used to collect, filter and analyse the KOs that populate the online CFD repository.







## 1. Repository Collection

#### 1.1. NC Survey

The first entries of the Repository were collected through an extensive survey conducted under Task 5.1, which was circulated in the form of an online questionnaire to all CFD NCs during the early stages of the project. This step collected a total of 34 individual tools from the NCs that completed the survey, which served as a foundation to initially populate the repository. An overview of the recorded tools collected through this process, alongside their frequency (times mentioned in separate surveys) are presented in the following indicative chart selected from the submitted Milestone Report (Figure 1). An extensive analysis and breakdown of the results were documented in the first Milestone report of WP5, namely "First benchmark of the EU carbon and climate methodologies/tools".

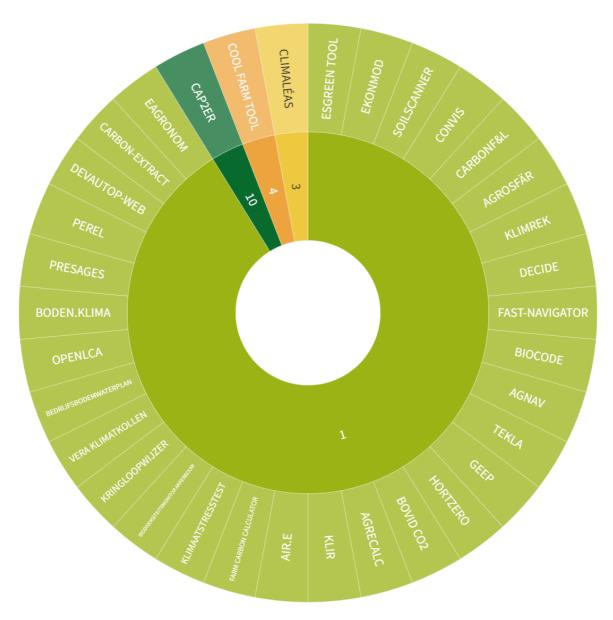


Figure 1. An overview of the tools collected through the NC survey and their respective survey.





#### 1.2. Systematic Literature Review

The following step for the gathering of KOs was the implementation of a Systematic Literature Review (SLR) focusing on existing carbon tools and methods from international sources. The review aimed to identify and record the wide array of available climate tools, methods and models, as well as assessment and management strategies. The SLR methodology used to map existing carbon and climate methodologies/tools utilised in the European Union (EU) involved utilising the extensive online bibliographic database Scopus<sup>4</sup>. The primary aim was to gather pertinent scientific literature focused on subjects such as carbon footprint, carbon accounting, carbon assessment, carbon measurement, carbon calculation, carbon management, carbon sequestration, climate change mitigation, climate change adaptation, greenhouse gas (GHG) emissions, carbon storage, nitrogen balance, air quality, eutrophication, and non-GHG emissions.

The derived results were limited by the following criteria:

- Document type, year, subject area, language
- Articles discussing carbon and climate methodologies/tools in the context of the European Union
- Articles written in English
- Articles published up to the date of the search

The language filter, despite the fact that the repository contains KOs that exist exclusively in local languages with no English versions / translations was necessary to facilitate an effective search. Considering that most widely used tools either contain documentation in English, and if not, the most noticeable ones were already assumed to have been collected from the NC survey, each KO entry was classified using an [Yes/No] filter for the availability of the KO in the English language.

The search query for the systematic review was as follows:

(TITLE-ABS-KEY ("carbon footprint" OR "carbon accounting" OR "carbon assessment" OR "carbon measurement" OR "carbon calculation" OR "carbon management" OR "carbon sequestration" OR "climate change mitigation" OR "climate change adaptation" OR "GHG" OR "greenhouse gas emission\*" OR "carbon storage" OR "nitrogen balance" OR "air-quality" OR "eutrophication" OR "non-GHG emission\*")) AND (TITLE-ABS-KEY ("tool\*" OR "model\*")) TITLE-ABS-KEY ("farm\*" OR "agriculture\*" OR "agri\*") AND (TITLE-ABS-KEY ("European Union" OR "EU")) AND (LIMIT-TO (OA, "all"))

The subsequent step involved a comprehensive analysis of these articles to manually extract information concerning the methodologies and tools employed in carbon and climate-related assessments and management.

The initial query yielded a total of 1440 articles (n = 1440), and the systematic review adhered to the PRISMA framework (Moher et al., 2009<sup>5</sup>). Subsequently, full-text articles were reviewed to confirm eligibility. Criteria for exclusion were based on subject areas, including Environmental Science,

<sup>&</sup>lt;sup>5</sup> Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group\*. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Annals of internal medicine, 151(4), 264-269.



<sup>4</sup> https://www.scopus.com/



Agricultural and Biological Sciences, Earth and Planetary Sciences, Energy, and Engineering. Additional filters encompassed country territory (European Union), document type (Article, Review, Conference Paper), and publication year (2003-2023). Of the initially identified papers, 928 were removed for not meeting the specified criteria, or not providing sufficient details about the various tools or models utilised within their context.

With 512 scientifically relevant papers remaining, a further manual selection process ensued. This involved eliminating papers inaccessible for full review, as well as those not aligned with the study's objectives, as determined by relevance of titles, abstracts (n = 376). Ultimately, 136 research studies met the inclusion criteria and were subjected to detailed analysis in this research study as they were identified as relevant for the Eligibility step. Finally, after careful consideration, the Qualitative Synthesis step would conclude the SLR process and the Prisma Methodology, yielding a total of 107 publications that contained carbon tools and methods relevant to the scope of CFD. A PRISMA flow diagram (Figure 2) illustrates the selection process of articles from the initial search to the final inclusion, providing a transparent representation of the article selection procedure. Ultimately, the number of unique, new (not previously recorded during the NC survey) KOs identified across the SLR was 91, thus increasing the final number of repository entries to 125.

Each individual entry and their respective extracted data were organised and summarised to identify the distinct tools/models (KOs), which were then categorised and described in terms of their applications and relevance to carbon and climate assessments in the EU agricultural sector. The identified KOs cover various areas such as carbon footprint measurement and modelling, accounting frameworks, emission assessment methods and measurement techniques, calculation models (both process-based and empirical), management strategies, sequestration practices, climate change mitigation endeavours, adaptation strategies, estimation of GHG emissions, mechanisms for carbon storage, assessment of nitrogen balance, monitoring of air quality, analysis of eutrophication, and evaluation of non-GHG emissions.

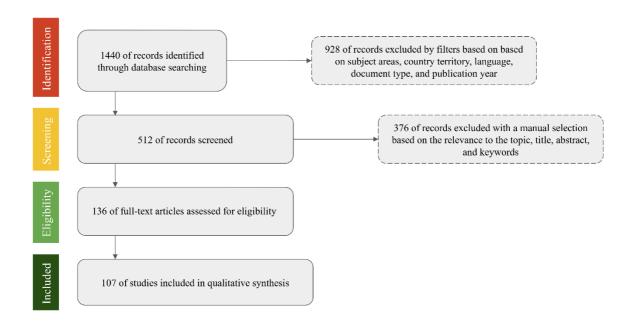


Figure 2. The PRISMA flow chart used for the SLR.



#### 1.3. Object Characterisation

The KOs that were registered as entries to the repository are essentially accompanied by metadata that describe their use, scope, capabilities and overall characteristics. These metadata can both provide information about the described model, tool or method in an accessible way, but can also help users search the repository more efficiently by filtering the various fields (metadata) they are interested in. To this end, the parameters that should be used to effectively convey the most important aspects of each KO were selected within WP5, and can be divided into four (4) main categories (Figure 3). The first one provides basic information about each KO and its source, such as link to the original entity where the users can access the actual model, tool or method, a [Yes/No] field indicating the accessibility of each KO by stating whether it is Open Access, and finally another [Yes/No] field indicating whether documentation and/or the KO itself have an English version available.

The second category provides general information relevant to the usage of each KO. To this end, the main scope of each model, tool and method are described, alongside the data the KO requires to operate, and finally the spatial level that it covers, recorded as a [Yes/No] field for Farm Level implementation. The third category focuses on the Modelling process, describing the parameter(s) that the KO can predict or simulate, followed by an open-text field that elaborates on the modelling process and provides insights for its use. Finally, a fourth category was added, providing miscellaneous information about each KO. This information currently covers an estimated ease of use for each tool, model or method (expressed in a numeric 1-5 scale), and whether each KO has been used within the CFD project activities.

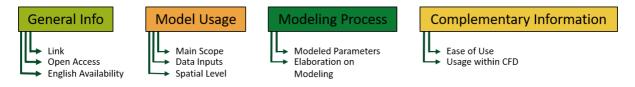


Figure 3. A schematic representation of the KO categorisation and description.



#### Chapter 2

# Repository Overview

An overview of the 1st version of the CFD online repository, its contents and KO categorisation.







### 2. Repository Overview

#### 2.1 KO Representation

In this chapter the curated categorised and analysed results derived from the compilation of KOs within the online CFD repository are presented. The main objective of this chapter is to illuminate key trends, patterns, and insights embedded within the data collected under Task 5.1. By utilising schematic visual representations, this section provides a clear and structured overview of the landscape of carbon tools, their distribution, functionalities, and implications for climate change mitigation and adaptation efforts across the EU.

The first qualitative parameter that was documented was the availability (for both the KO itself as well as its documentation / user guidelines) in the English language. This is arguably a pivotal parameter for the widespread adoption of each KO, but at the same time it can potentially indicate an association with various inherent limitations, such as spatial restrictions (namely the model, tool or method are designed for a certain region under its specific pedoclimatic zones and can only be applied within these areas). Out of the 125 KOs of the repository, 83 % of them provided access to English documentation and an English version of the model, tool or method (Figure 4).

#### Availability in English

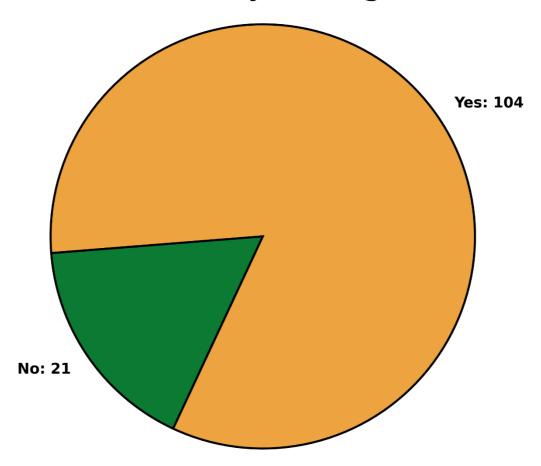


Figure 4 The analysis of English Language Availability for the KOs.



The second qualitative parameter that was recorded was the accessibility of each KO, namely whether all of its required components are provided in a "free-of-charge" way to all users. Several options were encountered in describing the registers to this parameter, e.g. some tools would charge a specific amount per usage, or a monthly / yearly subscription, instead of a one-time purchase. At the same time, several tools offer a limited free trial (either based on a number of assessments or for a predetermined period of time per user). These tools were categorised as Open in this 1st version of the repository, but in future updates, this specific parameter can be further elaborated to include more detailed information for each specific KO. Out of the 125 tools of the repository, 62 % offer a free version of their materials, while the authors/owners of two (2) KOs suggested that a free-trial version of the tool, method or model was currently under development (Figure 5).

# No: 46 No: 46 Under development: 2

Figure 5. The accessibility of KOs, namely whether a "free-of-charge" option is provided.

The final qualitative parameter that was documented with this type of categorisation was the spatial resolution on which the KOs could operate. To this end, their ability to conduct assessments, simulations or prediction on a farm-level was evaluated. (Figure 6). A total of 55 % of the repository's KOs offer the option to perform on a farm-level, while a single KO owner indicated that a smaller scale version of their model was currently developed, and would soon offer farm-level assessments.



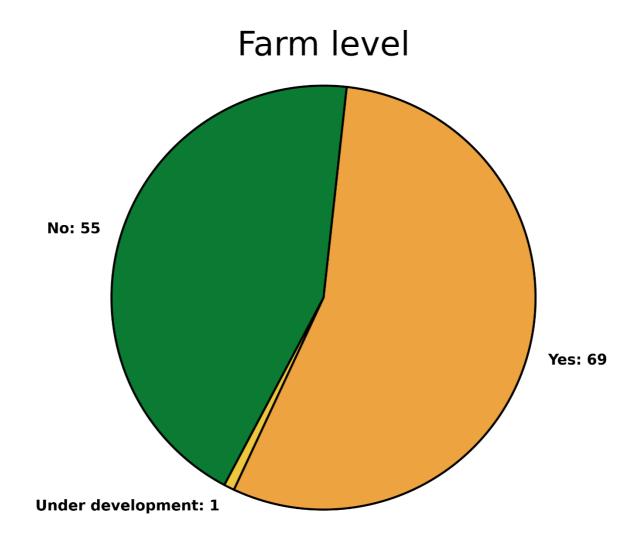


Figure 6. The ability of KOs to perform on a farm-level.

For the visualisation of the open-text characterisation of the repository entries, a series of Word cloud diagrams using the Python 3 Wordcloud library<sup>6</sup> (Figures 7, 9 and 11 respectively) and Frequency charts (Figures 10, 12 and 14 respectively) are provided below, illustrating what are the most commonly used words and/or terms in the description of the repository's KOs. Preliminary in this step, an effort to filter the text fields and omit non-keyword terms such as prepositions and conjunctions was first conducted. For the Frequency charts, an additional separation within each text field was conducted, using a dedicated (secondary) delimiter to distinguish different terms that represent a single data point. Similarly, "umbrella terms" such as 'Livestock" were handled as unique entries if they were encountered in the description of a KO, and were not linked to their respective subclasses (e.g. specific livestock systems such as "dairy").

<sup>&</sup>lt;sup>6</sup> https://pypi.org/project/wordcloud/





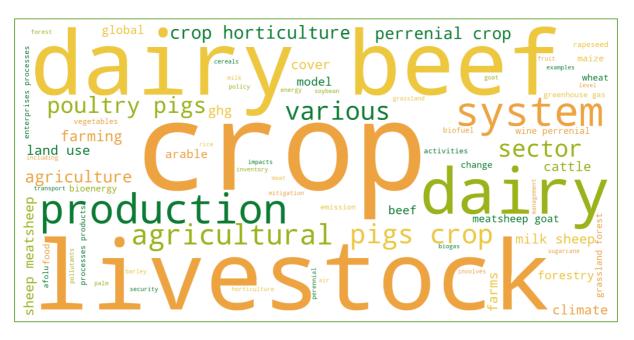


Figure 7. The Word cloud diagram for the KO's "Main Objectives" characterisation.

#### Most Common Entries for KO "Main Objectives"

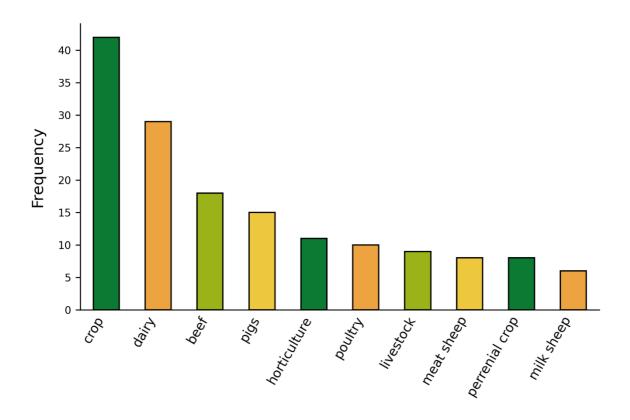


Figure 8. The frequency chart for the term characterising the KOs' "Main Objectives".





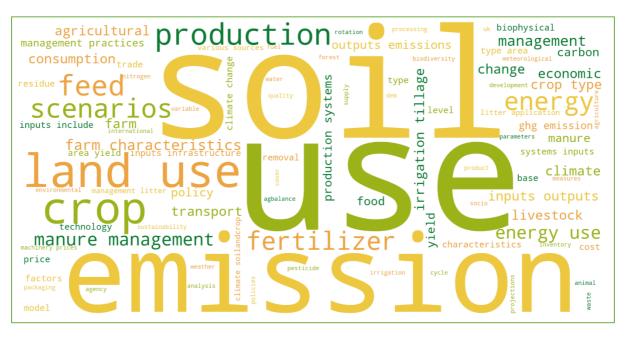


Figure 9. The Word cloud diagram for the KO's "Data Inputs" characterisation.

#### Most Common Entries for KO "Data Inputs"

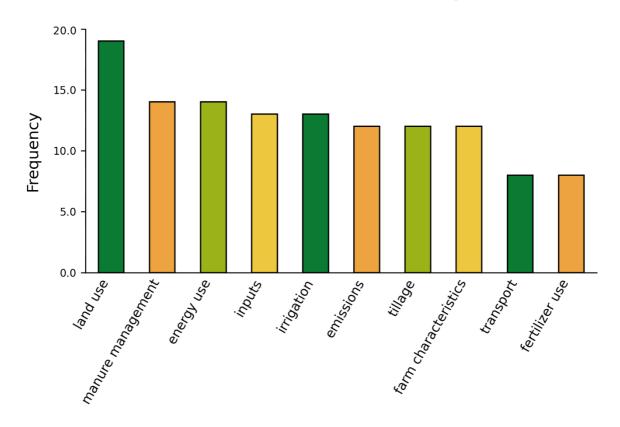


Figure 10. The frequency chart for the term characterising the KOs' "Data Inputs".





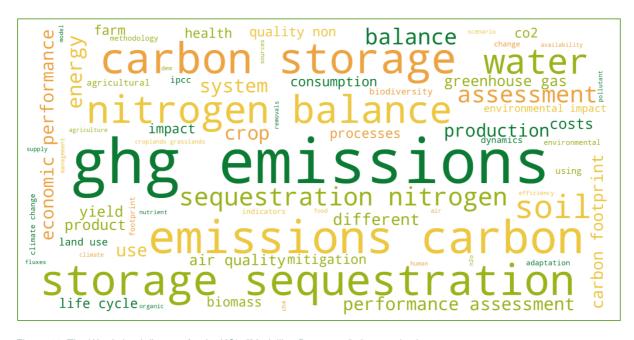


Figure 11. The Word cloud diagram for the KO's "Modelling Parameter" characterisation.

#### Most Common Entries for KO "Modelling Parameter"

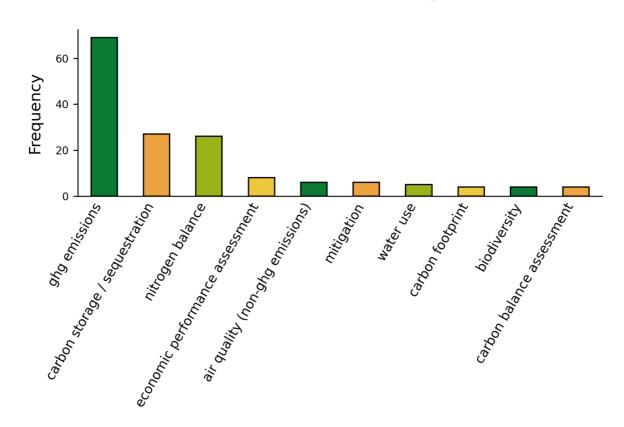


Figure 12. The frequency chart for the term characterising the KOs' "Modelling Parameters".





#### Chapter 3

# Platform Integration

An overview of the most important functionalities integrated to the repository on the CFD project's website.







# 3. Platform Integration

#### 3.1 Online Interface

In order to develop an online knowledge reservoir, all Task 5.1 partners, in collaboration with BIOS (who are leading all development tasks under WP8), meticulously followed a systematic approach to outline the core functions and user requirements essential for its efficient deployment and operation. Upon identifying various functionality requirements, BIOS designed the layout of the repository, ensuring an intuitive and accessible user interface (UI), while also considering parameters such as the repository's scalability and modularity (which are pivotal for the upcoming update operations that will follow on a bi-annual basis throughout the project's duration), and naturally, performance. Upon successful completion of development and testing, the repository was deployed, integrated to the CFD project's website under the "Resources" section (Figure 13), facilitating effective utilisation of the repository's documented knowledge, including a simplistic filtering system, which empowers users to refine their KO searches based on various metadata (KO characterisation data) criteria.

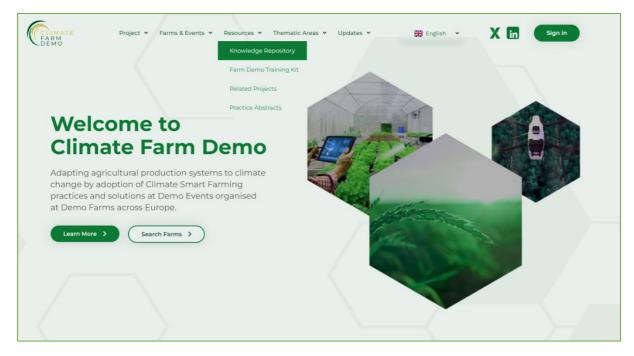


Figure 13. The CFD website platform and path to the online Repository, developed by BIOS.

#### 3.2 Filtering Fields

An effective filtering system for each specific data structure enhances the usability and accessibility of an online repository, enabling users to efficiently discover and retrieve the information they need from a large and diverse collection of data. To this end, the filtering system for an online repository's entries typically involves categorising and organising the available data based on various attributes or metadata. In our case, the metadata were the categorisation parameters identified within WP5 to describe KOs, which BIOS used to develop a discreet interface that allows users to utilise these metadata tags as filters to refine their search results and narrow down the repository entries to suit their specific needs or interests. The filtering system includes various commonly used, widely recognised elements such as checkboxes, dropdown menus, sliders, and search boxes, which allow users to easily





select and apply the desired filters (Figure 14). As users apply their selected filters, the repository dynamically updates the displayed results to reflect the selected criteria, enabling users to quickly locate the most relevant KOs for their purposes. A snapshot of the finalised UI with a few KO displayed are presented in Figure 15.

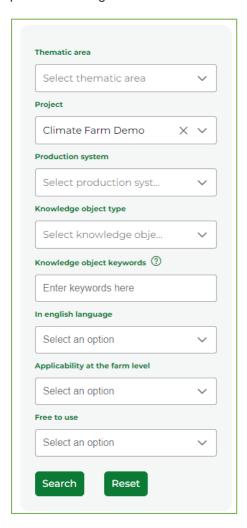


Figure 14. An indicative UI for a set of filters for the CFD online repository.



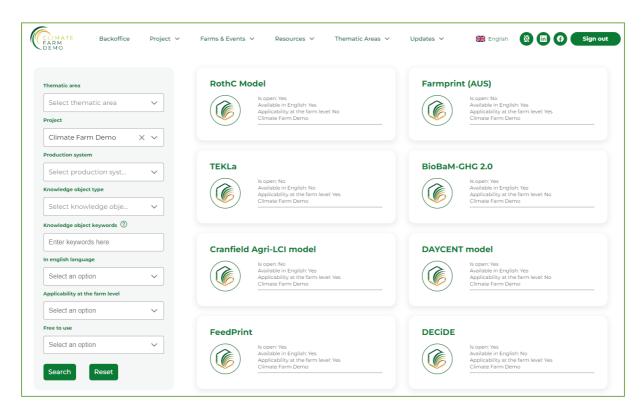


Figure 15. The finalised UI of the online repository.

#### 3.3 Common Online Repository

During the development phase of the CFD repository, which was aligned with the preliminary stages of the Climate Smart Advisors (CSA)<sup>7</sup> "sister project", we undertook an ambitious endeavour to create a shared repository for climate-related EU projects. This repository aimed to accumulate knowledge from both projects, as well as other climate-focused initiatives such as the Horizon2020 project ClieNFarms<sup>8</sup> (Figure 16). Extensive discussions between the management teams of these projects have been ongoing since late 2023, in order to realise this goal and implement the shared repository in the following months.



<sup>&</sup>lt;sup>7</sup> https://climatesmartadvisors.eu/

<sup>8</sup> https://clienfarms.eu/



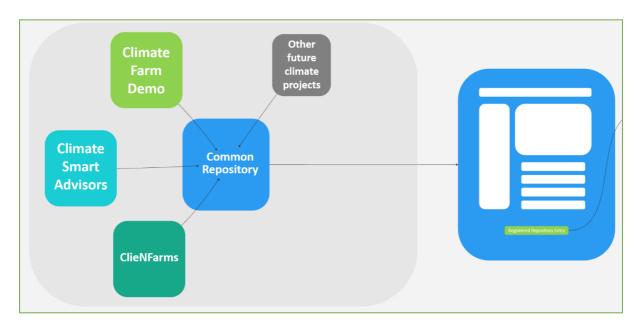


Figure 16. A schematic draft of the common repository, serving as a cumulative knowledge reservoir for all involved projects.

Currently, several internal documents have been developed to identify user requirements, optimise role allocations, and ensure an overall alignment and harmonisation among stakeholders (entities and endusers) from both projects. The repository is aspired to be a dynamic library, encompassing both knowledge generated within the involved projects, but also giving the option to various users to submit their own KO entries, which could be published (upon moderation checks). A key development step for this dynamic process involves the identification of the various users/entities and their roles across each participating project, namely which users will have the option to view, submit/upload and moderate (accept or reject) submitted KOs (Figure 17). The development tasks for the common repository is a collaboration between AUA (also responsible for developing the CSA repository), and BIOS. The first version is anticipated to be completed by March 2025, aligning with CSA's initial repository deliverable.

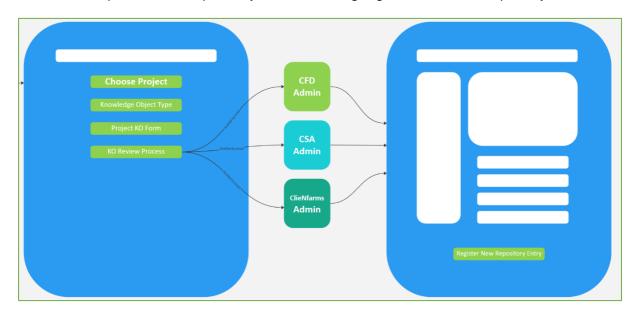


Figure 17. A schematic draft demonstrating potential steps for a KO submission to the Common Repository.





#### Chapter 4

# Conclusions





#### 4. Conclusions

To conclude, the development of the repository marks a significant milestone and achievement in our project, providing a centralised platform for accessing and sharing valuable climate-related knowledge and resources. Through meticulous planning, collaboration, and dedication, the WP5 and WP8 teams have successfully created an efficient and user-centric repository that will serve as a vital tool for European farmers, advisors, researchers, practitioners, and stakeholders in the agri-food sector. Moving forward, we are committed to continuously improve and expand the repository, ensuring the enduring relevance, comprehensiveness, and accessibility of its contents, facilitating and assisting in the advancement of knowledge and innovation across the agricultural domain.

The repository is forecasted to implement 2 (two) updates throughout the project's duration, namely in Month 48 (September 2026) and Month 78 (March 2029). These updates will not only expand the repository's entries, including new models, tools and methods that might have been introduced during this period, but will also enhance already existing KOs and their characterisation, by integrating new knowledge generated within the CFD project, but also covering externally obtained knowledge, implementation cases and potential added functionalities to the KOs themselves.

Finally, a pivotal aspect for the widespread knowledge exchange within the EU agricultural sector is expected to be the common repository that will host selected entries from all involved projects (including but not limited to CFD, CSA and ClieNFarms - as of the writing of the document). The ambition behind this common repository is to provide a "one-stop" library for all agricultural actors across the European agrifood value chain, essentially gathering potentially fragmented knowledge from major climate-related projects into a single online, accessible and fully open entity.



# **Appendix**

1. The most recent version of the repository





|                         |   | Open / Free to | Available in |  |   |             |                                   |  |             |                 |
|-------------------------|---|----------------|--------------|--|---|-------------|-----------------------------------|--|-------------|-----------------|
| Model                   | Link  | Use            | Engish       | Main Objective                                 | Data inputs   | Farm level  | Modelling Parameter               | Elaboration in Modelling   | Ease of Use | Used within CFD |
|                         |   |                |              |  |   |             |                                   | Uses IPCC methodology and national   |             |                 |
|                         | LH - 76   |                |              | Crops and livestock                            | Energy consumption, fertilizer                        |             | 0110                              | emission factors to estimate GHG   |             |                 |
| ACCT Tool               | https://www.bodensee-   | Vac            | Na           | systems in Germany,<br>France, Italy and Spain | use, manure management, crop                          | Vee         | GHG emissions, carbon storage     | emissions and carbon sequestration per   | 2           | Na              |
| (CC1 1001               | stiftung.org/agroco2ncept/  | Yes            | No           | France, italy and Spain                        | residues, etc.  | Yes         | / sequestration.                  | hectare. The tool uses a crop simulation model                                   | 3           | No              |
|                         |   |                |              |  |   |             |                                   | (AquaCrop) to estimate the impacts of  |             |                 |
|                         | https://tool.adapt2clima.eu/en/h                                      |                |              |  |   |             |                                   | climate change and adaptation  |             |                 |
|                         | ome/  |                |              |  | Information on the climate                            |             |                                   | measures on crop performance and   |             |                 |
|                         | https://climate-  |                |              |  | scenarios, crop parameters,                           |             |                                   | water use. The tool also uses an   |             |                 |
|                         | adapt.eea.europa.eu/en/metada   |                |              |  | irrigation parameters, soil                           |             |                                   | emission factor approach to estimate   |             |                 |
|                         | ta/tools/adapt2clima-decision-  | la constant    | 500.00       | Wheat, barley, maize,                          | parameters, adaptation                                | 8570 SP 1   | GHG emissions, water use, crop    |  |             |                 |
| ADAPT2CLIMA             | support-tool  | Yes            | Yes          | potato, tomato,grapevine                       | measures  | No          | yield                             | production   | 4           | No              |
|                         | https://climate-  |                |              |  | Climate change scenarios and                          |             |                                   | Mich board tool that provides avidence   |             |                 |
|                         | adapt.eea.europa.eu/en/knowle<br>dge/tools/adaptation-support-        |                |              | All sectors affected by                        | projections, vulnerability<br>assessments, adaptation | Under       | Climate change impacts and        | Web-based tool that provides guidance<br>and resources for developing adaptation |             |                 |
| Adaptation Support Tool | tool  | Yes            | Yes          | climate change impacts                         | options and measures                                  | development | adaptation strategies and plans   | strategies and plans at national level   | Ä           | No              |
| -daptation Support Tool | http://afolucarbon.org/   | 162            | 165          | climate change impacts                         | options and measures                                  | development | adaptation strategies and plans   | strategies and plans at national level   | - 4         | 140             |
|                         | http://clh-   |                |              |  |   |             |                                   |  |             |                 |
|                         | ckan.apps.fao.org/dataset/tools-                                      |                |              |  |   |             |                                   |  |             |                 |
|                         | for-greenhouse-gas-   |                |              |  |   |             |                                   | The model uses the IPCC methodology  |             |                 |
|                         | assessments/resource/e2d11b9  |                |              |  |   |             | 0000 00 W 40 00                   | and other peer-reviewed literature to  |             |                 |
|                         | 3-a6f8-40f5-8934-   |                | 1            | and the same of the                            | Land use, livestock, energy use,                      |             |                                   | calculate the carbon balance of the  |             |                 |
|                         | 712a6909547a?inner_span=Tru   | les.           | 200          | Agriculture, forestry and                      | inputs and infrastructure,                            | 202         | the life cycle of the AFOLU       | AFOLU system based on land use, land   |             |                 |
| AFOLU Carbon Calculator | e   | Yes            | Yes          | other land use (AFOLU)                         | emission and removals                                 | No          | system                            | use change and management practices.   |             | No              |
|                         |   |                |              |  |   |             |                                   | A comprehensive life cycle assessment  |             |                 |
|                         |   |                |              |  |   |             |                                   | method based on over 20 years' data<br>from more than 600 studies                |             |                 |
|                         |   |                |              |  |   |             |                                   | https://www.agricentre.basf.co.uk/en/Su  |             |                 |
|                         |   |                |              |  |   |             | Sustainability performance of     | stainability/AgBalance/  |             |                 |
|                         |   |                |              |  |   |             | different farming systems,        | https://www.agricentre.basf.co.uk/en/Su  |             |                 |
|                         |   |                |              |  |   |             | agricultural enterprises,         | stainability/AgBalance/AgBalance.html  |             |                 |
|                         |   |                |              |  | Data on 69 indicators of                              |             | processes and products across     | Evaluates the trade-offs within and  |             |                 |
|                         |   |                |              |  | sustainability across 16                              |             | three dimensions: economy,        | across the three dimensions of   |             |                 |
|                         |   |                |              |  | categories of interest such as                        |             | environment and society           | sustainability and helps drive innovative  |             |                 |
|                         |   |                |              |  | working conditions, human                             |             | https://agriculture.basf.com/glob | and sustainable solutions  |             |                 |
|                         |   |                |              |  | toxicity, fair trade, variable                        |             | al/en/sustainable-                | https://agriculture.basf.com/global/en/su  |             |                 |
|                         |   |                |              |  | costs, farm profits, water use,                       |             | agriculture/climate-smart-        | stainable-agriculture/climate-smart-   |             |                 |
|                         |   |                |              |  | emissions, soil health and                            |             | farming/sustainability-           | farming/sustainability-assessments.html  |             |                 |
|                         |   |                |              |  | biodiversity  |             | assessments.html                  | https://www.agricentre.basf.co.uk/en/Su  |             |                 |
|                         | https://agriculture.basf.com/glob                                     |                |              |  | https://www.agricentre.basf.co.u                      |             | https://www.agricentre.basf.co.u  | stainability/AqBalance/ . Provides a   |             |                 |
|                         | al/en/sustainable-  |                |              |  | k/en/Sustainability/AgBalance/                        |             | k/en/Sustainability/AgBalance/_   | virtual farming game to simulate   |             |                 |
|                         | agriculture/climate-smart-  |                |              | Various farming systems,                       | https://www.agricentre.basf.co.u                      |             | https://www.agricentre.basf.co.u  | different scenarios and compare results  |             |                 |
|                         | farming/sustainability-   |                | L.           | agricultural enterprises,                      | k/en/Sustainability/AgBalance/A                       | .,          | k/en/Sustainability/AgBalance/A   | https://www.agricentre.basf.co.uk/en/Su  |             |                 |
| AgBalance               | assessments,html  | No             | Yes          | processes and products                         | gBalance.html   | Yes         | gBalance.html                     | stainability/AgBalance/<br>Comparing two scenarios (current and                  | 5           | No              |
|                         | https://www.teagasc.ie/news   |                |              |  |   |             |                                   | planned); using a cutting edge big data  |             |                 |
|                         | events/daily/environment/introd                                       |                |              |  |   |             |                                   | solution for fast data analysis; providing                                       |             |                 |
|                         | ucing-agnavputting-climate-   |                |              |  | Farm characteristics .                                |             | GHG emissions; Air quality (non-  | accurate and verificable data to support   |             |                 |
|                         | action-planning-back-in-farmers-                                      |                |              | Dairy;Beef;Tillage and Meat                    |   |             | GHG emissions);Further to be      | decision making on farm to help meet   |             |                 |
| AgNav                   | hands.php   | Yes            | Yes          | Sheep will be added                            | outputs, emissions                                    | Yes         | added                             | agriculture's climate action   | 4           | Yes             |
|                         |   |                | 1            | *  |   | 1           |                                   | The model uses the Intergovernmental   |             |                 |
|                         | 1   |                | 1            |  |   |             |                                   | Panel on Climate Change (IPCC)   |             |                 |
|                         |   |                |              |  |   |             |                                   | methodology and other peer-reviewed  |             |                 |
|                         | I   |                | 1            |  | I   |             |                                   | literature to calculate GHG emissions  |             |                 |
|                         | 1   |                | 1            |  |   |             |                                   | and carbon sequestration at farm level.  |             |                 |
|                         |   |                | 1            |  | Land use, livestock, energy use,                      |             | 0110                              | It compares a baseline scenario (without   |             |                 |
| AI-                     | hu//  | V              | V            | sheep;Goat;Poultry;Pigs;Cro                    |   | V           | GHG emissions, carbon balance     | project) and an alternative scenario   |             | V               |
| Agrecalc                | https://www.agrecalc.com/   | Yes            | Yes          | ps   | emission and removals                                 | Yes         | assessment                        | (with project) The model uses the Life Cycle                                     | 2           | Yes             |
|                         | 1   |                | 1            |  |   |             |                                   | Assessment technique and the IPCC  |             |                 |
|                         | 1   |                | 1            |  |   |             |                                   | methodology to calculate the   |             |                 |
|                         | 1   |                | 1            |  |   |             |                                   | environmental impacts of agricultural  |             |                 |
|                         | 1   |                | 1            |  | Life cycle inventory data for                         |             |                                   | products. It covers a wide range of  |             |                 |
|                         | 1   |                | 1            |  | agricultural production .                             |             |                                   | impact categories including those  |             |                 |
|                         |   | 1              | 1            |  | processing, transport and                             |             | Environmental impact of           | related to water, land use, land use   |             |                 |
|                         | https://blonksustainability.nl/tool                                   |                |              |  |   | No          | agricultural products             | change, fertilizers, and pesticides.   |             | No              |
| Agri-footprint          | https://blonksustainability.nl/tool<br>s-and-databases/agri-footprint | No             | Yes          | Crops  | packaging   |             |                                   |  |             |                 |
| Agri-footprint          |   | No             | Yes          | Crops  | packaging   | 140         | agricultural products             | Uses a consortium of researchers,  |             | INO             |
| Agri-footprint          |   | No             | Yes          | Crops  | GHG measurement and                                   | 110         | agricultural products             |  |             | No              |
| Agri-footprint          |   | No             | Yes          | Crops  Agricultural greenhouse                 |   | 110         | agricultural products             | Uses a consortium of researchers,  |             | 140             |
| Agri-footprint          |   | No             | Yes          |  | GHG measurement and                                   | No          |                                   | Uses a consortium of researchers, students and professionals to develop          | 5           | 110             |



|  | AGRICARBON-EO is a tool that uses  |
|--|--|
|  | the PROSAIL radiative transfer model   |
|  | and the SAFYE-CO2 agronomic model  |
|  | to simulate the carbon budget  |
|  | components of crops and cover crops. It  |
|  | assimilates remote sensing data from   |
|  | Sentinel 2 satellites into the models and  |
|  | computes the uncertainties of the  |
|  |  |
|  | maps, climate and estimates. It allows for comparing the   |
| remoting sensir  |  |
|  | ariables, emission and C-budgets of crops and (without and with project) and evaluating  |
| AGRICARBON-EO rboneo/agricarbon-eo/ No No Crops and cover crops factors, carbon  | on cycle feedbacks Yes cover crops the additionality of the intervention 1 No  |
| https://www.nrel.colostate.edu/pr  |  |
| ojects/alusoftware/home  | The model uses the IPCC methodology  |
| http://clh-  | and other peer-reviewed literature to  |
| ckan.apps.fao.org/dataset/tools-   | calculate greenhouse gas emissions   |
| for-greenhouse-gas-  | and removals of the AFOLU system   |
| assessments/resource/0f1fbd73-   | based on land use, land use change   |
| Agriculture and Land Use 9a48-49aa-934f- Land use, lives   | estock, energy use, GHG emissions and removals and management practices. It also   |
| national Greenhouse Gas 931239972dc3?inner_span=Tru Agriculture, forestry and inputs and infra   | frastructure, assessment for the AFOLU provides a toolkit for building national  |
| Inventory software (ALU) e Yes Yes other land use (AFOLU) emission and re  |  |
|  | The model uses the Life Cycle  |
|  | Assessment technique and the IPCC  |
|  | methodology to calculate the   |
|  | environmental impacts of agricultural  |
| Life cycle inven   |  |
| Life Cycle inven   | inition y data for injuries a wide range or roduction , Life cycle assessment for the impact categories incling those  |
| Agro-Chain Greenhouse Gas https://ccafs.cgiar.org/resources All agricultural products: processing , tra  |  |
| Emissions (ACE) calculator /tools/acge-calculator Yes Yes feed, food, biomass packaging  | No agricultural products change, fertilizers, and use state to water, and use state to water.  |
| Emissions (ACE) calculator /100is/acge-calculator res res reed, rood, biomass packaging  | No agricultura products change, remizers 3 No  |
|  | Agrosian is a tour that uses a mile yore assessment (LCA) approach to estimate   |
|  |  |
|  | the carbon footprint of farming  |
|  | practices. It allows for comparing the   |
|  | performance of different scenarios (e.g.   |
|  | current vs improved) and identifying the   |
|  | key drivers of GHG emissions and   |
| User-defined da  |  |
| characteristics,   |  |
| https://www.agronod.com/om- Dairy;Beef;Crops;Perrenial systems , input   |  |
| Agrosfăr <u>agrosfar</u> No No crops emissions   | Yes farms) increase sequestration 1 Yes  |
|  | The tool uses emission factors from the  |
|  | IPCC and other sources to estimate the   |
|  | GHG emissions from different sources   |
| Crop   | on the farm and along the supply chain.  |
|  | d,tillage,irrigation,f The tool also provides a comparison   |
| ertiliser use, per   | esticide with a benchmark farm and a   |
| AHDB Carbon footprinting https://ahdb.org.uk/carbon- use,residue ma  | nanagement, GHG emissions breakdown of emissions by source and   |
| decision support tool footprint-decision-tool Yes Yes Cereals and oilseeds transport   | Yes (CO2,CH4,N2O) gas 4 No   |
|  | Äir.e is a tool that allows farmers to   |
|  | measure and monitor their carbon   |
|  | footprint and carbon sequestration   |
|  | potential. It uses satellite imagery,  |
|  | machine learning, and agronomic  |
|  |  |
|  | models to estimate the carbon balance  |
|  | models to estimate the carbon belance of different land uses and management  |
| ll and use soil t  | of different land uses and management  |
| https://www.solictorest.com/en/i Crops Perennial.crops management in   | of different land uses and management I type, crop type, GHG emissions;Carbon storage   practices. It also helps farmers to  |
| https://www.solidforest.com/en/i Crops, Perennial crops, management pr   | of different land uses and management  I type, crop type, GHG emissions;Carbon storage practices. It also helps farmers to practices, carbon / sequestration;Product carbon   access carbon markets and generate   |
| https://www.solidforest.com/en/i Crops, Perennial crops, management pr   | of different land uses and management practices, carbon   GHG emissions; Carbon storage practices, carbon   / sequestration; Product carbon emissions, etc.   Yes   footprint, Life Cycle Assessment   income from their carbon credits.   |
| https://www.solidforest.com/en/i Crops, Perennial crops, management pr   | type, crop type, practices, carbon emissions, etc.   GHG emissions:Carbon storage practices, talso helps farmers to proceed to the practices, talso helps farmers to proceed to the practices, talso helps farmers to proceed to the process carbon markets and generate (noome from their carbon credits.)  The tool uses emission factors from the   |
| https://www.solidforest.com/en/i Crops, Perennial crops, management pr   | of different land uses and management practices, carbon practices, carbon emissions, etc.    Sequestration/Product carbon access carbon markets and generate footprint, Life Cycle Assessment footprint, Life Cycle Assessment process of the carbon credits.    Sequestration/Product carbon access carbon markets and generate footprint, Life Cycle Assessment footprint, Life Cycle Assessment process of the life County of the life Count |
| https://www.solidforest.com/en/i Crops, Perennial crops, management pr   | l type, crop type, practices, carbon emissions, etc.  Yes GHG emissions/Carbon storage practices. It also helps farmers to access carbon markets and generate footprint, Life Cycle Assessment in come from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources   |
| https://www.solidforest.com/en/i ndex.html  No Yes Crops, Perennial crops, Horticulture, Livestock stocks, GHG er  | I type, crop type, practices, carbon emissions, etc.  GHG emissions/Carbon storage practices. It also helps farmers to access carbon markets and generate footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission from different sources on the farm and at the farm at the |
| https://www.solidforest.com/en/i Air.e ndex.html No Yes Horticulture, Livestock stocks, GHG er  https://www.alitech-e-co2.com/e- Feed use,manu   | I type, crop type, practices, carbon emissions, etc.  Yes  GHG emissions/Carbon storage / sequestration/Product carbon footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool also provides suggestions for  |
| Air.e https://www.solidforest.com/en/i ndex.html No Yes Crops, Perennial crops, Horticulture, Livestock stocks, GHG er  https://www.alltech-e-co2.com/e- co2-alltech-launch-dainy-tool-  | I type, crop type, practices, carbon emissions, etc.  Yes footprint, Life Cycle Assessment footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool also provides suggestions for reducing emissions and improving emissions for different sources.  |
| Air.e https://www.solidforest.com/en/i ndex.html No Yes Horticulture, Livestock stocks, GHG er https://www.alitech-e-co2.com/e- Feed use,manu  | I type, crop type, practices, carbon emissions, etc.  Yes GHG emissions/Carbon storage practices, carbon emissions, etc.  Yes cooperation of different land uses and management practices. It also helps farmers to access carbon markets and generate coccess carbon markets and generate commended in the carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool also provides suggestions for reducing emissions and improving differency.  4 No   |
| Air.e https://www.alitech-e-co2.com/e-co2-alitech-launch-dairy-tool-   | If type, crop type, practices, carbon emissions, etc.  Yes footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions for reducing emissions for frequency freq |
| Air.e https://www.alitech-e-co2.com/e-co2-alitech-launch-dairy-tool-   | I type, crop type, practices, carbon emissions, carbon storage / sequestration/Product carbon emissions, etc.  Yes footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool and the responsibility of the tool and the farm gate. The tool and the responsibility of the farm and at the farm gate. The tool and the farm gate in tool also provides suggestions for reducing emissions and improving efficiency and the farm gate. The tool uses a mass balance approach to estimate the inputs, outputs and  |
| Air.e https://www.alitech-e-co2.com/e-co2-alitech-launch-dairy-tool-   | I type, crop type, practices, carbon emissions, etc.  Yes GHG emissions/Carbon storage / sequestration/Product carbon footprint, Life Cycle Assessment income from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool also provides suggestions for reducing emissions and improving efficiency  4 No  The tool uses a mass balance approach to estimate the include, outputs and losses of introde, polyphorous and losse |
| All re https://www.solidforest.com/en/i ndex.html No Yes Horticulture, Livestock stocks, GHG er  | I type, crop type, practices, carbon emissions, carbon storage / sequestration/Product carbon emissions, etc.  Yes footprint, Life Cycle Assessment footprint, Life C |
| Air.e https://www.solidforest.com/en/i ndex.html No Yes Horticulture, Livestock stocks, GHG er h | I type, crop type, practices, carbon emissions, etc.  Yes GHG emissions/Carbon storage / sequestration/Product carbon footprint, Life Cycle Assessmen in come from their carbon credits.  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and at the farm gate. The tool also provides suggestions for reducing emissions and improving efficiency  A No  The tool uses emission from different sources on the farm and at the farm gate. The tool also provides suggestions for reducing emissions and improving efficiency  A No  The tool uses a mass balance approach to estimate the inputs, outputs and losses of infrogen, phosphorus and carbon on the farm. The tool also provides indicators for nutrient use  |
| All re https://www.solidforest.com/en/index.html No Yes Horticulture, Livestock stocks, GHG er h | I type, crop type, practices, carbon practices, carbon emissions, etc.  Yes footprint, Life Cycle Assessment footprint, Life Cycle A |



| AROPAj   | https://www6.inrae.fr/basc/Rech<br>erche/Modeles/AROPAJ                            | No  | No    | are dairy cattle, beef cattle,<br>sheep, goats, poultry, pigs)  | It requires data inputs on land  | No  | sequestration in biomass and<br>soils, nitrogen balance in<br>croplands and grasslands, water<br>use and availability  | The model allows for a full account of all agriculture GHG sources based on advanced IPCC methods  | 2 | No  |
|--|--|-----|-------|---|--|-----|--|--|---|-----|
| B-INTACT: The Biodiversity<br>Integrated Assessment and<br>Computation Tool  | https://www.fao.org/in-<br>action/epic/ex-act-tool/suite-of-<br>tools/b-intact/en/ | Yes | Yes   | dairy, beef, milk sheep,<br>meat sheep, goat, poultry,<br>pigs, crops, wine, perrenial<br>crops and horticulture. | use changes, habitat<br>fragmentation, infrastructure<br>and human encroachment that<br>affect biodiversity. | No  | GHG emissions, carbon storage/sequestration, biodiversity loss   | Global Biodiversity (GLOBIO) Model<br>Version 3.6 developed by the<br>Netherlands Environmental Assessment<br>Agency (PBL).  | 3 | No  |
| BedrijfsBodemWaterPlan   | www.bedrijfsbodemwaterplan.nl  | Yes | No    | Dairy;Beef;Milk sheep;Meat<br>sheep;Goat;Crops;Horticultu<br>re   | Soil characteristics , inputs,outputs, emissions.  | Yes | Soil health  | Comparing two scenarios (current and<br>planned); using a cutting edge big data<br>solution for fast data analysis; providing<br>accurate and verificable data to support<br>decision making on farm to help meet<br>agriculture's climate action<br>BiotlaM-GHIG Z.U is a biophysical model   | 4 | No  |
| BioBaM-GHG 2.0   | https://www.sciencedirect.com/s<br>ciercce/article/pii/\$03043800210<br>Q2817.     | Yes | Yes   | Crops, Livestock  | Food system scenarios, crop<br>yields, land use data, GHG<br>emission factors                                | No  | Biomass supply and demand,<br>GHG emissions, land use<br>changehttps://www.sciencedirec<br>t.com/science/article/pii/S03043<br>80021002817https://www.science<br>edirect.com/science/article/pii/S<br>0959378021000923 | that calculates the balance between the supply and demand of biomass on a global scale, differentiating 11 regions and allowing for trade between regions. A scenario is feasible when global biomass demand is matched by supply by at least 95% (considering a 5% uncertainty range, cropland constraints). The model also calculates 64M emissions from agriculture and land use change based on emission factors and land use data. https://www.sciencedirect.com/science/article/pii/S0304380021002817. | 3 | No  |
| Biccode  | https://biocode.io   | No  | Yes   | Crops;Perrenial   | Farming and production methods, crop rotations, soil carbon sequestration                                    | Yes | GHG emissions;Carbon storage / sequestration   | Biocode is a cloud-based tool that uses<br>ifte cycle assessment and international<br>standards to calculate the carbon<br>footprint of food products. It is based on<br>the guidelines of the national<br>greenhouse gas inventories of the<br>international climate panel IPCC   | 4 | Yes |
| 100 to 10 | Biodiversiteitsmonitor   |     | · oud | TO SPECIAL PROPERTY.  | Biodiversity indicators such as soil quality, water quality, landscape diversity, functional                 |     | Biodiversity, Environmental  | BodiversiteIstmonitor akkerbouw is a tool that helps arable farmers to measure and improve their blodiversity and environmental performance. It uses a set of Critical Performance Indicators (KPIs) that reflect the impact of different land uses and management practices on biodiversity. It also provides benchmarking and improvement options for farmers to enhance their environmental performance. It also serves as a basis for rewarding farmers  | , |     |



| Bodiese of the second control of the second                       |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
|---|------------------------|-------------------------------------|-----|-----|---|---------------------------------------|-----|-------------------------------|--|--------------------------|-------|
| BigGrade International Control                      |                        | 1                                   |     | 1   | 1                                       |                                       |     |                               | BioGrace is a spreadsheet-based tool     |                          |       |
| Bordere of the Americans nethons were view of the basis of the season of                      |                        |                                     |     |     |   |                                       |     |                               | that calculates the greenhouse gas       |                          |       |
| Bordere of the Americans nethons were view of the basis of the season of                      |                        |                                     |     |     |   |                                       |     |                               | emissions from biofuel production and    |                          |       |
| de la company participant de la company part                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Bodinace Introduction from control and interest plan. Conversion a                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Biodinace Introduction from processing the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the control of the CLL It can be used to demonstrate the CLL It can be used to demonstrate the control of the CLL                       |                        |                                     |     |     |   |                                       |     |                               | (2009/28/EC, RED) and the Fuel Quality   | ,                        |       |
| Bodiese into fewer large and a second fewer la                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Bodies Titre   Part   P                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Bischarce   Tittle, Therex incomes particularly recognished and distance, every see, emission in local distance, every see, every see, emission in local distance, every see, emission in local distance, every see, every see, every see, every see, every                       |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| BioCrises   Decreasing Conversion   Decreasing Convers                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Bodies International production and                       |                        |                                     |     |     |   | Biomass type, conversion              |     |                               |  |                          |       |
| Boden Kirne International Programme (and production and use programme) and production and use programme) by the discretive and connect lamms, food production and use of connect lamms, food productio                      |                        |                                     |     |     |   |                                       |     | Greenhouse gas emissions from |  |                          |       |
| Boden Klima  Land use soil structure, climate data, conversed the control of the                       | BioGrace               | https://www.biograce.net/home       | Yes | Yes | Biofuels                                |                                       | No  |                               |  |                          | 4 No  |
| Beyon Doze  Beyon                       |                        |                                     | 1   | 1   |   | 2/                                    |     |                               |  |                          |       |
| CAPORS  Into Johnson Allegar and Interview a                      |                        |                                     |     |     |   |                                       |     |                               | the regenerative transformation and      |                          |       |
| platform that allows famous to document for improvements provided different parties (but as food compress), but allows from the provided provided of the provi                      |                        |                                     |     |     |   |                                       |     |                               | connect farmers, food producers and      |                          |       |
| document fair de conservation from companies, books, powermental for companies, books, powermental for the deliveration from the deliveratio                      |                        |                                     |     |     |   |                                       |     |                               | consumers. It is based on a digital      |                          |       |
| Bodes Nime Programment and the control of the contr                      |                        |                                     |     |     |   |                                       |     |                               | platform that allows farmers to          |                          |       |
| Boden Nima Plans inhibitant affinos posylate with surface of the control of the control of the surface of the control of the s                      |                        |                                     |     |     |   |                                       |     |                               | document their regenerative practices    |                          |       |
| Boden Nima Plans inhibitant affinos posylate with surface of the control of the control of the surface of the control of the s                      |                        |                                     |     |     |   |                                       |     |                               | and receive financial rewards from       |                          |       |
| Boden Kirna International Control of the Control of                      |                        | I                                   | 1   | 1   | I                                       |                                       | 1   | I                             |  | 1                        |       |
| Bodes Nima (https://locate-diffuse crowner- wide hartfooderidina https://locate-diffuse crowner- wide hartfooderidina https://locate-diffuse-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse-diffuse- https://locate-diffuse-diffuse- https://locate-diffuse-diffuse- https://locate-diffuse-diffuse- https://locate-diffuse-diffuse- https://locate-diffuse-https://locate- https://locate-diffuse-diffuse- https://locate-diffuse-diffuse- https://locate-diffuse-https://locate- https://locate-diffuse-https://locate- https://locate-diffuse-https://locate- https://locate-diffuse-https://locate- https://locate-diffuse-https://locate- https://locate-https://locate- https://locate-https://locate- https://locate-https://locate- https://locate-https://locate- https://locate-https://locate- https://locate-https://locate- https://locate-https://locate-https://locate- https://locate-https                      |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| Boden Rüme  |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| Boden Klima Plates / Historiand - stiffung crossweeth residence of the process of                      |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| Boden Klima https://biorans-staffung.org/was- wis-fluid processors of the stage of                       |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| Boden Kirma https://bibliodend.aiffb.ena.org/wase.  Boden Kirma https://www.kirm.eo/or No No Deiry.Beef.Prgs.Crops  |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| Boden Klima    Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung provises   Boden Klima   Inter-Plackand-alfilhung-provises   Boden Klima   Bod                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Inter-Placement of the procession of the proce                        |                        |                                     |     |     |   | Land use soil structure, climate      |     |                               |  |                          |       |
| Boden.Rilma https://www.kilm.excor https://www.cime.excor boden.cover cropping refetible.cover c                      |                        | https://bioland-stiftung.org/was-   |     |     |   |                                       |     |                               |  |                          |       |
| https://www.klm.eco/ No No DeiryBeef Pigs.Crops   rotation.cover cropping   Yes   / sequestration.Soil health   Spring                        |                        |                                     |     |     |   | fertilization.irrigation.tillage.crop |     | GHG emissions:Carbon storage  | emissions and support regenerative       |                          |       |
| BOVID CO2 is a facility and -improving- endromeral assistance in the proving- page 1 p                      | Boden,Klima            |                                     | No  | No  | Dairy:Beef:Pigs:Crops                   |                                       | Yes |                               |  |                          | No I  |
| https://www.arbin.cov.uk/nover/sp. BOVID CO2  Spanish-beef-catific-farms  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  Beef Cattle  Spanish-beef-cattle-farms  No  No  Beef Cattle  Spanish-beef-ca                      |                        | <u> </u>                            |     |     | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |                                       |     |                               |  |                          |       |
| thtos://that.bookine-su.netiflodie-for-cate,datiling-and-improving-environmental-sustainability-on-be-critical farms-provided-2-th-cate sustainability-on-be-critical farms-prov                      |                        |                                     |     |     |   |                                       |     |                               | cattle farmers to calculate and reduce   |                          |       |
| Several cardical and procession of the process                        |                        |                                     |     |     |   |                                       |     |                               | their carbon footprint and environmental |                          |       |
| Service continued and improving and improving and improving and improving and improved proving a season of the proving and improved proving and improving and imp                        |                        | https://hub.bovine-eu.net/tools-    |     |     |   |                                       |     |                               | impact. It uses the Life Cycle           |                          |       |
| Exercication of the environmental seases smell specialized - the seases smell specialized - the spec                        |                        |                                     |     |     |   |                                       |     |                               | Assessment (LCA) methodology and         |                          |       |
| Inventory, feed consumption, energy   Seasessment, specialized-in-seasessment specialized-in-seasess                        |                        | environmental-sustainability-on-    |     |     |   |                                       |     |                               | follows the IPCC guidelines and          |                          |       |
| BOVID CO2  spanish-bed-cattle-farms No No Beef Cattle use, fertilizer use, etc.  Wes Indicators  The foot uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song that the characteristics, energy use, feet use, entirely expendent the characteristics and the supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The too                      |                        | beef-cattle-farms/bovidco2-a-       |     |     |   | Farm characteristics, animal          |     |                               | recommendations. It also provides        |                          |       |
| BOVID CO2  spanish-bed-cattle-farms No No Beef Cattle use, fertilizer use, etc.  Wes Indicators  The foot uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song the supply chain. The tool also provides a comparison with a benchmark farm and a song that the characteristics, energy use, feet use, entirely expendent the characteristics and the supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The tool also provides a comparison with a benchmark farm and a supply chain. The too                      |                        | tool-for-environmental-             |     |     |   | inventory, feed consumption,          |     | GHG emissions, Carbon         | benchmarking and improvement options     | :                        |       |
| BOVID CO2  spanish-beef-cattle-farms  No  No  Beef Cattle  use, fertilizer use, etc.  Yes  indicators  environmental performance.  3 Yes  The tool uses emission factors from the IPCC and other sources to estimate the GHG emissions from different sources on the farm and along the supply chain. The tool label provides a comparison The tool label provides and the effect of the provides on the farm and along the supply chain. The tool label provides and the effect of the provides on the farm of the effect of the provides on the farm of the provides on the effect of the provides on energy rate manufacture of the provides of the provides on energy rat                      |                        |                                     |     |     |   |                                       |     | footprint, Environmental      |  |                          |       |
| BoviS carbon footprint calculator  Abdisvelops-carbon-calculator  northern-ireland-dainy-farms  Pes  Yes  Dairy  D                      | BOVID CO2              |                                     | No  | No  | Beef Cattle                             |                                       | Yes |                               |  |                          | 3 Yes |
| BoviS carbon footprint bittps://www.edibini.gov.uk/news/a bridge-depose-carbon-calculator northern-rieland-dainy-farms of phittps://www.climateinteractive.org pic-roads/ https://www.climateinteractive.org pic-roads/ https://www.climateinteractive.org pic-roads/ narbon httmlps://www.climateinteractive.org pic-roads/ climateinteractive.org https://www.climateinteractive.org pic-roads/ https://www.climateinteractive.org/sce narbon-bridge-depose-arbon-objective-org/sce narbon-objective-org/sce narbon                      |                        |                                     |     |     |   |                                       |     |                               | The tool uses emission factors from the  |                          |       |
| by Scarbon footprint of this show, affining out where we had a farm characteristics, energy use, feed use, manure management, litter application yes GHG emissions of the farm and allowed between the economy, the energy systems model for the into-show clared the energy of the energy                      |                        |                                     |     |     |   |                                       |     |                               | IPCC and other sources to estimate the   |                          |       |
| BovIS carbon footprint fibe/evelopse-carbon-calculator for orthem-ireland-dairy/arms yes  Yes  Dairy  Dairy  Dairy  From characteristics, energy use, feed use, manure management, litter application  https://www.dimateinteractive.or g/c-roads/ https://co.coads/ https://coads/ https://coad                      |                        |                                     |     |     |   |                                       |     |                               | GHG emissions from different sources     |                          |       |
| BoylS carbon footprint bitbs://coarbon-notembern-ireland-dairy-farms / Ves Ves Dairy management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions gy source and gas 4 No management, littler application / Ves GHG emissions and gas 4 No management, littler application / Ves GHG emissions and gas 4 No management, littler application / Ves GHG emissions and gas 4 No management, littler application / Ves GHG emissions particulture and plantage gy stream dynamics model for the encon                      |                        |                                     |     |     |   |                                       |     |                               | on the farm and along the supply chain.  |                          |       |
| BoviS carbon footprint calculator  nothern-ireland-dainy-farms  https://www.climateinteractive.or g/croads/ nario-html?v=23.6.1  CAPZER  https://capdr-eu/  No  No  No  No  No  No  No  No  No  N   |                        |                                     |     |     |   |                                       |     |                               | The tool also provides a comparison      |                          |       |
| calculator northern-ireland-dainy-farms ves Yes Dairy management, litter application Yes GHG emissions gas 4 No  https://www.climateinteractive.org/cr-coads/ pttps://cr.coads.climateinteractive.org/cr.coads.climateinteractive.org/sce narios intension reduction  CROADS notic html?v=23.6.1 Yes Yes Crops national and global levels  CROADS notic html://creprandel.org/ Yes Yes Crops national and global levels  Pes Dairy management, litter application Yes GHG emissions yes GHG emissions between the economy, the energy systems and reproduction between the economy, the energy systems and reproduction shewhere the economy, the energy systems and reproduction on policy scenarios made for the long-term climate outcomes of long-term climate outcomes of policy scenarios court the effects of the policies on earlier scenarios and elevels into account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier scenarios (current and planned). The 1 and Ther 2 approaches; little account the effects of the policies on earlier                      |                        | https://www.afbini.gov.uk/news/a    |     |     |   | farm characteristics, energy          |     |                               | with a benchmark farm and a              |                          |       |
| https://www.climateinteractive.or<br>g/c-roads/<br>https://c-<br>grands.climateinteractive.or<br>g/c-roads/<br>https://c-<br>grands.climateinteractive.org/sce<br>nario.html?v=23.6.1 Yes Yes Yes Crops national and global levels Yes Promance assessment for the seven means of the promance assessment several and regional formation targets, population and economic to the production targets, population and economic to the production | BovIS carbon footprint | fbi-develops-carbon-calculator-     |     |     |   | use, feed use, manure                 |     |                               | breakdown of emissions by source and     | 1                        |       |
| https://www.climateinteractive.or g/c-roads/ https://c. C-ROADS  Adel covers the global climate system and regional climate system and the environment, taking into account the effects of the policies on energy mission energy systems and the environment, taking into account the effects of the policies on energy mission energy systems and the environment, taking into account the effects of the policies on energy mission energy systems and the environment, taking into account the effects of the policies on energy mission energy systems and the environment, taking into account the effects of the policies on energy mission energy mission systems and the environment, taking into account the effects of the policies on energy missions on energy misi                      | calculator             | northern-ireland-dairy-farms        | Yes | Yes | Dairy                                   | management, litter application        | Yes | GHG emissions                 | gas                                      | 1                        | 4 No  |
| CAPCER   https://capri-model.org/   Yes   Yes   Crops   national marked part   No   No   No   No   No   No   No   N   |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Model covers the global production and economic roads, climate instance uncomes of policy seemand regional climate system and regional cources of policy scenarios current and planned; Ter and Tier 2 approaches; Ter and Tier 2 approache                        |                        | https://www.climateinteractive.or   | 1   |     |   |                                       |     |                               |  | 1                        |       |
| CAPZER https://capZer.eu/ No No No Sheep;Goat:Crops outputs, emissions outputs, emissions, lemperature, seal everl rise.  CAPZER https://capZer.eu/ No No No Sheep;Goat:Crops outputs, emissions outputs, emissions, lemperature, seal everl rise.  CAPZER https://capZer.eu/ No No No Sheep;Goat:Crops outputs, emissions outputs, emissions, emigrative, outputs, earlier, edifice, outputs, emissions, emigrative, outputs, earlier, edifice, experience, outputs, emissions, emigrative, outputs, earlier, edifice, experience, edifice, ed                      |                        |                                     |     |     | L                                       |                                       |     |                               |  | 1                        |       |
| CAPZER https://capzer.eu/  No N   |                        |                                     |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPZER https://capzi-model.org/ Yes Yes GHG emission reduction intensity No policy scenarios sea level rise. 1 No policy scenarios sea level rise. 1 No policy scenarios sea level rise. 1 No policy scenarios (current and planned): Tier 1 and Tier 2 approaches; Parm characteristics aproduction systems, inputs, outputs, emissions Yes (non-GHG emissions): Tier 1 and Tier 2 approaches; IPCC methodology and per-reviewed literature. In CAPZER https://doi.org/10.1009/10.100                      |                        | roads.climateinteractive.org/sce    |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPZER https://capZer.eu/ No  | C-ROADS                | nario.html?v=23.6.1                 | Yes | Yes | GHG emission reduction                  | intensity                             | No  | policy scenarios              | sea level rise.                          |                          | 1 No  |
| CAPZER https://capZer.eu/ No  |                        |                                     |     |     | <u> </u>                                |                                       |     |                               |  |                          |       |
| CAPER https://cap2er.eu/ No No No Sheep;Meat broduction systems, inputs, outputs, emissions Yes (non-GHG emissions)   IPCC methodology and peer-reviewed   IPCC methodology and peer peer-reviewed   IPCC methodology and peer-reviewed   IPCC methodology and peer peer-reviewed   IPCC methodology and peer peer                       |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPER https://cap2er.eu/ No No sheep:Goat;Crops outputs, emissions Yes (non-GHG emissions) literature,FAO LEAP guidelines 3 Yes  Comparing two scenarios (current and planned); using a recursive-dynamic global partial equilibrium model; using a biophysical model for GHG emissions on balance and environmental data at regional, environmental data at regional, altional and global levels  CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 3 No  Leconomic apricultural and environmental data at regional, performance assessment results 3 No  Leconomic dwws.caling module or GHG emissions and nitrogen balance is using a spatial dwws.caling module or the high-resolution results 3 No  Leconomic dwws.caling module or GHG emissions based on the high-resolution to the first quantifies GHG emissions based on the high-resolution that quantifies GHG emissions high particular that the high-resolution that the high-resolutio                      |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 9 Performance assessment results 3 No    CAPRI   https://capri-model.org/ Yes Yes Crops   Ves performance assessment   Ves performance assess                      |                        |                                     |     |     |   |                                       | L   |                               |  | 1                        | 1.    |
| CAPRI   https://capri-model.org/   Yes   Yes   Crops   national and global levels   Yes   Performance assessment   planned, using a recursive-dynamic   global partial equilibrium model; using a biophysical model for GHG emissions   and nitrogen balance; using a spatial   downscaling module for high-resolution   downscali                        | CAP2ER                 | https://cap2er.eu/                  | No  | No  | sheep;Goat;Crops                        | outputs, emissions                    | Yes | (non-GHG emissions)           |  |                          | 3 Yes |
| CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results results to the qualification of the control of th                      |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
| Economic, agricultural and environmental data at regional, https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 3 No  CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 3 No  Uses a farm-level C footprint calculator that quantifies GHG emissions  And nitrogen balance; using a spatial downscaling module for High-resolution results  Uses a farm-level C footprint calculator that quantifies GHG emissions based on  |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPRI   https://capri-model.org/   Yes   Yes   Crops   national and global levels   Yes   Yes   Crops   national and global levels   Yes   Yes   Crops   national and global levels   Yes   Performance assessment   results   GHG emissions, nitrogen   and nitrogen balance; using a spatial   downscaling module for high-resolution   results   Uses a farm-level C footprint calculator   that quantifies GHG emissions based on   The company of the performance assessment   The company of t                        |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| environmental data at regional, national and global levels Yes performance assessment results 3 No  CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 3 No  Uses a farm-level C footprint calculator that quantifies GHG emissions based on  |                        | 1                                   |     |     |   |                                       |     |                               |  | 1                        |       |
| CAPRI https://capri-model.org/ Yes Yes Crops national and global levels Yes performance assessment results 3 No Uses a farm-level C footprint calculator that quantifies GHG emissions based on   |                        |                                     |     |     |   |                                       |     |                               |  | 1                        |       |
| Uses a farm-level C footprint calculator that quantifies GHG emissions based on   |                        |                                     |     |     |   |                                       |     |                               |  | 1                        |       |
| that quantifies GHG emissions based on  | CAPRI                  | https://capri-model.org/            | Yes | Yes | Crops                                   | national and global levels            | Yes | performance assessment        |  |                          | 3 No  |
|   |                        |                                     |     |     |   |                                       |     |                               |  |                          |       |
|   |                        |                                     |     |     |   | _                                     |     | L                             |  | וי                       |       |
|   |                        | https://setac.onlinelibrary.wiley.c |     |     |   | Farm characteristics,                 |     |                               |  | 1                        |       |
| om/doi/pdfdirect/10.1002/ieam.1 management practices, inputs / sequestration, Economic specifications on Life Cycle Assessment  |                        |                                     |     |     |   |                                       |     |                               |  | t                        |       |
| Carbon Calculator 629 No Yes Farming outputs Yes Performance Assessment (LCA) and C footprinting No information available No  | Carbon Calculator      | <u>629</u>                          | No  | Yes | Farming                                 | outputs                               | Yes | Performance Assessment        | (LCA) and C footprinting                 | No information available | No    |



| 1  |  |     |      |                                   |  |           |  | The model uses the IPCC methodology   |      |     |
|--|--|-----|------|-----------------------------------|--|-----------|--|---|------|-----|
|  |  |     |      |                                   |  |           |  | and other peer-reviewed literature to                                       |      |     |
|  |  |     |      |                                   |  |           |  | calculate carbon footprint of different                                     |      |     |
|  |  |     |      |                                   |  |           |  | household activities based on energy  |      |     |
|  | http://agroclimate.org/tools/carb  |     |      |                                   |  |           |  | consumption, transportation, waste  |      |     |
|  | on-footprint-calculator/   |     |      | Model covers the household        | Household location, energy   |           | carbon footprint assessment  | generation and lifestyle choices. It also                                   |      |     |
|  | https://www.carbonfootprint.com/   |     |      | carbon footprint for all          | consumption, transportation,   |           | and mitigation for different   | provides recommendations for reducing                                       |      |     |
| Carbon Footprint Calculator                      | calculator.aspx  | Yes | Yes  | activities                        | waste generation   | No        | household activities   | emissions and offsetting options  | 1 N  | o   |
|  | https://www.miteco.gob.es/es/ca  |     |      |                                   |  |           |  |   |      |     |
|  | mbio-  |     |      |                                   |  |           |  | Measurin direct emissions from sources                                      |      |     |
|  | climatico/temas/organismos-e-  |     |      |                                   |  |           |  | that are owned or controlled by the farm                                    |      |     |
|  | instituciones-implicados-en-la-  |     |      |                                   |  |           |  | (scope 1) and indirect emissions from                                       |      |     |
|  | lucha-contra-el-cambio-climatico   |     |      |                                   | User-defined data on farm  |           |  | purchased electricity, steam, heat or                                       |      |     |
|  | a-nivel-nacional/oficina-  |     |      |                                   | characteristics, production  |           |  | cooling (scope 2); using IPCC   |      |     |
| Carbon footprint of a farm.                      | espanola-en-cambio-  |     |      | Crops;Wine;Perrenial              | systems, inputs, outputs,  |           |  | methodology and peer-reviewed   |      |     |
| Scope 1 + 2                                      | climatico/default.aspx   | Yes | No   | crops;Horticulture                | emissions  | Yes       | GHG emissions  | literature  | 3 N  | 0   |
|  |  |     |      |                                   |  |           |  | The tool uses emission factors from the                                     |      |     |
|  |  |     |      |                                   |  |           |  | IPCC and other sources to estimate the                                      |      |     |
|  |  |     |      |                                   |  |           |  | GHG emissions from different sources  |      |     |
|  |  |     |      |                                   |  |           |  | on the farm and along the supply chain.                                     |      |     |
|  | https://www.arla.dk//  |     |      |                                   |  |           |  | The tool also provides a comparison   |      |     |
| , ,  | https://lca-   |     |      |                                   | farm characteristics, energy   |           |  | with a benchmark farm and a   |      |     |
| , ,  | net.com/projects/show/carbon-  | 1   | 1    | 1                                 | use, feed use, manure  |           |  | breakdown of emissions by source and  |      |     |
| Carbon Footprint Tool for Milk                   | footprint-milk//   | No  | Yes  | Milk production                   | management, litter application   | Yes       | GHG emissions  | gas   | 4 N  | o   |
|  |  |     |      |                                   |  |           |  | The Carbon Navigator is a tool that uses                                    |      |     |
| , ,  | 1  |     |      |                                   | I  |           |  | data from the Irish Cattle Breeding   |      |     |
| , ,  | 1  |     |      |                                   | I  |           |  | Federation (ICBF) and Teagasc   |      |     |
| , ,  | 1  |     |      |                                   | I  |           |  | National Farm Survey (NFS) to calculate                                     |      |     |
| , ,  |  |     |      |                                   | I  |           |  | the carbon footprint of beef farms. It                                      |      |     |
| , ,  | https://www.teagasc.ie/about/our   |     |      |                                   | I  |           |  | allows for comparing the performance of                                     |      |     |
|  | organisation/connected/online-   |     |      |                                   |  |           |  | different scenarios (e.g. current vs  |      |     |
|  | tools/carbon-navigator/  |     |      |                                   |  |           |  | target) and identifying the key drivers of                                  |      |     |
|  | https://www.ocae.ie/agricultural-  |     |      |                                   |  |           |  | carbon efficiency. It also provides   |      |     |
|  | consultancy/schemes-and-   |     |      |                                   | Farm management data such as   |           |  | guidance on how to implement best   |      |     |
|  | grants/caron-navigator-bdgf-   |     |      |                                   | herd size, calving rate, weaning   |           | GHG emissions, carbon  | practices to reduce emissions and   |      |     |
| Carbon Navigator                                 | scheme/  | No  | Yes  | Beef cattle                       | weight, slaughter age  | Yes       | efficiency (Kg CO2 per Kg beef)  |   | 3 N  | 0   |
| - Canbon Harrigator                              | 001101110  | 110 | 1.00 | D oor outile                      | moigrit, oldagittor ago  |           | omercine) (tig o oz por tig boot)  | The model uses the IPCC methodology   |      |     |
|  | https://agriculture.newholland.co  |     |      |                                   |  |           |  | and other peer-reviewed literature to                                       |      |     |
|  | m/en-us/nar/our-   |     |      |                                   | tractor model, fuel type, annual   |           |  | calculate the carbon footprint of the                                       |      |     |
|  | vision/sustainable-  |     |      |                                   | working hours, annual fuel   |           | Carbon footprint assessment for  | tractor fleet based on fuel type and  |      |     |
| CarbonID™ Calculator Tool                        | farming/carbonid-calculator  | Yes | Yes  | Tractor fleet                     | consumption  | Yes       | the tractor fleet  | consumption   | 1 N  | 0   |
|  |  |     | 1.00 |                                   |  |           |  | The tool uses emission factors from the                                     | 1    |     |
|  |  |     |      |                                   |  |           |  | IPCC and other sources to estimate the                                      |      |     |
|  |  |     |      |                                   |  |           |  | GHG emissions and other   |      |     |
|  |  |     |      |                                   |  |           |  | environmental impacts from different  |      |     |
|  |  |     |      |                                   |  |           |  | sources along the supply chain. The tool                                    |      |     |
|  |  |     |      |                                   | Product system, raw materials,   |           | GHG emissions, water footprint,  | also provides a comparison with a   |      |     |
|  |  |     |      |                                   | energy use, waste management   |           | acidification, eutrophication,   | benchmark system and a breakdown of   |      |     |
| CCalC  | http://www.ccalc.org.uk/   | Yes | Yes  | Biofuels, industrial activities   |  | No        | human toxicity   | emissions by source and gas   | 4 N  | n   |
| Coulo  | https://www6.versailles-   | 100 | 100  | Diolacio, madociai activitico     | and tanoport   | 110       | Tidifidit toxicity   | CERES-EGC is a process-based model  | - 10 |     |
| , ,  | grignon.inrae.fr/ecosys_eng/Pro  |     |      |                                   | Meteorological and   |           |  | describing soil–crop atmosphere   |      |     |
| , ,  | ductions/Softwares-  |     |      |                                   | management data as forcing   |           | GHG emissions Carbon storage   | processes in daily time steps with a  |      |     |
| , ,  | Models/CERES-  |     |      |                                   | variables and soil and   |           | / sequestration, Nitrogen  | focus on the simulation of  |      |     |
| , ,  | EGChttps://www6.versailles-  |     |      |                                   | vegetation data as input factors   |           | balance https://www6.versailles-   | environmental outputs such as N2O   |      |     |
| , ,  | grignon.inrae.fr/ecosys eng/Pro  |     |      |                                   | https://www.sciencedirect.com/s  |           | grignon.inrae.fr/ecosys eng/Pro  | emissions. It comprises sub-models  |      |     |
| , ,  | ductions/Softwares-  |     |      |                                   | cience/article/pii/S02697491110  |           | ductions/Softwares-  | accounting for different types of   |      |     |
| CERES-EGC  | Models/CERES-EGC   | Yes | Yes  | Crops                             | 00418  | No        | Models/CERES-EGC   | processes   | 3 N  | in. |
| OLI ILO EGO                                      | INDUCTOR CENTED - EGO  | 103 | 1.00 | отора                             | 00710  | 110       | MOGELS/OLINES-LOO  | The model uses the IPCC methodology   | 3 1  |     |
| , ,  | 1  |     |      |                                   | I  |           |  | and other peer-reviewed literature to                                       |      |     |
| , ,  | https://globalclimateactionpartne  |     |      |                                   | I  |           |  | calculate greenhouse gas emissions  |      |     |
| , ,  | rship.org/resource/climate-  | 1   |      |                                   | I  |           |  | from different agricultural systems   | l l  |     |
| , ,  | change-agriculture-food-security   | I   | 1    | I                                 | I  |           |  | based on crop type, yield, area,  |      |     |
| , ,  | mitigation-option-   | 1   |      |                                   | I  |           |  | management practices, livestock type,                                       |      |     |
| , ,  |  | 1   | 1    | I                                 | I  |           |  | number, feed intake, manure   |      |     |
| , ,  | tool/?loclang=en_gb http://clh-  |     |      |                                   | I  |           |  | management. It also ranks the most  |      |     |
| , ,  | HRD://GIT-   | 1   |      |                                   | I  |           |  | effective mitigation options for different                                  |      |     |
|  | okan appe for org/datas=t/t==1=  |     | 1    | I                                 | I  |           |  |   | l l  |     |
| ' h  | ckan.apps.fao.org/dataset/tools-   |     |      |                                   |  | 1         |  | crops and livestock according to<br>mitigation potential and in relation to |      |     |
| 1  | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-  |     |      |                                   | 0 6:   |           |  |   |      |     |
| A  | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923                      |     |      | B-d                               | Crop type, yield , area,   |           | 0110   |   |      |     |
| Climate Change, Agriculture                      | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- |     |      | Barley, maize, sugar cane,        | management practices,  |           | GHG emissions assessment   | current management practices and  |      |     |
| and Food Security (CCAFS)                        | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923                      |     |      | vegetables, legumes and           | management practices,<br>livestock type, feed intake,                      |           | and mitigation for different   | current management practices and<br>spatially-linked climate and soil       |      |     |
|  | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- | Yes | Yes  |                                   | management practices,  | No        | and mitigation for different<br>agricultural systems   | current management practices and  | 3 N  | o   |
| and Food Security (CCAFS)                        | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- | Yes | Yes  | vegetables, legumes and           | management practices,<br>livestock type, feed intake,                      | No        | and mitigation for different<br>agricultural systems<br>GHG emissions;Carbon storage   | current management practices and<br>spatially-linked climate and soil       | 3 N  | о   |
| and Food Security (CCAFS)                        | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- | Yes | Yes  | vegetables, legumes and           | management practices,<br>livestock type, feed intake,                      | No        | and mitigation for different<br>agricultural systems<br>GHG emissions;Carbon storage<br>/ sequestration;Nitrogen   | current management practices and<br>spatially-linked climate and soil       | 3 N  | io  |
| and Food Security (CCAFS)                        | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- | Yes | Yes  | vegetables, legumes and           | management practices,<br>livestock type, feed intake,                      | No        | and mitigation for different<br>agricultural systems<br>GHG emissions;Carbon storage<br>/ sequestration;Nitrogen<br>balance;Soil health;Air quality                                  | current management practices and<br>spatially-linked climate and soil       | 3 N  | 0   |
| and Food Security (CCAFS) Mitigation Option Tool | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- | Yes | Yes  | vegetables, legumes and livestock | management practices,<br>livestock type, feed intake,<br>manure management | No        | and mitigation for different<br>agricultural systems<br>GHG emissions;Carbon storage<br>/ sequestration;Nitrogen<br>balance;Soil health;Air quality<br>(non-GHG emissions);Feedstuff | current management practices and<br>spatially-linked climate and soil       | 3 N  | o   |
| and Food Security (CCAFS)                        | ckan.apps.fao.org/dataset/tools-<br>for-greenhouse-gas-<br>assessments/resource/5408923<br>d-cb7f-40c0-a8c4- |     | Yes  | vegetables, legumes and           | management practices,<br>livestock type, feed intake,<br>manure management | No<br>Yes | and mitigation for different<br>agricultural systems<br>GHG emissions;Carbon storage<br>/ sequestration;Nitrogen<br>balance;Soil health;Air quality                                  | current management practices and<br>spatially-linked climate and soil       |      | o   |



|                          |   |      |      |                           |  |     |  | CoolFarmTool is a tool that uses a life  |     |      |
|--------------------------|---|------|------|---------------------------|--|-----|--|--|-----|------|
|                          |   |      |      |                           |  |     |  | cycle assessment (LCA) approach to   |     |      |
|                          |   |      |      |                           |  |     |  | estimate the environmental impacts of  |     |      |
|                          |   |      |      |                           |  |     |  | farming practices. It allows for   |     |      |
|                          |   |      |      |                           |  |     |  | comparing the performance of different   |     |      |
|                          |   |      |      |                           |  |     |  | scenarios (e.g. current vs improved) and   |     |      |
|                          |   |      |      |                           |  |     |  | identifying the key drivers of   |     |      |
|                          |   |      |      |                           |  |     |  | environmental efficiency. It also  |     |      |
|                          |   |      |      |                           |  |     |  |  |     |      |
|                          |   |      |      |                           |  |     |  | provides guidance on how to implement  |     |      |
|                          |   |      |      |                           | Crop type, area, yield, fertilizer   |     | GHG emissions; Carbon storage  | best practices to reduce emissions and   |     |      |
|                          | https://coolfarmtool.org/coolfarm   |      |      |                           | use, irrigation, tillage, manure   |     | /  | improve water and biodiversity   |     |      |
| CoolFarmTool             | tool/   | Yes  | Yes  | Crops                     | management   | Yes | sequestration;Biodiversity;Water   |  | 4   | Yes  |
| 0.0011 0.11111001        | 1001  | 1.00 | 1.00 | 0.000                     | The state of the s |     | Environmental impacts of   | The same of the sa | i i |      |
|                          |   |      |      |                           |  |     | different farming systems,   | A process-based simulation of dairy,   |     |      |
|                          |   |      |      |                           |  |     | agricultural enterprises,  | beef, and crop farming systems   |     |      |
|                          |   |      |      |                           | Boto on allocate call case food  |     |  |  |     |      |
|                          |   |      |      |                           | Data on climate, soil, crop, feed,   |     | processes and products using   | https://www.cranfield.ac.uk/courses/shor   |     |      |
|                          |   |      |      |                           | manure, fertilizer, irrigation,  |     | different life cycle assessment  | t/agrifood/agricultural-life-cycle-  |     |      |
|                          |   |      |      |                           | tillage, machinery, prices, etc.   |     | methods and categories   | assessment-more-than-just-the-carbon-  |     |      |
|                          |   |      |      |                           | https://www.cranfield.ac.uk/cour   |     | https://www.cranfield.ac.uk/cour   | footprint https://sphera.com/wp-   |     |      |
|                          |   |      |      |                           | ses/short/agrifood/agricultural-   |     | ses/short/agrifood/agricultural-   | content/uploads/2022/02/Documentatio   |     |      |
|                          |   |      |      |                           | life-cycle-assessment-more-  |     | life-cycle-assessment-more-  | n-for-the-Agricultural-LCI-model-  |     |      |
|                          |   |      |      |                           |  |     |  |  |     |      |
|                          | l   |      |      |                           | than-just-the-carbon-footprint   |     | than-just-the-carbon-footprint   | 2022.pdf . Integrates the many physical  |     |      |
|                          | https://www.cranfield.ac.uk/cour  |      | 1    | L                         | https://sphera.com/wp-   |     | https://sphera.com/wp-   | and biological processes on a farm over  |     | I    |
|                          | ses/short/agrifood/agricultural-  |      | 1    | Various farming systems,  | content/uploads/2022/02/Docum  |     | content/uploads/2022/02/Docum  | many years of weather. Considers   |     | I    |
|                          | life-cycle-assessment-more-   |      |      | agricultural enterprises, | entation-for-the-Agricultural-LCI-   |     | entation-for-the-Agricultural-LCI-   | primary and secondary sources of   |     |      |
| Cranfield Agri-LCI model |   | No   | Yes  | processes and products    | entation-for-the-Agricultural-LCI-<br>model-2022.pdf   | Yes | model-2022.pdf   | emissionst   | l 3 | No   |
| Orannela 7 ign Eor model | than just the earbon reciping   | 110  | 100  | processes and preducts    | moder Edze.pdi   | 100 | GHG emissions, ammonia   | Process level simulation and process   |     | 110  |
|                          |   | I    | 1    | I                         | I  |     | emissions, hydrogen sulfide  | related emission factors to predict gas  |     | I    |
|                          |   |      | 1    | I                         | I  |     |  |  |     | I    |
|                          |   |      | 1    | I                         | I  |     | emissions, VOC emissions,  | emissions from dairy production  |     | I    |
|                          |   |      |      |                           |  |     | carbon footprint, energy   | systems  |     |      |
|                          |   |      |      |                           |  |     | footprint, water footprint   | https://data.nal.usda.gov/dataset/dairy-   |     |      |
|                          |   |      |      |                           |  |     | https://data.nal.usda.gov/datase   | gas-emissions-model-dairygem   |     |      |
|                          |   |      |      |                           |  |     | t/dairy-gas-emissions-model-   | https://www.ars.usda.gov/northeast-  |     |      |
|                          |   |      |      |                           |  |     |  |  |     |      |
|                          |   |      |      |                           |  |     | dairygem   | area/up-pa/pswmru/docs/dairy-gas-  |     |      |
|                          | L   |      |      |                           | L  |     | https://www.ars.usda.gov/northe  | emissions-model/ . Uses a daily  |     |      |
|                          | https://data.nal.usda.gov/datase  |      |      |                           | Climate, soil, crop, feed manure,  |     | ast-area/up-   | simulation of feed use and manure  |     |      |
|                          | t/dairy-gas-emissions-model-  |      |      |                           | fertilizer, irrigation, tillage,   |     | pa/pswmru/docs/dairy-gas-  | handling. Considers primary and  |     |      |
| DairyGEM                 | dairygem  | Yes  | lv   | D-I                       | residue management, etc.   | V   | emissions-model/   | secondary sources of emissions.  |     | No   |
|                          |   |      |      |                           |  | res |  |  | 1 4 |      |
| ,                        | danygem   | 162  | Yes  | Dairy                     | residue management, etc.   | Yes | emissions-model/   |  | 4   | 140  |
| 2, 2                     | danygom   | 163  | res  | Dairy                     | residue management, etc.   | res | emissions-model/   | DairyWise is an empirical model that   | 4   | 140  |
|                          | danygem   | res  | res  | Dairy                     | residue management, etc.   | res | emissions-model/   | DairyWise is an empirical model that<br>simulates technical, environmental and   | 4   | 140  |
|                          | danygon   | res  | res  | Dairy                     | residue management, etc.   | Yes | emissions-modeli_  | DairyWise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The   | 4   | NO   |
|                          | <del>dai jgon</del>   | res  | res  | Dairy                     | residue management, etc.   | Yes | emissions-model/   | Dairyvvise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The<br>central component is the FeedSupply   | 4   | NO.  |
|                          | <del>dan jgen</del>   | res  | res  | Dairy                     | residue management, etc.   | Yes | emissions-model/   | DairyWise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd  | 4   | NO   |
|                          | <u>canygen.</u>   | Tes  | res  | Dairy                     | residue management, etc.   | Yes | emissions-model/   | Dairywise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The<br>central component is the FeedSupply<br>model that balances the herd<br>requirements, as generated by the   | 4   | NO   |
|                          | Seen y gern   | Tes  | res  | Dairy                     | Testure management, etc.   | Yes | emissions-modeli   | Dairywise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The<br>central component is the FeedSupply<br>model that balances the herd<br>requirements, as generated by the   | 4   | 180  |
|                          | Seem 2 Sports   | Tes  | Tes  | Dairy                     | Tessure management, etc.   | Yes | ermssions-model/   | Dairywise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The<br>central component is the FeedSupply<br>model that balances the herd<br>requirements, as generated by the<br>DairyHerd model, and the supply of   | 4   | 1100 |
|                          | South years.  | les  | Tes  | Dairy                     | residue management, etc.   | Yes | erinssionis-incuen   | Dairywise is an empirical model that<br>simulates technical, environmental and<br>financial processes on a dairy farm. The<br>central component is the FeedSupply<br>model that balances the herd<br>requirements, as generated by the<br>DairyHerd model, and the supply of<br>homegrown feeds, as generated by the   | 4   | 180  |
|                          | State J growth  | Tes  | Tes  | Dairy                     | residue management, etc.   | Yes | erinssionis-incuen   | Dairywise is an empirical moder that simulates technical, environmental and financial processes on a dairy farm. The central component is the Feeds with the central component is the Feeds with the contral component is the Feeds by model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the corp models for grassland and com  | 4   | INO. |
|                          | State J graves  | les  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-model   | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and com sitage. The output of the FeedSupply   | 4   | NO.  |
|                          | South J grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | eritissionis-modele  | Dairywise is an empirical moder that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and com sitege. The output of the FeedSupply model is used as input for several  | 4   | NO.  |
|                          | South J growth.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modeli  | Dairywise is an emprical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn silege. The output of the FeedSupply model is used as input for several technical, environmental and economic  | 4   | NO.  |
|                          | South J grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modele  | Dairywise is an empirical moder that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and com sitege. The output of the FeedSupply model is used as input for several  | 4   | NO.  |
|                          | South J growth.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modeli  | Dairywise is an emprical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn silege. The output of the FeedSupply model is used as input for several technical, environmental and economic  | 4   | NO.  |
|                          | South J grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modele  | Dairywise is an emprical moder that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn silage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm sepects such as nitrogen   | 4   | NO.  |
|                          | South J growth.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modeli  | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn sitage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitros cycling, interso cycling, in | 4   | NO.  |
|                          | South grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modele  | Dairywise is an empirical moder that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and com silage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitrate leaching, ammonia emissions,  | 4   | NO.  |
|                          | South grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssionis-modeli   | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn sitiage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitrate leaching, ammonia emissions, greenhouse gas emissions, energy use   | 4   | NO.  |
|                          | South grants.   | Tes  | Tes  | Dairy                     | Tesaue management, etc.  | Yes | erinssions-modele  | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the Feedby model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn sitage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitrate leaching, ammonia emissions, greenhouse gas emissions, greeny us and a financial farm budget. The final  | 4   |      |
|                          |   | Tes  | Tes  | Dairy                     |  |     |  | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the FeedSupply model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn silage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitrate leaching, ammonia emissions, greenhouse gas emissions, energy use and a financial farm budget. The final output is a farm plan describing all  | 4   |      |
|                          |   | Tes  | Tes  | Dairy                     |  |     | Technical, environmental and   | Dairywise is an empirical model that simulates technical, environmental and financial processes on a dairy farm. The central component is the Feedby model that balances the herd requirements, as generated by the DairyHerd model, and the supply of homegrown feeds, as generated by the crop models for grassland and corn sitage. The output of the FeedSupply model is used as input for several technical, environmental and economic submodels. The submodels simulate a range of farm aspects such as nitrogen and phosphorus cycling, nitrate leaching, ammonia emissions, greenhouse gas emissions, greeny us and a financial farm budget. The final  | 4   |      |
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| ONDC calculator  https://www.neg.com.com/from  Duch Ammail Nutries Cycle  Duck Ammail Nutries Cycle  D |  |   |     |     |   |  |           |   |   |              |
| CRIDC calculation  CRIDC calcula |  |   |     |     |   |  |           |   |   |              |
| DEDC calculator  Tribe Mineral discussion and Control Program  Tribe Mineral discussion and Control Program and Contro |  |   |     |     |   |  |           |   | climate/thermal-hydraulic flux sub-   |              |
| DACK concludes  This flewer date of an high of the company and the company of the |  |   |     |     |   |  |           |   | model, decomposition sub-model, and   |              |
| DACK concludes  This flewer date of an high of the company and the company of the |  |   |     |     |   | Climate, soil, crop, fertilizer.   |           | GHG emissions, carbon   | denitrification sub-model   |              |
| CADC calculative  Into, Time Amenda of the current of the Control  |  |   |     |     |   |  |           |   |   |              |
| Dutin Annual National Cycling Assessment (ANCA) food   | DNDC calculator  | https://www.dpdo.er.uph.edu/  | Voc | Voc | Crops   |  |           |   |   | 4 No.        |
| Date Annual Number Cycling Assessment (ANCA) tool  Ass | DIADO calculator                                       | Into 3.7 WWW. dride. 31. driin. edur  | 163 | 163 |   | management, etc.   | 163       | balance, crop yield   |   | 7110         |
| Dutch Annual Natinet Cycling Associational database radiates (Page Ass |  | https://sseesersh.usus.pl/en/public   |     |     |   | Form obsessatoriation  |           |   |   |              |
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| Agronn Farm Management Software, Carbon Program  Agronn Farm Management Software, Carbon Software Software, Carbon Program  Agronn Farm Management Software, Carbon Program  Agronn Farm Management Software, Carbon Program  Agronn Farm Management Software, Carbon Software Software, Carbon Software Software, Carbon Software Software | Assessment (ANCA) tool                                 | assessment-anca   | Yes | Yes | Netherlands.  | losses   | Yes       | losses.   |   |              |
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| a Agronon Farm Menagement Software, Carbon Program  Into Jivaww eagronom.com/ms No Yes Crops III peciation Intelligation Into Jivaww eagronom.com/ms No Yes Crops III peciation Intelligation Into Jivaww eagronom.com/ms No Yes Crops III peciation Intelligation Into Jivaww eagronom.com/ms No Yes Crops III peciation Intelligation Ves Crops III peciation Intelligation III peciation Intelligent Crops III peciation II |  |   | I   | I   | 1   |  | 1         |   |   |              |
| also creables farments for receive financial rewards from different parties (such as banks, governments, eagronn parties from the fewer parties (such as banks, governments).  Agronn Farm Management Software, Carbon Program  Agronn Farm Management Software Carbon Program  Agronn Farm Management Software Carbon Program  Agronn Farm Management Software Carbon Storage State Indication  Agronn Farm Management Software Carbon Storage State Indication against the Varma Varietied Carbon environmental mending, exported individuol program calculating and individuol program calcul |  |   | I   | I   | 1   |  | 1         |   |   |              |
| financial rewards from different parties (such as banks, government) operations such as crop rotation, soil coverage, no- software, Carbon Program  Altips //www.eegronem.com/mis No Yes Crops III, precision intellization  Altips //www.eegronem.com/mis No Yes Version intelliza |  |   |     |     |   |  |           |   |   |              |
| eAgronom Farm Management Software, Carbon Program  No Yes Crops  111, precision ferfilization  No Yes Crops  112, precision ferfilization  No Yes Crops  113, precision ferfilization  No Yes Crops  114, precision ferfilization  No Yes Crops  115, Annual Precision ferfilization  No Yes No Yes Crops  115, Annual Precision ferfilization  No Yes N |  |   |     |     |   |  |           |   |   |              |
| Regenerative practices such as corporations for their climate and environmental bandlists adoption applies he Verra Verified Outcom applies he Verra Verified Carbon mapples he Verra Verified Carbon  |  |   |     |     |   |  |           |   |   |              |
| Regenerative practices such as cro protation, said coverage, no star, precision fertilization at preci |  |   |     |     |   |  |           |   |   |              |
| Regenerative practices such as crop rotation, so til coverage, no- til the //www.eagrorom.com/fms  |  |   |     |     |   |  |           |   |   |              |
| eAgronom Farm Management SOftware C, Carbon Program  No  Yes  Crops  Ill precision fertilization  Ves  Crops  Ill precision fertilization  Ves  Ves  Ves  Ves  Ves  Ves  Ves  Ve   |  |   |     |     |   |  |           |   | environmental benefits. eAgronom  |              |
| eAgronom Farm Management SOftware C, Carbon Program  No  Yes  Crops  Ill precision fertilization  Ves  Crops  Ill precision fertilization  Ves  Ves  Ves  Ves  Ves  Ves  Ves  Ve   |  |   |     |     |   | Regenerative practices such as   |           |   | applies the Verra Verified Carbon   |              |
| Software, Carbon Program    https://www.eagronom.com/fms   No   Yes   Crops   Bill. precision fertilization   Yes   / sequestration   carbon credits   4. No   |  |   |     |     |   |  |           |   |   |              |
| ECOSSE model    ECOSSE as a process-based model that simulates soil cannon and intropen turnover and generhouse gas emissions using a pool-type approach and pools, represented the pools of the process of the process of the pools of the process results in gaseous losses of OCS and pool and plant material. The decomposable plant material. The decomposable plant material and decomposable plant material. The decomposition are of each pool is modified by temperature, water content, plant cover and pl.T. The decomposition process results in gaseous losses of OCS and pool and plant material. The decomposition process results in gaseous losses of OCS and pool and plant material. The decomposition process results in gaseous losses of OCS and pool and process results in gaseous losses of OCS and pool and plant material. The decomposition process results in gaseous losses of OCS and pool and plant material and decomposable plant material. The decomposition process results in gaseous losses of OCS and pool and plant material. The decomposition process results in gaseous losses of OCS and pool and plant material. The decomposition of the soil of opposition of the soil opposition opposition of the soil opposition opposit | eAgronom Farm Management                               |   |     |     | 1   | crop rotation, soil coverage, no-  |           | GHG emissions:Carbon storage  | Standard methodology for calculating  |              |
| simulates soil carbon and nitrogen furnover and gree-throuse gas emissions using a pool-type approach. It comprises the soil organic matter pools: inert organic matter pools: inert organic matter, humus, blomass, elesistent plant metalerial and decomposition plant of activity of the composition of the soil of the composition of the co |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  | Yes       |   |   | 4 No.        |
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| using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, hums, biomass, resistant plant material. The documposable plant materi |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  | Yes       |   | carbon credits<br>ECOSSE is a process-based model that  | 4 No         |
| Comprises five soil organic matter pools:  |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  | Yes       |   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen  |              |
| Inter-Organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition of process results in gaseous losses of CDC and CH4, with CDC Josses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The Introgen content of the soll officewise the decomposition of the soll office each soil organic matter, with a stable CN ratio defined or each soil organic matter, with a stable CN ratio defined for each soil organic matter, with a stable CN ratio defined for each soil organic matter, with a stable CN ratio defined for each soil organic matter pool.  ECOSSE model   Inks/model-portal/ecosse   Yes   Yes   Crops, Grassland, Forest   Meteorological, land use, land management and soil data   No organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reach soil organic matter, with a stable CN ratio defined reaches organic matter, with a stable CN ratio defined reaches organic matter, with a stable CN ratio defined reaches organic matter, with a stable CN ratio defined reaches   |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  | Yes       |   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions  |              |
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| Auto-//Soil-   Auto-//Soil-   Meteorological, land use, land     Meteorological, land use, land land     Meteorological (land use, land lease use)     Meteorological (land use, land use, land use, land use, land use, land us   |  | https://www.eagronom.com/īms  | No  | Yes | Crops   |  | Yes       |   | carbon credits ECUSSE is a process-based model that simulates soil carbon and nitrogen tumover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposable plant material to decomposable plant material, plant cover and pH. The decomposition plant cover and pH. The decomposition  |              |
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| ECOSSE model    https://soil-modeling.org/resources-productions   https://soil-modeling.org/reso |  | https://www.eagronom.com/īms  | No  | Yes | Crops   |  | Yes       |   | carbon credits ECUSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses  |              |
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| https://soil-modeling.org/resources-modeling.org/resources-modeling.org/resources-modeling.org/resources-modeling.org/resources-production and target in the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the seminary of the first plant in the foot in the foot in the first plant in the foot in the foot in the first plant in the foot plant in the foot in the first plant plant plant in the foot in the first plant in the foot plant in the foot in the first plant in the foot plant in the foot in the first plant in the foot plant  |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  | Yes       |   | carbon credits ECUSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic  |              |
| Meteorological, land use, land management and soil data   Mo organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land a given pth.   3 No   Meteorological, land use, land a given pth.   3 No   Meteorological, land use, land and splend to give pth.   3 No   Meteorological, land use, lan   |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  |           | / sequestration   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools; inert organic matter, humus, biomass, resistant plent material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the   |              |
| Meteorological, land use, land management and soil data   Mo organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land management and soil data   No organic soils   Meteorological, land use, land a given pth.   3 No   Meteorological, land use, land a given pth.   3 No   Meteorological, land use, land and splend to give pth.   3 No   Meteorological, land use, lan   |  | https://www.eagronom.com/fms  | No  | Yes | Crops   |  |           | / sequestration   | carbon credits ECONSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil   |              |
| ECOSSE model    Inks/model-portal/ecosse   |  |   | No  | Yes | Crops   |  |           | / sequestration   | carbon credits ECONSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil   |              |
| The fool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by eFoodPrint ENV  https://efoodprint.com/ No Yes vegetables,cereals,wine Production and transport Yes Water footprint, carbon footprint source and gas 4 No    No  |  | https://soil-   | No  | Yes | Crops   | till, precision fertilization  |           | / sequestration  Soil carbon and nitrogen dynamics, greenhouse gas  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen tumover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, biomass, resistant plent material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-in ratio  |              |
| PCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by especially reduction and transport   Yes   Water footprint, carbon footprint source and gas   Vestion and transport   Vestive footprint, carbon footprint source and gas   Vestive footprint, carbon footprint source footprint so   | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses CO2 and CH4, with CO2 losses soil follows the decomposition of the soil follows the decomposition of the soil follows the decomposition of the soil organic matter, with a stable C:N ratio   |              |
| water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by eFoodPrint ENV https://efoodprint.com/ No Yes vegetables,cereals,wine Production and transport Yes Water footprint, carbon footprint source and gas A No  Comparing two scenarios (current and plarmed): Tier 1 and Tier 2 approaches; sk.cvzv.sk/hd/ndex.php?menu= Dairy:Milk sheep;Meat | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen tumover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, biomass, resistant plent material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-iN ratio defined for each soil organic matter pool at a given pH.   |              |
| eFoodPrint ENV https://efoodprint.com/ No Yes    Fruit, vegetables,cereals,wine production and transport   Yes   Water footprint, carbon footprint source and pass   And a breakdown of emissions by   | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECONSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses CO2 and CH4, with CO2 losses of ioliows the decomposition of the soil organic matter, with a stable C:N ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the   |              |
| eFoodPrint ENV https://efoodprint.com/ No Yes vegetables,cereals,wine production and transport Yes Water footprint, carbon footprint source and gas 4 No    Author/finadobis-sk.vcvv.ks/hdr/ndex.php?menu=   Dairy:Milk sheep;Meat   | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inet organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C:N ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the   |              |
| Foed use, manure management, soll manage | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the levater use and GHG emissions from   |              |
| eFoodPrint ENV  https://efoodprint.com/ No Yes  Fruit, vegetables,cereals,wine production and transport Yes  Water footprint, carbon footp | Software, Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | till, precision fertilization  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposable plant material. The decomposable plant material. The decomposable plant material of the plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along  |              |
| eFoodPrint ENV https://efoodprint.com/ No Yes vegetables,cereals,wine production and transport Yes Water footprint, carbon footprint source and gas 4 No    Comparing two scenarios (current and planned): Tier 1 and Tier 2 approaches;   | Software; Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | Meteorological, land use, land management and soil data  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C:N ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool lato provides   |              |
| http://madobis- sk.cvzv.sk/hd/index.php?menu= Dairy:Milk sheep;Meat production systems, inputs,    Comparing two scenarios (current and planned); Tier 1 and Tier 2 approaches;  | Software; Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     |   | Meteorological, land use, land management and soil data  Feed use, manure management,  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and PH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool ta given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides   |              |
| http://madobis- sk.cvzv.sk/hd/index.php?menu= Dairy:Milk sheep;Meat production systems, inputs,    Comparing two scenarios (current and planned); Tier 1 and Tier 2 approaches;  | Software; Carbon Program                               | https://soil-<br>modeling.org/resources-  |     |     | Crops, Grassland, Forest  | Meteorological, land use, land management and soil data  Feed use, manure management,  |           | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and  | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: iner organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and PH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool ta given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides   |              |
| http://madobis-sk.cvzv.sk/hd/index.php?menu=   Farm characteristics , production systems, inputs,   GHG emissions; Nitrogen   PCC methodology and peer-reviewed  | Software; Carbon Program  ECOSSE model                 | https://soil-<br>modeling.org/resources-<br>links/model-portal/ecosse   | Yes | Yes | Crops, Grassland, Forest  | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop  | No        | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soilis   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-In ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by   | 3 No         |
| http://madobis-sk.cvzv.sk/hd/index.php?menu=   Farm characteristics , production systems, inputs,   GHG emissions; Nitrogen   IPCC methodology and peer-reviewed   | Software; Carbon Program  ECOSSE model                 | https://soil-<br>modeling.org/resources-<br>links/model-portal/ecosse   | Yes | Yes | Crops, Grassland, Forest  | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop  | No        | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soilis   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-In ratio defined for each soil organic matter pool at a given pH. The tool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by   | 3 No         |
| sk.cvzv.sk/hd/index.php?menu= Dairy:Milk sheep;Meat production systems, inputs, GHG emissions.Nitrogen IPCC methodology and peer-reviewed  | Software; Carbon Program  ECOSSE model                 | https://soil-<br>modeling.org/resources-<br>links/model-portal/ecosse   | Yes | Yes | Crops, Grassland, Forest  | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop  | No        | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soilis   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools; inert organic matter, humus, blomass, resistant plant material and decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under anearobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-In ratio defined for each soil organic matter pool at a diven pH. The foll uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along different sources on the farm and along different sources on the farm and along a persiston with a benchmark farm and a breakdown of emissions by source and gas  | 3 No         |
|  | Software; Carbon Program  ECOSSE model                 | https://soil-<br>modeling.org/resources-<br>links/model-portal/ecosse   | Yes | Yes | Crops, Grassland, Forest  | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop production and transport   | No        | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soilis   | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, biomass, resistant plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool ta given pH. The tool uses emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by source and gas  Comparing two scenarios (current and   | 3 No         |
| Tes   Tes   Sneep;Higs   Outputs, emissions   Tes   Dalance;economic aspects   literature, FAO LEAF guicelines   3 No  | Software; Carbon Program  ECOSSE model                 | https://soil-modeling.org/resources-<br>links/model-portal/ecosse   | Yes | Yes | Crops, Grassland, Forest Fruit, vegetables,cereals,wine                             | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop production and transport  Farm characteristics,                            | No<br>Yes | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soils  Water footprint, carbon footprint                         | carbon credits ECOSSE is a process-based model that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools; inert organic matter, humus, biomass, resistant plant material and decomposable plant material. The decomposable plant material. The decomposable plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CC2 losses CO2 and CH4, with CC2 losses dominating under aerobic conditions and CH4 losses under aneerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool at a given pH. The fool uses emission factors from the IPCC and other sources to estimate the water use and GHG emissions from different sources on the farm and along the supply chain. The tool also provides a compension with a benchmark farm and a breakdown of emissions by source and gas  Comparing two scenarios (current and planned); Tier 1 and Tier 2 approaches, | 3 No         |
|  | Software; Carbon Program  ECOSSE model  eFoodPrint ENV | https://soil-<br>modeling.org/resources-<br>links/model-portal/ecosse<br>https://efoodprint.com/<br>https://efoodprint.com/ | Yes | Yes | Crops, Grassland, Forest  Fruit, vegetables, cereals, wine  Dairy, Milk sheep; Meat | Meteorological, land use, land management and soil data  Feed use, manure management, soil management, crop production and transport Farm characteristics, production systems, inputs, | No<br>Yes | Soil carbon and nitrogen dynamics, greenhouse gas emissions from mineral and organic soils  Water footprint, carbon footprint  GHG emissions:Nitrogen | carbon credits ECOSSE is a process-based moder that simulates soil carbon and nitrogen turnover and greenhouse gas emissions using a pool-type approach. It comprises five soil organic matter pools: inert organic matter, humus, biomass, resistant plant material. The decomposition rate of each pool is modified by temperature, water content, plant cover and pH. The decomposition process results in gaseous losses of CO2 and CH4, with CO2 losses dominating under aerobic conditions and CH4 losses under anaerobic conditions. The nitrogen content of the soil follows the decomposition of the soil organic matter, with a stable C-N ratio defined for each soil organic matter pool at a given pH. The tool uses emissions from different sources on the farm and along the supply chain. The tool also provides a comparison with a benchmark farm and a breakdown of emissions by source and gas  Comparing two scenarios (current and planned), Tier 1 and Tier 2 approaches; PCC methodology and peer-reviewed   | 3 No<br>4 No |



|                                 |   |                |     | The database covers              | The database uses various data                                   |     |                                  |  |      |     |
|---------------------------------|---|----------------|-----|----------------------------------|--|-----|----------------------------------|--|------|-----|
|                                 |   |                |     |                                  | sources such as FAO (Food and                                    |     |                                  |  |      |     |
|                                 |   |                |     | various emission sources         |  |     | The database estimates           |  |      |     |
|                                 |   |                |     | such as enteric                  | Agriculture Organization), IEA<br>(International Energy Agency), |     | emissions of all greenhouse      |  |      | I   |
|                                 |   |                |     | fermentation, manure             | IPCC (Intergovernmental Panel                                    |     | gases, air pollutants and        |  |      |     |
|                                 |   |                |     | management, rice                 | on Climate Change), etc. The                                     |     | aerosols from human activities   |  |      | I   |
| Emissions Database for Global   |   |                |     | cultivation, agricultural soils, | data inputs include activity data.                               |     | on Earth using a consistent      | The database also provides emission  |      |     |
| Atmospheric Research            |   |                |     | field burning of agricultural    | emission factors, emission                                       |     | methodology based on the         | scenarios for future projections based                                     |      |     |
| (EDGAR)                         | https://edger.ire.ee.eurepe.eu/                                   | <sub>Vas</sub> | Yes | residues                         | inventories.   | No  | latest IPCC guidelines           | on different assumptions and policies                                      |      | No  |
| (EDGAR)                         | https://edgar.jrc.ec.europa.eu/                                   | 162            | 169 | residues                         | inventories,   | INU | latest in CC guidelines          | The model simulates the interactions                                       |      | NO  |
|                                 | https://www.climateinteractive.or                                 |                |     |                                  |  |     |                                  | between the economy, the energy  |      |     |
|                                 | g/en-roads/   |                |     |                                  | Energy supply and demand   |     |                                  | systems and the environment, taking  |      |     |
|                                 | https://en-   |                |     | Global climate system and        | trade.   |     | System dynamics model for the    | into account the effects of the policies                                   |      |     |
|                                 | roads.climateinteractive.org/sce                                  |                |     | cross-sector climate             | prices technologies policies and                                 |     | long-term climate outcomes of    | on energy mix, emissions, temperature,                                     |      |     |
| En-ROADS                        | nario.html?v=23.6.1   | Yes            | Yes | solutions                        | emissions  | No  | policy scenarios                 | sea level rise.  | 1    | No  |
| EITROADO                        | Harro.Harri   4 - 25.0.1  | 163            | 163 | Solutions                        | CITIOSIOTIS  | 140 | GHG emissions, Carbon storage    | Sca level lise.  | '    | 140 |
|                                 | https://data.nal.usda.gov/datase                                  |                |     |                                  |  |     | / sequestration, Nitrogen        | Uses a process-based simulation model                                      |      |     |
| Environmental Policy Integrated |   |                |     |                                  | Soil, weather, crop.   |     | balance, Economic                | that estimates soil productivity as  |      |     |
| Climate Model (EPIC)            |   | No             | Yes | Crops                            | management, and erosion data                                     | Yes | Performance Assessment           | affected by erosion and other factors                                      | او ا | No  |
| Similate Model (El 10)          | magnated chimate cpic filodel                                     | 1              |     | 0.000                            |  |     |                                  | The model provides a toolkit for building                                  |      |     |
|                                 |   |                |     |                                  |  |     |                                  | national GHG inventory systems that  |      | I   |
| I                               | I   |                |     | I                                | I  |     |                                  | consists of seven templates that can be                                    |      | I   |
| I                               | I   |                |     | I                                | I  |     |                                  | adapted to reflect national  |      | I   |
| I                               | I   |                |     | I                                | I  |     |                                  | circumstances and compiled into a  |      | I   |
|                                 | http://clh-   |                |     |                                  |  |     |                                  | National GHG Inventory System  |      | I   |
|                                 | ckan.apps.fao.org/dataset/tools-                                  |                |     |                                  |  |     |                                  | Manual. The toolkit covers inventory                                       |      |     |
|                                 | for-greenhouse-gas-   |                |     |                                  |  |     |                                  | planning, institutional arrangements,                                      |      |     |
|                                 | assessments/resource/8a58804                                      |                |     |                                  |  |     |                                  | data collection and management, quality                                    |      |     |
| EPA, 2020, U.S. EPA Toolkit for |   |                |     |                                  | not specified, depends on  |     | GHG emissions and removals       | assurance and quality control.   |      |     |
| Building National GHG           | 26241c28a07c?inner span=Tru                                       |                |     | GHG inventory system for         | national circumstances and data                                  |     | assessment for all sectors using |  |      |     |
| Inventory Systems               | e#  | Yes            | Yes | all sectors                      | availability   | No  | the IPCC methodology             | archiving  | 5    | No  |
|                                 |   |                |     |                                  | ĺ í  |     |                                  |  |      |     |
|                                 |   |                |     |                                  |  |     |                                  | Comparing two scenarios (current and                                       |      |     |
|                                 |   |                |     |                                  | Farm characteristics,  |     |                                  | planned); Tier 1 and Tier 2 approaches;                                    |      |     |
|                                 |   |                |     | Dairy;Beef;Poultry;Pigs;Cro      | production systems, inputs,                                      |     | GHG emissions;Soil carbon        | IPCC methodology and peer-reviewed   |      |     |
| ESGreen Tool                    | www.seges.dk/esgreentool  | No             | No  | ps;Perrenial crops               | outputs, emissions   | Yes | balance                          | literature,FAO LEAP guidelines   | 3    | Yes |
|                                 |   |                |     |                                  |  |     |                                  | Uses a system dynamics model to  |      |     |
|                                 | https://www.europarl.europa.eu/t                                  |                |     |                                  | Land use, food consumption,                                      |     | Land use change, greenhouse      | simulate a range of European land use                                      |      |     |
|                                 | hinktank/en/document/EPRS_A                                       |                |     | Crops and livestock              | food waste, bioenergy, forestry,                                 |     | gas emissions, carbon storage /  | scenarios and their impacts on climate                                     |      |     |
| EU Land Use Futures (EULUF)     | TA%282022%29729453  | Yes            | Yes | systems in the EU                | etc.   | No  | sequestration                    | mitigation by 2050   | 3    | No  |
|                                 |   |                |     |                                  |  |     |                                  | A model that simulates the effects of                                      |      |     |
|                                 |   |                |     |                                  |  |     | GHG emissions, carbon            | different scenarios of technological                                       |      |     |
|                                 |   |                |     |                                  |  |     | sequestration, nitrogen balance, | deployment and consumption behaviour                                       |      |     |
|                                 | l   |                |     | L                                | energy, resources, production                                    |     | water consumption, land use,     | on energy, resources, production and                                       |      | I   |
| EUCalc (European Calculator     | https://www.european-   | l I            |     | Various (crops, livestock,       | and food systems at the EU                                       |     | etc.                             | food systems at the EU level + UK and                                      |      |     |
| Model)                          | calculator.eu/model/  | No             | Yes | dairy, etc.)                     | level + UK and Switzerland                                       | No  |                                  | Switzerland  | 4    | No  |
|                                 |   |                |     |                                  |  |     |                                  | The EU inventory is a compilation of<br>national inventories, based on the |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | emissions reported under the EU  |      | I   |
|                                 | I   |                |     | All sectors, including           | I  |     |                                  | Climate Monitoring Mechanism.  |      | I   |
|                                 | https://www.coc.ouropa.co/cochil                                  |                |     | agriculture, land use, land      | Emissions of seven greenhouse                                    |     |                                  | UNFCCC regularly reviews the   |      | I   |
| European national greenhouse    | https://www.eea.europa.eu/publi<br>cations/annual-european-union- |                |     | use change and forestry          | gases (the greenhouse gas  |     |                                  | submitted EU inventory. EU inventory                                       |      | I   |
| gas inventories (NGHGIs)        | greenhouse-gas-inventory-2021                                     | Yes            | Yes | (LULUCF)                         | inventory) from all sectors                                      | No  | GHG emissions                    | system & quality assurance programme                                       | ا    | No  |
| gas inventories (NGHGIS)        | greeniouse-gas-inventory-2021                                     | 169            | 163 | (LOLOGF)                         | inventory) nom an sectors  | INO | OTTO ETTISSIONS                  | The model uses the Intergovernmental                                       | 3    | 140 |
|                                 | I   |                |     | I                                | 1  |     |                                  | Panel on Climate Change (IPCC)   |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | methodology and other peer-reviewed  |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | literature to calculate GHG emissions at                                   |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | each stage of the value chain. It  |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | compares a baseline scenario (without                                      |      | I   |
|                                 | I   |                |     | I                                | I  |     |                                  | project) and an alternative scenario                                       |      | I   |
|                                 | I   | i              |     | I                                | I  |     |                                  | (with project). It also evaluates the                                      |      |     |
|                                 | I   |                |     | I                                | I  |     |                                  | economic, social and environmental   |      |     |
|                                 | I   |                |     | I                                | I  |     |                                  | impacts of the interventions along the                                     |      |     |
|                                 | I   |                |     | I                                | Production level emissions,                                      |     | GHG emissions, socio-            | value chain, such as value added,  |      | I   |
| EX-ACT VC: The EX-Ante          | https://www.fao.org/in-   |                |     | I                                | processing, storage, packaging,                                  |     | economic performance             | income levels, employment, food loss,                                      |      | I   |
| Carbon-balance Tool for value   | action/epic/ex-act-tool/suite-of-                                 |                |     | I                                | transportation, food loss,                                       |     | assessment for the life cycle of | gender and youth participation and SDG                                     |      | I   |
| chains                          | tools/ex-act-vc/en/   | Yes            | Yes | Any agri-food value chain        | income levels  | No  | the agri-food value chain        | alignment.   | 2    | No  |
|                                 |   |                |     |                                  |  |     |                                  |  |      |     |



|                        |  |     |      |  |   |     |  | The model uses the Intergovernmental        |       |
|------------------------|--|-----|------|--|---|-----|--|---|-------|
|                        |  |     |      |  |   |     |  | Panel on Climate Change (IPCC)              |       |
|                        |  |     |      |  |   |     |  | methodology for greenhouse gas (GHG)        |       |
|                        |  |     |      |  |   |     |  | emissions inventories. It provides          |       |
|                        |  |     |      |  |   |     |  | estimates of the impact of interventions    |       |
|                        |  |     |      |  |   |     |  | on the carbon balance by comparing a        |       |
|                        |  |     |      |  |   |     |  | baseline scenario (without project) and     |       |
| I.                     |  |     |      |  |   |     |  |   |       |
|                        | https://www.fao.org/in-                                |     |      |  | Land use, livestock, energy use,  |     |  | an alternative scenario (with project). It  |       |
|                        | action/epic/ex-act-tool/suite-of-                      |     |      | Agriculture, forestry and  | inputs and infrastructure,  |     |  | covers both GHG emissions and carbon        |       |
| balance Tool           | tools/ex-act/en/                                       | Yes | Yes  | other land use (AFOLU)   | emission and removals   | Yes | Carbon balance assessment  | sequestration                               | 3 No  |
|                        |  |     |      |  |   |     |  |   |       |
|                        |  |     |      |  | The database uses various data  |     |  |   |       |
|                        |  |     |      |  | sources such as FAO (Food and   |     |  |   |       |
|                        |  |     |      |  | Agriculture Organization), IEA  |     |  |   |       |
|                        |  |     |      |  | (International Energy Agency),  |     |  | The database provides emission maps         |       |
|                        |  |     |      |  | IPCC (Intergovernmental Panel   |     |  | at different spatial and temporal           |       |
|                        |  |     |      |  | on Climate Change), etc. The  |     |  | resolutions, as well as different sectorial |       |
|                        |  |     |      | Crop production, livestock   | data inputs include socio-  |     |  | and substance breakdowns. The               |       |
|                        |  |     |      | production, bioenergy  | economic scenarios, climate   |     | GHG emissions, air pollutants  | database also provides emission             |       |
|                        |  |     |      | production, water use,   |   |     |  | scenarios for future projections based      |       |
| EVIORAGES              |  |     | l.,  |  | scenarios, biophysical data   |     | using methodology based on   |   | ļ.,   |
| EXIOBASE3              | https://www.exiobase.eu/                               | Yes | Yes  | nutrient cycles  | emission factors  | No  | IPCC   | on different assumptions and policies       | No    |
|                        |  | I   | 1    | I  | I   |     |  | Farm Carbon Calculator is a tool that       |       |
|                        |  | I   | 1    | I  | I   |     |  | uses a life cycle assessment (LCA)          |       |
|                        |  | I   | 1    | I  | I   |     |  | approach to estimate the carbon             |       |
|                        |  | I   | 1    | I  | I   |     |  | footprint of farming practices. It allows   |       |
|                        |  | I   | 1    | I  | I   |     |  | for comparing the performance of            |       |
|                        |  | I   | 1    | I  | I   |     |  | different scenarios (e.g. current vs        |       |
| I                      |  |     | 1    | I  | I   |     |  | improved) and identifying the key           |       |
|                        |  | I   | 1    | I  | I   |     |  | drivers of GHG emissions and carbon         |       |
|                        |  |     |      | Dairy;Beef;Meat  |   |     |  | offsets. It also provides guidance on       |       |
|                        |  |     |      |  | Crop type , area, yield, fertilizer   |     |  | how to implement best practices to          |       |
| l.                     | https://seleculates.formershootsel                     |     |      |  |   |     |  |   |       |
|                        | https://calculator.farmcarbontool                      |     |      | ine;Perrenial  | use, irrigation, tillage, manure  |     |  | reduce emissions and increase               | dy    |
| Farm Carbon Calculator | kit.org.uk/  | Yes | Yes  | crops;Horticulture   | management  | Yes | / sequestration  | sequestration                               | 4 Yes |
|                        |  |     |      |  |   |     |  | The model uses the Intergovernmental        |       |
|                        |  |     |      |  |   |     |  | Panel on Climate Change (IPCC)              |       |
|                        |  |     |      |  |   |     |  | methodology and other peer-reviewed         |       |
|                        |  |     |      |  |   |     |  | literature to calculate GHG emissions       |       |
|                        |  |     |      |  |   |     |  | and carbon sequestration at farm level.     |       |
|                        |  |     |      | All farming systems that   | Land use, livestock, energy use,  |     |  | It compares a baseline scenario (without    |       |
| l,                     | https://calculator.farmcarbontool                      |     |      | produce agricultural   | inputs and infrastructure   |     |  | project) and an alternative scenario        |       |
|                        | kit.org.uk/  | Yes | Yes  | products   | emissions and removals  | Yes | assessment   | (with project)                              | 2 Yes |
| Turri Garbori Gardado  | THE OF GLAID   | 100 | 1.00 | products   | ,crinociono ana removalo  | 100 | doccomen   | The tool uses emission factors from the     | 2 100 |
|                        |  |     |      |  |   |     |  | IPCC and other sources to estimate the      |       |
|                        |  |     |      |  |   |     |  | energy use and GHG emissions from           |       |
|                        |  |     |      |  |   |     |  | different sources on the farm and along     |       |
|                        |  |     |      |  |   |     |  |   |       |
| I.                     |  |     |      |  | crop type,  |     |  | the supply chain. The tool also provides    |       |
|                        | https://www.ecologicalmodels.ps                        |     | 1    | I  | area, yield, tillage, irrigation, fertiliz  |     |  | a comparison with a benchmark farm          |       |
|                        | u.edu/agroecology/feat/about.ht                        | 1   | 1    | I  | er use,pesticide use,residue  |     |  | and a breakdown of emissions by             |       |
| (FEAT)                 | <u>m</u>   | Yes | Yes  | Crops  | management and transport  | Yes |  | source and gas                              | 4 No  |
|                        |  |     |      |  |   |     |  | Uses Tier 2 methodologies for livestock     |       |
|                        |  | I   | 1    | I  | I   |     |  | and manure management and Tier 3            |       |
|                        |  | I   | 1    | I  | Farm-scale information,   |     |  | methodologies for crops and soil.           |       |
|                        |  | 1   | 1    | I  | cropping sequences, crop  |     |  | Simulates crop and livestock                |       |
|                        |  |     | 1    | I  | production potential, ruminant  |     |  | production, C and N mass flows, mineral     |       |
|                        |  | I   | 1    | I  | livestock production, livestock   |     |  | N supply and losses, crop dry matter        |       |
|                        |  | I   | 1    | I  | manure management, manure   |     | / sequestration, nitrogen  | yield. Depends on agro-ecological zone      |       |
| I                      |  |     | 1    | 1  |   | Yes | balance  | parameters.                                 | 3 No  |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  |  |   |     |  |   |       |
| FarmAC                 | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | and fertiliser applications The model uses various data   | res | balance  | parameters.                                 | 9 110 |
| FarmAC                 | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data   | res | balance  | parameters.                                 |       |
| FarmAC E               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data<br>sources such as KTBL (German   | res | balance  | рагашенегь.                                 | 3,13  |
| FarmAC                 | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and   | res | balance  | рагатечегь.                                 | 3,10  |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data<br>sources such as KTBL (German<br>Association for Technology and<br>Structures in Agriculture),  | res | balance  | parameters.                                 |       |
| FarmAC                 | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European  | res | balance  | parameters.                                 |       |
| FarmAC .               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI   | Tes | Dalance  | perameters.                                 |       |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI (Common Agricultural Policy   | res | Dardine  | parameters.                                 |       |
| FarmAC J               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI (Common Agricultural Policy Regionalised Impact), etc. The  | res | Dordine  | paraminents.                                |       |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI (Common Agricultural Policy   | Tes | Delaine  | paraminents.                                |       |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  | arable and livestock farms   | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI (Common Agricultural Policy Regionalised Impact), etc. The data inputs include biophysical  | Tes |  | paraminents.                                |       |
| FarmAC I               | https://www.farmac.dk/                                 | Yes | Yes  |  | Ine model uses various data<br>sources such as KTBL (German<br>Association for Technology and<br>Structures in Agriculture),<br>EUROSTAT (European<br>Statistical Office), CAPRI<br>(Common Agricultural Policy<br>Regionalised Impact), etc. The<br>data inputs include biophysical<br>characteristics of land and soil,   | Tes | GHG emissions from agriculture   | paraminents.                                |       |
|                        |  | Yes | Yes  | The model covers various   | Ine model uses vanous data<br>sources such as KTBL (German<br>Association for Technology and<br>Structures in Agriculture),<br>EUROSTAT (European<br>Statistical Office), CAPRI<br>(Common Agricultural Policy<br>Regionalised Impact), etc. The<br>data inputs include biophysical<br>characteristics of land and soil,<br>technological change, climate                             | Tes | GHG emissions from agriculture sources, carbon storage and   | paraminents.                                |       |
| ı                      | https://www.iir1.uni-                                  | Yes | Yes  | The model covers various agricultural activities such                                | Ine model usés vanous data<br>sources such as KTBL (German<br>Association for Technology and<br>Structures in Agriculture),<br>EUROSTAT (European<br>Statistical Office), CAPRI<br>(Common Agricultural Policy<br>Regionalised Impact), etc. The<br>data inputs include biophysical<br>characteristics of land and soil,<br>technological change, climate<br>change scenarios, policy | res | GHG emissions from agriculture sources, carbon storage and sequestration in biomass and  |   |       |
|                        | https://www.ilr1.uni-<br>bonn.de/en/research/research- | Yes | Yes  | The model covers various agricultural activities such as crop production, livestoot. | The model uses various data sources such as KTBL (German Association for Technology and Structures in Agriculture), EUROSTAT (European Statistical Office), CAPRI (Common Agricultural Policy Regionalised Impact), etc. The data inputs include biophysical characteristics of land and soil, technological change, climate change scenarios, policy scenarios, market prices,       | res | GHG emissions from agriculture sources, carbon storage and sequestration in biomass and soils, nitrogen balance in                                 | The model allows for a full account of      |       |
|                        | https://www.iir1.uni-                                  | Yes | Yes  | The model covers various agricultural activities such                                | Ine model usés vanous data<br>sources such as KTBL (German<br>Association for Technology and<br>Structures in Agriculture),<br>EUROSTAT (European<br>Statistical Office), CAPRI<br>(Common Agricultural Policy<br>Regionalised Impact), etc. The<br>data inputs include biophysical<br>characteristics of land and soil,<br>technological change, climate<br>change scenarios, policy | Yes | GHG emissions from agriculture sources, carbon storage and sequestration in biomass and soils, nitrogen balance in croplands and grasslands, water |   | No    |



|  |   |            | 1   |  |   |     |   | FARMPRINT is a tool that uses life   | 1   | 1        |
|--|---|------------|-----|--|---|-----|---|--|-----|----------|
|  |   |            |     |  |   |     |   | cycle assessment (LCA) methodology to  |     |          |
|  |   |            |     |  |   |     |   | calculate the environmental impacts of   |     |          |
|  |   |            |     |  |   |     |   | farming practices, It allows for   |     |          |
|  |   |            |     |  |   |     |   | comparing the performance of different   |     |          |
|  |   |            |     |  |   |     |   | scenarios (e.g. baseline vs improved)  |     |          |
|  |   |            |     |  |   |     |   | and identifying the hotspots and   |     |          |
|  |   |            |     |  |   |     |   | improvement opportunities. It also   |     |          |
|  |   |            |     |  |   |     |   | enables farmers to communicate their   |     |          |
|  | https://www.csiro.au/en/research  |            |     |  | Farm management data, such  |     | GHG emissions, carbon storage   |  |     |          |
|  | /environmental-   |            |     |  | as crop type, area, yield,  |     | / sequestration, water use  | stakeholders (e.g. consumers,  |     |          |
| Farmprint (AUS)                          | impacts/sustainability/FarmPrint  | No         | Yes | Dryland broadacre cropping                                     | fertilizer use, irrigation, tillage   | Yes | efficiency  | investors, regulators)   | 111 | No l     |
| Tampint (A00)                            | impacts/sustainability/r airin fint   | 140        | 163 | Dairy;Beef;Milk sheep;Meat                                     | refulizer use, irrigution, thage  | 163 | GHG emissions:Carbon storage  | investors, regulators)   |     | 40       |
|  |   |            |     | sheep;Goat;Poultry;Pigs;Cro                                    |   |     | / sequestration; Nitrogen   |  |     |          |
|  | https://tool.fastnavigator.eu/inde  |            |     | ps;Wine;Perrenial  |   |     | balance;Economic Performance  |  |     |          |
| FaST-Navigator                           | x.html  | Yes        | Yes | crops:Horticulture   |   | Yes | Assessment  |  | ۱,  | No.      |
| 1 a31-Navigator                          | X.11010   | 169        | 163 | crops, i forticulture  |   | 165 | Assessment  | A calculation tool and database that   |     | 40       |
|  |   |            |     |  |   |     |   | calculates the greenhouse gas  |     |          |
|  |   |            |     |  |   |     |   | emissions during the production and  |     |          |
|  |   |            |     |  |   |     |   | utilization chain of feed and identifies   |     |          |
|  |   |            |     |  |   |     |   | mitigation options   |     |          |
|  |   |            |     |  |   |     |   | http://webapplicaties.wur.nl/software/fee  |     |          |
| 1  |   |            |     |  |   |     |   | dprintNL/index.asphttps://www.wur.nl/en/   |     |          |
| 1  |   |            | 1   | 1  | I   |     | 1   | show/FeedPrint-Calculate-CO2-per-  |     |          |
| 1  |   |            |     |  | Data on feed raw materials, crop  |     |   |  |     |          |
| 1  |   |            |     |  | production, processing of crop  |     |   | kilogram-meat-milk-or-eggs.htm<br>https://research.wur.nl/en/publications/m  |     |          |
| 1  |   |            |     |  |   |     |   |  |     |          |
| 1  |   |            |     |  | and animal products, compound   | -   | Carbon featurint of food  | ethodology-used-in-feedprint-a-tool-   |     |          |
| 1  |   |            |     |  | feed production, utilization by   |     | Carbon footprint of feed raw  | quantifying-greenhouse-gas-e . Covers  |     |          |
|  |   |            |     |  | the animal, transport and   |     | materials during their complete   | the complete Dutch Feed list, over 300   |     |          |
|  |   |            |     |  | storage   |     | life cycle  | feed materials, sourced from countries   |     |          |
|  |   |            |     |  | http://webapplicaties.wur.nl/soft   |     | http://webapplicaties.wur.nl/soft   | all over the globe   |     |          |
|  |   |            |     |  | ware/feedprintNL/index.asp_   |     | ware/feedprintNL/index.asp  | https://research.wur.nl/en/publications/m  |     |          |
|  |   |            |     |  | https://www.wur.nl/en/show/Feed   |     | https://www.wur.nl/en/show/Feed   | ethodology-used-in-feedprint-a-tool-   |     |          |
|  |   |            |     |  | Print-Calculate-CO2-per-  |     | Print-Calculate-CO2-per-  | quantifying-greenhouse-gas-e .   |     |          |
|  |   |            |     |  | kilogram-meat-milk-or-eggs.html   |     | kilogram-meat-milk-or-eggs.htm  | Incorporates animal nutrition to evaluate  |     |          |
|  |   | l          |     |  | https://research.wur.nl/en/public   |     | https://research.wur.nl/en/public   | the ultimate effect of changing rations  |     |          |
|  |   |            |     |  |   |     | https://research.wur.hi/en/public   |  |     |          |
|  |   |            |     |  | ations/methodology-used-in-   |     | ations/methodology-used-in-   | https://research.wur.nl/en/publications/m  |     |          |
|  | http://webapplicaties.wur.nl/soft   |            |     | Livestock (meat, milk and                                      |   |     |   |  |     |          |
| FeedPrint                                | http://webapplicaties.wur.nl/soft<br>ware/feedprintNL/index.asp   | Yes        | Yes |  | ations/methodology-used-in-   | Yes | ations/methodology-used-in-   | https://research.wur.nl/en/publications/m  | 41  | No       |
| FeedPrint                                |   | Yes        | Yes | Livestock (meat, milk and eggs)                                | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.nl/en/publications/m<br>ethodology-used-in-feedprint-a-tool-<br>guantifying-greenhouse-gas-e.<br>The tool uses a life cycle assessment  | 4 1 | No       |
| FeedPrint                                |   | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.nl/en/publications/m<br>ethodology-used-in-feedprint-a-tool-<br>quantifying-greenhouse-gas-e.<br>The tool uses a life cycle assessment<br>approach based on ISO standards and   | 4 1 | No       |
| FeedPrint                                | ware/feedprintNL/index.asp  | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.nl/en/publications/m<br>ethodology-used-in-feedprint-a-tool-<br>guantifying-greenhouse-gas-e.<br>The tool uses a life cycle assessment  | 4 1 | No       |
| FeedPrint                                | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do   | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.nl/en/publications/m<br>ethodology-used-in-feedprint-a-tool-<br>quantifying-greenhouse-gas-e.<br>The tool uses a life cycle assessment<br>approach based on ISO standards and   | 41  | No       |
| FeedPrint                                | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/documents/FootprintCategoryRule  | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.nl/en/publications/methodology-used-in-feedprint-a-tool-<br>quantifying-greenhouse-gas-e.<br>The tool uses a life cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.   | 4 1 | No       |
| FeedPrint                                | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do   | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | https://research.wur.ni/en/publications/methodology-used-in-feedprint-a-tool-<br>quantifying-greenhouse-gas-e. The tool uses a life cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation  | 4 1 | No       |
| FeedPrint                                | ware/feedprintNL/index.asp  http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf  | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-  | Yes | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-e  | https://research.wur.l/ne/publications/mu-<br>ethodology-used-in-dectorin-la-loot-<br>quantifying-greenhouse-gas-e.  The tood uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.  The tool uses different allocation<br>methods for different stages of the   | 41  | No       |
| FeedPrint                                | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d   | Yes        | Yes |  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee   | Yes | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  | https://research.wur.nlen/publications/methodology-used-in-feedprint-a-tool-<br>quartifying-greenhouse-gas-e . The tool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different   | 41  | No       |
|  | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio  | Yes        | Yes |  | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-ee   | Yes | ations/methodology-used-in-<br>feedprint-a-bol-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage<br>/ sequestration, nitrogen   | https://research.war./len/publications/multips/iresearch.war./len/publications/multips/iresearch/mediprint-a-lool-quantifying-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga   | 41  | No       |
| Footprint Category Rules for             | ware/feedprintNL/index.asp http://www.uecby.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/de efault/files/endr_publications/bio economy_factsheet-decision  |            |     | eggs)  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, weste,  |     | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage<br>/ sequestration, nitrogen<br>balance, energy use, water use,   | https://issearch.wur.n/len/publications/methodology-used-in-feedprint-e-tool-<br>quartitiving-greenhouse-gas-e . The tool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance do uncertainty   |     |          |
|  | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio  | Yes        | Yes |  | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions   | Yes | ations/methodology-used-in-<br>feedprint-a-bol-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage<br>/ sequestration, nitrogen   | https://research.war./len/publications/multips/iresearch.war./len/publications/multips/iresearch/mediprint-a-lool-quantifying-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga   | 4 ! |          |
| Footprint Category Rules for             | ware/feedprintNL/index.asp http://www.uecby.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/de efault/files/endr_publications/bio economy_factsheet-decision  |            |     | eggs)  | ations/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and  |     | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage<br>/ sequestration, nitrogen<br>balance, energy use, water use,<br>land use   | https://iseserch.wur.n/len/publications/methodiogyused-in-deedprint-e-lool-<br>quartifying-greenhouse-gas-e. The tool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance do uncertainty analysis and sensitivity analysis and sensitivity analysis  |     |          |
| Footprint Category Rules for             | ware/feedprintNL/index.asp http://www.uecby.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/de efault/files/endr_publications/bio economy_factsheet-decision  |            |     | eggs)  Beef, pork, lamb  | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, weste,<br>emissions Economic, energy and<br>agricultural development,   |     | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage  | https://research.wur.n/len/publications/multipsidology-used-in-dedprint-a-lool-<br>quartifying-greenhouse-gase-e<br>The fool uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation<br>methods for different stages of the<br>supply chain and different<br>environmental finances. The tool also<br>provides guidance on uncertainty<br>analysis and sensitivity analysis<br>Integrated assessment model of air  |     |          |
| Footprint Category Rules for<br>Red Meat | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategor/Rule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://liesearch.wur.n/len/publications/methodology-used-in-deciprint-a-tool-quantifying-greenhouse-gas-e.  The tool uses a life cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis and sensitivity analysis integrated assessment model of air pollutant and greenhouse gas emissions  | 1,0 | No       |
| Footprint Category Rules for             | ware/feedprintNL/index.asp http://www.uecby.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/de efault/files/endr_publications/bio economy_factsheet-decision  | Yes        |     | eggs)  Beef, pork, lamb  | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, weste,<br>emissions Economic, energy and<br>agricultural development,   |     | ations/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage  | https://research.wur.n/len/publications/miodiogyused-in-feedprint-la-tool-quartifying-greenhouse-gase-th-feedprint-la-tool-quartifying-greenhouse-gase-th-feed to less a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental Footprint category chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis integrated assessment model of air pollutant and greenhouse gas emissions and their interactions   |     | No       |
| Footprint Category Rules for<br>Red Meat | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategor/Rule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://iseserch.wur.n/len/publications/methodology-used-in-decdrint-la-doct-quartifying-greenhouse-gas-e.  The tool uses a life cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis integrated assessment model of air pollutant and greenhouse gas emissions and their interactions  GEME-21 is a multi-regional, multi-  | 1,0 | No       |
| Footprint Category Rules for<br>Red Meat | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategor/Rule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/en/publications/miodiogyused-in-dedprint-a-lool-<br>quartifying-greenhouse-gase-e<br>The fool uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation<br>methods for different stages of the<br>supply chain and different<br>environmental impacts. The tool also<br>provides guidance on uncertainty<br>analysis and sensitivity analysis<br>Integrated assessment model of air<br>pollutant and greenhouse gas emissions<br>and their interactions<br>GE-ME-3 is a multi-regional, multi-<br>sectoral, recursive dynamic computable  | 1,0 | No       |
| Footprint Category Rules for<br>Red Meat | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategor/Rule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/len/publications/methodology-usertify/research.wur.n/len/publications/methodology-usertify/regreen/bouse-gas-e-funded/mind-green/bouse-gas-e-funded/mind-green/bouse-gas-e-funded/mind-green/bouse-gas-e-funded/mind-green/sed-guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis integrated assessment model of air pollutant and green/house-gas emissions and their interactions CREME-3 is a multi-regional, multi-sectoral, recursive dynamic computable general equilibrium (COE) model that  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/len/publications/methodology-used-in-feedprint-la-tool-quartifying-greenhouse-gase-e The foot uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis in Integrated assessment model of air pollutant and greenhouse gas emissions and their interactions GEME-3 is a mutin-regional, mutin-sectoral, recursive dynamic computable general equilibrium (CGE) model that covers the interactions  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://lessearch.war./len/publications/methodology-usedtin/len/publications/methodology-usedtin/legotinita-leolog-<br>quantifying-greenhouse-gas-e The tool uses a life cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document. The tool uses different allocation<br>methods for different stages of the<br>supply chain and different<br>environmental impacts. The tool also<br>provides guidance on uncertainty<br>analysis and sensitivity analysis<br>Integrated assessment model of air<br>pollutant and greenhouse gas emissions<br>and their interactions<br>CENHE3 is a multi-regional, multi-<br>sectoral, recursive dynamic computable<br>general equilibrium (CSE) model that<br>covers the interactions between the<br>economy, the energy system and the   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://iesearch.wur.n/len/publications/mitodiogyusedni-needgorinal-atolo-quartifying-greenhouse-gasse-the footprint-lead-in-l | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur./len/publications/multips/lensearch.wur./len/publications/multips/lensearch/medgrint-a-lool-quantifying-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/en/publications/methodology-userfr/ing-greenhouse-gase-e-thodology-userfr/ing-greenhouse-gase-e-the foot in the Forduct Environmental Footprint Category Rules guidance document. The tool uses a fife cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different atages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis integrated assessment model of air pollutant and greenhouse gas emissions and their interactions CEE/ME-3 is a multi-regional, multi-sectoral, recurrencions covers the interactions between the economy, the energy system and the environment. It is especially designed to evaluate energy, climate and   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://lesearch.war./len/publications/methodology-usedf-in-feedprint-a-lool-quantifying-greenhouse-gase-ethodology-usedf-in-feedprint-a-lool-quantifying-greenhouse-gase-ethodology-usedf-in-greenhouse-gase-ethodology-greenhouse-gase-ethodology-greenhouse-gase-ethodology-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/len/publications/methodology-used-in-deadrint-a-tool-quartifying-greenhouse-gas-e-The foot uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty enalysis and sensitivity analysis in tegrated assessment model of air pollutant and greenhouse gas emissions and their interactions CEE/ME-3 is a multi-regional, multi-sectoral, recurrise dynamic computable general equilibrium (CGE) model that covers the interactions between the economy, the energy system and the environment. It is especially designed to evaluate energy, climate and environmental policies. It simulates the economic behaviour of various agents, etc.)  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodologu-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.war.ine/inpublications/methodology-used/in/ediprint-la-lool-quantifying-greenhouse-gase-ethodology-used-in-edegrint-la-lool-quantifying-greenhouse-gase-ethodology-use-gase-ethodology-use-gase-ethodology-in-la-lool-guarding-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/en/publications/methodology-used-in-eedgorina-t-aolog-<br>quartifying-greenhouse-gass-e. The tool uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation<br>methods for different stages of the<br>supply chain and different<br>environmental impacts. The tool also<br>provides guidance on uncertainty<br>enalysis and sensitivity analysis<br>integrated assessment model of air<br>pollutant and greenhouse gas emissions<br>and their interactions<br>ICE-ME-2 is a multi-regional, multi-<br>sectoral, recurrence of the<br>economy, the energy system and the<br>environment It is especially designed to<br>evaluate energy, climate and<br>environment It is especially designed to<br>evaluate energy, climate and<br>environmental policies. It simulates the<br>economic behaviour of various agents, etc.)<br>and the market equilibrium conditions<br>for all goods and services. It also   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://lessearch.war./len/publications/methodology-usedfin/len/grinel-aloo-quantifying-greenhouse-gase-ethodology-usedfin/len/grinel-aloo-quantifying-greenhouse-gase-ethodology-usedfin/greenhouse-gase-ethodology-usedfin/greenhouse-gase-ethodology-greenhouse-gase-ethodology-greenhouse-gase-ethodology-greenhouse-gase-ethodology-greenhouse-gase-gase-gase-gase-gase-gase-gase-ga  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://research.wur.n/en/publications/methodology-userfr/ing-greenhouse-gas-e-thodology-userfr/ing-greenhouse-gas-e-the tool toos a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty environmental impacts. The tool also provides guidance on uncertainty enabysis and sensitivity analysis  Integrated assessment model of air pollutant and greenhouse gas emissions and their interactions CRE-ME-D is a multi-regional, multi-sectoral, recurrised dynamic computable general equilibrium (CGE) model that covers the interactions between the economy, the energy system and the environment It is especially designed to evaluate energy, climate and environmental policies. It simulates the economic behaviour of various agents, etc.) and the market equilibrium conditions for all goods and services. It also accounts for the feedbacks between the economic system and the environment   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://lessearch.war./len/publications/methodology-usedrin/elegórinla-leolo-<br>quartifying-greenhouse-gase-et<br>thodology-usedrin/elegórinla-leolo-<br>quartifying-greenhouse-gase-et<br>The fool uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation<br>methods for different stepse of the<br>supply chain and different<br>environmental impacts. The tool also<br>provides guidance on uncertainty<br>analysis and sensitivity analysis<br>Integrated assessment model of air<br>pollutant and greenhouse gas emissions<br>and their interactions<br>GE-WE-3 is a multi-regional, multi-<br>sectoral, recursive dynamic computable<br>general equilibrium (CGE) model that<br>covers the interactions between the<br>economy, the energy system and the<br>environment II is especially designed to<br>evaluate energy, climate and<br>environmental policies. It simulates the<br>economic behaviour of various agents<br>(households, firms, guivernments, etc.)<br>and the market requilibrium conditions<br>for all goods and services. It also<br>accounts for the feedbacks between the<br>economic system and the environment  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprinta-bolo-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use, land use  GHG emissions, carbon storage / sequestration, air pollutant, health and ecosystem impacts   | https://research.wur.n/en/publications/methodology-userfr/ing-greenhouse-gas-e-thodology-userfr/ing-greenhouse-gas-e-the tool toos a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty environmental impacts. The tool also provides guidance on uncertainty enabysis and sensitivity analysis  Integrated assessment model of air pollutant and greenhouse gas emissions and their interactions CRE-ME-D is a multi-regional, multi-sectoral, recurrised dynamic computable general equilibrium (CGE) model that covers the interactions between the economy, the energy system and the environment It is especially designed to evaluate energy, climate and environmental policies. It simulates the economic behaviour of various agents, etc.) and the market equilibrium conditions for all goods and services. It also accounts for the feedbacks between the economic system and the environment   | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf                                    | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprint-a-lool-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration , air pollutant,   | https://lessearch.war./len/publications/methodology-usedrin/elegórinla-leolo-<br>quartifying-greenhouse-gase-et<br>thodology-usedrin/elegórinla-leolo-<br>quartifying-greenhouse-gase-et<br>The fool uses a file cycle assessment<br>approach based on ISO standards and<br>the Product Environmental Footprint<br>Category Rules guidance document.<br>The tool uses different allocation<br>methods for different stepse of the<br>supply chain and different<br>environmental impacts. The tool also<br>provides guidance on uncertainty<br>analysis and sensitivity analysis<br>Integrated assessment model of air<br>pollutant and greenhouse gas emissions<br>and their interactions<br>GE-WE-3 is a multi-regional, multi-<br>sectoral, recursive dynamic computable<br>general equilibrium (CGE) model that<br>covers the interactions between the<br>economy, the energy system and the<br>environment II is especially designed to<br>evaluate energy, climate and<br>environmental policies. It simulates the<br>economic behaviour of various agents<br>(households, firms, guivernments, etc.)<br>and the market requilibrium conditions<br>for all goods and services. It also<br>accounts for the feedbacks between the<br>economic system and the environment  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | warefeedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.eurona.eu/enrd/sites/d efault/fliesfenrd_publications/bio economy_factsheet-decision- support.pdf, https://gains.iiasa.ac.at/models/  | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG                    | alions/methodology-used-in-<br>feedprint-a-tool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and          | No  | ations/methodology-used-in-<br>feedprinta-bolo-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use, land use  GHG emissions, carbon storage / sequestration, air pollutant, health and ecosystem impacts   | https://research.wur.n/en/publications/methodology-userfr/ing-greenhouse-gas-e-thodology-userfr/ing-greenhouse-gas-e-the tool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis.  Integrated assessment model of air pollutant and greenhouse gas emissions and their interactions between the exception of the stage of the supply chain and the environment. It is especially designed to evaluate energy, climate and environment Is it especially designed to evaluate energy, climate and environment is it especially designed to evaluate energy, climate and environment in the supplications. It is supplied to a supplied to the encomorphism of the province of the control of the feedbacks between the reconomic system and the environment through energy use and GHG environment incomplements of the feedbacks between the encomic of the feedbacks between the encomonic system and the environment through energy use and GHG environments of the feedbacks between the ensistence.  | 1,0 | No       |
| Footprint Category Rules for<br>Red Meat | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do cuments/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/enrd_publications/bio economy_factsheet-decision- support.pdf, https://gains.iiasa.ac.at/models/ | Yes        | Yes | Beef, pork, lamb  All sectors that emit GHG and air pollutants | ations/methodology-used-in-<br>feedprinta-bolo-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, weste,<br>emissions Economic, energy and<br>agricultural development,<br>emission control potentials and<br>cost.  | No  | ations/methodology-used-in-<br>feedprinta-bolo-quantifying-<br>greenhouse-gas-e  GHG emissions, carbon storage / sequestration, nitrogen balance, energy use, water use,<br>land use  GHG emissions, carbon storage / sequestration, air pollutant,<br>health and ecosystem impacts   | https://research.wur.in/en/publications/murboology-usert/in/en/grein-teologi-usert/in/in-greenhouse-gas-e-theologi-usert/in/in-greenhouse-gas-e-the tool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis integrated assessment model of air pollutant and greenhouse gas emissions and their interactions computations and their interactions computation of the province of the sensitivity analysis in the green of the province of the sensitivity analysis of the province of the sensitivity analysis of the province of the sensitivity analysis of the province  | 1,0 | No       |
| Footprint Category Rules for Red Meat    | ware/feedprintNL/index.asp http://www.uecbv.eu/UECBV/do currents/FootprintCategoryRule sRedMeat16661.pdf https://ec.europa.eu/enrd/sites/d efault/files/end publications/bio economy factsheet-decision- support.pdf https://gains.iiasa.ac.at/models/  | Yes<br>Yes | Yes | Beef, pork, lamb  All sectors that emit GHG and air pollutants | ations/methodologu-used-in-<br>feedprints-bool-quantifying-<br>greenhouse-gas-ee  Feed, energy consumption,<br>water management, waste,<br>emissions  Economic, energy and<br>agricultural development,<br>emission control potentials and<br>cost. | No  | atlons/methodology-used-in-<br>feedprinta-bol-quantifying-<br>greenhouse-gas-e.  GHG emissions, carbon storage<br>/ sequestration, nitrogen<br>blance, energy use, water use,<br>land use  GHG emissions, carbon storage<br>/ sequestration, air pollutant,<br>health and ecosystem impacts  Economy, Energy system,<br>Environment, Climate change | https://insearch.wur.n/en/publications/mitodiopysus-din-feedprint-a-lool-quartifying-greenhouse-gase-thoology-use-din-feedprint-a-lool-quartifying-greenhouse-gase-the look of the product Fine fool uses a file cycle assessment approach based on ISO standards and the Product Environmental Footprint Category Rules guidance document. The tool uses different allocation methods for different stages of the supply chain and different environmental impacts. The tool also provides guidance on uncertainty analysis and sensitivity analysis in the analysis and sensitivity senarios such as carbon taxes, senarios such as carbon taxes,   | 1,0 | No<br>No |



|                             |                                   | 1    | I    |                              |                                    |      |  | A software tool and a set of algorithms                  |                          |      |
|-----------------------------|-----------------------------------|------|------|------------------------------|------------------------------------|------|--|--|--------------------------|------|
|                             |                                   |      |      |                              |                                    |      |  | that simulate whole farm                                 |                          |      |
|                             |                                   |      |      |                              |                                    |      | Net-greenhouse gas emission                                    | greenhouse/trace gas emissions                           |                          |      |
|                             |                                   |      |      |                              |                                    |      | (carbon dioxide - CO2, nitrous                                 | consistent with the International Panel                  |                          | 1    |
|                             |                                   |      |      |                              |                                    |      | oxide - N2O and methane CH4)                                   | on Climate Change (IPCC) emissions                       |                          |      |
|                             |                                   |      |      |                              | Data on climate, soil, crop, feed, |      | from farms as a function of                                    | quantification methodology modified to                   |                          |      |
|                             |                                   |      |      |                              | manure, fertilizer, irrigation,    |      | climate and management   | Canadian conditions and farming.                         |                          | 1    |
|                             |                                   |      |      |                              | tillage, machinery, prices, etc.   |      | practices  | Allows users to quantify, interpret and                  |                          | 1    |
|                             |                                   |      |      |                              | https://www.semanticscholar.org    |      | https://www.semanticscholar.org                                | compare alternative farm management                      |                          | 1    |
|                             |                                   |      |      |                              | /paper/GHGFarm%3A-a-               |      | /paper/GHGFarm%3A-a-   | scenarios and identify mitigation                        |                          | 1    |
|                             |                                   |      |      |                              | software-tool-to-estimate-and-     |      | software-tool-to-estimate-and-                                 | strategies   |                          |      |
|                             |                                   |      |      |                              | reduce-gas-                        |      | reduce-gas-  | https://www.semanticscholar.org/paper/                   |                          | 1    |
|                             |                                   |      |      |                              | Newlands/e8723810d669e07e8         |      | Newlands/e8723810d669e07e8                                     | GHGFarm%3A-a-software-tool-to-                           |                          |      |
|                             |                                   |      |      |                              | b6bcf91e7f8d63c5ce497cc            |      | b6bcf91e7f8d63c5ce497cc  | estimate-and-reduce-gas-                                 |                          | 1    |
|                             |                                   |      |      |                              | https://www.researchgate.net/pr    |      | https://www.researchgate.net/pr                                | Newlands/e8723810d669e07e8b6bcf91                        |                          | 1    |
|                             |                                   |      |      |                              | ofile/Nathaniel-                   |      | ofile/Nathaniel-   | e7f8d63c5ce497cc   |                          | 1    |
|                             |                                   |      |      |                              | Newlands/publication/23478919      |      | Newlands/publication/23478919                                  | https://www.researchgate.net/profile/Nat                 |                          |      |
|                             |                                   |      |      |                              | 3 GHGFarm a software tool t        |      | 3 GHGFarm a software tool t                                    | haniel-  |                          | 1    |
|                             |                                   |      |      |                              | o estimate and reduce net-         |      | o estimate and reduce net-                                     | Newlands/publication/234789193_GHG                       |                          | 1    |
|                             |                                   |      |      |                              | greenhouse gas emission fro        |      | greenhouse gas emission fro                                    | Farm a software tool to estimate and                     |                          | 1    |
| 1                           |                                   | 1    | 1    |                              | m_farms_in_Canada/links/54f0a      |      | m_farms_in_Canada/links/54f0a                                  | reduce_net-  |                          |      |
| 1                           |                                   | 1    | 1    |                              | 4e90cf2b36214aac37d/GHGFar         |      | 4e90cf2b36214aac37d/GHGFar                                     | greenhouse gas emission from farms                       |                          |      |
| 1                           | https://www.researchgate.net/fig  |      | 1    |                              | m-a-software-tool-to-estimate-     |      | m-a-software-tool-to-estimate-                                 | in_Canada/links/54f0a4e90cf2b36214                       |                          |      |
| 1                           | ure/Overview-of-the-GHGFarm-      |      | 1    | L                            | and-reduce-net-greenhouse-gas      |      | and-reduce-net-greenhouse-gas-                                 | aac37d/GHGFarm-a-software-tool-to-                       |                          |      |
| 1                           | emission-model-and-software-      | 1    | 1    | Various farming systems,     | emission-from-farms-in-            |      | emission-from-farms-in-  | estimate-and-reduce-net-greenhouse-                      |                          | j    |
| I                           | tool-addressing-multi-            | l    | l    | agricultural enterprises,    | Canada.pdf?origin=publication_     | l    | Canada.pdf?origin=publication_                                 | gas-emission-from-farms-in-                              |                          | I I  |
| GHGFarm                     | user fig1 234789193               | Yes  | Yes  | processes and products       | detail                             | Yes  | <u>detail</u>  | Canada.pdf?origin=publication_detail .                   | 4                        | No   |
|                             | https://foodandagricultureorgani  |      |      |                              |                                    |      |  |  |                          | 1    |
|                             | zation.shinyapps.io/GLEAMV3_      |      |      |                              |                                    |      |  |  |                          | 1    |
|                             | Public/ http://clh-               |      |      |                              |                                    |      |  | The model uses the IPCC methodology                      |                          | 1    |
|                             | ckan.apps.fao.org/dataset/tools-  |      |      |                              |                                    |      |  | and other peer-reviewed literature to                    |                          |      |
|                             | for-greenhouse-gas-               |      |      |                              |                                    |      |  | calculate greenhouse gas emissions                       |                          |      |
|                             | assessments/resource/eea2191      |      |      |                              |                                    |      |  | from different livestock systems based                   |                          |      |
|                             | 1-f7ae-449c-b8c5-                 |      |      |                              |                                    |      |  | on livestock numbers, animal                             |                          |      |
|                             | 65ff796850e7?inner_span=True      | 4    |      |                              | Livestock numbers, animal          |      |  | production, feed intake, manure                          |                          |      |
|                             |                                   |      |      |                              | production, GHG emissions and      |      |  | management and land use change. It                       |                          |      |
|                             | https://www.fao.org/fileadmin/us  |      |      |                              | emissions intensities by region,   |      | GHG emissions assessment                                       | also provides an interactive web                         |                          |      |
|                             | er_upload/gleam/docs/GLEAM        | l,,  | .,   |                              | production systems and source      |      | and mitigation for different                                   | application for data aggregation and                     |                          | l I  |
| GLEAM v 3.0 Dashboard       | 3.0 Model description.pdf         | Yes  | Yes  | Livestock                    | of emissions                       | No   | livestock systems  | visualization The model allows for a full account of all |                          | No   |
|                             |                                   |      |      |                              |                                    |      |  | agriculture and forestry GHG sources                     |                          |      |
|                             |                                   |      |      |                              |                                    |      |  | based on advanced IPCC methods. The                      |                          |      |
|                             |                                   |      |      |                              |                                    |      |  | model accounts for various land use                      |                          |      |
|                             |                                   |      |      |                              |                                    |      |  | activities such as crop production                       |                          |      |
|                             |                                   |      |      |                              |                                    |      | Some of the modelling  | (rainfed or irrigated), livestock                        |                          |      |
|                             |                                   |      |      |                              |                                    |      | parameters are demand and                                      | production (grazing or mixed), forest                    |                          |      |
| 1                           |                                   | 1    | 1    |                              |                                    |      | supply quantities, bilateral trade                             | management (plantation or natural),                      |                          | j    |
| 1                           |                                   |      | 1    |                              |                                    |      | flows, prices for commodities                                  | bioenergy production (first or second                    |                          |      |
| 1                           |                                   | 1    | 1    |                              | The data inputs include            |      | and natural resources, GHG                                     | generation), etc. The model also                         |                          | j    |
| 1                           |                                   | 1    | 1    |                              | population dynamics, income        |      | emissions from agriculture and                                 | accounts for various processing                          |                          |      |
| 1                           |                                   |      | 1    |                              | levels, food preferences,          |      |  | activities such as crop processing (food                 |                          |      |
| 1                           |                                   | 1    | 1    | wheat, rice, maize, soybean, |                                    |      | and sequestration in biomass                                   | or feed), livestock processing (meat or                  |                          | j    |
| 1                           |                                   |      | 1    | rapeseed, sugarcane, dairy   | and cover change, biophysical      |      | and sequestration in biomass<br>and soils, nitrogen balance in | dairy), forest processing (sawlogs or                    |                          |      |
| Global Biosphere Management | https://iiasa.ac.at/models-tools- | 1    | 1    | cattle, beef cattle, sheep,  | characteristics of land and soil.  |      | croplands and grasslands, water                                | pulpwood), bioenergy processing                          |                          |      |
| Model GLOBIOM               | data/globiom                      | Yes  | No   | goats, poultry, pigs,        | climate change scenarios, etc      | No   | use and availability   | (ethanol or biodiesel)                                   |                          | No   |
| WOOG, GEODIOW               | GattergeODIOIII                   | 1.03 | 1.00 | godio, poultry, pigo,        | land use, crop yields, livestock   | 110  | asc and availability   | Partial equilibrium model that covers the                | · '                      | 110  |
| 1                           |                                   | 1    | 1    |                              | production, forest management,     |      |  | competition for land use between                         |                          |      |
| 1                           | https://iiasa.ac.at/models-tools- | 1    | 1    |                              | trade consumption, GHG             |      |  | agriculture, forestry and bioenergy                      |                          | j    |
| GLOBIOM-G4M                 | data/globiom                      | No   | Yes  | Crops, Bioenergy, Forestry   | emissions                          | Yes  | GHG emissions  | sectors  |                          | No   |
| SESSIONI-G-IVI              | Gatter grotzioi i                 | 1    | 1.00 | Crops, Bioenergy, 1 orestry  | CITIOGOTTO                         |      | CI IC CITIBATORIA  | The model uses the IPCC methodology                      | · `                      | 1    |
| 1                           |                                   | 1    | 1    |                              |                                    |      |  | and other peer-reviewed literature to                    |                          |      |
| 1                           |                                   |      | 1    |                              | Crop type , soil type, irrigation, |      | Nitrous oxide (N2O) emissions                                  | calculate nitrous oxide emissions from                   |                          |      |
| GNOC- Global Nitrous Oxide  |                                   | 1    | 1    |                              | fresh yield, mineral fertilizer ,  |      | from soil associated with biofuel                              | soil based on crop type, soil type,                      |                          |      |
| Calculator                  | https://gnoc.jrc.ec.europa.eu/    | Yes  | Yes  | Biofuel crops                | manure                             | No   | crop production  | irrigation and nitrogen inputs                           |                          | No   |
| - Caronator                 | pos.gnoc.jic.ec.europa.eu/        | 1.53 | 1.50 | Diolasi Gropa                | - Indiana                          |      | or op production   | Uses a mixture of Tier 2 and Tier 3                      |                          | 1    |
| 1                           |                                   | 1    | 1    |                              |                                    |      |  | methodologies, considers direct and                      |                          |      |
| 1                           |                                   | 1    | 1    |                              |                                    |      |  | indirect emissions of CH4, N2O and                       |                          |      |
| I                           | https://www.sciencedirect.com/s   | 1    | 1    | I                            | Farm-scale data of soil physical   | 1    | GHG emissions, soil C changes.                                 | CO2, estimates soil C emissions using                    |                          |      |
| 1                           | cience/article/pii/S00220302077   |      | 1    | Dairy and beef production    | characteristics, weather, and      |      | N losses, crop and livestock                                   | the Introductory Carbon Balance Model                    |                          |      |
| HolosNor                    | 20039                             | No   | Yes  | systems in Norway            | farm operations                    | Yes  | production   | (ICBM)   | No information available | No   |
|                             | In pilot testing phase so doesn't |      | 1.00 | System in Hornay             |                                    | 1.55 | p  |  |                          | ļ''' |
| HortZero                    | have one yet                      |      | Yes  | Horticulture                 |                                    | Yes  | GHG emissions  |  |                          | No   |
|                             |                                   |      |      |                              |                                    |      |  |  |                          |      |



| International Control of the Control |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
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| Deficiency of the property of  |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| APPLICATION TO THE PRIVATE AND |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
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| April 1 February 1 Status Market Individual Control of Horizon Status St |                                    |  |      |       |                             |                                 |       |  | integrates a suite of ten sectoral models |                          |       |
| APPERISSOR I legislated supplied scheduling and suppli |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| ABSCRATE AND I AND ADDRESS AND |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| MRESEDIO ROYALE Version (Part 1997)  Version (Part  |                                    |  |      |       |                             |                                 |       |  | on various indicators of human well-      |                          |       |
| MRESESTORY (account) Protection (Army of the control of the contro |                                    |  |      |       |                             | Climate scenarios, Socio-       |       | Climate change impacts,  | being. It also provides options for       |                          |       |
| Assessment Parform (MPC)  Assessment Parform | IMPRESSION Integrated              | http://www.highendsolutions.eu/  |      | 10000 | Agriculture, Forests,       | economic scenarios, Land use,   |       | Vulnerability, Adaptation,   | adaptation and mitigation measures and    |                          |       |
| The fluinted case cath as a labelian control to a fluing on the control of the co | Assessment Platform (IAP2)         |  | Yes  | Yes   | Biodiversity                | Management practices, etc.      | No    | Ecosystem services   | evaluates their costs and benefits.       |                          | 3 No  |
| INCAN SOCIATION TO A SECURITY OF THE PROPERTY  |                                    |  |      |       |                             |                                 |       |  | The model simulates the sources,          |                          |       |
| PROCA NO. CONTROL 1999 May 199 |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| INCOATION  INTEGRATOR  INTEGRA |                                    | and the second s |      |       |                             |                                 |       |  |   |                          |       |
| NICHAL M. SCORPLOSES 1. No. Yes Sherr systems on progen sources and sinks to M. Stronger sources an |                                    | https://catalogue.ceh.ac.uk/docu   |      |       |                             |                                 |       |  |   |                          |       |
| Content of Fam System Mode   Content of Fam   |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Climate and continued and provided to Assess the Integrated monotory of the Continued  | INCA-N                             | 960d0c2b6b14   | No   | Yes   | River systems               | nitrogen sources and sinks      | No    | Nitrogen dynamics  | fluxes                                    |                          | 3 No  |
| Integrated Farm System Mode  PSM  West Vision Daily and Based  Copy and Based  |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| make consummation of internations and international control of the construction of the | 1                                  | I  | 1    | 1     |                             | I                               |       |  |   | I                        | 1     |
| Integrated model to Assess the Titles Award of Reference and the American School registers and the Colores and | 1                                  |  |      |       | I                           | I                               |       |  |   | I                        |       |
| The control of Assess the stock flower and development and provides an | 1                                  |  |      |       | I                           | I                               |       |  | area/up-pa/pswmru/docs/integrated-        | I                        |       |
| Clinate, soil crop, feed, manufactured from system model  Integrated Farm System Model  Integrat |                                    |  |      |       |                             |                                 |       |  |   | 1                        |       |
| Girners oid cross feed, measure, feedbast register, feedbast constructions of the process and the process of th | 1                                  |  |      |       | I                           | I                               |       |  |   |                          |       |
| Climate, soil, crop, feed, manure, fieldizer, rigards, collection, manure, fieldizer, fieldizer, fieldizer, fieldizer, manure, fieldizer, field |                                    |  |      |       |                             |                                 |       | Taylor to the same to the  |   |                          |       |
| Section of the content of the cont   |                                    |  |      |       |                             |                                 |       | GHG emissions, nutrient flows,   |   |                          |       |
| Integrated Form System Mode   Corps and Entire New Part    |                                    |  |      |       |                             |                                 |       |  |   | 1                        |       |
| integrated Farm System Model  Application and a second process of the parties of the process of the parties of  |                                    |  |      |       |                             |                                 |       | use, manure production and   |   |                          |       |
| Climate, soil, conjection, markers, trefficer, irregation, all and power states according model fame areas according model fame areas according model fame areas according model fame. The property of the pro |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Bases, machiner, prices, etc.    Bases, machiner, prices, etc.   Bases, prices, prices, prices |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Bittos: //www.ars.uscia.gov/morthe asternatives.com/morthe asternatives.com/   |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| https://www.usr.usda.gov/nothes als-sravaur_ ans.usda.gov/nothes ans.usda.gov/nothes als-sravaur_ ans.usda.gov/nothes als-sravaur_ ans.usda.gov/nothes ans. |                                    |  |      |       |                             |                                 |       | ast-area/up-   | area/up-pa/pswmru/docs/integrated-        |                          |       |
| integrated Farm System Model  Integr |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Integrated Farm System Model  Integr |                                    |  |      |       |                             |                                 | 2     |  |   |                          |       |
| Integrated Farm System Mode  Integrated Farm  |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Integrated Farm System Mode  IPSM)  Ves  Ves  Ves  Daily and Beef  Integrated farm system model  Ips My was permitted farm system model  Integrated farm sys |                                    | per de la companya del companya de la companya de la companya del companya de la companya del la companya del la companya de l |      |       |                             |                                 |       |  |   |                          |       |
| Integrated Farm System Model   System-model   Yes   Ves   Daily and Beef   film   Yes   Pes   Pes   Daily and Beef   film   Yes   Pes   Pes   Daily and Beef   film   Yes   Daily and Beef   film   Yes   Pes   Pes   Daily and Beef   film   Yes   Pes   Daily and Beef   film   Yes   Pes   Pes   Daily and Beef   film   Yes   Pes   Pes   Daily and Beef   film   Yes   Daily and Beef   film   Yes   Pes   Daily and Beef   film   Yes   Pes   Daily and Beef   film   Yes   Daily and Beef   f   |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| (IFSM) system-model. Ves Ves Dary and Beef Ifsm Ves Integrated-farm-system-model. Its model consists of 13 submodels that over offiteral aspects of the human-environment system such as Global Environmental (IMAGE) ut-lange Ves Ves Ves systems at the global level consorting the systems at the global level consorting the systems at the global level of the systems at the global level consorting the systems and the systems and the systems at the global level of the systems and the systems of the systems and the systems of the systems and the systems of the systems | and the second real for the second | ast-area/up-   |      |       |                             |                                 |       | https://www.agmrv.org/knowledg   | https://www.ars.usda.gov/northeast-       |                          |       |
| The model consists of 13 submodels that cover different aspects of the human-environment system such as energy use, climate charge socio-according systems and a veter use, climate policy, terrestrial and aveter use, climate policy terrestrial and aveter use, climate policy terrestrial and aveter use, climate policy, terrestrial  |                                    |  |      | 100   | and the same                |                                 | 650   |  |   |                          |       |
| that cover different aspects of the human-environmental system such as energy supply and demand, land and well-being, sustainability issues, election of the human-environmental and aquatic cosystems. he model can be energy supply and demand, land and well-being, sustainability issues, election of the human particular special consists of the particular special consists of the human particular special consists of the particular special consists of the human particular special consists of the particular special consists of the human particular special consists of the | (IFSM)                             | system-model/_   | Yes  | Yes   | Dairy and Beef              | <u>ifsm</u>                     | Yes   | integrated-farm-system-model/  | farm-system-model/.                       | -                        | 4 No  |
| Integrated model to Assess the clicibal Environmental (MACE)  Ves Yes Crops and livestock systems at the global level sociation and pattern control of this provides and pattern control of this provides and pattern control of the pattern cont |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Integrated model to Assess the Clobal Environmental (IMAGE) ut-image very systems at the global level Global Environmental (IMAGE) ut-image very systems at the global level Global Environmental (IMAGE) ut-image very systems at the global level systems at the global level very systems at the global very systems at the global level very systems at the global leve |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| water use, climate policy, terrestrial and aquice cosystems, he model can be lused to explore different scenarios and well-being, sustainability issues, etc.  Yes Yes systems at the global level commit (MAGE) ut-limage Yes control (Crops and levestock systems at the global level Scenarios, policies, etc.  No Yes distribution of this policy femoral impacts, human well-being, sustainability issues, etc.  No Yes distribution of this policy terrestrial and aquice cosystems, he model can be used to explore different scenarios and well-being, sustainability issues, etc.  No Yes distribution of this policy terrestrial and aquice cosystems, he model can be used to explore different scenarios and well-being, sustainability issues, etc.  No Yes distribution of this policy terrestrial and aquice cosystems, he model can be used to explore different scenarios and well-being, sustainability issues, etc.  No Yes distribution of this policy terrestrial and aquice cosystems, he model can be used to explore different scenarios and business of the push  |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Integrated model to Assess the https://www.pbl.ni/enginege/abo ul-image  Ves Yes systems at the global level ves vystems at th |                                    |  |      |       |                             |                                 |       |  |   |                          |       |
| Integrated model to Assess the Global Environmental (IMAGE)  INTEGRATOR  INTEG |                                    |  |      |       |                             |                                 |       |  |   | 1                        |       |
| Integrated model to Assess the Global Ervironmental (IMAGE)  Ves Ves systems at the global level of systems at the global level of systems at the global level of security of the global level of specific security of the global level of specific security of the global level of systems at the global level of systems at the global level of systems at the global level of specific security of the global level of systems at the global level of specific security of specific security of the global level of the gl | 1                                  |  |      | 1     |                             |                                 |       |  |   | I                        | 1     |
| Significant (IMAGE) ut-image   |                                    |  |      |       | 0                           |                                 |       |  |   | 1                        |       |
| NTEGRATOR   https://edepot.wur.nl/192673   No  |                                    |  | lv   |       |                             |                                 | Maria | weil-being, sustainability issues,   |   | 1                        |       |
| Various (crops, livestock, dairy, etc.)  No Yes districtions, form code, sensors, statellites, drones, etc.  Various (crops, livestock, dairy, etc.)  Integration in https://edepot.wur.ni/192673  No Yes districtions, statellites, drones, etc.  Various (crops, livestock, dairy, etc.)  No Yes districtions, statellites, drones, etc.  Various (crops, livestock, dairy, etc.)  No Yes districtions, statellites, drones, etc.  Ves impact, etc.  The model provides a software for developing and reporting national GHG inventories using the 2006 IPCC Guidelines. The software consists of worksheets for data ertry and calculation, quality control checks, sessessment for all sectors using the 2006 IPCC Guidelines. The software consists of worksheets for data ertry and calculation, quality control checks, severate and data availability  The model provides a software for developing and reporting national GHG inventories using the 2006 IPCC Guidelines. The software consists of worksheets for data ertry and calculation, quality control checks, severate and alta availability and reporting tables.  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon values  Any sector that involves degradation, biomass or carbon v | Giodai Environmental (IMAGE)       | ut-image   | res  | res   | systems at the global level | scenanos, policies, etc.        | INO   | etc.   |   | -                        | 3 NO  |
| INTEGRATOR    https://dedepot.wur.nl/192673   No   Yes   Various (crops, livestock, dairy, etc.)   farm records, sensors, stellites, drones, etc.   Yes   impact, etc.   The model provides a software for developing and reporting national GHG inventories using the 2008 IPCC Guidelines. The software consists of worksheets for date entry and sessements/resource/2r03a03 - 94fdd-4125-9045- 96c3378e6317inner_span=Tru   Software   Yes   Yes   Any sector that involves deforestation and forest   Any sector that involves   degradation   https://forbs.ir.e.e.e.europa.eu/fol   Yes   Yes   degradation   https://forbs.ir.e.e.europa.eu/fol   Transport, industry,   Energy technologies, building   Softage/9 sequestration, energy   software consists of worksheets for date entry and software consists of worksheets for date entry and sections using the 2008 IPCC Guidelines. The software consists of worksheets for date entry and seasons and removals assessment for all sectors using the 2008 IPCC Guidelines. The software consists of worksheets for date entry and seasons and removals assessment for all sectors using the software consists of worksheets for date entry and seasons and removals assessment for all sectors using the software consists of worksheets for date entry and seasons and removals assessment for all sectors using the software consists of worksheets for date entry and sectors using the software consists of worksheets for date entry and sectors using the software consists of worksheets for date entry and sectors using the software consists of worksheets for date entry and sectors using the software consists of worksheets for date entry and sectors using the 2008 IPCC Guidelines. The software consists of worksheets for d |                                    |  |      |       |                             | V                               |       | Vield soulity seeds sour   |   | 1                        |       |
| INTEGRATOR  https://www.ru/t192673 https://ww | 1                                  | I  | 1    | 1     | Maniana (anna Birani        |                                 |       |  |   | I                        | 1     |
| https://www.ipcc- nggip.iges.or.jp/software/index.h tml —— http://ch- ckan.apps.fao.org/dataset/tools- for-greenhouse-gas- assessments/resource/2/d3da/3 specified-3/d2-59045- software  IPCC 2020. IPCC Inventory | INITEODATOR                        |  | la.  | \v    |                             |                                 | V     |  |   |                          | dhi-  |
| ngipi.ges.or.jp/software/index.html —— http://chn-chan apps.fao.org/dataset/lools-for-greenhouse-gas-sessements/resource/zldabas gassessments/resource/zldabas gassessment for all sectors using three zone read and the zone zone zone zone zone zone zone zon  | INTEGRATOR                         |  | IND  | res   | uairy, etc.)                | saterities, grones, etc.        | 162   | impact, etc.   | auvisors                                  | -                        | 4 140 |
| tml — http://clin. ckm.anps.fa.ourg/adsates/floots- for-greenhouse-gas- assessments/resource/zidaba3 assessment for all sectors using uncertainty analysis, key category analysis and reporting tables  Town modules, CartEF and ForestER, to the programming optimization algorithm that simultaneously solvers of the optimum investment portfolio of energy the programming op | 1                                  |  | 1    | 1     |                             | I                               |       |  | The model provides a software for         | I                        | 1     |
| ckan apps fao org/dataset/foots- for-greenhouse-gras- assessments/recource/2(d3ab3 9-dfdd-4325-9045- Software  Yes  Yes  Ary sector that involves deforestation and forest degradation  Intellige for tode/carbon emissions php  Yes  Yes  Yes  Yes  Ary sector that involves deforestation and forest degradation  Intellige for tode/carbon emissions php  Yes  Yes  Yes  Yes  Ary sector that involves deforestation and forest degradation  Intellige for tode (agradation) biomass or carbon values  Ary sector that involves deforestation and forest degradation  Intellige for tode (agradation) biomass or carbon values  Ary sector that involves deforestation and forest degradation  Intellige for tode (agradation) biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon values  Ary sector that involves deforestation and forest degradation biomass or carbon va |                                    | tml http://olb   | 1    |       |                             |                                 |       |  |   | 1                        |       |
| for-greenhouse-gas-assessments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesments/resource/2rd3ab3 sessesment for all sectors and data assessment for all sectors undertainty analysis, key category analysis and reporting tables 5 No service degradation to inforest area or in thitps://forobs.jrc.ec.europa.eu/if orce/carbon emissions.php   | 1                                  |  |      |       | I                           | I                               |       |  |   | I                        |       |
| assessments/resource/20/3ab3 ye/dd-4/32/5-9/045- 96c3378e31?inner_span=Tru e  Yes  Yes  Any sector that involves deforestation and forest degradation of troget degradation and forest degradation  Any sector that involves deforestation and forest degradation  Any sector that involves deforestation and forest degradation  | 1                                  |  |      |       | I                           | I                               |       |  |   | I                        |       |
| PCC 2020, IPCC Inventory Software  Yes  Any sector that involves deforestation and forest degradation to remissions. php Yes  Yes  Any sector that involves deforestation and forest degradation to https://data.jrc.ec.europa.eu/oll  Any sector that involves deforestation and forest degradation to https://data.jrc.ec.europa.eu/oll  Any sector that involves deforestation and forest degradation to https://data.jrc.ec.europa.eu/oll  Any sector that involves deforestation and forest degradation to https://data.jrc.ec.europa.eu/oll  Any sector that involves deforest degradation to biomass or carbon values  Any sector that involves deforest degradation, biomass or carbon values  Any sector that involves deforest degradation, biomass or carbon values  No emissions and removals assessment for all sectors using uncertainty analysis, key category analysis and reporting tables  Two modules, CarbEr and ForestER, to large and forest degradation to biomass or carbon values  No emissions entermovals assessment for all sectors using uncertainty analysis, key category  Two modules, CarbEr and ForestER, to large and forest degradation to biomass or carbon values  No emissions entermovals assessment for all sectors using uncertainty analysis, key category  Two modules, CarbEr and ForestER, to large and forest degradation to biomass or carbon values  No information available  No office missions and removals  The pock of degraded forest degradation to biomass or carbon values  No information available  No office missions and removals assessment for all sectors using uncertainty analysis, key category  The pock of degraded forest degradation to biomass or carbon values  No information available  No office missions and removals  The pock of degraded forest degradation to biomass or carbon values  No information available  No office missions and removals  The pock of degraded forest degradation to biomass or carbon values  The tool uses a linear programming optimization algorithm that simulations are advanced in the possible of degraded  | ass                                |  |      |       | I                           | I                               |       |  |   | I                        |       |
| GHG inventory system for all sectors send data assessment for all sectors using uncertainty analysis, key category availability not the IPCC methodology analysis and reporting tables 5 No  |                                    | 0 dtdd 4225 0045   | 1    | 1     |                             | not enocified, depends on       |       | CHC omissions and romavala   |   | I                        | 1     |
| Software e Yes Yes all sectors availability No the IPCC methodology analysis and reporting tables 5 No  Any sector that involves deforestation and forest degradation, orce/carbon emissions, php Yes Yes degradation and forest degradation to biomass or carbon values No emissions expressed in IC/ha of this pick-hased maps of forest area change and forest degradation to biomass or carbon values No emissions expressed in IC/ha of the IPCC methodology analysis and reporting tables 5 No  Two modules, CarbE and ForestER, to link pixel-based maps of forest area change and forest degradation to biomass or carbon values No emissions expressed in IC/ha of the IPCC methodology analysis and reporting tables 5 No  Two modules, CarbE and ForestER, to link pixel-based maps of forest area change and forest degradation to emissions expressed in IC/ha of the IPCC methodology analysis and reporting tables 5 No  Two modules, CarbE and ForestER, to link pixel-based maps of forest area change and forest degradation to emissions expressed in IC/ha of the IPCC methodologies and the IPCC methodologies and the IPCC methodologies and reporting tables 7 No  Two modules, CarbE and ForestER, to link pixel-based maps of forest area change and forest degradation to emissions expressed in IC/ha of the IPCC methodologies and the IP | IPCC 2020 IPCC Inventory           |  |      |       | GHG inventory system for    | national circumstance and data  |       |  |   | 1                        |       |
| Any sector that involves deforestation and forest degradation biomass or carbon values  Any sector that involves deforestation and forest degradation, biomass or carbon values  Yes  Any sector that involves deforestation and forest degradation, biomass or carbon values  Yes  Any sector that involves deforestation and forest degradation, biomass or carbon values  Yes  Any sector that involves deforestation and forest degradation, biomass or carbon values  No emissions expressed in IC/ha  The bot uses a linear programming optimization algorithm that simultaneously solves for the optimum investment portfolio of energy  Intelligence europa eu/oil  Transport, industry,  Emissions in forest area or in Two modules, CarbEF and ForestER, to area of degraded forest degradation to biomass or carbon values  No emissions expressed in IC/ha  The bot uses a linear programming optimization algorithm that simultaneously solves for the optimum investment portfolio of energy  Intelligence europa eu/oil   |                                    | o socoo reliner_span=1ru   | Voc  | Vos   |                             |                                 |       |  |   | 1                        | 5 No. |
| Any sector that involves deforest area change and forest atera change and forest atera change and forest degradation, or carbon values  Pixel Desaed maps of forest area change and forest degradation, or carbon values  Yes Yes degradation  No information available  No Ostantial Transport, industry  Transport, industry, Energy technologies, building storage sequestration, energy technologies and their operation under  | Software                           | e  | 169  | 165   | an acciois                  | avanavility                     | INO   |  |   | _                        | JINO  |
| And Carbon Calculator by the street of the s |                                    |  |      | 1     | Any sector that involves    | Pivel-based mans of forcet area |       |  |   | 1                        |       |
| JRC Carbon Calculator orce/carbon emissions.php Ves Ves degradation biomass or carbon values No emissions expressed in tC/ha biomass or carbon values No information available No The tool uses a linear programming optimization algorithm that simultaneously solves for the optimum investment portfolio of energy https://data.jrc.ec.europa.eu/coll Transport, industry, Energy technologies, building storage/sequestration, energy  |                                    | https://forobs.irc.ec.europa.eu/if   |      |       |                             |                                 |       |  |   | 1                        |       |
| The tool uses a linear programming optimization algorithm that simultaneously solves for the optimum investment portfolio of energy https://data.jrc.ec.europa.eu/coll  Transport, industry, Energy technologies, building storage/ sequestration, energy technologies and their operation under   | JRC Carbon Calculator              |  | Yes  | Yes   |                             |                                 | No    |  |   | No information available | No    |
| optimization elgorithm that simultaneously solves for the optimum investment portfolio of energy https://data.jrc.ec.europa.eu/coll Transport, industry, Energy technologies, building storage/sequestration, energy technologies and their operation under  | o, to carbon calculator            | отостолно списаюна.рпр   | 1.03 | 1.00  | ocgradation                 | Diomission of Carpon values     |       | Company of the Compan |   |                          | 110   |
| simultaneously solves for the optimum investment portfolio of energy https://data.jrc.ec.europa.eu/coll  Transport, industry, Energy technologies, building storage/ sequestration, energy technologies and their operation under  | 1                                  |  |      |       | I                           | I                               |       |  |   | I                        |       |
| GHG emissions, carbon investment portfolio of energy technologies, building storage/ sequestration, energy technologies and their operation under  | 1                                  |  |      |       | I                           | I                               |       |  |   | I                        |       |
| https://data.jrc.ec.europa.eu/coll Transport, industry, Energy technologies, building storage/ sequestration, energy technologies and their operation under  | 1                                  |  |      |       | I                           | I                               |       | GHG emissions carbon   |   | I                        |       |
| Transport, mades y, Errorgy commongree, saming contages expectation, criergy transmissions and main operation in their operation in their operations.  | 1                                  | https://data.irc.ec.europa.eu/coll   |      |       | Transport industry          | Energy technologies, building   |       |  |   | I                        |       |
| JRC-EU-TIMES Lection/id-00287 Lyes Lyes Lagriculture Lylock No Idemand and supply Idifferent sets of assumptions 1 31No  | JRC-EU-TIMES                       | ection/id-00287  | Yes  | Yes   | agriculture                 | stock                           | No    | demand and supply  | different sets of assumptions             |                          | 3 No  |



|                                      |                                   |                | I              |                             |  |     | Climate change adaptation crop                     |  |                          |       |
|--------------------------------------|-----------------------------------|----------------|----------------|-----------------------------|--|-----|--|--|--------------------------|-------|
| Klimaatstresstest                    | https://edepot.wur.nl/517290      | Yes            | No             | Crops;Aniek de Jong         |  | Yes | impact and measures                                |  |                          | 1 No  |
| Klimrek<br>KLIR = Klimaschonende und | www.klimrekproject.be             | No             | No             | Dairy;Pigs;Horticulture     |  | Yes | GHG emissions                                      | and  |                          | Yes   |
| Ressourceneffiziente                 | pas de site pour l'outil KLIR (en |                |                |                             |  |     |  |  |                          |       |
| Milchproduktion                      |                                   | No             | No             | Dairy                       |  | Yes | GHG emissions                                      |  |                          | Yes   |
|                                      | ,                                 |                | 1              |                             |  |     |  | The tool uses a life cycle assessment                                |                          | 1     |
|                                      |                                   |                |                |                             |  |     |  | approach that simulates the nutrient                                 |                          |       |
|                                      |                                   |                |                |                             | Soil analysis, feed analysis,                        |     | GHG emissions;Nitrogen                             | flows and GHG emissions from different                               |                          |       |
| Kringloopwijzer                      | www.mijnkringloopwijzer.nl        | No             | No             | Dairy                       | manure   | Yes | balance  | sources and sinks on the farm.                                       | No information available | Yes   |
|                                      |                                   |                |                |                             |  |     |  | LandscapeDNDC is a simulation<br>framework for terrestrial ecosystem |                          |       |
|                                      |                                   |                |                |                             |  |     |  | models on site and regional scales.                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | LandscapeDNDC emerged from the site                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | scale model MoBiLE, which was based                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | on the Arable-DNDC and Forest-DNDC                                   |                          |       |
|                                      |                                   |                |                |                             |  |     |  | models. The modular design of  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | LandscapeDNDC allows plugging in any                                 |                          |       |
|                                      |                                   |                |                |                             | Meteorological data, soil data,                      |     |  | choice of process descriptions for                                   |                          |       |
|                                      |                                   | l              | l.,            |                             | land use data, management                            |     | / sequestration, Nitrogen                          | various parts of different natural                                   |                          | .l I  |
| LandscapeDNDC                        | https://ldndc.imk-ifu.kit.edu/    | No             | Yes            | Crops, Grassland, Forest    | data   | No  | balance, Water balance                             | ecosystems.  LandscapeDNDC-MeTrx is a sub-model                      |                          | 3 No  |
| 1                                    |                                   |                |                |                             |  |     |  | of LandscapeDNDC that simulates                                      |                          |       |
|                                      |                                   |                |                |                             |  |     |  | carbon and nitrogen cycle of soils.                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | Focus lies on the production and                                     |                          |       |
|                                      |                                   |                |                |                             |  |     |  | consumption of the greenhouse gases                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | CO2, CH4 and N2O. Therewith related                                  |                          |       |
|                                      |                                   |                |                |                             |  |     |  | outputs include leaching of NO3 and                                  |                          |       |
|                                      | https://ldndc.imk-                |                |                | Main agricultural and       | Meteorological data, soil data,                      |     |  | emissions of NH3.https://ldndc.imk-                                  |                          |       |
|                                      | ifu.kit.edu/doxy/ldndc/doc/html/  | l              | l.,            | farming target: Crops,      | land use data, management                            |     | / sequestration, Nitrogen                          | ifu.kit.edu/doxy/ldndc/doc/html/metrx.ht                             |                          | .l I  |
| LandscapeDNDC-MeTrx                  | metrx.html                        | No             | Yes            | Grassland, Forest           | data   | No  | balance, Water balance                             | ml The model covers all agricultural                                 |                          | 3 No  |
|                                      |                                   |                |                |                             |  |     |  | sectors and considers the special                                    |                          |       |
|                                      |                                   |                |                |                             |  |     |  | features and trends of each sector. The                              |                          |       |
|                                      |                                   |                |                |                             | Historical data on agricultural                      |     |  | model can also assess the impacts of                                 |                          |       |
|                                      |                                   |                |                | Agricultural production,    | sectors, medium-term price                           |     |  | changes in climate, markets, and policy                              |                          |       |
|                                      |                                   |                |                | greenhouse gas emissions,   | projections for agricultural                         |     |  | on agricultural production, greenhouse                               |                          |       |
| Latvian Agricultural Sector          |                                   |                |                | food security, policy       | products in the EU, changes in                       |     | Econometric, recursive, multi-                     | gas emissions, food security, and rural                              |                          |       |
| Analysis Model (LASAM)               | https://lasam.llu.lv/             | Yes            | Yes            | analysis                    | support policy, resource use                         | No  | period scenario model                              | development  |                          | No    |
|                                      |                                   |                |                |                             |  |     |  | MAGICC is a reduced complexity model                                 |                          |       |
|                                      |                                   |                |                |                             |  |     |  | that approximates the behaviour of                                   |                          |       |
|                                      |                                   |                |                |                             |  |     |  | more complex Earth system models. It                                 |                          |       |
|                                      |                                   |                |                |                             |  |     |  | consists of a set of coupled differential                            |                          |       |
|                                      |                                   |                |                |                             |  |     |  | equations that describe the carbon                                   |                          |       |
|                                      |                                   |                |                |                             |  |     |  | cycle, atmospheric chemistry, climate                                |                          |       |
|                                      |                                   |                |                | Global model that simulates |  |     |  | and sea level. It allows for exploring the                           |                          |       |
| 1                                    |                                   |                |                | climate system and its      | Emissions scenarios, climate                         |     |  | implications of different emissions                                  | 1                        |       |
| MAGICO                               | Lu///                             | l <sub>v</sub> | l <sub>v</sub> | interactions with GHG and   | sensitivity, radiative forcing,                      | NI- | / sequestration, global mean                       | pathways and policy scenarios for future                             |                          | .l    |
| MAGICC                               | https://magicc.org/               | Yes            | Yes            | other pollutants            | carbon cycle feedbacks                               | No  | temperature, sea level rise.                       | climate change and its uncertainty  Dynamic recursive model with 13  |                          | 3 No  |
| 1                                    | 1                                 |                |                |                             |  |     |  | regions and 28 sectors; land use                                     | 1                        |       |
| 1                                    |                                   |                |                |                             |  |     |  | change module based on biophysical                                   | 1                        |       |
| 1                                    |                                   |                |                |                             | Global Trade Analysis Project                        |     | GHG emissions, carbon                              | and economic drivers; GHG emissions                                  | 1                        |       |
| 1                                    | https://www.worldscientific.com/  |                |                | Crops (such as corn,        | (GTAP) database, FAOSTAT                             |     | storage/sequestration, nitrogen                    | module based on IPCC guidelines;                                     | 1                        |       |
| 1                                    | doi/abs/10.1142/S20100078125      |                |                | sugarcane, wheat, soybean,  | database, International Energy                       |     | balance, economic performance                      |  | 1                        |       |
| MIRAGE-BIOF                          | 00170                             | No             | Yes            | rapeseed, palm oil, etc.)   | Agency (IEA) database, etc.                          | No  | assessment   | on welfare indicators  |                          | 3 No  |
|                                      |                                   |                |                |                             | Various data sources, such as                        |     |  |  |                          |       |
| 1                                    |                                   |                |                | Mandaura dannara Buranda .  | CAPRI model outputs, GAINS                           |     | Nitrogen losses, phosphorus                        | A model that integrates the effects of                               | 1                        |       |
| 1                                    | 1                                 |                |                | Various (crops, livestock,  | model outputs, soil type,<br>climate, land use, etc. |     | balances, ammonia emissions,                       | policies and measures on nitrogen and                                | 1                        |       |
| MITERRAEUROPE                        | https://edepot.wur.nl/192673      | No             | Yes            | dairy, etc.)                | ciimate, iand use, etc.                              | No  | nitrous oxide emissions, nitrate<br>leaching, etc. | phosphorus flows in agriculture at a<br>regional level in EU-27      | 1                        | 3 No  |
| WITERWALDIOFE                        | mps//euepot.wur.nr/1920/3         | 1140           | 169            |                             |  | 110 | reading, etc.                                      | regional ievel III EU-27   |                          | 7 140 |



| Moder of Apportus Provinces  Moder of Apportu |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
|--|----------------------------------|--|------|------|-----------------------------|----------------------------------|-----|-----------------------------------|---|---|------|
| Mode of Agricular of Production  Mode of Agricultural Production   |                                  | 1  |      |      |                             | 1                                |     |                                   | The model is a modular open source      |   |      |
| Mount Application for a provided in the right in the content of th |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Model Agricultural Production (and Section 1997)  Model Agricultural Production (and Section 199 |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Commence    |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Model of Agricultural Production from agricultural ground concerned and production for a given money of an abundance of the production for a given money of an abundance of the production for a given money of an abundance of the production for a given money of a |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Moder of Agriculary Physical Colorans   Management of Security Confidence of Security Con   |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Septiment of Agricultural Production of Control of Agricultural Production  |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Model of Agricultural Production State P |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Available of policional Physical Configuration Control |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Model of Agricultural Production and Continue place and the production and the continue of the |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Description of the proof of the |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Septiment of Agricultural Projection of Agricult |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| About of Agricultural Production (and inclination and inclinat |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Security Chronical Production of Management and Management and Security Chronical Securit |                                  |  |      |      |                             | Regional demand for              |     |                                   | sustainable development under future    |   |      |
| Model of Agricultural Production and Improved prints and production codes (printing composition and improved printing composition and improved |                                  |  |      |      | Land-use change, food       | agricultural commodities,        |     |                                   | scenarios of rising food, energy and    |   |      |
| and its imprised on the instigation, fund-related by york. In an an water province of the control of the contro |                                  | https://www.pik-   |      |      | security, climate change    | technological development,       |     |                                   | material demand as well as production,  |   |      |
| and its imprised on the instigation, fund-related by york. In an an water province of the control of the contro | Model of Agricultural Production |  |      |      | impacts, greenhouse gas     | production costs, potential crop |     | Land use change, food security.   | climate change impacts and              |   |      |
| Environment (MayPE) model improvement of the public feet of the public |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Modular Applied Calvenia Modular Applied Calve |                                  |  | No   | Yes  |                             |                                  |     |                                   |   | 3 | No   |
| Mediciar Applied Celeval Egysteria minor (MACHET) They Develope magneticated a part of the Company of the production trade, source of the production of the globel concerns with a production of the glob | Cittionillon (in ignic)          | The second secon | 110  | 1.00 | ponoico                     | Constraints                      | 110 | mater sourcity; etc.              |   |   | 110  |
| Modular Agricult Celebral Equipment of MACHET 1.03  Modular Agricultural production, toda, consumption, pross, policies, consu |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Apricultural production, fruite, device complete control (MAGNET)  State Alexander applied Gelvenia  Equilibrium Too (MAGNET)  This allows coords organized as a control of the control of |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Modular Agripting Collevial Egisticum Tool (MACNET)  Notes (Mexicon projection)  Notes |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Modular Applied CeNeral Equaliform Tool (MAGDET)  No.   No.  |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Moduler Applied Colorinal grant process of MACNET process and recommendating process, bodies and environmental process. bodies are environmental process, bodies and environmental process, bodies and environmental process. bodies are environmental process, bodies and environmental process. bodies are environmental process, bodies are environmental process, bodies are environmental process. bodies are environment |                                  | I  |      | I    | I                           | Agricultural production, to-d-   |     | Economia impacts                  |   |   |      |
| Equilibrum Tool (MACNET)   Inter-Inventopredictorial set   Ves   Ves   Subjected Pige (Cropt-Note)   College   Col   | Madelan Applied Cables 1         | I  |      | I    | C                           |                                  |     |                                   |   |   |      |
| Comparison of the company of the c   |                                  |  | l.,  | l.,  |                             |                                  |     |                                   |   | _ | N- 1 |
| OpenCA 1.10.3    Committee   C | Equilibrium Tool (MAGNET)        | nttps://www.magnet-model.eu/   | Yes  | Yes  | systems at the global level | etc.                             | No  |                                   | nousehold food security                 | 3 | No   |
| OpenLCA 1.10.3 (F. Yes Yes Quiture Yes emissions) OPCIBLE_CANTIST VIOLENTIST CONTIST CONTINT CONTIST CONTIST CONTIST CONTIST CONTIST C |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| ORCHIDE-CMIR a version of ORCHIDE-CMIR a process-branch of the control of the process-branch of the process-bra |                                  | https://www.openica.org/openica  |      |      |                             |                                  |     |                                   |   |   |      |
| ORCHIDEE CM  Ittiss://WAK bea just frixualibles effects prixmedia blad patient  Ittiss://WAK bea just frixualibles effects prixmedia patient  Ittiss://WAK bea just frixualibles effects prixmedia patient  Ittiss://WAK bea just frixualibles effects prixmedia  Ittiss://WAK | OpenLCA 1.10.3                   | 1  | Yes  | Yes  | culture                     |                                  | Yes | emissions)                        |   |   | No   |
| ecosystem model, plat integrates the management of greastand, including supplication. It uses the equations from PaSins, a greastant model developed for site applications, to simulate the dynamics of relating programming mode, allowed programming mode, |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| management of grassland, including morter, grazing and fertilizer in use the equations from the special control true of the equation of the special control true of the equation of the special control true of the equation o |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| PalmGHG Calculator  PalmGH |                                  |  |      |      |                             |                                  |     |                                   | ecosystem model, that integrates the    |   |      |
| application. It uses the equations from page applications. It uses the equation for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications, to simulate the dynamics of leaf resistant model developed for size applications from the distribution of leaf resistant model developed for size applications, to simulate the distribution developed for size applications from the size application of the size applications and developed for size applications, to an idea of the size application of the size applications and developed for size applications and size applications and decisions and deviate application of the size application of the size application of the size application and the size application of the size application and the size application and the size application and the size applicat |                                  |  |      |      |                             |                                  |     |                                   | management of grassland, including      |   |      |
| Pasim, a grassland model developed for site applications, to simulate the dynamics of leaf area index, bornass and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and event management practices and manageme |                                  |  |      |      |                             |                                  |     |                                   | mowing, grazing and fertilizer          |   |      |
| Pasim, a grassland model developed for site applications, to simulate the dynamics of leaf area index, bornass and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and cathon fuses of managed and cathon fuses of setting and event management practices and manageme |                                  |  |      |      |                             |                                  |     |                                   | application. It uses the equations from |   |      |
| Security of the production of  |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| A plant of the properties of the decision fluctuation (procession of the decision fluctuation (procession of the decision fluctuation (procession of the procession of the pro |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| and cathon fluxes of managed grasslands. It can operate in deterministic or stochastic programming mode, glowing for senantor tree reduction and different fish measures. It edeterministic or stochastic programming mode, glowing for senantor tree reduction and different fish measures. It edeterministic or stochastic programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode, glowing for senantor tree reduction and different fish measures. It elects the programming mode management and energy fuses and programming mode and energy fuses and programming mode and energy fuses and programming mode and energy fuses and energy fuses and production chain. It uses the expression factor from the Interpovermental Panel on Climate Change (PCC) and other sources to estimate the GHS emissions from different sources to estimate the GHS emissions from the Interpovermental Panel  |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Attors/Web Loco Indifficultibles  OFICHIDEE-GM  OFICHIDE-GM  OFICHIDE-GM  OFICHIDEE-GM  OFICHIDE-GM  OFICHIDE-GM  OFICHIDE-GM  OFICHIDE-GM  OF |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| deterministic or stochastic programming mode, allowing for scenario tree roduction and different risk measures. It allowed allowing for scenario tree roduction and different risk measures. It allowed in grassland ecosystems under in grassland eco |                                  |  |      |      |                             |                                  |     |                                   | grasslands. It can aparate in           |   |      |
| node, allowing for scenarior tree reduction and different risk measures. It also includes detailed modules for a control offerent part of the production and different risk measures. It also includes detailed modules for a control offerent part of the production and different risk measures. It also includes detailed modules for a control offerent part of the production and different risk measures. It also includes detailed modules for a control offerent part of the production and different risk measures. It also includes detailed modules for a control offerent part of the production and response to the production and part of the production of the produc |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| https://wkik.isce.jps.fr/pku/libizer.  Antips://wkik.isce.jps.fr/pku/libizer.  Antips: |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| https://wiki lsce ipst fr/pkulibleve effetch phy-mediae blog abstract effetch phy-mediae phy-mediae blog abstract effects effetch phy-mediae blog abstract effects effetch phy-mediae blog abstract effetch phy-mediae blog abstract effetch phy-mediae phy-m |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| https://wkii.see.ipsit.fripka.fibitibex effects.php?mediate-blog.abstrace.   |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| ORCHIDEE-GM 1 presentation   heap agd   no   no   yes   Grassland   copystems under   different management practices   no   different management and environmental   no   different management practices   no   different paragement |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| ORCHIDEE-GM L presentation i chang.gff  No Ves Grasland management data No different management practices indicators  Outil de gestion de trésorreir fourragère (OGF)  elevages.firtresoreire/ fourragère (OGF)  elevages.firtresoreire/ fourragère (OGF)  elevages.firtresoreire/ fourragère (OGF)  elevages.firtresoreire/ presentation i chang.gff  No No No Dair/, Beef  Dair |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Outlid de gestion de trésorerie fourragère (OGF)    Couragère (OGF)   Diuragère (OGF)   Diuragère de le vages, fritesorerie   No   No   Dairy, Beef   Yes   Todder stock   PaimGHG Calculator is a tool that enables oil paim growers to estimate and monitor their net GHG emissions and identify and reduce troublesome areas in their production chain. It uses the approach of Life Cycle Assessment (LCA) and follows the IPCC guidelines and recommendations. It can also be integrated with other tools such as paim oil production only production, etc.   Yes   Sequestration, Carbon tootage integrated with other tools such as 1 their production of the commendations. It can also be integrated with other tools such as 3 sequestration, Carbon tootage integrated with other tools such as 3 sequestration, Carbon tootage integrated with other tools such as 4 No  |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| Outil de gestion de trésorerie fourragère (OSF)    PalmGHG Calculator    | ORCHIDEE-GM                      |  | No   | Yes  | Grassland                   | management data                  | No  | different management practices    | indicators                              | 3 | No   |
| Outil de gestion de trésorerie fourragère (OSF)    PalmGHG Calculator    |                                  | https://www.perel.autonomie-   |      |      |                             |                                  |     |                                   |   |   |      |
| fournagère (OGF)    Selevages fritescrerie/   No   No   Dairy, Beef   Yes   fodder stock   PalmCHG Calculator is a tool that enables oil palm growers to estimate and monitor their net CHG emissions and identify and reduce troublesome areas in their production chain. It uses the approach of Life Cycle PCC guidelines and recommendations. It can also be refullizer use, mill effluent, methane capture, palm oil production, etc.   Yes   Jesquestration, Carbon storage integrated with other tools such as PSPO Credits and GeoRSPO.   4 No   No   No   No   No   No   No   | Outil de gestion de trésorerie   |  |      | I    | I                           | I                                |     |                                   |   |   |      |
| PalmGHG Calculator is a tool that enables oil palm growers to estimate and monitor their net GHG emissions and identify and reduce troublescome areas in their production chain. It uses the approach of Life Cycle Assessment (LCA) and follows the IPCC guidelines and recommendations. It can also be entered to the policy of the palm oil production only in the policy of the policy o |                                  |  | No   | No   | Dairy:Beef                  | I                                | Yes | fodder stock                      |   |   | No I |
| enables oil palm growers to estimate and monitor their et GHG emissions and identify and reduce troublesome areas in their production chain. It uses the approach of Life Cycle Assessment (LCA) and follows the production and identify and reduce troublesome areas in their production chain. It uses the approach of Life Cycle Assessment (LCA) and follows the Cycle (Assessment areas) in the production and in the commendations. It can also be refulzer use, mill effluent, methane capture, palm oil production only production, etc.  PalmGHG Calculator  PalmGHG Calculat | 3                                |  |      |      | 7,555                       |                                  |     |                                   | PalmGHG Calculator is a tool that       |   |      |
| and monitor their net GHG emissions and identify and reduce troublesome areas in their production chain. It uses the approach of Life Cycle Assessment (LCA) and follows the IPCC guidelines and recommendations. It can also be fertilizer use, mill effluent, methane capture, palm oil production only production, etc.  PalmGHG Calculator  PalmGHG Calculator  Pig Production Environmental Broad on Climate Change (LCA) and follows the GHG emissions and recommendations. It can also be and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be defined and recommendations. It can also be integrated with other tools such as a service of the follows and recommendations. It can also be defined and recommendations. It can also |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| A companies of the co   |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| PalmGHG Calculator Pig Production Environmental a Footprint Calculator (PPFEC) Pig Production Environmental a Footprint Calculator (PPFEC) Pig Production Environmental a Footprint Calculator (PPFEC) Pig Production Environmental (Pot Per Pot Pot Production Producti |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Land use change, soil type, fertilizer use, mill effluent, methane capture, palm oil production only production, etc.  PalmGHG Calculator  PalmGHG |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| PalmGHG Calculator  Palm Characteristics, energy  Use, feed use, manure  Palm Characteristics, energy  The tool uses emission factors from the palmanum of |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| https://tsoo.org/as-an- PalmGHG Calculator  Pa |                                  | I  |      | I    | I                           | l and was abanda asil bo-        |     |                                   |   |   |      |
| https://tispo.org/as-an- organisation/tools/ghg/ Yes Yes palm oil production only  whith production only  whith production only  whith production such as organisation/tools/ghg/ Yes Yes palm oil production only  whith production  |                                  | I  |      | I    | I                           |                                  |     |                                   |   |   |      |
| PalmGHG Calculator organisation/tools/ghg/ Yes Yes palm oil production only production, etc. Yes / sequestration, Carbon footprint RSPO Credits and GeoRSPO. 4 No    Recomplemental panel on climate   Change (IPCC) and other sources to estimate the GHG emissions from different sources on the farm. The tool uses emission factors from the Intergovernmental Panel on climate Change (IPCC) and other sources to estimate the GHG emissions from different sources on the farm. The tool use, feed use, manure   Panel on climate   Change (IPCC) and other sources to estimate the GHG emissions from different sources on the farm. The tool use emission sand improving efficiency   A No   |                                  | l  |      | I    | I                           |                                  |     |                                   |   |   |      |
| The tool uses emission factors from the Intergovernmental Pootprint Calculator (PPFEC)  Pig Production Environmental Footprint Calculator (PPFEC)  Pigs Pigs management, litter application Pissons and improving efficiency practices/greenhouse-  The tool uses emissions from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emissions from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emissions from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pootprint Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Intergovernmental Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Interpolation Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Interpolation Pissons and improving efficiency practices/greenhouse-  The tool uses emission factors from the Interpolation Pissons and | L                                |  | l    | l    | I                           |                                  |     | GHG emissions, Carbon storage     | integrated with other tools such as     |   | I I  |
| Pig Production Environmental Footport Mitss://biolg-swine extension.umn.edu/2018/ Officip-production-environmental Footport Mitss://australlampork.com.au/environmental footport.html  Yes Yes Pigs manure  The foot use, feed use, manure  ### And Intergovernmental Panel on Climate Change (IPCC) and other sources to estimate the GHG emissions from different sources on the farm. The tool use emissions and improving efficiency  ### And Intergovernmental Panel on Climate Change (IPCC) and other sources to estimate the GHG emissions from different sources to estimate the GHG emissions from different sources to estimate the GHG emissions and improving efficiency  #### And Intergovernmental Panel on Climate Change (IPCC) and other sources to estimate the GHG emissions from different sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions from the IPCC and other sources to estimate the GHG emissions from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GHG emissions factors from the IPCC and other sources to estimate the GH | PalmGHG Calculator               | organisation/tools/ghg/  | Yes  | Yes  | palm oil production only    | production, etc.                 | Yes | / sequestration, Carbon footprint |   | 4 | No   |
| https://blog-swine.extension.umn.edu/2018/ Pig Production Environment al Footprint Calculator (PPFEC) for https://australianpork.com.au/en vironmental- production Environment al Footprint Calculator (PPFEC) for https://australianpork.com.au/en vironmental- production Environment al Footprint Calculator (PPFEC) for https://australianpork.com.au/en vironmental- practices/greenhouse- practices/greenhouse- super language and super  |                                  |  |      |      |                             |                                  |     |                                   |   |   |      |
| https://bloc-swhee.extension.um.edu/2018/<br>Pig Production Environmental al Footprint Calculator (PPFEC) This // assistallampork.com.au/en vironmental- practices/greenhouse-   |                                  | I  |      | I    | I                           | I                                |     |                                   |   |   |      |
| https://bloc-swhee.extension.um.edu/2018/<br>Pig Production Environmental al Footprint Calculator (PPFEC) This // assistallampork.com.au/en vironmental- practices/greenhouse-   |                                  | I  | 1    | I    | I                           | I                                |     |                                   |   |   |      |
| Swine_extension.umn_edu/2018/   Swine_extension.umn_edu/2018   |                                  | https://blog-  |      | I    | I                           | I                                |     |                                   |   |   |      |
| Pig Production Environmental Footprint Calculator (PPFEC) Footprint Limit Yes Yes Pigs management, litter application The strategies of th |                                  |  |      | I    | I                           | farm characteristics, energy     |     |                                   |   |   |      |
| Footprint Calculator (PPFEC)   footprint.html   Yes   Yes   Pigs   management, litter application   Yes   GHG emissions   emissions and improving efficiency   4 No   No   No   No   No   No   No  | Pig Production Environment at    |  | 1    | I    | I                           |                                  |     |                                   |   |   |      |
| https://australlanpork.com.au/en virormental- term characteristics, energy term dother sources to estimate the practices/greenhouse- use, feed use, manure GHG emissions from different sources to   |                                  |  | Yes  | Yes  | Pias                        |                                  | Yes | GHG emissions                     |   | 4 | No I |
| vironmental-<br>practices/greenhouse-     farm characteristics, energy<br>use, feed use, manure     IPCC and other sources to estimate the<br>GHG emissions from different sources   | . ss.p.int outdation (FFFEO)     |  | 1.23 | 1.55 | 3                           | gament, nucl application         |     | 2.12 2.71001010                   |   | 7 |      |
| practices/greenhouse- use, feed use, manure GHG emissions from different sources   |                                  |  |      | I    | I                           | farm characteristics energy      |     |                                   |   |   |      |
|  |                                  |  |      | I    | I                           |                                  |     |                                   |   |   |      |
| rryoaa (noo) Igaacaynggaranunca prea prea prea prea prea prea prea pre   | DiaCas (AUR)                     |  | Voc  | Voc  | Suino                       |                                  | Voc | GHG omissions                     |   | 4 | No   |
|  |                                  |  |      |      |                             | management, inter application    | 105 | ONG CHIISSIONS                    | por ure ranti and at the ranti gate     | 4 | INU  |



|                                 | I                                |     |     |                             |                                     |     |                                 | A dynamic partial equilibrium               | I  |                 |
|---------------------------------|----------------------------------|-----|-----|-----------------------------|-------------------------------------|-----|---------------------------------|---|--|-----------------|
|                                 |                                  |     |     |                             |                                     |     |                                 | framework that simulates year-by-year       |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | recursive modelling, with endogenous        |  |                 |
|                                 |                                  |     |     |                             |                                     |     | Energy prices, demand           | international energy prices and lagged      |  |                 |
|                                 |                                  |     |     | Can be used for any sector  |                                     |     | elasticities, technology costs. | adjustments of supply and demand by         |  |                 |
|                                 | https://joint-research-          |     |     | that involves energy supply | historical statistics, projections, |     | potentials and learning rates.  | world region. The tool also follows the     |  |                 |
|                                 | centre.ec.europa.eu/poles/mode   |     |     | and demand, including       | technology characteristics,         |     | emission factors and abatement  |   |  |                 |
| POLES-JRC                       | I en                             | No  | Yes | agriculture                 | policies and scenarios              | No  | costs                           | the decision-making process                 | No information available                         | No              |
| FOLESSING                       | I CII                            | 140 | 163 | agriculture                 | policies and scenarios              | 140 | 00010                           | The tool uses emission factors from the     | No illioillation available                       | 140             |
|                                 |                                  |     |     |                             |                                     |     |                                 | Intergovernmental Panel on Climate          |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | Change (IPCC) and other sources to          |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | estimate the GHG emissions from             |  |                 |
|                                 |                                  |     |     |                             | l                                   |     |                                 |   |  |                 |
|                                 | https://extension.uga.edu/public |     |     |                             | farm characteristics, energy        |     |                                 | different sources on the farm. The tool     |  |                 |
| Poultry Carbon Footprint        | ations/detail.html?number=B144   |     |     |                             | use, feed use, manure               |     |                                 | also provides suggestions for reducing      |  |                 |
| Calculation Tool (PCFCT)        | 3                                | Yes | Yes | Poultry                     | management, litter application      | Yes | GHG emissions                   | emissions and improving efficiency          |  | 1 No            |
|                                 |                                  |     |     |                             |                                     |     |                                 | L   |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | PRIMES is a partial equilibrium model       |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | that simulates an energy market             |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | equilibrium by finding the prices for       |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | each energy source that clear the           |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | market. It also represents energy           |  |                 |
| I                               | I                                | 1   | 1   | 1                           | I                                   |     |                                 | demand, supply and emission                 | I  | 1               |
| I                               | https://climate.ec.europa.eu/eu- | I   | 1   |                             | Energy demand and supply            |     | 1                               | abatement technologies in a detailed        | I  |                 |
| 1                               | action/climate-strategies-       |     |     |                             | data, technology data, policy       |     |                                 | and dynamic way. It uses a bottom-up        | I  |                 |
| 1                               | targets/economic-                |     |     |                             | data, economic data,                |     |                                 | approach with a rich technological          | I  |                 |
| 1                               | analysis/modelling-tools-eu-     |     |     |                             | environmental data                  |     | CO2 emissions from energy and   | representation and a top-down approach      | J  |                 |
| PRIMES                          |                                  | No  | Yes | Energy                      | environmental data                  | No  |                                 | with macroeconomic feedbacks                | Ί.   | 2 No            |
| FRIIVES                         | analysis en                      | INO | res | Energy                      | <u> </u>                            | INO | industrial processes            |   | <del>                                     </del> | UNU             |
| 1                               | I                                | I   | 1   |                             |                                     |     |                                 | PRIMES-TREMOVE is a partial                 | I  |                 |
| 1                               | 1                                |     |     |                             |                                     |     |                                 | equilibrium model that simulates an         | I  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | transport market equilibrium by finding     |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | the prices for each transport mode and      |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | vehicle type that clear the market. It also |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | represents transport demand, supply         |  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | and emission abatement technologies in      | 1  |                 |
|                                 |                                  |     |     |                             |                                     |     |                                 | a detailed and dynamic way. It uses a       |  |                 |
|                                 | https://climate.ec.europa.eu/eu- |     |     |                             |                                     |     |                                 | bottom-up approach with a rich              |  |                 |
|                                 | action/climate-strategies-       |     |     |                             | Transport demand and supply         |     |                                 | technological representation and a top-     |  |                 |
|                                 | targets/economic-                |     |     |                             | data, technology data, policy       |     |                                 | down approach with macroeconomic            |  |                 |
|                                 | analysis/modelling-tools-eu-     |     |     |                             | data, economic data,                |     | CO2 emissions from transport    | feedbacks                                   |  |                 |
| PRIMES-TREMOVE                  | analysis/modelling-tools-ed-     | No. | Yes | Transport                   | environmental data                  | No  | activity and vehicle stock      | leedbacks                                   |  | l <sub>No</sub> |
| PRIVES-TREWOVE                  |                                  | INU | res | панароп                     | Soil type, temperature, soil        | INU | activity and vehicle stock      | A model for the turnover of organic         | · · · · · · · · · · · · · · · · · · ·            | 2 140           |
|                                 | https://www.rothamsted.ac.uk/sit |     |     | Mariana (asabla massaland   |                                     |     | Sail annual annual animabial    |   |  |                 |
|                                 | es/default/files/RothC_guide_WI  |     |     | Various (arable, grassland  | moisture, plant cover, soil         |     | Soil organic carbon, microbial  | carbon in non-waterlogged topsoils that     |  |                 |
|                                 | N.pdf                            |     | l   | and woodland)               | organic carbon inputs and initial   |     | biomass carbon, radiocarbon     | divides the total organic carbon into four  |  | .               |
| RothC Model                     |                                  | Yes | Yes |                             | soil organic carbon content         | No  | age                             | active pools and one inert pool             | ;  | 3 No            |
| Scientific Integrated Modelling |                                  |     |     | Crop and ecosystem          |                                     |     |                                 | Uses a modular software framework to        |  |                 |
| Platform for Agro-Ecological    |                                  |     |     | management, model           | Crop models, soil models,           |     | Crop growth, soil processes,    | integrate different crop and soil models    |  |                 |
| Crop and Environmental          |                                  |     |     | development, decision and   | weather data, management            |     | water balance, nutrient         | and run simulations at different spatial    |  |                 |
| Simulation (SIMPLACE)           | http://www.simplace.net/         | No  | Yes | policy support              | data, etc.                          | No  | dynamics, etc.                  | and temporal scales                         | :  | 3 No            |
|                                 |                                  |     |     |                             |                                     |     |                                 | SHERPA-city is a tool that allows users     |  |                 |
| 1                               | 1                                |     |     |                             |                                     |     |                                 | to assess the impact of traffic measures    | I  |                 |
| I                               | I                                | 1   | 1   | 1                           | I                                   |     |                                 | on NO2 pollution in cities. It uses a       | I  | 1               |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | simplified source-receptor relationship     | I  |                 |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | to estimate the changes in NO2              | I  |                 |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | concentrations due to changes in traffic    | I  |                 |
| 1                               | 1                                |     |     |                             |                                     |     |                                 | emissions. It also evaluates the co-        | I  |                 |
| 1                               | 1                                |     |     |                             |                                     |     |                                 |   | I  |                 |
| I                               | I                                | 1   | 1   | 1                           | I                                   |     |                                 | benefits of traffic measures for other      | I  | 1               |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | pollutants (e.g. PM) and impacts (e.g.      | I  |                 |
| I                               | I                                | I   | 1   | l                           | Traffic data, emission factors,     |     | 1                               | health and ecosystems). It allows for       | I  |                 |
| L                               | https://www.terraria.com/sherpa- |     | 1   |                             | NO2 concentrations, traffic         |     |                                 | comparing different scenarios and           | 1  |                 |
| SHERPA-city                     | city/                            | Yes | Yes | measures                    | measures                            | No  | NO2 and PM concentration        | identifying the most effective measures     |  | 1 No            |
|                                 |                                  |     |     |                             |                                     |     | GHG emissions, Carbon storage   |   |  |                 |
| I                               | I                                | I   | 1   |                             |                                     |     | / sequestration, Nitrogen       | I   | I  |                 |
| I                               | 1                                | 1   | 1   | 1                           | I                                   |     | balance, Economic               | I   | I  | 1               |
| I                               | https://www.sciencedirect.com/s  | I   | 1   |                             |                                     |     | Performance Assessment,         | A software tool for conducting LCA          | I  |                 |
| I                               | cience/article/pii/S09596526220  | I   | 1   |                             | Various LCI databases, such as      |     | Water consumption, Land use,    | studies and creating reports in a           | I  |                 |
| Sima-pro                        | 46121?pes=vor                    | No  | Yes | Various                     | ecoinvent v3 and Agri-footprint     | Yes | etc.                            | transparent and user-friendly way           | 1  | I No            |
|                                 |                                  |     | 1   |                             |                                     |     | Carbon storage /                | , and and and morally may                   | 1  | 1               |
| I                               | I                                | I   | 1   |                             |                                     |     | sequestration; Nitrogen         | I   | I  |                 |
| Soilscanner                     | https://www.agrocarge.com/       | No  | Yes | Crops                       |                                     | Yes | balance;Soil health             |   | I  | No I            |
| Suiscalille                     | https://www.agrocares.com/       | 140 | 162 | Отора                       |                                     | 100 | pararice, 3011 Health           | The model uses the IPCC methodology         | +  | INO             |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               |   | I  |                 |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | and other peer-reviewed literature to       | I  |                 |
| I                               | I                                | I   | 1   |                             |                                     |     | 1                               | calculate energy consumption and            | I  |                 |
| I                               | https://solagro.org/carbon-      | 1   | 1   | 1                           | I                                   |     |                                 | greenhouse gas emissions at farm            | I  |                 |
| I                               | calculator -                     | I   | 1   |                             |                                     |     |                                 | level. It also provides a distribution of   | I  |                 |
| 1                               | https://solagro.com/images/imag  |     | 1   |                             | Energy consumption, GHG             |     | Energy consumption and GHG      | emissions per workshop and calculates       | I  |                 |
| I                               | esCK/files/publications/2016/Far |     | 1   |                             | emissions, farm activities,         |     | emissions assessment and        | the potential mitigation actions for the    | I  |                 |
| Solagro Carbon Calculator       | m Tool Calculator Carbon.pdf     | Yes | No  | All agricultural production | mitigation actions                  | Yes | mitigation for the farm system  | farm  | 1  | 1 No            |
|                                 |                                  |     |     |                             |                                     |     |                                 |   |  |                 |





|  |  |     |            |                             |   |          |  | Answers are scored on a scale between  |                          |        |
|--|--|-----|------------|-----------------------------|---|----------|--|--|--------------------------|--------|
|  |  |     |            |                             |   |          |  | 1 (poor) and 5 (excellent) and an overall  |                          | 1      |
|  |  |     |            |                             |   |          |  | score given for each spur. Results are   |                          | 1      |
|  |  |     |            |                             |   |          |  | captured on a radar diagram to give an   |                          | 1      |
|  |  |     |            |                             |   |          | Soil management, landscape,                    | instant visual overview of the   |                          | 1      |
| SustainFARM Public Goods http:                         | p://www.sustainfarm.eu/en/de   |     |            | Crops, livestock,           |   |          | NPK balance, energy and                        | sustainability of the farm1 (poor) and 5   |                          | 1      |
| Tool cisio   | sion-support-tool  | Yes | Yes        | vegetables, fruit, olives   | yields, fuel consumption  | Yes      | carbon, animal health                          | (excellent)  |                          | 4 No   |
| 4  |  |     |            |                             |   |          | Environmental indicators (GHG                  |  |                          |        |
|  |  |     |            |                             |   |          | emissions, energy                              |  |                          | 1      |
|  |  |     |            |                             |   |          | consumption); Economical                       |  |                          | 1      |
|  |  |     |            |                             |   |          | indocators (Raw product, Total                 |  |                          | 1      |
|  |  |     |            |                             |   |          | production costs, Gross margin,                |  |                          | 1      |
|  |  |     |            |                             |   |          | Operational costs,                             |  |                          | 1      |
|  |  |     |            |                             |   |          | Mechanization costs, Wages,                    | SYSTERRE assesses performances,  |                          | 1      |
|  |  |     |            |                             | Crop production systems and   |          | Input efficiency); Technical                   | through the calculation of 20 main   |                          | 1      |
|  |  |     |            |                             | farming practices such as crop  |          | indocators (Labor time, Fuel                   | indicators with 190 subindicators The  |                          | 1      |
|  |  |     |            |                             | type, area, yield, fertilizer use,  |          | consumption, NPK balances,                     | GHG emissions modelling is based on  |                          | 1      |
| https  | ps://www.systerre.fr/systerre/h  |     |            |                             | irrigation, tillage, manure   |          | Amounts of active ingredients,                 | the IPCC methodology with parameters   |                          |        |
| SYSTERRE ome   | ne/description/home  | Yes | Yes        | Crops                       | management, etc   | No       | Irrigation volumes)                            | defined at the French level  |                          | 2 No   |
|  | ps://www.lwk-  |     |            |                             |   |          | enter anno                                     |  |                          |        |
|  | edersachsen.de/lwk/news/351  |     |            |                             |   |          | GHG emissions; Nitrogen                        |  |                          |        |
|  | Rechentool TEKLa fuer D  |     |            | states to the total state   |   |          | balance; Air quality (non-GHG                  |  |                          | 1      |
|  | tschen Innovationspreis fuer   | 000 |            | Dairy;Beef;Poultry;Pigs;Cro |   |          | emissions);water, energy                       |  |                          | nee:   |
| TEKLa Klir   | Jima und Umwelt nominiert  | No  | No         | ps;Biogas                   |   | Yes      | consommations                                  |  |                          | Yes    |
|  |  |     |            |                             |   |          |  | The model uses the IPCC methodology  |                          |        |
| i l  |  |     |            |                             |   |          |  | and other peer-reviewed literature to  |                          | 1      |
|  |  |     |            |                             |   |          |  | calculate carbon balance, biodiversity,  |                          | 1      |
|  |  |     |            |                             |   |          |  | water quality and other natural capital  |                          | 1      |
|  |  |     |            |                             |   |          |  | indicators for different farm systems  |                          | 1      |
|  |  |     |            |                             |   |          |  | based on farm location, land use, soil   |                          | 1      |
|  |  |     |            |                             |   |          |  | type, livestock type and number,   |                          | 1      |
|  |  |     |            |                             |   |          |  | management practices and carbon  |                          | 1      |
|  |  |     |            |                             | Farm location, land use, soil   |          | Carbon balance, biodiversity,                  | sequestration projects. It also provides   |                          | 1      |
|  |  |     |            |                             | type, livestock type and number,  |          | water quality and other natural                | recommendations for optimizing natural   |                          | 1      |
|  |  |     |            | Grasslands, uplands,        | management practices, carbon  |          | capital indicators for different               | capital outcomes and accessing carbon  |                          | 1      |
|  |  | No  | Yes        | peatlands                   | sequestration projects  | Yes      | farm systems                                   | markets  |                          | 1 No   |
|  | ps://adm.greppa.nu/vera.html   |     |            |                             |   |          |  |  |                          |        |
|  | ps://adm.greppa.nu/vera/kurs-  |     |            |                             |   |          |  |  |                          |        |
|  | ra-klimatkollen.html   |     |            |                             |   |          |  |  |                          |        |
|  | ps://verra.org/programs/verifi   |     |            | Dairy;Beef;Poultry;Pigs;Cro |   |          |  |  |                          |        |
| Vera klimatkollen ed-c                                 | -carbon-standard/  | No  | No         | ps;Perrenial crops          |   | Yes      | GHG emissions                                  |  | No information available | No     |
|  |  |     |            |                             |   |          |  | I found some information on how the  |                          |        |
|  | I  |     |            |                             |   |          |  | WineGB Farm Carbon Calculator  |                          |        |
|  | I  |     |            |                             |   |          |  | elaborates its modelling. It seems to be   |                          |        |
|  |  |     |            |                             |   |          |  | a tool that uses two modules, Vineyard   |                          |        |
|  | I  |     |            |                             |   |          |  | and Winery, to calculate emissions from  |                          |        |
|  |  |     |            |                             |   |          |  | different sources and sinks. The tool  |                          |        |
|  |  |     |            |                             | Vineyard records, energy bills,   |          | the IPCC guidelines and                        | also provides reports and graphs that  |                          | 1      |
|  | ps://calculator.farmcarbontool   |     |            |                             | fuel receipts, fertilizer and   |          | methods for estimating                         | show the carbon footprint per hectare of   |                          | Page 1 |
| WineGB Carbon Calculator kit.or                        | .org.uk/winegb   | Yes | Yes        | Vineyards and wineries      | pesticide use   | Yes      | emissions                                      |  | No information available | No     |
|  | and the same of th |     |            |                             | Various meteorological,   |          |  | A regional atmospheric model coupled   |                          |        |
| (E) (S)  |  |     |            |                             | chemical and land use data sets   |          | GHG emissions, Carbon storage                  | with chemistry that simulates dust   |                          | I      |
|  | ps://agupubs.onlinelibrary.wil   |     |            |                             |   |          |  |  |                          |        |
| ey.c   | .com/doi/full/10.1029/2019JD   | 192 |            | 600                         | at different spatial and temporal   |          | / sequestration, Nitrogen                      | emission, transport and deposition at  |                          |        |
| WRF-Chem 0302  | .com/doi/full/10.1029/2019JD<br>0248   | Yes | Yes        | Crops                       |   | No       | / sequestration, Nitrogen balance, Air quality | high resolution  |                          | 2 No   |
| WRF-Chem ey.c. 0302                                    | .com/doi/full/10.1029/2019JD<br>0248<br>odeling soil organic carbon  | Yes | Yes        | Crops                       | at different spatial and temporal resolutions                                     | No       |  | high resolution<br>Mechanistic model that model soil                                 |                          | 2 No   |
| WRF-Chem 9302 Mod evol                                 | .com/doi/full/10.1029/2019JD<br>0248<br>odeling soil organic carbon<br>olution in long-term arable   | Yes | Yes        | Crops                       | at different spatial and temporal<br>resolutions  Meteorological data, soil data, | No       |  | high resolution  Mechanistic model that model soil compartment to asses soil organic |                          | 2 No   |
| ey.c<br>  WRF-Chem   0300<br>  Mod<br>  evol<br>  expe | .com/doi/full/10.1029/2019JD<br>0248<br>odeling soil organic carbon<br>olution in long-term arable<br>periments with AMG model -   | Yes | Yes<br>Yes | Crops Crops and vinevards   | at different spatial and temporal resolutions                                     | No<br>No | balance, Air quality                           | high resolution<br>Mechanistic model that model soil                                 |                          | 2 No   |





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