

# GRAZING LAND AND LIVESTOCK MANAGEMENT GREENHOUSE GAS MITIGATION METHODOLOGY

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## MODULE NAME:

*METHODOLOGY FRAMEWORK*

## MODULE CODE:

**FRAMEWORK-GLLM**

## Output Parameter(s)

**Parameter Name:** *ERT\_GLLM<sub>t</sub>*

**Parameter Description:** Number of ERTs generated from grazing land and livestock management activity at time t (t CO<sub>2</sub>e)

## Key Input Data:

E_ENT	Net enteric emissions, t CO <sub>2</sub> -e.
E_MAN	Net manure emissions, t CO <sub>2</sub> e.
E_FERT	Net fertilizer emissions, tCO <sub>2</sub> -e.
E_FF	Net fossil fuel emissions, t CO <sub>2</sub> -e.
S_BIO	Net biotic sequestration/emission, t CO <sub>2</sub> -e.
Buffer%	Buffer withholding percentage, %.
E_LK	Net emissions due to leakage, t CO <sub>2</sub> -e

**Purpose**

- To provide the overall structure and functionality of this modular Grazing Land and Livestock Management (GLLM) GHG methodology
- To provide applicability conditions for the methodology overall
- To provide guidance under which conditions to use the other modules
- To provide guidance for defining the project boundary (geographic boundary, temporal boundary, and GHG sources, sinks and reservoirs included/excluded from accounting)
- To provide requirements for demonstrating additionality
- To calculate ERTs using the output parameters of the other modules
- To specify rules regarding aggregation and Programs of Activities

**Applicability Conditions**

- The methodology is applicable to any GLLM project activity implemented on a beef or dairy livestock operation.
- The FRAMEWORK module shall be used regardless of the magnitude of emissions or removals estimated *ex ante*.
- In the baseline scenario and/or as of the project Start Date, project lands may not constitute ‘forest’ per applicable definitions<sup>1</sup>; or if project lands have sufficient forest cover to constitute ‘forest,’ trees present in the baseline may not be felled in site preparation or during project implementation.
- In the project scenario, project lands must be managed for grazing/livestock. The methodology is not intended for activities taking grazing lands out of production, due to leakage concerns.
- GLLM activities in which livestock are grazed all or part of the year on public lands may only receive credit for enhanced biotic sequestration if the Project Proponent provides documentation from the responsible public agency that the agency cedes offset ownership to the Project Proponent. In addition, projects claiming credit for biotic sequestration on public lands must make their non-permanence buffer contribution in non-project ERTs.
- Recognizing that some grazing land is leased rather than owned, the Project Proponent need not necessarily demonstrate land ownership, but must demonstrate offset title and effective control over the GHG sources and sinks from which the credited reductions/removal enhancements originate, for the duration of the specified Minimum Project Term. This applicability condition may be met by providing a letter from the landowner granting offset title to the Project Proponent and guaranteeing no change in land-use for the duration of the Minimum Project Term.
- If project activities lead to a decrease greater than 3% in product output, relative to the baseline case, the potential for activity shifting and market-effects leakage emissions must be accounted for using the L-GLLM module.
- Projects on organic soils are eligible unless excluded by the models used in the relevant module.

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<sup>1</sup> See *ACR Forest Carbon Project Standard* for applicable forest definition.

- Change by the Project Proponent to the drainage conditions on project lands are not permitted in any instance in which such changes would significantly increase emissions of greenhouse gases.
- Aggregated projects and Programs of Activities (PoAs) must comply with the definitions in 3.0 and the rules in Annex A.

## 1.0 Goal

The goal of this methodology is to create a comprehensive and flexible accounting framework for a broad range of beef and dairy baseline management practices and GHG mitigation activities. The methodology focuses on five primary GHG sources, sinks and reservoirs (SSRs): enteric methane, manure methane, nitrous oxide from fertilizer use, fossil fuel emissions, and biotic sequestration in above- and below-ground biomass and soils. Grazing land and livestock management (GLLM) activities will affect one or more of these SSRs.

Any GLLM activity that affects these sources and pools, whether it involves feedlot operations, feed composition, changing intensity of grazing, grassland management, manure management, fertilizer management, or a range of other mitigation practices, is eligible under this methodology as long as it meets the applicability conditions of the relevant modules and all applicable requirements of the *ACR Standard*.

The methodology is designed to ensure the complete, consistent, transparent, accurate and conservative quantification of GHG emission reductions associated with a GLLM project. The methodology also aims to provide flexible and cost-effective accounting methods where it can be shown that anticipated impacts on a particular SSR are small; see section 2.1.

## 2.0 Methodology Structure

This GLLM Methodology adopts a modular structure to streamline methodology development and use. Considering the broad range of potential baseline management practices and GHG mitigation activities in the livestock sector, rather than creating stand-alone methodologies specific to each baseline and mitigation activity, the modular structure allows Project Proponents (livestock producers or the project developers/aggregators representing them) to select the modules relevant to their particular baseline and project activities.

**FRAMEWORK-GLLM** constitutes, together with the modules and tools it calls upon, a complete baseline and monitoring methodology. The reference to **FRAMEWORK-GLLM** and the modules used to construct the project-specific methodology shall be given in the ACR GHG Project Plan.

### 2.1 Graduated Approach to GHG Accounting

The tool **T-XANTE**, contained within the **A-MICROSCALE** module, allows Project Proponents to select an accounting approach corresponding in complexity and data requirements to the

magnitude of the estimated GHG impacts associated with a particular SSR. In **A-MICROSCALE**, simplified accounting tools are provided that estimate net GHG impacts in each SSR based on readily available data inputs.

For SSRs where the project activity is expected to cause ‘micro’ impacts (less than 5,000 tCO<sub>2</sub>-e per year), the simplified accounting tools provided in **A-MICROSCALE** are all that is required to account for emission reductions/removal enhancements in that SSR.

For SSRs where the project activity is expected to cause ‘small’ impacts (more than 5,000 but less than 60,000 tCO<sub>2</sub>-e per year, *and* direct emissions less than 60,000 t CO<sub>2</sub>-e annually), projects in the continental United States may use **A-SMALLSCALE**, which employs the whole-farm calculation model COMET 2.0, to calculate biotic, fertilizer and fossil fuel emissions. However the **A-ENTERIC** and **A-MANURE** modules must be used when estimated reductions in enteric and manure methane are greater than 5,000 t CO<sub>2</sub>-e annually, since enteric and manure emissions are not accounted in COMET 2.0.

For projects in the continental United States, for SSRs where the project activity is expected to cause impacts greater than 60,000 tCO<sub>2</sub>-e per year, the large-scale modules **A-ENTERIC**, **A-MANURE**, **A-FERTILIZER**, and **A-BIOTIC** must be used.

For projects outside the continental United States, for SSRs where the project activity is expected to cause impacts greater than 5,000 tCO<sub>2</sub>-e per year, the large-scale modules **A-ENTERIC**, **A-MANURE**, **A-FERTILIZER**, and **A-BIOTIC** must be used.

For fossil fuel emissions, for all projects in the continental United States **A-SMALLSCALE** shall be used; for all other locations **A-MICROSCALE** shall be used.

## *2.2 Modules Provided and Conditions for Use*

Accounting modules:

- **A-MICROSCALE**: an Excel spreadsheet-based tool calculating baseline and project emissions from GLLM activities inside or outside the United States, using IPCC emission factors and other methods. Used for all emission sources and carbon pools when estimated emission reductions from focal sources are less than 5,000 t CO<sub>2</sub>-e annually. **A-MICROSCALE** is also used for calculation of fossil fuel emissions for all projects outside the continental United States.
- **A-SMALLSCALE**: estimates emissions and net emission reductions from GLLM activities in the continental United States, when reductions from biotic sequestration, fossil fuel and fertilizer are more than 5,000 t CO<sub>2</sub>-e annually but less than 60,000 t CO<sub>2</sub>-e annually *and* direct emissions from these sources are less than 60,000 t CO<sub>2</sub>-e annually. For reductions in enteric and manure methane greater than 5,000 t CO<sub>2</sub>-e annually, the **A-ENTERIC** and **A-MANURE** modules must be used.
- **A-ENTERIC**: estimates baseline and project emissions and net emission reductions from enteric fermentation as part of GLLM activities. Used for GLLM activities inside or

outside the United States when estimated emission reductions from focal sources are greater than 5,000 t CO<sub>2</sub>-e annually.

- **A-MANURE**: estimates baseline and project emissions and net emission reductions from manure as part of GLLM activities. Used for GLLM activities inside or outside the United States when estimated emission reductions from focal sources are greater than 5,000 t CO<sub>2</sub>-e annually.
- **A-FERTILIZER**: estimates baseline and project emissions and net emission reductions from fertilizer use as part of GLLM activities. Used for projects in the continental United States when estimated emission reductions from focal sources are greater than 60,000 t CO<sub>2</sub>-e annually, and for projects outside the continental United States when estimated emission reductions from focal sources are greater than 5,000 t CO<sub>2</sub>-e annually.
- **A-BIOTIC**: estimates sequestration and net emission reductions from soils and plants as part of GLLM activities. Used for projects in the continental United States when estimated emission reductions from focal sources are greater than 60,000 t CO<sub>2</sub>-e annually, and for projects outside the continental United States when estimated emission reductions from focal sources are greater than 5,000 t CO<sub>2</sub>-e annually.

Leakage module:

- **L-GLLM**: provides procedures to calculate activity-shifting and market-effects leakage emissions where significant.

Tools:

- **T-XANTE**: an Excel spreadsheet-based *ex ante* estimation tool that estimates net emission reductions for enteric, manure, biotic, fertilizer and fossil fuel emissions from readily available data inputs. The tool is designed to streamline project development by allowing users to make an up-front estimate of impacts on each SSR and use simplified accounting methods for ‘micro’ (<5,000 t CO<sub>2</sub>-e annually) and ‘small’ (more than 5,000 t CO<sub>2</sub>-e annually but less than 60,000 t CO<sub>2</sub>-e annually) GHG impacts.
- **T-RISK**: ACR-approved risk assessment tool per the *ACR Forest Carbon Project Standard*. Used in **A-BIOTIC**, **A-SMALLSCALE** and **A-MICROSCALE** to mitigate the risk of reversals in biotic sequestration by calculating a required contribution of ERTs to the ACR non-permanence buffer pool.

### 3.0 Definitions

Where not explicitly defined in this document, current *ACR Standard* definitions apply.

**Aggregate**: the grouping of multiple project instances, fields, producers or facilities into a single project activity registered on ACR. An Aggregate must be coordinated by a Project Proponent (public or private entity) serving as the aggregator. The GHG Project Plan will define the overall project boundary and baseline conditions encompassing all project instances, fields, producers or facilities. An Aggregate will have a single Start Date and Crediting Period.

**Cohort:** a new group of Project Participants, meeting all eligibility, project boundary, baseline and additionality criteria of an already established Program of Activities (PoA).

**Cohort Description:** a document provided to ACR and the Validation/Verification Body (VVB) at the time of addition of a Cohort to the PoA, summarizing all necessary information on the Cohort. Each Cohort Description becomes an addendum to the greenhouse gas (GHG) Project Plan for the PoA.

**Module:** a component of a methodology that can be applied on its own to perform a specific task.

**Project Participant:** an individual producer participating in an Aggregate, or in a Cohort of a PoA.

**Project Proponent:** per the *ACR Standard*, “an individual or entity that undertakes, develops, and/or owns a project. This may include the project investor, designer, and/or owner of the lands/facilities on which project activities are conducted. The Project Proponent and landowner/facility owner may be different entities.” As used in this methodology, the Project Proponent may be a beef/dairy livestock producer, a carbon project developer representing the producer, a carbon project aggregator representing multiple Project Participants in an Aggregate, or a carbon project aggregator representing multiple Cohorts of Project Participants in a PoA.

**Program of Activities (PoA):** a project in which successive Cohorts of fields, producers or facilities are added incrementally to a project over time. A PoA must be coordinated by a Project Proponent (public or private entity) serving as the aggregator. In order to register a PoA the Project Proponent must use an approved baseline and monitoring methodology that defines the appropriate boundary, avoids double-counting, accounts for leakage, and ensures that the emission reductions are real, measurable, verifiable, and additional to any that would occur in the absence of the project activity.<sup>2</sup>

**Tool:** a guideline or procedure for performing an analysis or to help use or select a module or methodology.

## 4.0 Project Boundaries

The following boundaries shall be defined:

- a. The geographic boundaries relevant to the project activity;
- b. The temporal boundaries;
- c. The greenhouse gas SSRs included in and excluded from accounting for the baseline and project scenarios.

### 4.1 Geographic Boundary

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<sup>2</sup> Adapted from Clean Development Mechanism Rulebook at <http://cdmrulebook.org/452>.

Project Proponents shall clearly define the geographic boundaries of the project so as to facilitate accurate measuring, monitoring, accounting, and verifying of the project's emissions reductions and removals.

The geographic boundary shall include all facilities and lands where livestock are held, fed and grazed, in both the baseline and project scenarios. The geographic boundary may not be defined so as to exclude lands or facilities where emission increases attributable to the project activity may occur. The geographic boundary must be justified to ACR and the VVB.

The GLLM project activity may contain more than one discrete area of land or set of livestock production facilities. When describing physical project boundaries, the following information shall be provided per discrete area:

- Name of the project area (e.g., field number, facility, etc);
- Unique ID for each discrete parcel of land or facility;
- Map(s) of the area (preferably in digital format);
- Total land area and number of facilities.

The GLLM project activity may also span several commercial entities (e.g. cow-calf, backgrounding and feedyards). The geographic boundary shall be defined to include all entities over which the Project Proponent has effective control. Note that the GHG boundary, however, may be broader, requiring the project proponent to consider GHG emissions attributable to “upstream” activities such as feed production, fossil fuel and fertilizer use (see section 4.3).

Defining the geographic boundary of the GLLM project activity may require creating analytical units that correspond more to animal management than specific areas of land, e.g. in the case where animals are held on different lands at different times of the year or different parts of their life cycle. The Project Proponent must justify to ACR and the VVB the logic of the geographic boundary definition based on how animals under the Project Proponent's control are managed across the year and through their life cycle.

See Annex A for guidance on specifying the geographic boundary in Aggregates and Programs of Activities.

#### *4.2 Temporal Boundaries*

**Start Date** is the date on which GLLM project activities began. This will need to be defined in the GHG Project Plan such that there is a discrete identifiable date when the project scenario began to diverge from baseline management. For example, for a GLLM project instituting rotational grazing where the baseline was continuous pasture, the Start Date may be the start of the first grazing season in which fences are installed and cattle are managed in rotation. For a GLLM project continuing grazing but implementing silvopasture, the Start Date would be the date of tree planting. For a GLLM project implementing dietary changes to reduce enteric methane, the Start Date would be the date when the new dietary regime was introduced. This

methodology does not define Start Dates for all potential activities, but leaves to the Project Proponent to define the Start Date unambiguously in the GHG Project Plan.

A PoA will have multiple different Start Dates: a Start Date for the PoA overall, and Start Dates for each new Cohort. The Start Date of a Crediting Period for a Cohort shall be the date of its inclusion in the registered PoA or any date thereafter. See Annex A.

**Crediting Period** is the finite length of time during which the project's GHG Project Plan is valid, and during which a project can generate offsets for registration on ACR against its baseline.<sup>3</sup> For GLLM project activities the Crediting Period shall be 10 years; except that for GLLM activities impacting biotic sequestration only, or for the biotic sequestration component of GLLM activities impacting multiple SSRs, the Crediting Period shall be 40 years.

A PoA will have multiple different Crediting Periods: a Crediting Period for the first Cohort (the Cohort included in the GHG Project Plan at the time of establishment of the PoA), and Crediting Periods for each new Cohort. See Annex A.

Per the ACR Standard, Crediting Periods may be renewed without limitation. Renewing the Crediting Period requires re-assessing the project baseline, every 10 years (or every 40 years for GLLM activities impacting biotic sequestration only, or for the biotic sequestration component of GLLM activities impacting multiple SSRs), unless a reversal triggers an earlier baseline revision.

**Minimum Project Term** is the minimum length of time for which a Project Proponent commits to project continuance, monitoring and verification. For projects claiming credit for biotic sequestration in above- and below-ground biomass carbon and soils, a project term of 40 years is required.<sup>4</sup>

Projects claiming reduced emissions that are irreversible – e.g. reduced enteric, manure, fertilizer, and fossil fuel emissions – have no Minimum Project Term requirement. Thus the 40-year requirement only applies to projects seeking credit for enhanced biotic sequestration.

See Annex A for guidance on specifying the Temporal Boundaries in Aggregates and Programs of Activities.

### *4.3 GHG Boundary*

GLLM project activities may affect enteric emissions (primarily CH<sub>4</sub>), manure emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O), fertilizer emissions (N<sub>2</sub>O), fossil fuel emissions (CO<sub>2</sub>, with trace emissions of CH<sub>4</sub> and N<sub>2</sub>O), and CO<sub>2</sub> sequestration in above- and below-ground biomass and soils.

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<sup>3</sup> See *ACR Standard*.

<sup>4</sup> See *ACR Forest Carbon Project Standard*.

**Emission sources.** The project shall account for any significant increases in emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O relative to the baseline that are reasonably attributable to the project activity. The GHG emission sources included in or excluded from the project boundary are shown in Table 1.

**Table 1. Sources of emissions and associated greenhouse gases in GLLM project activities**

Sources	Gas	Included/Excluded	Justification / Explanation of choice
Enteric emissions from dairy and beef cattle	CO <sub>2</sub>	Excluded	Potential emissions are negligibly small
	CH <sub>4</sub>	Included	Primary GHG affected by the project activity
	N <sub>2</sub> O	Excluded	Potential emissions are negligibly small
Manure emissions from dairy and beef cattle	CO <sub>2</sub>	Included	Primary GHG affected by the project activity
	CH <sub>4</sub>	Included	Primary GHG affected by the project activity
	N <sub>2</sub> O	Included	Primary GHG affected by the project activity
Combustion of fossil fuels	CO <sub>2</sub>	Included	Must be included if fossil fuel emissions are significantly higher (greater than <i>de minimis</i> as defined in ACR Standard) in the project case.
	CH <sub>4</sub>	Excluded	Potential emissions are negligibly small
	N <sub>2</sub> O	Excluded	Potential emissions are negligibly small
Emissions from land application of organic and synthetic fertilizers	CO <sub>2</sub>	Excluded	Potential emissions are negligibly small
	CH <sub>4</sub>	Excluded	Potential emissions are negligibly small
	N <sub>2</sub> O	Included	Primary GHG affected by the project activity

Table 1 with the selection of sources and the appropriate justification shall be presented in the GHG Project Plan.

All emissions associated with feed production, such as fertilizer use, drying of Distillers Dry Grains (DDGs), feed processing etc. must be included in the GHG boundary and accounted for in both baseline and project, unless the Project Proponent can demonstrate these emissions are *de minimis* as defined in the *ACR Standard*.

Emission increases related to feed production (greater emissions from feed production in the project than in the baseline scenario) must be accounted and deducted as project emissions. This includes emissions caused by shifting from feed grown on a Project Proponent or Project Participant’s own lands, to greater reliance on imported feed.

Emission decreases related to feed production (lower emissions from feed production in the project than in the baseline scenario) may be credited to the project if the feed is grown on lands owned or controlled by the Project Proponent or Project Participant. For example, shifting from grains grown on own lands to greater pasturing of livestock, reducing the amount of grain produced, may result in a decrease in fertilizer and fossil fuel emissions on project lands that is creditable.

Emission decreases related to feed production (lower emissions from feed production in the project than in the baseline scenario), when feed is not grown on lands owned or controlled by the Project Proponent or Project Participant, will only be credited to the project if the Project Proponent can demonstrate to ACR and the VVB that the producers of feed, fertilizer etc. will not claim credit to the same emission reductions (which would constitute double counting). For example, decreases in fertilizer use by the feed producer when a project imports less feed, or decreases in natural gas use when a project uses less DDGs, will be credited to the project but only if the above condition is met.

**Carbon pools.** The project shall account for any significant decreases in carbon stock in the project scenario and any significant increases in carbon stock in the baseline scenario, and may account for decreases in the baseline scenario and increases in the project scenario. The carbon pools included in or excluded from the project boundary are shown in Table 2.

**Table 2. Carbon pools in GLLM project activities**

Carbon pools	Included / Excluded	Justification / Explanation of choice
Aboveground	Included / Excluded	Must be included if <i>ex ante</i> estimate of baseline C stocks exceed with-project C stocks. May be included if with-project C stocks exceed baseline and the Project Proponent wishes to claim credit.
Belowground	Included / Excluded	Must be included if <i>ex ante</i> estimate of baseline C stocks exceed with-project C stocks. May be included if with-project C stocks exceed baseline and the Project Proponent wishes to claim credit.
Dead wood	Excluded	Changes in the dead wood pool are expected to be negligibly small over the Crediting Period.
Harvested wood products	Included / Excluded	Must be included if <i>ex ante</i> estimate of baseline C stocks exceed with-project C stocks. May be included if with-project C stocks exceed baseline and the Project Proponent wishes to claim credit.
Litter	Excluded	Changes in the dead wood pool are expected to be negligibly small over the Crediting Period.
Soil organic carbon	Included / Excluded	Must be included if <i>ex ante</i> estimate of baseline C stocks exceed with-project C stocks. May be included if with-project C stocks exceed baseline and the Project Proponent wishes to claim credit.

Table 2 with the selection of carbon pools and the appropriate justification shall be presented in the GHG Project Plan.

## **5.0 Demonstration of Additionality**

GLLM project activities must yield GHG emission reductions or removal enhancements that exceed any GHG reductions or removals required by law or regulation, and exceed any GHG reductions or removals that would otherwise occur in a conservative business-as-usual scenario.

To demonstrate additionality, ACR requires all project activities to 1) be surplus to applicable enforced regulations and either 2a) pass a performance standard test, or 2b) demonstrate that the activity is not common practice and faces at least one implementation barrier (financial, technological or institutional), making it less attractive than the business-as-usual scenario.

### *5.1 Start Date*

If the project Start Date is more than one year before submission of the GHG Project Plan, the Project Proponent shall provide evidence that GHG mitigation was considered in the decision to proceed with the project activity. Evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the Start Date.

### *5.2 Regulatory Surplus*

The regulatory surplus test involves existing laws, regulations, statutes, legal rulings, or other regulatory frameworks that directly or indirectly affect GHG emissions associated with a project action or its baseline candidates, and which require technical, performance, or management actions.

The Project Proponent shall conduct a review of applicable regulations (e.g. air quality, water quality, water discharge, nutrient management, endangered species and protection, etc.), mandates, legal rulings, consent decrees etc. that affect the project facilities or lands. The Project Proponent must demonstrate in the GHG Project Plan that the proposed project activity is not required by any existing applicable and enforced mandate. For example, a Project Proponent wishing to register a project changing the manure management system must demonstrate that this change is not effectively required by air, water, odor or other regulations. In determining whether an action is surplus to regulations, the Project Proponent should not consider voluntary agreements without an enforcement mechanism, proposed laws or regulations, optional guidelines, or general government policies.

Projects that are deemed regulatory surplus are considered surplus for the duration of the Crediting Period. If laws or regulations change during the Crediting Period, this may make the project ineligible for renewal.

### 5.3 Practices Deemed Additional

ACR conceptually supports the approach that certain practices, which can be shown to have a very low common practice adoption rate, may be included on a “positive list” of practices deemed additional. These practices, implemented in the specified regions, are eligible for crediting provided they meet the Regulatory Surplus test, without requiring a project-specific demonstration of implementation barriers or common practice adoption rates as specified in 5.4.

Project Proponents may submit data to ACR indicating a particular practice within a specified region has an adoption rate lower than 5%. ACR will evaluate the submitted data and supporting documentation and consider adding the activity to the positive list of practices deemed additional. Adoption rate data will need to be re-evaluated at every baseline renewal.

### 5.4 Three-Prong Test

For practices not included in 5.3, Project Proponents shall demonstrate additionality in the GHG Project Plan using the ACR “three-prong” test (regulatory surplus, not common practice, and faces at least one implementation barrier) as supported by application of an ACR-approved additionality tool.<sup>5</sup> Such tools will help the Project Proponent to identify credible alternative land use scenarios, evaluate the attractiveness of all identified scenarios, and demonstrate that the project scenario is not the most economically or financially attractive of the identified scenarios, or faces higher barriers than those faced by another identified land use scenario, and is not common practice in the sector and geographic region.

### 5.5 Early Adopters<sup>6</sup>

Some existing GHG methodologies do not allow producers who have implemented an eligible project activity in recent years (“early adopters”) to participate in the program, even if that practice is at a very low adoption rate in the industry. If the baseline is set by the recent historical management on a producer’s own livestock operations or fields, an early adopter will have no difference between baseline and project scenarios and therefore no credits will be generated. These mechanics are justified by the notion that producers who are already implementing a project activity will not change their practice when they participate in a carbon project, and there would be no environmental improvement if such producers could participate. However, since many agricultural/livestock management decisions are made year-to-year, the argument of no environmental improvement does not necessarily hold, and disqualifying early adopters may even create a perverse incentive for them to discontinue low-emission practices for one or more years in order to be able to re-start those practices and claim carbon credits. It also fails to reward

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<sup>5</sup> Such as the “ACR Tool for Determining REDD Project Baseline and Additionality” at <http://americancarbonregistry.org/carbon-accounting/tools-templates/>, or the CDM Tool for the Demonstration and Assessment of Additionality at <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/>

<sup>6</sup> This section based on *Voluntary Emission Reductions in Rice Management Systems*, a GHG methodology prepared by Terra Global Capital LLC, Environmental Defense Fund, California Rice Commission, and Applied Geosolutions LLC. July 2012.

early action, and is often seen by others in the industry as a reason not to adopt the practices either (since those who are seen as the “industry leaders” cannot benefit).

Here eligible early adopters are allowed up to ten years to participate in the program. If their participation has not succeeded in bringing new producers into the program after ten years, as measured by the rate of adoption of the alternative practice, then the early adopters cannot renew their Crediting Period and continue in the program. The early adopter provision invests in the early adopters’ ability to promote increasing levels of participation by non-early-adopters.

Early adopters of activities that have limited baseline adoption are allowed to use a “common practice baseline” rather than the baseline on their own livestock operations or fields. The limited adoption rate is tested using a simple threshold level: every project that plans to implement a practice that can be demonstrated to have an adoption rate less than or equal to 5% in the industry and relevant geographic region is deemed additional and can use a baseline that is based on the common practice of the producers that have not adopted the practice (“common practice baseline”).<sup>7</sup> At the end of the 10-year Crediting Period, if the baseline adoption rate is still less than 5%, the Crediting Period may not be renewed. If after 10 years, the baseline adoption rate is greater than 5%, the Crediting Period may be renewed. This limitation on Crediting Period renewal is based on the view that if after 10 years the practice remains at <5% adoption, there must be some other barrier to adoption, and the reason for allowing early adopters in the program (to prime the system and demonstrate that a set of management practices can be successfully used) becomes less persuasive.

The additionality of activities for which the baseline adoption rate exceeds 5% must be tested on a project-specific basis using the approach in 5.4. Only a project-based baseline is allowed for such activities. The project’s Crediting Period for such practices may be renewed only until the baseline adoption reaches 50%. This to ensure that a baseline is set based on common practice that represents the practice of a majority of the producers.

- **Minimum data requirements for determining adoption rate.** The baseline adoption rate must be quantified in the reference region the project is located in. The Project Proponent shall define the project’s reference region, justifiable to ACR and the VVB. During validation of a GHG Project Plan or renewal of the Crediting Period for an existing project, the average of all publically available baseline adoption rates (including those published in validated GHG Project Plans) during a 5-year historical period shall be used.
- **Procedures to determine baseline adoption rate.** There are two options to determine the baseline adoption rate of a specific practice:
  - **Survey data.** The baseline adoption must be determined using a statistically valid survey of producers within the reference region where the project is located. The average of all available survey data must be used to calculate the baseline

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<sup>7</sup> The 5% threshold is identical to the VCS’ level of activity penetration of 5% in the Standardized Methods Requirements document.

adoption rate (including those published in validated GHG Project Plans). For initial validation, 1 data point in the past 5 years suffices to quantify the baseline adoption rate. However, upon renewal of a project’s Crediting Period, the baseline adoption rate must be based on the average of at least 2 time points in the 5 years preceding the Crediting Period.

- **Expert opinion.** If 3 independent experts assert that the baseline adoption rate of a given practice is less than 2% of the acres or animal population within the reference region, no survey is required, and projects using the practice may use a common practice baseline. The independent experts must have at least 10 years of relevant experience and must be associated with an academic institution, government institution, or must be a full-time professional livestock advisor with experience in the reference region. The credentials of the independent experts shall be evaluated during validation of a GHG Project Plan by the VVB.
- **Renewal of the Crediting Period.** At initial validation, practices for which the adoption rate is less than or equal to 5% within the reference region where the project is located are eligible to use a baseline that is based on common practice. At every renewal of the Crediting Period, Project Proponents shall demonstrate that the adoption rate is greater than 5% in the reference region where the project area is located. If the adoption rate remains below 5% at the time of Crediting Period renewal for an early adopter, renewal is not allowed. Maximally 10 years are thus allowed to demonstrate that the early adopters’ incentive is causing an eligible practice to be adopted by others.
- **How to set the values for critical variables for common-practice baselines.** All data used to set the critical variables of a common practice baseline shall be based on actual management data from at least 5 operations on which the common practice management is done (i.e. non-early-adopters) and shall be reviewed by at least 3 independent peer reviewers such as farm advisors, extension agents or academic scientists.

## 6.0 Mitigation of Risk of Reversals in Biotic Sequestration

Projects seeking credit for enhanced biotic sequestration are subject to risks of both unintentional and intentional reversals. These risks must be assessed as detailed in the ACR *Forest Carbon Project Standard*.

Project Proponents shall conduct a risk assessment using the latest ACR-approved tool.<sup>8</sup> The result of this assessment is an overall risk category for the project, translating into a percentage or number of ERTs that must be deposited, at each new ERT issuance, into a shared non-permanence buffer pool managed by ACR.

All buffer contributions, deductibles, and ERT replacements (in the case of intentional reversals) may be made in ERTs of any type and vintage. Buffer contributions for projects on public lands, that wish to claim credit for biotic sequestration, *must* be made in non-project ERTs.

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<sup>8</sup> Currently the latest published version of the Verified Carbon Standard *AFOLU Non-Permanence Risk Tool*.

Project risk is reassessed every five years, on verification, except in the case of a reversal triggering an immediate reassessment of the project baseline, risk category and buffer contribution.

Reductions in enteric, manure, fertilizer and fossil fuel GHG emissions are not subject to reversal risk so no buffer contribution is required for these SSRs.

### 7.0 Calculation of Total Net Greenhouse Gas Emissions Reductions

Net emission reductions shall be calculated as:

$$ERT\_GLLM_t = E\_ENT + E\_MAN + E\_FERT + E\_FF + (S\_BIO * (1 - Buffer\ \%)) - E\_LK \quad (1)$$

Where:

$ERT\_GLLM_t$	Emission reduction tonnes awarded to the GLLM project activity at time $t$ ; tCO <sub>2</sub> e.
$E\_ENT$	Net enteric emissions; t CO <sub>2</sub> -e. From <b>A-ENTERIC</b> when annual enteric emissions are >5,000 tCO <sub>2</sub> -e. For annual emissions <5,000 tCO <sub>2</sub> -e, set $E\_ENT=E\_ENT_{MS}$ from <b>A- MICROSCALE</b> .
$E\_MAN$	Net manure emissions; t CO <sub>2</sub> e. From <b>A-MANURE</b> when annual manure emissions are >5,000 tCO <sub>2</sub> -e. For annual emissions <5,000 tCO <sub>2</sub> -e, set $E\_MAN=E\_MAN_{MS}$ from <b>A- MICROSCALE</b> .
$E\_FERT$	Net fertilizer emissions; tCO <sub>2</sub> -e. From <b>A- FERTILIZER</b> when annual fertilizer emissions are >60,000 tCO <sub>2</sub> -e for projects in continental US, and >5,000 tCO <sub>2</sub> -e for projects outside continental US. For annual emissions <60,000 tCO <sub>2</sub> -e but >5,000 tCO <sub>2</sub> -e in the continental US, set $E\_FERT=E\_FERT_{SS}$ from <b>A-SMALLSCALE</b> . For annual emissions <5,000 tCO <sub>2</sub> -e, set $E\_FERT=E\_FERT_{MS}$ from <b>A- MICROSCALE</b> .
$E\_FF$	Net fossil fuel emissions; t CO <sub>2</sub> -e. From <b>A- SMALLSCALE</b> when annual fossil fuel emissions are >5,000 tCO <sub>2</sub> -e for projects in continental US. For all other projects set $E\_FF=E\_FF_{MS}$ from <b>A- MICROSCALE</b> .
$S\_BIO$	Net biotic sequestration/emission; t CO <sub>2</sub> -e. From <b>A- BIOTIC</b> when annual biotic sequestration is >60,000 tCO <sub>2</sub> -e for projects in continental US, and >5,000 tCO <sub>2</sub> -e for projects outside continental US. For annual sequestration <60,000 tCO <sub>2</sub> -e but >5,000 tCO <sub>2</sub> -e in the continental US, set

	S_BIO=S_BIO <sub>SS</sub> from <b>A-SMALLSCALE</b> . For annual emissions <5,000 tCO <sub>2</sub> -e, set S_BIO=S_BIO <sub>MS</sub> from <b>A- MICROSCALE</b> .
<i>Buffer%</i>	Buffer withholding percentage; %. From <b>A-BIOTIC</b> , <b>A-SMALLSCALE</b> or <b>A- MICROSCALE</b> .
<i>E_LK</i>	Total emissions from leakage; tCO <sub>2</sub> -e. From <b>L-GLLM</b> , including both activity shifting leakage <i>E_AS</i> and market-effects leakage <i>E_ME</i> .

### 7.1 Allowance for “positive leakage”

Module **L-GLLM** provides conditions under which activity shifting and market-effects leakage must be calculated and procedures for these calculations.

Emissions from activity shifting leakage (*E\_AS*) will either be positive, or zero in the case where activity shifting leakage is allowed to be ignored.

Emissions from market-effects leakage (*E\_ME*) may be positive or negative. If project output is more than 3% less than baseline output, market-effects leakage must be calculated; *E\_ME*, as derived in equation (2) of **L-GLLM**, will be positive.<sup>9</sup> This means that the decrease in project output is causing positive emissions due to market-effects leakage, and these emissions are subtracted from net emission reductions attributable to the project in equation (1) of this module.

If project output exceeds baseline output, *E\_ME* as derived in equation (2) of **L-GLLM** will be negative. This means that due to the increase in project output, less output needs to be produced elsewhere, as compared to the baseline case, so emissions elsewhere are being displaced. This is sometimes referred to as “positive” market-effects leakage. *E\_LK* will likewise be negative (since *E\_ME* is negative and there is no activity shifting leakage), so when *E\_LK* is subtracted from net emission reductions in equation (1) of this module, “positive leakage” (emissions displacement elsewhere) will be credited to the project activity.

This is permissible, but only in cases where the Project Proponent can demonstrate to ACR and the VVB that there is no potential for double crediting. Double crediting would occur whenever the emission reductions being credited as positive leakage could also be claimed by other producers or production facilities, e.g. where fossil fuel emissions or emissions from fertilizer production are “capped” in a regulated system and/or where crediting is occurring for reductions in these sectors.

<sup>9</sup> Except in the case that output from production shifted to non-project areas more than compensates for the decrease in output from the project area.

## 8.0 Ex Post Monitoring

### 8.1 Interval of Monitoring and Verification

Issuance of ERTs is subject to monitoring and verification. The minimum duration of a monitoring period is one year and the maximum duration is 5 years, as dictated by ACR's required interval for field verification.

The required interval for verification is as specified in the *ACR Standard*: a desk-based audit at each request for issuance of new ERTs (may be annual, or less frequent), and a full verification including field visit by the VVB at the first verification and then at least once every five years.

For a Program of Activities, Cohorts added subsequent to the initial Cohort shall be field-verified at the first interval of field verification for the initial Cohort, and subsequently join the regular five-year cycle. For example, if a PoA is established with an initial Cohort in year 0, and additional Cohorts added in years 2 and 4, all three Cohorts will be field-verified in year 5 and then subsequently on five-year intervals.

Validation of the GHG Project Plan is required once per Crediting Period. Validation may occur simultaneously with the first verification and be conducted by the same VVB.

All data collected as part of monitoring should be archived electronically and kept at least for 2 years after the end of the last Crediting Period.

### 8.2 Parameters to be Monitored

All parameters listed in the relevant accounting module must be monitored. One hundred percent of the data should be monitored if not indicated otherwise in the parameter tables of the relevant module.

In the event the relevant accounting module specifies use of a model, or allows various models to be used, the input parameters required by the model used must be monitored.

### 8.3 Monitoring of Project Implementation

Information shall be provided in each monitoring report to establish that:

- (a) The geographic position of the project boundary is recorded for all areas of land, whether these are part of a single project, Aggregate, or Cohort of a PoA;
- (b) The geographic coordinates of the project boundary (and any stratification inside the boundary) are established, recorded and archived. This can be achieved by field survey (e.g., using GPS), or by using georeferenced spatial data (e.g., maps, GIS datasets, orthorectified aerial photography or georeferenced remote sensing images).
- (c) Standard operating procedures (SOPs) and quality control/quality assurance (QA/QC) procedures for field data collection and data management have been applied. Use or

adaptation of SOPs available from published handbooks, or from the *IPCC GPG LULUCF 2003*<sup>10</sup>, is recommended.

#### 8.4 Sampling Design and Stratification

Stratification of the project into relatively homogeneous units – either relatively homogeneously managed land areas, or relatively homogenous animal populations spread across these land units at different times of the year and at different life stages – can either increase measurement precision without increasing the cost unduly, or reduce the cost without reducing measurement precision, because of the lower variance within each homogeneous unit. The Project Proponent should present in the GHG Project Plan an *ex ante* stratification of the project area or justify the lack of it. The number and boundaries of the strata defined *ex ante* may change during the Crediting Period (*ex post*).

Stratification shall be updated *ex post* because of the following reasons:

- Unexpected disturbances occurring during the Crediting Period (e.g., due to fire, pests or disease outbreaks), affecting differently various parts of an originally homogeneous stratum;
- Management activities that are implemented in a way that affects the existing stratification.

Established strata may be merged *ex post* if reasons for their establishment have disappeared.

#### 8.5 Conservativeness

In choosing key parameters or making assumptions based on information that is not specific to the project circumstances, such as in the use of default data, the Project Proponent should select values that will lead to an accurate estimation of net emission reductions and removal enhancements, taking into account uncertainties. If uncertainty is significant, the Project Proponent should choose data that tends to under-estimate, rather than over-estimate, net emission reductions and removal enhancements.

The Project Proponent should identify key parameters that would significantly influence the accuracy of estimates. Local values that are specific to the project circumstances should be obtained for these key parameters, whenever possible. These values should be based on:

- Data from well-referenced peer-reviewed literature or other well-established published sources; or
- National inventory data or default data from IPCC literature that has, whenever possible and necessary, been checked for consistency against available local data specific to the project circumstances; or

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<sup>10</sup> See <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.html>.

- In the absence of the above sources of information, expert opinion may be used to assist with data selection. Experts will often provide a range of data, as well as a most probable value for the data. The rationale for selecting a particular data value should be briefly noted in the GHG Project Plan. For any data provided by experts, the GHG Project Plan shall also record the expert's name, affiliation, and principal qualification as an expert. A 1-page summary CV for each expert consulted shall be included in an annex to the GHG Project Plan.

## Annex A: Rules governing Aggregates and Programs of Activities

See section 3.0 for definitions of terms and acronyms used in this Annex.

### *A.1 Information required for establishing an Aggregate*

A Project Proponent proposing an Aggregate shall submit a GHG Project Plan encompassing all project instances, fields, producers or facilities included in the Aggregate. Project boundaries, baseline definition, additionality demonstration, and all other requirements are applied at the level of the Aggregate. The relevant thresholds (5,000 and 60,000 tCO<sub>2</sub>-e) must be assessed at the level of the Aggregate and the appropriate accounting modules used.

The *ACR Standard* requirements for precision ( $\pm 10\%$  of the mean at a 90% confidence level) shall be applied at the level of the entire Aggregate for the purposes of monitoring and verification.

The GHG Project Plan for an Aggregate is subject to certification by ACR and third-party validation, once per Crediting Period.

If the Project Proponent anticipates adding more project instances, fields, producers or facilities before the end of the Crediting Period, they should instead register a PoA.

### *A.2 Information required for establishing a PoA<sup>11</sup>*

The Project Proponent serving as aggregator for a PoA shall complete a GHG Project Plan covering the entire PoA as well as the first Cohort of Project Participants. The GHG Project Plan shall define the project boundary and baseline criteria encompassing the initial Cohort of fields, producers or facilities, and should be written broadly enough to encompass new Cohorts anticipated to be added in the future. The GHG Project Plan will specify project boundaries (geographic, temporal, and the GHG assessment boundary), a baseline scenario, and a monitoring/verification plan for the entire PoA, i.e. for the initial and future Cohorts.

A PoA may be created at the time of registering the first Cohort of fields, producers or facilities. Cohorts may be added at any time provided they conform to the project boundaries and baseline criteria established in the initial GHG Project Plan. A PoA will have multiple Start Dates and Crediting Periods, but a single overall baseline scenario and monitoring/verification plan. See section 4.2 for rules concerning the Start Date and Crediting Periods for Cohorts in a PoA.

The *ACR Standard* requirements for precision ( $\pm 10\%$  of the mean at a 90% confidence level) shall be applied at the level of each Cohort for the purposes of monitoring and verification.

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<sup>11</sup> This section adapted from Clean Development Mechanism Rulebook at <http://cdmrulebook.org/452>.

The GHG Project Plan for a PoA is subject to certification by ACR and third-party validation, at the start of the Crediting Period for the first Cohort. Subsequently each Cohort Description must be reviewed by the VVB.

The Project Proponent must describe in the GHG Project Plan a management system that includes the following:

- Clear definition of the roles and responsibilities of personnel involved in the process of inclusion of new Cohorts;
- Procedures for technical review of inclusion of new Cohorts, made available to the VVB at the time of validation of the PoA;
- A procedure to avoid double counting (e.g. to avoid the case of including in a Cohort a project instance, field, producer or facility that has been or will be registered on ACR as its own project, or in a Cohort of another PoA);
- Records and documentation control process for each Cohort under the PoA, made available to the VVB at the time of request for inclusion of the Cohort.

The Project Proponent of the PoA shall identify measures to ensure that all Cohorts under its PoA are neither registered as an individual ACR project activity, nor included as Cohorts in another registered PoA. These measures are to be validated and verified by the VVB.

The Project Proponent shall demonstrate that net emission reductions and removal enhancements for each Cohort under the PoA are real and measurable; are an accurate reflection of what has occurred within the project boundary; and are uniquely attributable to the PoA. The PoA shall therefore define at registration the type of information which is to be provided for each Cohort to ensure that leakage, additionality, establishment of the baseline, baseline emissions, eligibility and double counting are unambiguously defined for each Cohort within the PoA.

### *A.3 Information required for subsequent Cohorts in a PoA*

When a Project Proponent adds subsequent Cohorts to an existing PoA, the Project Proponent shall provide a Cohort Description including, but not limited to, the following information:

- Geographic information to uniquely identify the Cohort;
- Name/contact details of the entity/individual responsible for the operation of the Cohort;
- Start Date and duration of the Crediting Period of the Cohort. The Start Date of a Crediting Period for a Cohort shall be the date of its inclusion in the registered PoA or any date thereafter.
- Confirmation that the Start Date of any Cohort is not, or will not be, prior to the validation of the PoA;
- Information stipulated in the GHG Project Plan for the PoA, to demonstrate how the new Cohort meets PoA requirements with respect to:
  - Fulfilling the eligibility criteria, project boundaries, baseline scenario, and demonstration of additionality specified in the GHG Project Plan

- Calculations of baseline emissions and estimated net emission reductions and removal enhancements
- Compliance with relevant environmental impact analysis requirements, if any, unless the analysis was undertaken for the whole PoA and applies equally to this Cohort;
- Information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, unless the comments were sought for the whole PoA and apply equally to this Cohort;
- Confirmation that the Cohort is neither registered as an individual ACR project activity, nor included as a Cohort in another registered PoA.

The Cohort Description shall be provided to ACR and the VVB.<sup>12</sup> The VVB must provide to ACR its opinion on inclusion of the Cohort, prior to registration. This opinion does not require a site visit.

#### *A.4 Preventing debundling*

“Debundling” here refers to separating individual project activities from an Aggregate, and/or splitting Cohorts from a PoA, for registration as a separate project, in order to keep the SSR impacts below the relevant thresholds (5,000 and 60,000 tCO<sub>2</sub>-e) that would require the use of larger-scale accounting modules. Debundling is not allowed under this methodology, since the intent of the thresholds and simplified accounting procedures is to improve the feasibility and cost-effectiveness of activities that have truly “micro” or “small” impacts on the atmosphere. It is therefore important to set criteria by which debundling can be recognized and prevented by ACR and the VVB.

For the purposes of registration of an Aggregate or PoA, a proposed project activity or Cohort shall be deemed to be a debundled component of an Aggregate or PoA if there is already a project activity or Cohort:

- a) Registered by the same Project Proponent; AND
- b) In the same GLLM project category and technology/measure; AND
- c) Registered within the previous 2 years; AND
- d) Whose project boundary is within 1 mile of the boundary of the proposed project activity or Cohort, at the closest point.

If a proposed project activity or Cohort is deemed to be a debundled component of an Aggregate or PoA, but the total size of the project activity or Cohort combined with the already registered Aggregate(s) or Cohort(s) does not exceed the applicable thresholds specified in Section 2, then the proposed project activity or Cohort may use the simplified accounting modules relevant to the combined threshold.

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<sup>12</sup> Preferably the same VVB who validated the original GHG Project Plan for the PoA. If this is not possible or practical, the Project Proponent may use a new VVB to validate subsequent Cohorts and should communicate to ACR the reason for the change.

The VVB shall review the GHG Project Plan and/or Cohort Description for any newly proposed project activity or Cohort to determine whether it is a debundled component of an Aggregate or PoA and thus ineligible for separate registration. Project activities or Cohorts deemed to be debundled may still register using the larger-scale accounting methods dictated by the applicable threshold.

#### *A.5 Addition of Cohorts causing accounting thresholds to be passed*

It is possible that a project, using **T-XANTE**, initially estimates micro-scale effects (<5,000 tCO<sub>2</sub>-e annually) on a particular SSR and thus chooses **A-MICROSCALE**, or initially estimates small-scale effects (60,000 tCO<sub>2</sub>-e annually) and thus chooses **A-SMALLSCALE**, but with the addition of subsequent Cohorts, the effects on this SSR exceed those thresholds.

Note that **T-XANTE** will estimate for the entire Crediting Period, so if the Project Proponent plans from the beginning to bring in a sufficient number of Cohorts to exceed the relevant threshold for a SSR, these plans should be reflected in the GHG Project Plan for the PoA, and the project should adopt the next larger-scale accounting module for that SSR from the beginning.

However, if the exceedance is unexpected, then starting from the registration of the new Cohort going forward, the entire PoA must use the SSR accounting module corresponding to the relevant threshold. It is not required to recalculate emission reductions/removals for the PoA for the years prior to addition of the Cohort(s) that caused the threshold to be exceeded.