



Verra's IALM Methodology (VM0042, v2.0) and Trinity Natural Capital Markets Carbon Credits Methodology (TNCMCM, v1.1) Comparison

Aster Global Environmental Solutions, Inc. (Aster Global) prepared this comparison for the use of Trinity Natural Capital, associated companies and potential clients. This is not an endorsement of either program/platform or methodology. Information contained in this comparison is based on the current versions of the two methodologies and professional judgement on the interpretation and requirements of each program/platform.

BASELINE

For both methodologies, the project baseline scenario is whatever the farmer was doing before the project began, based on lookback periods.

Baseline lookback period is the same for the two methodologies:

VM0042: 3-year minimum lookback period, though longer lookback periods are preferred.

Trinity CCM: 3-year minimum lookback period, though a 5-year or longer lookback period is preferred.

VM0042 Baseline is reassessed, according to the VCS Standard, to reflect current ag production in region every 10 years. This reassessment is to determine whether a project activity has been adopted by enough farmers in a region to be considered *common practice*, which would eliminate the activity from consideration in the Verra methodology. The TNCMCM does not reject project activities due to rates of adoption in a region, so such a reassessment is unnecessary.

Baselines for soil models are updated for both methodologies as another year's worth of data is collected.

ADDITIONALITY

Additionality rules are used to ensure that a carbon project's emissions reductions and carbon sequestration activities would not have occurred in the absence of the project.

VM0042:

1. Demonstrate regulatory surplus (project activities are NOT required by law).
2. Identify and demonstrate barriers that prevent project activities from occurring exist (cultural practices, social norms, attitudes and beliefs). Financial barriers are not considered.

3. Demonstrate that project activities are not common practice. If 20% or more of the farmers in a region use the practice, it is considered a common practice by Verra, regardless of barriers preventing a farmer from adopting the practice.

Trinity CCM:

1. Demonstrate regulatory surplus.
2. Identify whether financial barriers exist. Negative profitability is required, without the sale of credits.

In both of these methodologies, no credits are issued for emissions reductions/carbon sequestration that would have happened anyway.

Two major differences between additionality rules of the two methodologies include:

1. VM0042's common practice rule, which rejects project activities that have been adopted by 20% or more of the farmers in the region. However, for this particular methodology, a project developer can get around the common practice rule by adopting more than one activity and, provided at least one of those activities passes the common practice rule, activities with a higher than 20% adoption rate can be used to generate credits.
2. TNCMCM's financial barrier rule.

Both methodologies can be said to reward agricultural practices that would not have occurred in the absence of a carbon project, and therefore are considered additional.

APPLICABILITY/ELIGIBILITY

On top of additionality requirements, methodologies typically have some more specific requirements.

Applicability Conditions for VM0042

- Change in practice that is expected to result in reduced emissions or increased GHG removals
- No land use conversions, unless it can be credibly demonstrated that the land is degraded and a land use change leads to significant improvements in soil health and environmental benefits.
- Not cleared of native ecosystems within 10-years prior to start date
- Not expected to result in a sustained reduction in productivity greater than 5%
- No wetlands
- No biochar

Eligibility for TNCMCM

- No enrollment in other carbon crediting programs
- Perform carbon footprint assessment of farm operation
- Practice changes not required by law
- No land use changes.
- Wetlands OK
- Biochar OK

VM0042 does not allow enrollment in other carbon programs, either. This is covered in their no double counting rule and is no different than TNCMCM.

A practice change is required in the TNMCM, since a baseline is first established and is compared to scenarios in which a practice change takes place.

Clearing of native vegetation is not specifically mentioned in the TNMCM, though barring land use changes should cover the issue, at least for the length of the baseline look-back period. Calculation of emissions reductions on wetlands used for agriculture is complicated and not well established. Verra excludes them from consideration, at this time. TNMCM allows the use of wetlands.

The emissions reductions through the use of biochar have not yet been studied thoroughly enough to be considered by VM0042 at this time. Reductions would also have to be offset by the emissions caused by the creation of biochar. Waste management solutions are included in the TNMCM. Practice changes not being required by law is a part of applicability conditions for VM0042, so the two methodologies are equal on this point.

CALCULATION APPROACHES

VM0042:

1. Measure and model – Initial soil organic carbon (SOC) measurements are made to inform the model. Subsequent sampling is required at least once every 5 years and the results are used to adjust the model if sampling indicates it is over- or underestimating SOC.
2. Measure and remeasure, using baseline control sites.
3. Regardless of the above two approaches, certain fluxes are calculated via default factors – CO₂ from fossil fuel use, N₂O and CH₄ emissions from soil are calculated using the accepted IPCC emissions factors.

TNMCM:

1. SOC changes are modeled, with SOC measurements optional. The model within SANDY works with inputs from the grower, local weather data and published soil parameters for soil types in the area of the fields. When direct SOC measurements are available, they are used in a similar manner to models used under VM0042.
2. As with VM0042, some fluxes are calculated using default factors.
3. No measure and remeasure option is necessary, because the TNMCM is used in areas where SANDY's SOC model has been demonstrated to be accurate.

The VM0042 methodology is intended for use anywhere in the world where agriculture is practiced. In regions where soil models have been demonstrated to be accurate, a project developer would use the measure and model approach to calculate soil organic carbon changes, because it is the most economical option. However, models have not been calibrated and demonstrated for many developing regions of the world, and Verra's methodologies are usually designed to accommodate as many parts of the world as possible.

It should be noted that the measure and remeasure approach has been available since the approval of VM0021 in 2012, yet no one has ever used it due to high costs.

The measure and model approach should be more precise than a modeled approach without initial SOC measurements. TNMCM addresses this when calculating uncertainty. Remeasuring SOC

every 5 years, in order to adjust the model and credits issued by a project, offers additional assurance that models calculating soils emissions and sequestration are as accurate as possible.

Further comment on calculations –

TNCMCM V1.0, currently lacks the formulas needed by verifiers to check project calculations. There is little doubt these can be provided, but they are not currently available for review.

Models

No in-depth examinations of the model used in SANDY or other models that might be used in a VM0042 project were performed for this comparison. An interview with two members of Trinity's modeling team was held to derive some basic information.

VM0042: No specific model mandated

Model requirements:

1. Publicly available.
2. Demonstrated by peer-reviewed studies.
3. Validated per datasets and procedures detailed in VMD0053.

TNCMCM:

The model used is integrated into SANDY. The model is verified to work in the region of a project by a team of knowledgeable experts, and separate model verification is not required by the project developer or the verifiers.

This is a key feature of Trinity CMM, given that it relieves either party of the necessity of hiring qualified experts to verify and run the models.

The SOC model is based on the well-known and well-studied Century Model, which is publicly available. This is the same model on which the USDA-NRCS bases Comet-VR. Other emissions sources are calculated based on IPCC emissions factors and other established formulas, which is also allowable under VM0042.

Leakage

VM0042:

Three types of leakage must be monitored:

1. **Organic Amendments from Outside the Project Area** -- This leakage does not need to be calculated if source of amendment is within project boundaries or if the manure was diverted from an uncontrolled anaerobic lagoon or tank, where no methane recovery for heat or electricity. It is also not necessary to calculate this leakage if it can be documented the organic material was not used as a soil a soil amendment before the project.
2. **Displacement of Livestock** -- If livestock are displaced, livestock emissions are still attributed to the project, based on historical stocking numbers.
3. **Productivity Declines** -- While not expected, productivity must be monitored and leakage calculated if there is a decline in productivity >5%. Given the aversion of farmers to productivity losses and the fact that farm income will continue to be defined largely by productivity and not the sale of carbon or other environmental credits, drops in productivity are expected to be small and of short duration, if they occur.

TNCMCM:

Two of the three types of leakage recognized in VM0042 are monitored:

1. **Productivity Declines** -- Leakage is based on productivity declines >5%.
2. **Displacement of livestock** is treated in the same way as in VM0042.

There are no rules regarding organic amendments from outside the project area, at this time.

Buffer Pool

Both methodologies set 20% of all credits aside for a buffer pool, pooled among all projects. These credits cannot be sold, but when project reversals occur due to natural events, buffer pool credits are retired by the carbon trading platforms. To date, the buffer pool credits have been more than sufficient to cover reversals that were beyond the control of project developers.

Project Duration and Monitoring

VM0042: Minimum of 20 years, maximum of 100 years.

TNCMCM: 10 years, renewable twice for a total of 30 years.

OTHER ITEMS

It should be noted that it would be difficult or impossible for an individual farmer to develop a project under VM0042, without consultants or previous expertise in carbon offset crediting. TNCMCM is designed so that an individual farmer can use the platform to choose from a list of management and practice changes to get estimates on any GHG reductions associated with them. Farmers can then arrange to develop their own projects.

TNCMCM requires land ownership information and has different warranty and consent declarations, depending on whether land is owned or leased by the farmer.

VM0042 does not address the potential for reversals from carbon sequestered as SOC after the project ends. TNCMCM covers reversals through the 10-year retention period beyond the project lifetime, with the buffer pool. The similar Climate Action Reserve protocol, applicable only within the United States, requires monitoring for 100 years after the project ends. There is some doubt whether the 100-year monitoring beyond the end of a project's crediting period can be realistically expected.

While it may be desirable in the future, VM0042 does not differentiate between carbon credits generated through sequestration (the actual removal of CO₂ from the atmosphere to be stored in a carbon pool, like soil) and credits generated through emissions reductions, for the purpose of differently valued credits. TNCMCM differentiates between the two types of credits, which may prove to be attractive to potential customers of carbon credits. In addition, TNCMCM also rewards carbon retention credits, for farmers maintaining an already high level of SOC. As with TNCMCM, VM0042 differentiates between reversible and irreversible emissions reductions, for purposes of determining buffer pool contributions.

The various possible contracts and terms to sell credits is not addressed by VM0042. Any agreements between project developers and customers are not governed by Verra, though they will not allow the transfer of credits from one party to another, until they are property verified.