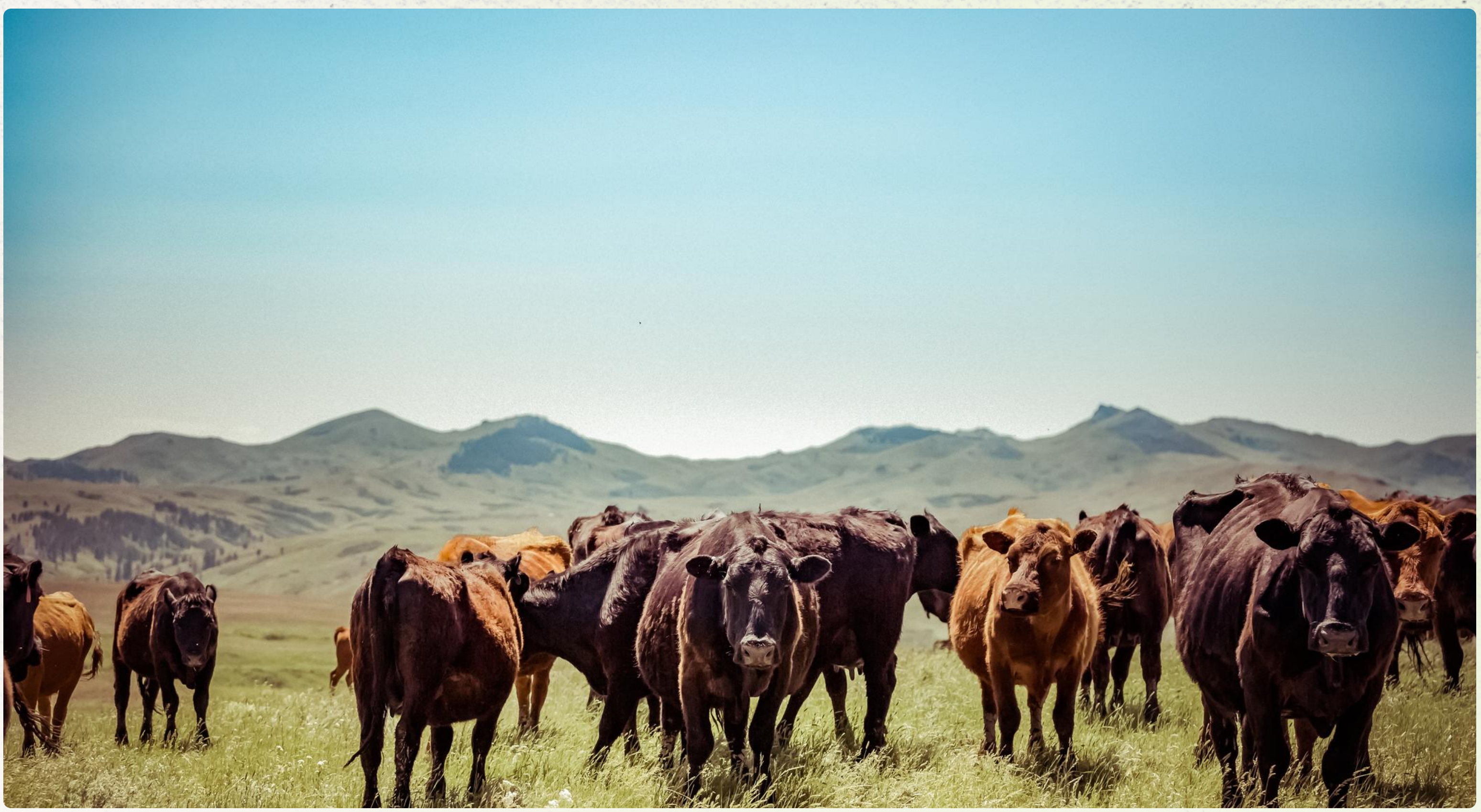

JOINT METHODOLOGY

Methodology for Quantifying Beef Lifecycle Emissions

June 2026

Using inventory accounting to measure improvement from herd management interventions

Developed in partnership

Contents

Developed in partnership regrow SE ADVISORY SERVICES

01

Sources

This methodology is informed by the following methodologies and guidance documents:

- Intergovernmental Panel on Climate Change (IPCC). (2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 4—Agriculture, Forestry and Other Land Use (AFOLU)*. IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP).
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02

Summary Description of the Methodology

This methodology provides procedures to quantify greenhouse gas (GHG) emissions, resulting from interventions aimed to reduce enteric methane (CH_4) in cattle production from cow-calf beef operations. The quantification is an inventory accounting approach aligned with Greenhouse Gas Protocol (GHGP) methodology to support accounting of GHG emissions within a company's supply for beef production. This methodology is designed to support GHG quantification for herd management practices, with enteric methane emissions quantified by a Tier 2 enteric model and supplemented with secondary data to provide a holistic beef emission factor. The basis of a tier 2 enteric model is:

EQUATION 1 — FORMULA FOR TIER 2 ENTERIC CALCULATIONS

$$\text{Emissions} = (\text{Feed Quality} \times \text{Feed Quantity}) \times \text{Time per Head} \times \text{EF}$$

Regrow is not quantifying variation in feed quantity or quality based on intervention practices, and instead uses a consistent input for these parameters, while project developers can submit values for these inputs based on measured data (e.g., forage analysis or reverse calculated dry matter intake, DMI). This methodology is not for use as an intervention protocol as quantified change in inputs, and thus enteric outcomes are not being directly represented here. Project types covered by this methodology include management practices that increase feed conversion efficiency and thus reduce methane emissions per unit of beef produced.

Key practices that a rancher may use include: forage improvements, genetic improvements, herd management, and grazing management detailed in more granular practices in the table below.

TABLE 1 — HERD MANAGEMENT PRACTICES APPLICABLE TO METHODOLOGY

Practice Name	Description	Purpose / Impact
Early culling	Remove cow that is not getting pregnant.	An unproductive animal is removed from the operation, therefore reducing CH_4 emissions via less animal days.
Fencing / Forage improvement / pasture composition	Fencing is used to provide more granular and/or controlled grazing management within the farm.	Better manage grass productivity, both quantity and quality, to improve forage utilization and/or increase weight gain of animals given improved pasture quality. Can reduce animal days given increased weight gain.

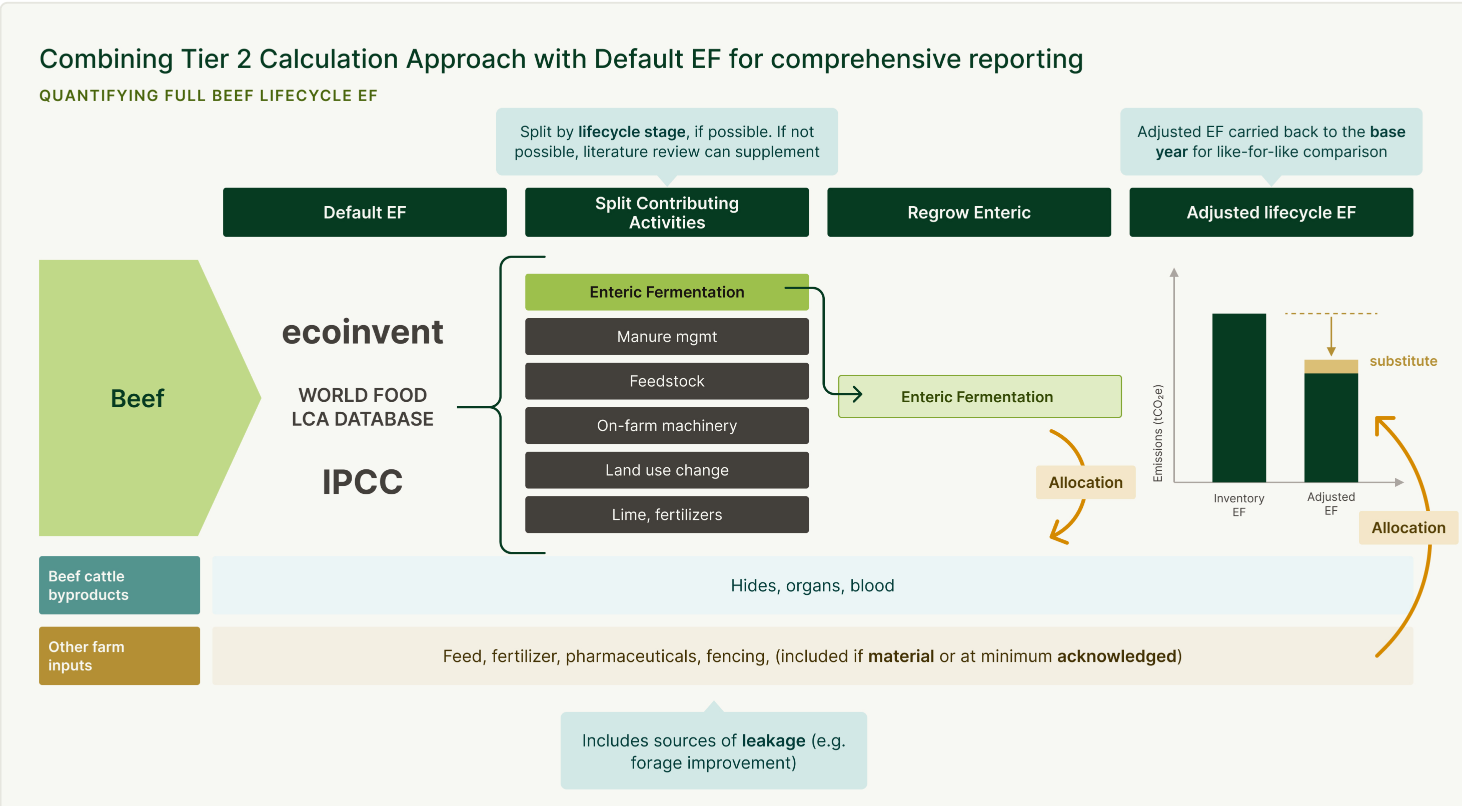
Practice Name	Description	Purpose / Impact
Implants	A weight gain implant is used on the animal.	Growth-promoting hormones stimulate muscle growth [and reduce fat], for increased weight gain in animals (improved average daily gain — ADG), which can reduce CH_4 by reducing animal days to get to weight.
Gender skew	Using AI and gender sorted semen to control the calf gender for desired maintenance of herd numbers and sales.	Reduce unwanted animal genders to maintain herd numbers, with goal of improving carbon intensity via efficiency of herd numbers, with faster weight gain of steers compared to heifers (reducing animal days) or better control on replacement animals desired.
Monensin	Feed a monensin ionophore antibiotic (e.g., rumensin).	Promote increased weight gain on the same amount of feed, or reduce feed intake required to meet the same weight gain. For faster weight gain and thus lower CH_4 emissions per feed/animal.
Artificial Insemination (AI)	Artificial insemination to reduce the number of bulls needed in the system boundary and/or to control the gender skew.	Reduce bulls needed on farm, control gender skew, and/or alter genetic pool of herd — all able to alter the CH_4 emissions, by reducing the number of animal-days, or improving weight gain efficiency of progeny.
Synchronization	Synchronization of animals in heat at the same time for improved fertilization efficiency.	Improved fertilization rates and timing so that less early culling or culling of cows unable to get pregnant.
EPDs and Genomic testing	Expected Progeny Differences (EPDs) for comparison of genetic potential between animals.	For helping in selection of improved genetic potential animals within herd for improved weight gain, pregnancy rates, operational efficiencies, etc. For reduction of CH_4 by increased weight gain over shorter time frame.
Creep feeding	Providing additional supplemental feed to calves who are still nursing.	Increase calves growth rates and weaning weight, for reduced CH_4 by less animal-days needed.

The project scenario uses roughly one year of primary data collected from the project sites, with a baseline based on a 3-year historical average of herd and feed data where historic data is available.

Integration into Life Cycle Greenhouse Gas Accounting

The majority of GHG emissions from the beef lifecycle derive from enteric fermentation, with most of those emissions occurring at the cow-calf stage of animal growth. However, to deliver a comprehensive GHG footprint, reporting entities need to estimate the GHG impact of all stages of beef production. This methodology addresses this gap by providing complementary guidance for estimating full beef life cycle emissions, described below in Sections 8 and 9. This methodology, referred to as the “adjustable emissions factor approach”, entails substituting a certain emissions contribution from a default emissions factor database and replacing it with Tier 2 quantification results. The benefits of the adjustable emissions factor approach is that it is a pragmatic way to ensure completeness for the purposes of corporate GHG reporting while also maintain the accuracy of Tier 2 methods.

FIGURE 1 — OVERVIEW OF EMISSIONS QUANTIFICATION PROCESS



03

Definitions

Enteric [emissions]: Methane (CH_4) emissions from the digestive process of ruminants.

Terminal Unit: lbs of live weight, from animals sold out of the system boundary.

Herd Management: Activities related to the structuring and care of the cattle herd, including breeding, culling, and feeding.

Baseline: Emissions and herd characteristics prior to project activities.

Reporting Unit: Metrics for reporting include CO_2e per project, per terminal unit, and per animal stage.

Animal age class definitions

Animals within the herd need to be sorted into their respective age class (below), as the animal age classes reflect variation in enteric emissions, from the activity data (forage quantity consumed) to the methane (CH_4) conversion (Ym) rate from consumed feed.

Cow — a female cattle that has given birth at least once.

Bull — a male cattle, uncastrated, used for breeding.

Yearling — can be used for both steers and heifers, but notes 12–23 month old time frame.

Weaner — can be used for bulls, heifers, steers, but is 7–11 months old.

Calf — can be used for both steers and heifers, who have not been weaned and are under ~7 months old.

04

Applicability Conditions

This methodology applies to beef cattle operations focused on cow-calf systems. Only beef livestock are addressed; other livestock types are excluded.

The methodology is applicable under the following conditions:

- The project includes at least one herd management activity that increases feed conversion efficiency and reduces methane emissions per unit of beef produced. Current interventions include improved forage, improved genetics, and improved grazing.
- Project boundaries include: bred cows, bulls, calves, breeding stock (including replacement heifers), and terminal animals.
- The reporting period is based on a defined annual period by the reporting entity that aligns to their corporate inventory reporting period.

Not applicable under the following conditions:

- Mixed species herds.
- Operations not using intervention practices.

05

Tier 2 Quantification Project Boundary

The spatial boundary includes all ranch lands where project practices are implemented. Only emissions from enteric methane are included in the Tier 2 quantification methodology.

Excluded sources (but may be relevant for full GHG accounting outside this methodology):

- Soil emissions, and removals, from forage management;
- Emissions from additional intervention materials: fencing materials, artificial insemination, water infrastructure, etc. We recommend that project developers understand whether interventions would involve additional emissions calculations.

The reporting period should span one full year (e.g., fiscal reporting year, inventory reporting year) that the company (owner) of the beef commodity uses. Benefits from implemented practices may take several years to be realized in inventory accounting given that the lifecycle of cattle is longer than a year.

06

Baseline Scenario

The baseline scenario for this methodology is the herd management practices and associated emissions prior to project start date. Given the inter-annual variability of inputs, production, and emissions, it is generally necessary for the baseline to be determined using data averaged over several years. Emissions are calculated based on average herd structure, feed data, and productivity over the past three years ideally, although fewer years are possible if project data limitations require. If historical data are unavailable, secondary industry data may be used with justification.

07

Quantification of Enteric Methane Reductions Using Primary Data

7.1 Summary

Enteric emissions are quantified using Tier 2 models selected by the California Air Resources Board (CARB) from a study conducted by UC Davis, which compare measured-modeled outcomes for enteric studies (Appuhamy & Kebreab, 2018). The final models chosen from the study are based on lowest root mean squared error (RMSE) fit between the measured-modeled enteric data in the study, where the selected models vary by the animal age class.

As a Tier 2 model, **activity data** (forage quantity and quality by days) is used along with an **emission factor** (EF, the broader equation with coefficients) to quantify each animal's emissions on a daily basis. The Tier 2 model calculates emissions on a gCH_4/animal-day basis and then multiplied by each animal's number of days within the ranch during the reporting period. Outcomes are thus quantified based on Equation 1: Formula for Tier 2 Enteric Calculations.

This calculation is then summed at the animal age class level, and finally to the ranch level.

7.2 Data inputs for quantification of Emissions

When forage samples are available, these should be used as data inputs within the model. Otherwise, defaults are used within the model, seen in the appendix.

INPUTS FOR ENTERIC CALCULATIONS

Input / Parameter	Abbrev.	Entered via Grower or Defaulted	Definition	Units
Dry matter intake	**DMI**	Grower	Amount of feed, on a dry-matter basis, consumed by the animal.	pounds/day
Neutral detergent fiber	**NDF**	Grower	The portion of fiber that is composed of hemicellulose, cellulose and lignin — forage fiber directly impacts the CH_4 production by affecting propionate/acetate formation which affects CH_4 production through the CH_4 reduction process.	%
Crude protein	**CP**	Grower	An optional input. The nitrogen, protein, content of the feed consumed by the animal — for growth, maintenance, as well as impacts on forage digestibility and energy availability.	%

Input / Parameter	Abbrev.	Entered via Grower or Defaulted	Definition	Units
End body weight	BW	Grower	The average ending body weight during the reporting period for the animal is used for the calculation of enteric when BW is used.	pounds
Gross Energy Intake	GEI	Default	Total amount of energy contained in feed consumed by the animal.	MJ/day
Ether Extract	EE	Default	Or the crude dietary fat consumed by the animal.	%
Organic Matter	OM	Default	The organic matter content of the feed.	%
Ash	ash	Default	Total mineral content of the feed.	%

7.3 Models used in the methodology

Steer1

$CH_4 = (-1.487 + 0.046 \cdot GEI + 0.038 \cdot NDF + 0.006 \cdot BW) / 0.05565$

Cow1

$CH_4 = (2.381 + 0.053 \cdot GEI) / 0.05565$

Heifer2

$CH_4 = (0.065 \cdot GEI) / 0.05565$

Bull2

$CH_4 = (0.065 \cdot GEI) / 0.05565$

7.4 Quantifying outcomes

As a Tier 2 model, enteric emissions are quantified within the reporting period based on quantification of activity data with the EF as reflected in section 7.2 Models used in the methodology.

EMISSIONS CALCULATION

Emissions = activity data (quantity × quality × days) × EF

Activity data — Animal age class

As different enteric models are used for different animal age classes, the animals within the herd need to be associated to their respective age classes, with the following inputs provided per age class:

- Population (number of head) per age class

Feed regime

The forage quantity and quality data is provided by each *Animal age class*. These inputs include:

- DMI
- CP
- NDF
- EE
- OM

Time period (duration, days)

For each unique *Animal age class* and *Feed regime*, a specific time period needs to be provided over which the quantification should be done. Inputs include:

- Days within the *Animal age class* × *Feed regime* (month/day/year to month/day/year)

OUTPUT PARAMETERS

Parameter	Units
DMI	pounds/day
NDF	%
CP	%
BW	pounds
GEI	MJ/day
EE	%
ash	%
CH_4	$kgCH_4$/animal-day
total_CH_4	$kgCH_4$/animal-reporting period

The same equations are applied to the post-intervention herd and feed data collected during the reporting period. Variations in the number of animals, length of time, and possible changes to quantity and quality of forage will thus impact outcomes.

7.5 Outcome Reporting

Reporting unit: The emissions outcomes for all the animals in the system will be allocated to the terminal unit for the reporting period, for live weight sold, as described in Section 9. The emissions outcomes will also be calculated for all of the animals in the system and will be allocated for the reporting period, for the following, for the full project and per rancher:

- CO_2Eq Total
- CO_2Eq Per Pound Of Terminal Unit (lbs live weight sold)
- CO_2Eq Per Animal Stage (ex. CO_2e for cows, for bulls, for calves, etc.)

The non-fossil CH_4 global warming potential (GWP) value of 27 from the IPCC AR6 assessment is used for conversion of CH_4 to CO_2Eq, per Greenhouse Gas Protocol (GHGP) guidance.

7.6 Leakage

This methodology only quantifies within the system boundary as defined in section 5 Tier 2 Quantification Project Boundary. Leakage assessment or quantification and mitigation are the responsibility of the project developer.

7.7 Uncertainty

Uncertainty is currently not accounted for within this methodology. Approaches for characterizing uncertainty in beef carbon footprints are discussed by Sykes et al. (2019).

08

Life Cycle Emissions Accounting

8.1 Combining Tier 2 quantification approaches with life cycle greenhouse gas (GHG) accounting

This methodology may be integrated into a broader life cycle greenhouse gas (GHG) accounting framework through an adjustable emissions factor (EF) approach. This approach allows Regrow's Tier-2 enteric methane quantification to replace the corresponding enteric component within an existing Life Cycle Inventory (LCI) database, while retaining all other upstream and downstream emissions sources from that LCI (e.g., manure management, feed production, energy use, and transport).

8.2 Adjustable Emissions Factors Approach

The adjustable EF approach enables companies to merge enteric methane data from cow-calf operations with secondary life cycle data for other emissions sources. This ensures consistency with corporate GHG inventories and allows changes in on-farm management practices to be reflected accurately within a company's overall beef emissions factor. The adjustable EF can be applied in the following way:

1. **Substitution** — The enteric fermentation portion of the selected LCI database (e.g., ecoinvent, Agrifootprint) is replaced with Regrow's Tier-2 modeled results. If the chosen LCA does not differentiate the portion of enteric fermentation that is allocated to cow-calf vs. stocker/background and feedlot/finishing, then reliance on proxy data from peer reviewed literature is required to estimate the portion of the enteric fermentation in cow-calf that should be replaced by this cow-calf EF. For example, peer-reviewed literature indicates that the cow-calf phase accounts for approximately 70–85% of total enteric methane emissions. Beauchemin et al. (2010) is a reputably referenced study of North American beef systems that reported that the cow-calf stage contributes about 84% of enteric CH_4 and 80% of total GHG emissions in North American beef systems (a non-exhaustive list of other peer reviewed sources for this estimation can be found in Table 2; see also Desjardins et al., 2012). The assumption should be clearly documented and applied consistently across baseline and reporting years. All other contributing activities remain unchanged.
2. **Boundary consistency** — Ideally, the system boundary of the selected LCI selected aligns as closely as possible with the project boundary of this methodology (i.e. cradle-to-farm gate). The same hybridized EF structure (Tier-2 enteric + secondary LCI data for other sources) must be applied to both the baseline and subsequent reporting years to ensure a like-for-like comparison, and the methodology must be clearly documented for transparency and auditability.
3. **Documentation** — Reporting entities should clearly record the substitution steps, including:
   - The LCI database and version used,
   - The portion of the database emission factor replaced,
   - The Tier-2 value substituted, and
   - The resulting hybrid emission factor expressed per kilogram of liveweight sold.

The use of professional LCA software such as SimaPro, GaBi, or OpenLCA is recommended to facilitate accurate substitution and ensure that data adjustments remain consistent and auditable.

FIGURE 2 — ADJUSTABLE EF APPROACH: BEEF LIFECYCLE EF BREAKDOWN

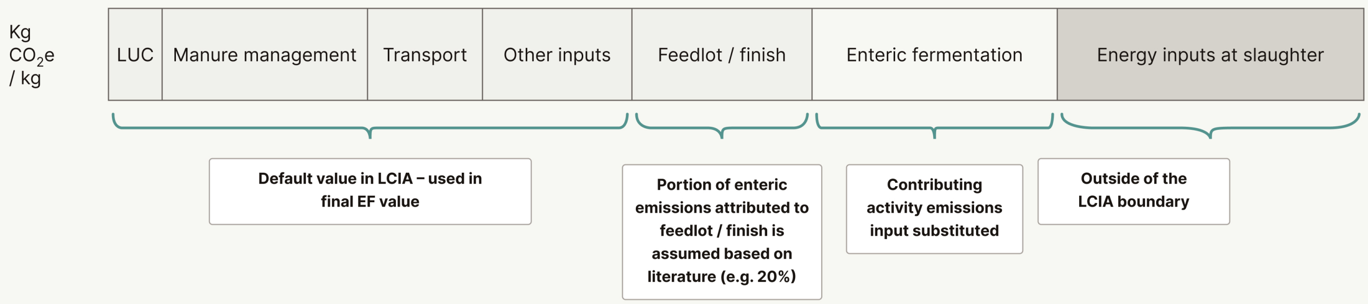


TABLE 2 — ESTIMATIONS OF EMISSIONS PER LIFECYCLE STAGE

Source & region / system	Boundary	Cow–calf	Stocker / backgrounding	Feedlot / finishing
Stackhouse-Lawson et al., 2012 (California; British beef breeds)	Cradle-to-farm-gate	**69–72%**	—	**17–27%**
Beauchemin et al., 2010 (Western Canada, case study)	Cradle-to-farm-gate	**80% (84% of enteric methane)**	**8%**	**12%**
Industry synthesis (Beef Research / NCBA fact sheet)	To farm-gate share of *total* value chain	**70%** of *pre-harvest*	13% of *pre-harvest*	**17%** of *pre-harvest*

8.3 Aligning with GHG Accounting

Any substituted elements of the LCI datasets should be reflected in the base year, to give a like-for-like comparison. In other words, emissions calculated with an adjustable emissions factor approach (Tier 2 in combination with secondary LCI database) should not be compared to an emissions baseline which relies on LCI database values only.

This methodology assumes that emissions reductions over time are tracked using a GHG accounting approach, as opposed to a project-based accounting approach. For example, emissions reduction will be reflected as a reduction in the emissions factor which is quantified on yearly basis.

When using LCI approach, the entire emissions profile from the livestock system are accounted for and divided by the total output (in this case, liveweight) to derive an emissions factor. The emissions factor is therefore considered a product-level carbon footprint, inclusive of an entire production system, and not simply the lifecycle emissions of a particular animal. In the case that the reporting entity collects primary data for other emissions sources (for example, on-farm energy consumption, bedding, or feed) this may also be used to substitute a certain aspect of the LCI default values. It's critical to ensure that inventory boundaries are aligned. Reporting entities should also take care to use appropriate allocation approaches when certain inputs purchased and tracked at the farm-level are associated with many different co-products from a production system (e.g. beef and dairy).

09

Monitoring of Primary Data

9.1 Data and Parameters

Parameters required:

- Animal count by category — Bull, Calf, Cow, Heifer_calf, Steer_calf, Weaner, Weaned_bull, Weaned_heifer, Weaned_steer, Yearling, Yearling_heifer, Yearling_steer
- Feed inputs: DMI, NDF, CP *(defaulted as of now: OM, EE)*
- Days in stage
- Start weight and End weight
- Terminal / Non-terminal designation

9.2 Description of Monitoring Plan

Data should be submitted after the close of the inventory reporting period.

Quality Assurance & Control

Input data is validated to be within expected ranges based on the below **Input Data Validations** and **Body Weight Validations** tables.

TABLE 3 — INPUT DATA VALIDATIONS

Input / parameter	Abbrev.	Units	QAQC ranges allowed
Neutral detergent fiber	**NDF**	%	5–75% *
Crude protein	**CP**	%	0–70% *

TABLE 4 — VALIDATIONS FOR ANIMAL AGE CLASS SPECIFIC CATEGORIES; BODY WEIGHT AND DMI

Animal category	Age class	DMI (kg/day)	Body weight validations (kg)
Cow (non-dairy)	cow	10–20	300 – 700
Beef (heifer, non-feedlot)	Weaned Heifer	5–12	200 – 350
	Yearling Heifer	5–12	300 – 500

Animal category	Age class	DMI (kg/day)	Body weight validations (kg)
Beef (steer / stocker, non-feedlot)	Weaned steer	5–12	200 – 350
	Yearling steer	5–12	300 – 500
Bull	Bulls, yearling bulls	7–15	600 – 1,000
Calves on milk	Heifer calves, Bull calves, Steer calves, Generic calves (no sex)	NA	<150
Calves on forage	Heifer calves, Bull calves, Steer calves, Generic calves (no sex)	<5	100 – 200

9.3 Uncertainty

Uncertainty is currently not accounted for within this methodology.

10

Accounting for Animal Transfers

10.1 Methodological implication of animal transfers

Animal transfers can notably skew the calculations, particularly when herd size is significantly changing during the course of a reporting period, because these situations represent a non-steady state condition for livestock operations. LCAs are fundamentally constructed to provide an accounting framework for steady-state operations. For example, feeder calves may be purchased by fattening operations and integrated directly into a new system boundary or bred heifers may be purchased as replacements to grow the herd. For the purchasing beef enterprise, the emissions associated with the production of the animal up to the point of purchase are considered "upstream, embedded emissions." This requires the purchasing company to account for the impacts that occurred prior to these animals arriving on the farm.

The IDF Global Carbon Footprint Standard for Dairy proposes an allocation approach for dairy operations which diminishes overestimation from herd expansion using a biophysical allocation approach to allocate emissions to milk co-products and meat. This methodology is limited in that it only applies to the dairy sector; however, a similar biophysical allocation approach could be considered for the beef sector, to attribute yearly emissions only to productive animals. An overview of the allocation methods recommended by IDF for the dairy sector can be found in *Table 5*.

TABLE 5 — IDF RECOMMENDED ALLOCATION METHODS FOR DAIRY SYSTEM CO-PRODUCTS

Outputs: / Life-cycle stage	Food	Feed	Fertiliser	Fuel/energy/heat	Waste
Production of imported feed	Economic	Economic	Not relevant	Economic	No allocation, i.e. all emissions are allocated to the other products.
Dairy farm operations	Milk/Meat*: biophysical ('physical causality')	Crops: sub-division	Cut-off or economic	Sub-division of cut-off	No allocation, i.e. all emissions are allocated to the other products.
Manufacturing of dairy products	Food products: mass (milk solids)	Whey or milk losses: Economic or cut-off	Not relevant	Sub-division of cut-off	No allocation, i.e. all emissions are allocated to the other products.

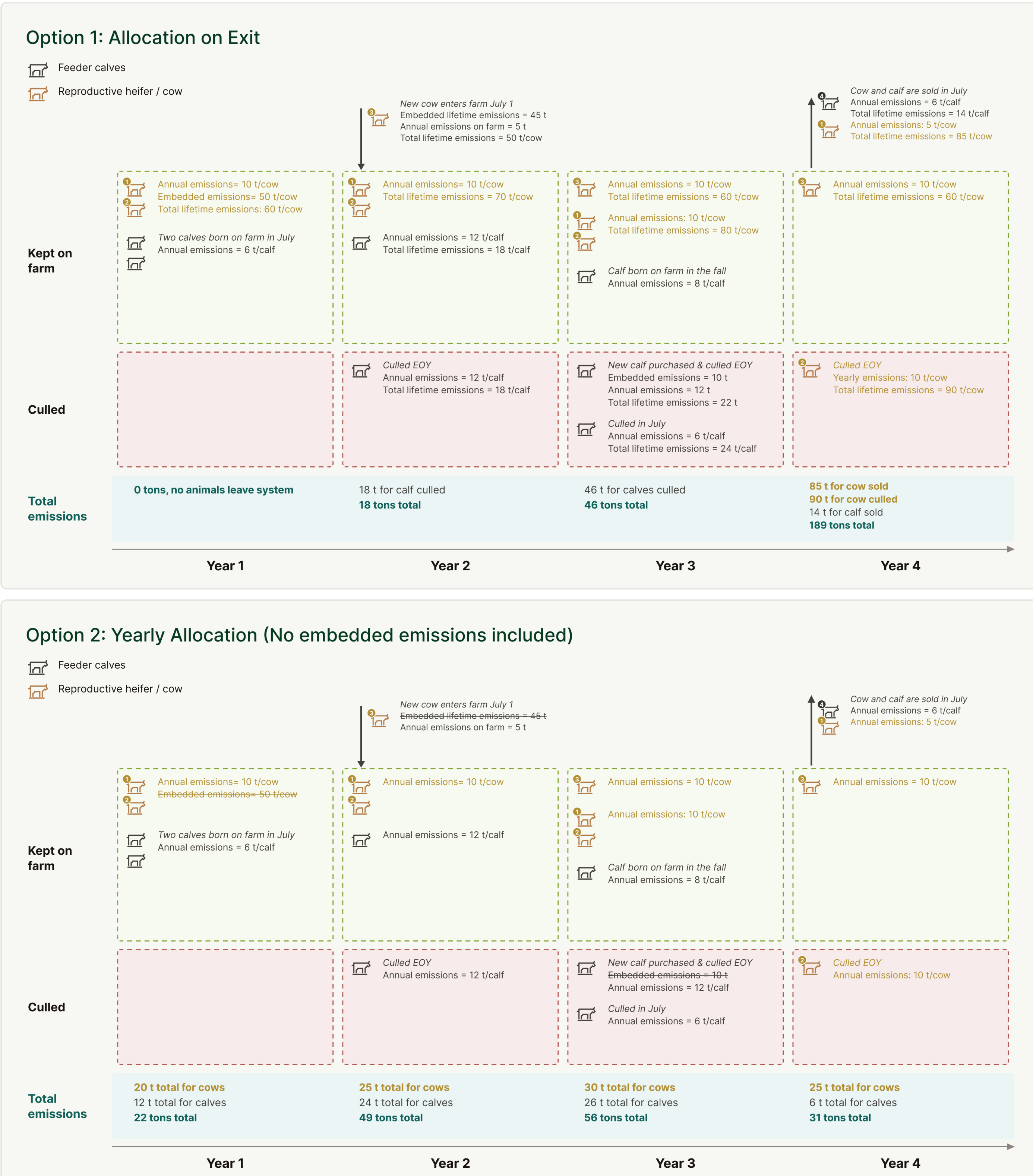
10.2 Potential allocation-based solutions to animal transfers

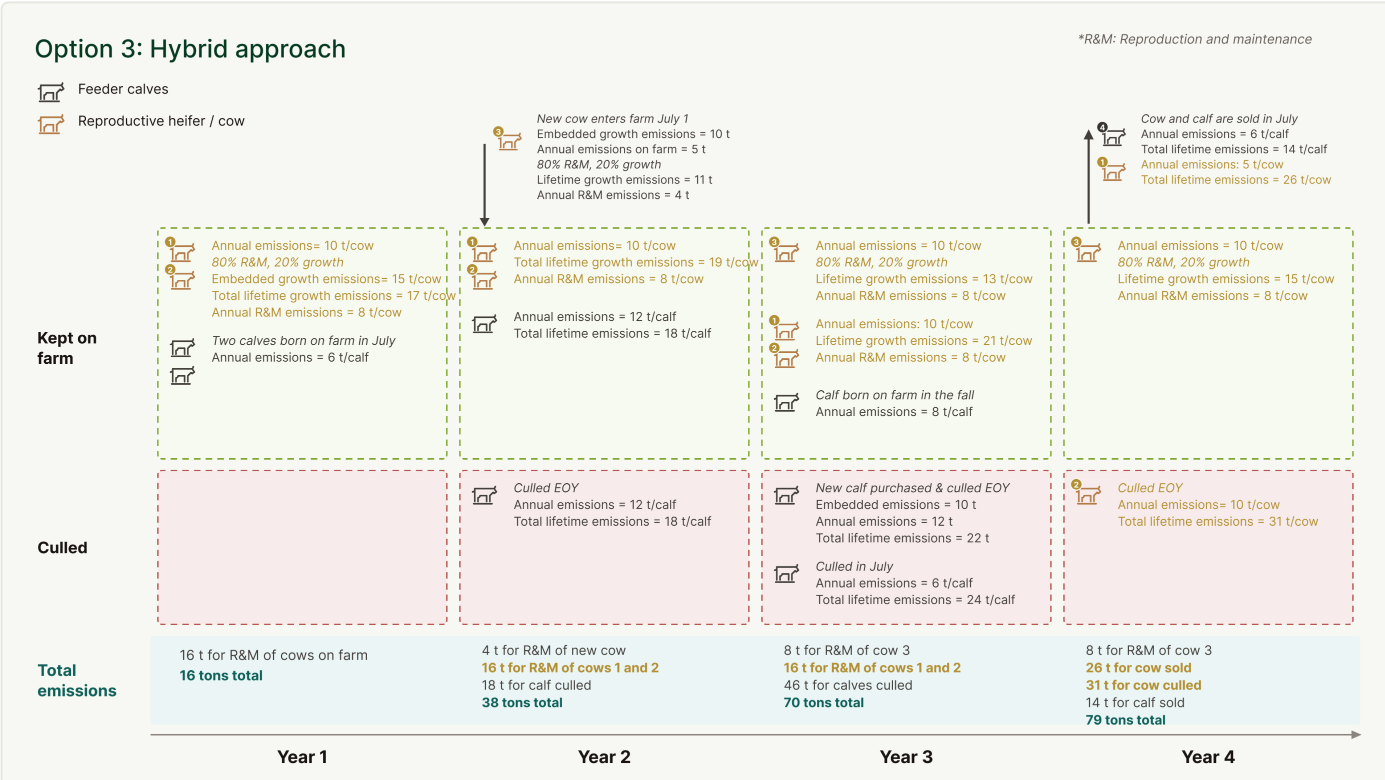
Challenges in emissions allocation arise when animals stay on farm for more than one year, and animal transfer causes animal count to constantly be in flux. There is no one clear definition of how to allocate lifetime emissions from animals in yearly inventory reporting. Therefore, this methodology proposes three methods for allocation, illustrated in Figure 3, each with their own pros and cons. These methods are the following:

1. **Allocation on Exit:** All lifetime emissions of each animal on farm are allocated to that animal only, the year the animal exits the farm.
    - **Pros:** aligned with lifecycle accounting, and emissions are not artificially impacted by herd expansion or contraction.
    - **Cons:** some animals (female cows that are eventually culled) will have very high emissions at slaughter due to their long lifespan.
2. **Yearly Allocation:** All yearly emissions of all animals on farm are attributed to the reporting year's output.
    - **Pros:** easier to keep track of, more accurate for the allocation of reproduction emissions to the steer.
    - **Cons:** artificially impacts emissions during herd expansion and contraction. This methodology is somewhat misaligned with the principles of lifecycle accounting as it ignores the embedded emissions of animals transferred to farm.
3. **Hybrid Approach:** A hybrid approach, following the logic of IDF's biophysical allocation for dairy, where reproduction & maintenance emissions are allocated yearly to the farm's output, and growth emissions are held to be allocated at the specific animal's exit of farm.
    - **Pros:** most accurate and highlights the benefits of both approaches, aligned with FAO LEAP and IDF methodologies.
    - **Cons:** more complex to implement and calculate due to increased data needs.

Depending on data availability and reporting goals, entities should choose one of the above options and provide clear explanations regarding their reasoning. When secondary data is integrated, such as through an LCI emission factor, entities should aim to reconcile boundaries and allocation rules to avoid double counting or gaps.

FIGURE 3 — THREE METHODS FOR ALLOCATING ANIMAL EMISSIONS





** values for illustrative purposes only, not representative of cattle emissions*

11

Further Considerations & Future Developments

11.1 Leakage

Leakage refers to the negative impacts on GHG emissions and removals that occur outside the reporting boundary but are directly or indirectly caused by activities to reduce emissions within the reporting boundary. Farm level interventions aimed at reducing emissions from enteric fermentation are likely to influence emissions elsewhere in the system (e.g., fencing, artificial insemination, fertilizer use). While calculating leakage is not currently covered through this methodology, it is recommended that entities report leakage from project interventions to understand the full greenhouse gas emissions impact of each action taken. A reasonable threshold may be established to determine if sources of leakage should be considered in the inventory boundary (for example, 5%).

11.2 Improved Data Collection

Although reliance on secondary LCI datasets to fill gaps is an appropriate and common interim solution to carbon footprinting in the beef sector, it is recommended that reporting entities collect as much primary data as possible to improve data quality and decrease reliance on secondary emission factor values. The Tier 2 quantification methodology is currently focused solely on collecting enteric methane data in the cow-calf portion of the beef lifecycle. However, if additional data is available, for example on land use change or manure management, this data would further improve the data quality rating of the resulting emissions factor and potentially allow reporting entities to account for further emissions reductions.

11.3 Verification & Using the Results to Make Claims

To ensure a robust methodology and provide confidence that guidelines are met, it is recommended that third party verification is undertaken. Furthermore, the level of quality and verification received will also influence how the results should be used. It's recommended that before starting a GHG emissions quantification project, reporting entities understand how their results will be used. For example, internal use only, external communication, product marketing claims, or comparative study. Use cases that involve sharing the results to third parties or using results as the basis for emissions quantification by downstream actors (e.g. product carbon footprints) involve higher levels of data quality, completeness, and third-party verification. It's recommended that the verification guidelines provided by PACT and the IDF verification framework are used as the primary reference for verifying results and communicating claims externally.

12

Partnership Model

Robust and credible measurement of beef lifecycle emissions can be a highly bespoke and complex exercise where fit-for-purpose third-party guidance is lacking.

For these reasons, SE Advisory Services and Regrow offer services to support clients in the beef sector that are interested in making product-level carbon footprint claims for their beef operations. Although this methodology serves as a foundation for analysis, it should not be viewed as a stand-alone resource. Significant levels of expert judgement, data manipulation in LCA software, and assessment of the quality of third-party datasets is needed to successfully implement the methodology.

PARTNERSHIP MODEL

Regrow	SE Advisory Services	Partnership
Enabling Tier 2 measurement of enteric fermentation emissions in cow-calf systems — enabling beef sector actors to measure emissions reduction in the most material phase of the lifecycle.	Enabling full beef lifecycle GHG accounting, to ensure Tier 2 outputs are accurately reflected in a credible carbon footprint declaration, ready to use in third-party reporting.	Single advisor in driving emissions reductions and sharing results to customers and suppliers.

A

Appendices

Appendix 1: Possible Emission Sources Outside Scope of Enteric Methodology

- Artificial Insemination (AI) related emissions
- Fencing materials and power
- Seeding and brush removal machinery
- Water access infrastructure
- Diesel and gas used by ranch labor

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