



# **Pilot Croplands Methodology**

Version 1.3

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# 1. Description of the Methodology

Nori Inc is a Washington-based company building the software infrastructure establishing a marketplace to mobilize investment in the removal of carbon dioxide (CO<sub>2</sub>) from the atmosphere. The purpose of the Nori platform is to host the sale of Nori Carbon Removal Tonnes (NRTs), where one NRT is a digital asset that represents one tonne of CO<sub>2</sub> removed from the atmosphere where the recovered carbon (C) is retained in a terrestrial reservoir for at least 10 years. This methodology should be read along with the *How Nori Works* manual, which includes more details on the Nori market design.<sup>1</sup> This version of the methodology will go into effect on December 15, 2021. Nori will be offering certain terms in the NRT agreement, including up to 4 years of grandfathered NRTs.

Through the adoption of certain soil management and crop production practices global food and fiber producers have the potential to draw CO<sub>2</sub> from the atmosphere and store the recovered C in solid (organic or mineral) form in the earth's topsoil layer. The multiple practices that food and fiber producers can employ to draw down and store C in terrestrial reservoirs are often referred to as regenerative, sustainable, carbon beneficial, or climate positive agriculture. When incremental CO<sub>2</sub> is drawn out of the atmosphere, the recovered C is retained in the soil layer and, over time, an increase in the soil organic carbon (SOC) and/or soil mineral carbon (SMC) stocks is typically found in the topsoil.

This Nori methodology outlines how increases in SOC stocks resulting from the adoption of regenerative soil treatment and cropping practices are estimated and how those estimates convert into NRT issuance for projects that originate in US croplands.

The NRT is denominated in CO<sub>2</sub>-equivalents (CO<sub>2</sub>e). One tonne of incremental SOC stock gain is multiplied by 44/12 (g CO<sub>2</sub> / g C) to reflect the amount, in CO<sub>2</sub>e, that is deemed to be removed from the atmosphere when 1 tonne of SOC stock gain is detected.

The Nori Croplands Methodology ("Methodology") outlines:

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<sup>1</sup> <https://nori.com/resources/how-nori-works>

- (1) the process and procedures through which United States crop producers can define Nori Market enrollable projects;
- (2) how carbon removal claims (CRCs) arising from those projects are estimated, monitored, reported and verified;
- (3) how these CRCs are quantified into Nori Carbon Removal Tonnes (NRTs) and NRTs are generated;
- (4) project eligibility rules;
- (5) the data project owners must provide to establish project baselines and their claims of incremental CO<sub>2</sub> drawdown and C retention;
- (6) record-keeping requirements; and
- (7) procedures for reporting project information to Nori.

This Methodology is designed with the goal of achieving comprehensive, consistent, transparent, and conservative quantification and independent verification of the data that inform NRT issuance of projects founded on the adoption of regenerative practices in US croplands. It has been informed by the peer-reviewed guidance originally published in 2014 by the US Department of Agriculture (USDA), and updated in 2017, which outlines multiple distinct methods that can be used to quantify greenhouse gas (GHG) emissions and sinks at the field and farm entity scales.<sup>2</sup> Based on the report's general guidance and GHG emissions and sink estimation method selection criteria, the Nori Croplands Methodology applies a soil sample test-informed process model method to estimate the incremental carbon removal and retention that is represented by one NRT.

As described in the *How Nori Works* document, all Nori methodologies rely on an approved independent, third party-controlled, Carbon Quantification Tool (CQT) to establish carbon removal project baselines and quantify incremental CO<sub>2</sub> drawdown and C retention in terrestrial reservoirs. For SOC stock changes in US croplands,

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<sup>2</sup> *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory*, available at: [https://www.usda.gov/oce/climate\\_change/Quantifying\\_GHG/USDATB1939\\_07072014.pdf](https://www.usda.gov/oce/climate_change/Quantifying_GHG/USDATB1939_07072014.pdf).

USDA’s guidance on quantification methods recommends the use of DayCent process-based models or platforms.

## 1.1 Greenhouse Gas Implementation Tool

This Nori methodology relies on the Soil Metric’s platform, which is the commercial implementation of a Greenhouse Gas Implementation Tool model (“GGIT”), that meets USDA greenhouse gas and carbon stock and flux estimation guidance (sometimes referred to as the “Blue Book” standards). The tool on which GGIT is based was developed by CSU staff and students, with funding from and under the guidance of the US Department of Agriculture’s (USDA) Natural Resources Conservation Service (NRCS).<sup>3</sup> GGIT directly and indirectly relies on outputs from DayCent and up to 35 other models that are maintained and used by multiple US federal government agencies to estimate the SOC stock change and greenhouse gas (GHG) emissions impacts associated with changes in soil treatment, cropping and livestock management and production practices at both the field and farm-scale.

Detailed and comprehensive documentation of the version of the GGIT on which this version of the Nori US Croplands Methodology largely relies – including all of the external data sources on which the core and related process models rely, default factors and formulae employed to generate soil organic carbon stock and related GHG emission trend estimates, how outputs from the DayCent and the other models form inputs into the GGIT, etc. – can be found at:

[https://www.usda.gov/sites/default/files/documents/USDATB1939\\_07072014.pdf](https://www.usda.gov/sites/default/files/documents/USDATB1939_07072014.pdf)

GGIT directly and indirectly benefits from ongoing NRCS support and is derived from the same datasets and estimation tools that inform the Land Use, Land Use Change and Forests (LULUCF) sections of the official US national GHG inventory. GHG emissions and carbon stock and flux estimates derived from GGIT are deemed to be in the “Tier 3” class, as defined by the International Panel on Climate Change (IPCC) guidelines.<sup>4</sup> In selecting the Soil Metrics GGIT as Nori’s first CQT for US

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<sup>3</sup> <http://cometfarm.nrel.colostate.edu/>

<sup>4</sup> For more information about IPCC guidance and estimation method tiers, go to: [https://www.ipcc.ch/site/ashttps://data.nal.usda.gov/dataset/cropscape-cropland-data-layersets/uploads/2019/05/01\\_2019rf\\_OverviewChapter.pdf](https://www.ipcc.ch/site/ashttps://data.nal.usda.gov/dataset/cropscape-cropland-data-layersets/uploads/2019/05/01_2019rf_OverviewChapter.pdf).

Croplands, Nori is ensuring that the NRTs that Nori issued will be quantified in a manner that is consistent with the US EPA's official GHG inventory and any/all reports of progress towards any US commitments to cap and/or reduce net GHG releases to the atmosphere.

To summarize, Nori has chosen GGIT as the croplands CQT because it is:

- Transparent;
- Subject to continuous scientific peer review and updates;
- Enables Nori to link estimated changes in SOC stocks to changes in management and production practices;
- Consistent with the official US GHG inventory;
- A conservative incremental SOC stock change estimation tool.

The GGIT platform enables crop producers to evaluate and choose the best changes in practice for any combination of field location and crop mix on a continuing basis. NRT quantification is informed by historical and current practices, but does not prescribe or bind project owners to specific practices. The same protocol applies to a wide range of crop mixes and project owners are not required to change methodologies in the event they change crop mixes and/or practices during the NRT Agreement term. In fact, this Methodology potentially rewards crop producers for adopting different crop production and practice mixes if/when that might be the best real-time response to changes in soil health, weather, and climate.

## **1.2 New Versions of the Methodology**

Projects listed on the Nori marketplace pursuant to this version or any subsequent version of this Methodology, must comply with the data reporting requirements specified by Nori in the Project's data reporting template and NRT agreement. These data requirements reflect information Nori requires to generate SOC stock change trend estimates using process models and tools.

If GGIT or its USDA-approved documentation is subject to material modification, including but not limited to new crop modeling, changes that impact modelling

outputs or data input changes, Nori shall provide project owners of relevant projects notice of such change. If any such modification results in a material change to the Nori data reporting requirements, Nori will also produce an updated version of this Methodology, as well as a new Nori project data reporting template that is consistent with the updated version. Whenever Nori introduces a new version of this Methodology, project owners who have signed NRT agreements will be given the option of complying with the version of the methodology that is identified in Exhibit A of the relevant NRT Agreement, or update the project using the new data reporting template that reflects the new version of the methodology and apply the new version of the methodology to any remaining years of the 10-year data reporting term of the NRT agreement. This choice will be at the project owner's sole discretion.

### **1.3 Baseline and Incremental Soil Organic Carbon**

GGIT currently provides 10-year projections of SOC stock and GHG emission change trends for both historic "Baseline" and "Actual" post-practice adoption scenarios for each field that is included in a Nori US Croplands Pilot Project ("Nori Project" or "Project"). In this credit quantification methodology, the baseline scenario SOC stock and GHG emission change trends are controlled for weather and climate change impacts. This is called a dynamic baseline estimation method, whereas a static baseline accounts only for estimated changes in point-in-time SOC stocks. If carbon credit quantification relies on static baselines, the incremental SOC stock changes for any given field or fieldset can be significantly under- or over-estimated, depending on the choice of project start year. Nori NRT issuance reflects the difference between a dynamic baseline and the estimated actual SOC stock change trend to credit, to the extent possible, only the incremental SOC stock change that is due to the grower's decisions to adopt changes in soil treatment and cropping practices. Therefore, a Nori NRT represents a conservative interpretation of the difference between the Baseline and Actual SOC stock change trends, as estimated using GGIT.

To produce estimates of the incremental SOC stock change that are attributable to changes in practices, Nori asks crop producers to submit substantial historical information describing past practices on the land, including but not limited to: crop



rotations, crop seeding dates; liming, fertilizer and nutrient applications; irrigation practices and water use; crop yields and uses; crop residues left on their fields; residue management and removal techniques and tillage practices. Access to this land use history is important, because past practices can be as important in the determination of future changes in SOC stocks as the operator's new practice choices.

When current farm operators are unable to provide comprehensive historical soil treatment and land use details, Nori substitutes proxy historical data drawn from multiple USDA/NRCS databases, including but not limited to CropScape - Crop Data Layer (CDL)<sup>5</sup>, as well as assuming best management practices associated with a given crop. If data from CDL is not accessible for a given time period or area, Nori backfills the historic information by assuming the cropping system based on the most recent historic data for that given area.

In the Nori market, every project has a "Switch Date", which is the year of the crop planting or seeding date associated with adoption of a new practice, or suite of practices, that is/are reasonably expected to draw more carbon out of the atmosphere than would otherwise be sequestered in the absence of the new practice adoption. The GGIT Baseline reflects the hypothesis that the pattern of practices that was established prior to the Project's official Switch Date would be repeated, indefinitely, in the absence of the operator's decision to change practices but reflects actual weather and climate impacts.

The Nori project Switch Date forms the boundary between the Project's Baseline and Actual SOC stock trend scenarios, where NRTs represent a conservative estimate of the SOC stock difference between the two trends. The pattern of practices that inform the Baseline SOC stock change trend repeats every 10 years. Every Nori Project's Switch Date and the practice history that informs the Baseline scenario is subject to independent third party verification.

A project Switch Date can be in any year after 2011, but for a Switch Date to be verifiable, the individual who is implementing the practice and generating the NRT (the "Supplier") must be able to provide at least 3 years of pre-switch operating

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<sup>5</sup> See [https://www.nass.usda.gov/Research\\_and\\_Science/Cropland/SARS1a.php](https://www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php)

data or records to support their claim of new practice adoption. In other words, if the Supplier's Switch Date is in 2017, and the Supplier can provide verifiable land use data back to 2014, the Supplier potentially qualifies for 2017 and later vintage NRTs (subject to NRT "grandfathering" provisions). But if the Supplier can only provide verifiable data back to 2016, the first grandfathered NRTs for which the project might qualify would be the 2019 vintage.

## **1.4 NRT Agreement**

The individual who signs the NRT agreement with Nori is known as the Primary Contact. The Primary Contact may be a Supplier or a representative of the Supplier. When the Primary Contact signs the NRT agreement, they are agreeing to comply with the following terms, which include, but are not limited to, the following obligations:

- Update the Nori data reporting template annually, for at least 10 years after the NRT vintage or the year the NRT was issued, whichever is later;
- Pay for approved third party verification of the reported data, at least once every 3 years and at least 3 times during the 10-year NRT agreement term;
- Make best efforts to maintain and/or build on the new SOC stock levels for the 10-year reporting term;
- The terms and conditions of the contract are effective upon the execution of the NRT agreement.

Nori Suppliers are not contractually bound to adopt or maintain any soil treatment or cropping practices under the NRT agreement. The contract does require that a farmer use best efforts to maintain and/or further enhance the amount of C that is stored in soils and root systems. Primary Contacts are not liable for C stock losses that are due to causes beyond the field/farm operator's control, or to actions executed by the operator that are deemed reasonable responses to protect soil health after extreme weather or climate events.

## 2. Eligibility

### 2.1. Crops

Nori considers any crop or mix of crops that are represented in the GGIT platform to be automatically eligible under this Methodology. These crops currently include:

- Row crop/hay/grass: Alfalfa, barley, broccoli, carrots, cauliflower, clover, corn (grain or silage), cotton, dry field beans, dry field pea, fallow, grass, grass-legume mix, lettuce (head, romaine, or leaf), millet, oats, peanuts, potato, rye, sorghum (grain or silage), soybean, strawberries, sugar beets, sunflowers, switchgrass, tomato (fresh or processing), wheat (spring or winter);
- Seasonal cover crop: Annual rye, annual rye/legume mix, annual rye/legume/radish mix, Austrian winter pea, cereal rye, clover, corn, millet, radish (forage or oilseed), sorghum, vetch, winter wheat, other winter grain;
- Orchard/vineyard: Almond, avocado, cherry, English walnut, grapefruit, grape (raisin, table, or wine), lemon/lime, olive, orange, peach/nectarine, pistachio, tangerine/mandarin.

For crops not included in the above list, Suppliers or their “Data Managers”—individuals or platforms that facilitate data entry into the Nori application— may be able to substitute surrogate crops for the crops they are actually growing.

Surrogate crops have similar growth patterns and are likely to have soil health impacts similar to those associated with the actual crops, for the given field location. Soil Metrics staff are available to assist in the identification of suitable surrogates, for the combination of field locations and crops for which that is an appropriate strategy.

### 2.2. Land Ownership

This Methodology is primarily designed to support CO<sub>2</sub> drawdown and C retention in circumstances in which land owners and operators have agreed to legally assign control of the Nori Project, including data reporting and the determination of the disposition of NRTs, to the Primary Contact. But it is regularly the case that operators have and will adopt regenerative practices on year-to-year rental or

short-term leased lands, where securing the land owner's authority for project registration and NRT sale is not immediately possible. For this reason, Nori has two paths for project registration:

- "Path A" is for projects/fields for which all parties with an interest in the associated land and operations have assigned authority to the Primary Contact to register the project, sign NRT agreements, set NRT prices and control the disposition of NRTs.
- "Path B" is for projects composed of fields for which the required assignment(s) of authority to a Primary Contact is not yet in place..

Under Path A, Primary Contacts who have been assigned the right to register the fields as a Nori Project can potentially receive and sell NRTs after each NRT issuance event.

Path B enables Primary Contacts to establish Switch Dates and the Baseline pattern of practices, to establish projects NRTs for fields for which a Primary Contact is not yet assigned authority. An operator with effective control over the property can meet enrollment and continuing data reporting requirements, without the land owner(s) assignment of authority for up to three years. If the required assignment of authority is secured any time within 10 years of the Path B Project registration, Nori will issue NRTs to the project if/when that assignment of authority is received and a Primary Contact named. But these NRTs will not be issued until there is verification of the assignment of authority to a Primary Contact from any all parties who have ownership interests in the fields that comprise the project. And no more than 3-years worth of potential NRTs will be issued, regardless how many years of Project data updates have been completed when the assignment of authority is secured.

Path B is intended to create the opportunity for an operator to accumulate and document a projected NRT issuance to aid them in securing the required assignments of authority(ies) from landowner(s).

A Primary Contact is permitted to separate fieldsets into different projects and enroll these projects through either Path A and Path B, whichever may be appropriate.

## 2.3. Project Activities

In the Nori pilot phase (sometimes referred to as “Stage 1”), only adopting new practices in croplands that remain cropland, or substituting perennial grasses or woody biomass in wetlands, riparian or buffer zones that were previously cropped, will be eligible activities. Because the conversion of forests or grasslands to cropland results in significant net CO<sub>2</sub> releases to the atmosphere, croplands that were converted from forests or grasslands after December 31, 1999 are not eligible.

Eligible changes in cropland practices that are currently incorporated into GGIT include the following:

- Changing or expanding crop rotations and cropping intensity
- Introducing cover crops and/or shifting from annuals to perennials
- Reducing tillage events and intensity and/or adopting new residue management techniques
- Substituting synthetic fertilizers with organic matter additions

Nori does not prescribe management practices in this Methodology, so adoption of one or any combination of the above, as well as changes in other parameters reportable through GGIT, could result in incremental carbon removal compared to the project’s dynamic baseline.

## 2.4. Customer Types

The following Nori market participants will need to be familiar with this Methodology.

- **Supplier:** The owner or operator of land who has implemented practices that have resulted in incremental carbon gain in the soil. This person may also be the Primary or Secondary Contact.
- **Primary Contact:** The owner, or the designated representative of the owner(s) of the croplands involved in a Nori Project. When multiple parties have real interest in the land and/or operations on which a Nori Project is based, all of those parties must formally assign authority to both a Primary and Secondary Contact to represent all of the owners in respect to the

management of reporting for and sale of NRTs arising from the project in order for NRTs to be issued to the project.

- **Data Manager:** A person, platform, or entity which directly helps suppliers collect, organize, and report the data that they need to submit to Nori to register their projects and receive NRTs. Project owners can add Data Managers to their projects. A Data Manager can be identified as a Secondary Contact for the Supplier. A Data Manager can represent more than one Supplier in a single Nori project as an aggregator of projects.
- **Verifier:** A professional in good standing who is bound by a standard or ethical code to put the interests of their clients above their own with respect to a defined and limited class of transactions, and who is qualified to attest to the accuracy of evidence provided by NRT suppliers to a reasonable level of assurance. When an approved Verifier is a corporate entity, Nori asks for both a Primary and Secondary Contact for the corporate entity, both of whom must be authorized representatives or officers.

## 2.5. Project Switch Dates

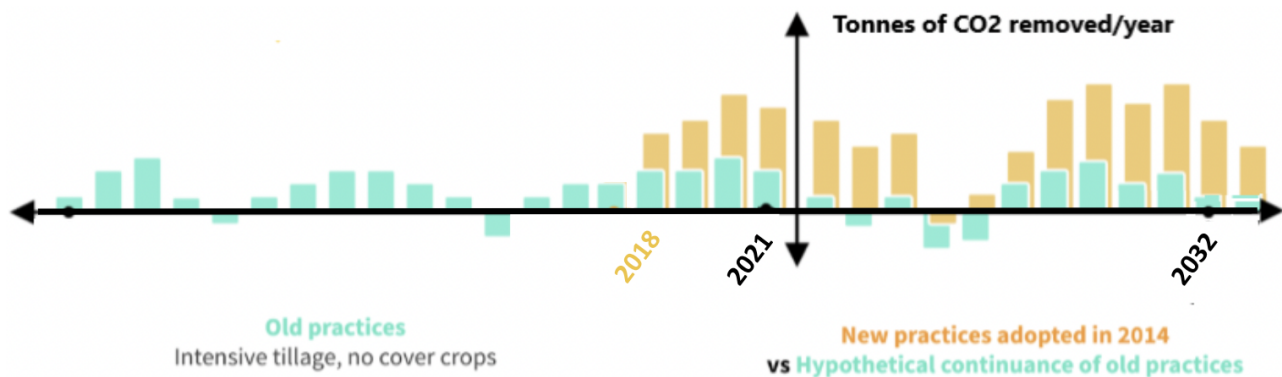
The project Switch Date is defined as the date (denominated as a calendar year) when a Supplier adopted practices defined in Section 2.3 (also see Section 1.3). The Switch Date is used to differentiate between Baseline and post-new practice adoption carbon stock changes, which are used to generate net activity or practice change-derived CO<sub>2</sub> removal estimates. The Baseline established by the land's first registration with Nori will remain constant for the entire period that land is enrolled in Nori. To qualify, a Supplier will need to provide evidence of undertaking at least one eligible project activity i.e. regenerative practice on or after January 1, 2011.

## 2.6. Additionality

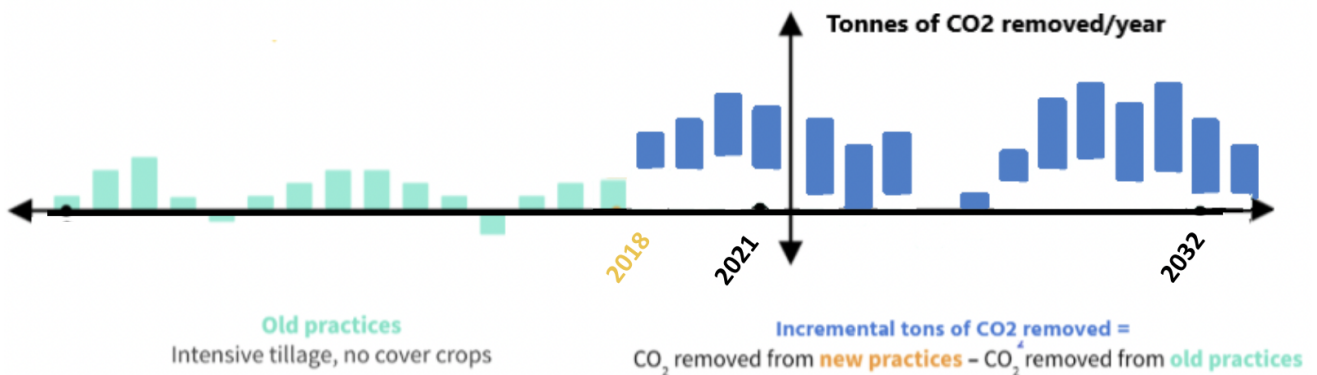
Nori only issues NRTs representing incremental CO<sub>2</sub> drawdown and C retention that arises from a discrete and verifiable activity or practice change that is reasonably expected (given the scientific evidence available at the time) to result in a new net CO<sub>2</sub> removal and C retention. GGIT's dynamic baseline SOC stock change estimation method is controlled for weather and climate impacts, ensuring that NRTs reflect

incremental SOC stock changes arising from soil management and cropping practice changes, net of the impact of the forces of nature.

For example, the diagram below depicts the incremental SOC stock changes that could result after a Supplier added cover crops and shifted to no-till in 2017. The columns in teal show the estimated annual historical SOC stock change trend starting in 2000. The 2008 to 2017 pattern of soil management and cropping practices is repeated for 2018 through 2027, with new SOC stock change estimates reflecting the actual weather and climate impacts for those years. This weather/climate impact-controlled projection forms the Project SOC stock change Baseline. The yellow columns represent the estimated Actual SOC stock changes that differ from the Baseline as a result of the farmer's decision to integrate cover crops and reduce tillage in their operation.



Under the current US Croplands Methodology, Suppliers will only be issued NRTs based on the difference between the two SOC stock change trends, as illustrated below. In this example, 2018 is the Project Switch Year. The Switch Year always defines the boundary between the pattern of practices that form the Project Baseline and the Actual activity that is storing incremental C in the topsoil and root systems.



## 2.7. Geographic Location

This Methodology is only applicable to croplands located in the continental United States.

# 3. Project Definition

## 3.1. Spatial Boundary

Nori Suppliers can define projects as the entire farm operation or a subset of fields. Suppliers can also join together to combine multiple farms or sets of fields as one larger project. Because Nori is a dedicated carbon removal marketplace and the NRT represents only net CO<sub>2</sub> drawdown and C retention, the Nori market defines an NRT as 1 tCO<sub>2</sub>e removed and retained in the soil within the physical project boundaries, and neither includes indirect upstream or downstream GHG emissions, nor other CO<sub>2</sub>e, such as N<sub>2</sub>O or CH<sub>4</sub> emissions. Soil organic carbon is the sole basis of the NRT.

Though Suppliers can list only a subset of fields, Nori requires project owners to disclose total farm acreage and total farm energy use, even though Nori does not reward or penalize Suppliers for practice change associated GHG reductions or increases. Research and experience to date suggest that when accounting for all sources of on-farm GHGs, it is unlikely that the adoption of the practices listed above will cause a net change in total farm GHGs. Therefore, for projects registered with this version of the Methodology, Suppliers' will receive NRTs reflecting full, verifiable NRTs. NRTs will not be adjusted to reflect related GHG reductions or increases that might be revealed in the evidence they submit. But this procedure is



subject to change if the evidence Nori collects negates the assumption that related net GHG changes are rare.

In the event that the evidence Nori collects from Suppliers negates this current assumption, and if Nori decides, as a result, to modify this Methodology to net any related net GHG increases out of CR claims in the NRT generation process, Suppliers who registered their projects under this version of the Methodology will expect to be required to adhere to a change in methodology that results in net related GHG increases being removed from the NRT issuances.

While Nori allows Suppliers significant discretion in the definition of project boundaries, if/when the project is defined as a subset of the entire farm operation, the NRT verification process will establish whether or not the incremental SOC stock gains realized within the project boundaries directly result in SOC stock losses outside the boundaries elsewhere on the farm(s) for which the selected fields are a subset. NRTs will not receive a positive verification finding in the event that the NRTs are found to be primarily an artifact of boundary definitions.

Suppliers are required to provide data in geojson files to identify the locations and boundaries of all fields that are included within the project boundaries for which NRTs can be generated.

## **3.2. Temporal Boundaries**

### **3.2.1. Switch Date**

The Switch Date (see Section 1.3) refers to the year when a Supplier lists the first adoption of eligible project activities since 2011. This date must be verifiable to show that new carbon removing activity was adopted since January 1, 2011. Suppliers will be required to provide three years of pre-Switch Date verifiable practice records for a Switch Date to be considered valid.

Any project listed under this Methodology will qualify for up to 4 years of pre-2022 vintage NRTs. Suppliers who register in the Nori market during the Pilot phase are contributing to the design and testing of the Nori market interface, development of new methodologies and helping Nori develop its marketplace. This limited grandfathering provision is to reward Suppliers for their contributions to these

processes. In addition, participants in the Pilot are eligible for 1 Nori token for each NRT issued. The Nori tokens will be held in a restricted account for 10 years and are subject to provisions in the NRT agreement.

### **3.3. Data Enrollment for a Project**

A Supplier or Data Manager initiates the project enrollment process by submitting a complete-as-possible Croplands data template to Nori. Nori's data privacy policy applies to any data the Supplier shares with Nori in this or any other manner.<sup>6</sup> The data is only used to run and validate GGIT. Each project owner will be assigned a supply account manager (SAM) to facilitate the data enrollment process. During this phase, the Supplier may also work with a Data Manager, who can serve as an intermediary between the Supplier and Nori to enroll the project.

Upon receipt of a completed data template, Nori will automatically execute a customized GGIT model run. This run will identify and issue any anomalies in the submitted evidence. There may be a resulting need for clarification regarding the Supplier's submission. If so, the SAM will reach out to the Supplier to address outstanding questions. If necessary, Nori will run a revised data template through the GGIT platform until there is a successful model run.<sup>7</sup>

In addition to project location, ownership and historical practice/activity information, the data template requires the Supplier to communicate the future practices/activities that are reflected in their existing farm management plans. Nori will not hold the Supplier to any future practice adoption. But including these projections in the submitted data enables Nori to produce a NRT projection that the Supplier could use to inform their final decision whether or not to register their project in the Nori market. These practices include but are not limited to:

- Cropping sequence
- Planting and harvest dates
- Tillage methods and dates of tilling
- Rate, timing, type and application methods for fertilizers and nutrients

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<sup>6</sup> <https://nori.com/resources>

<sup>7</sup> Note that Nori has a custom interface to the GGIT model. While users are encouraged to interact with the GGIT website, it cannot be used to generate a Nori model run or related output.

- Irrigation method and water use rates
- Crop end-use and residue management methods
- Duration of grazing system
- Manure production volumes and manure disposition
- Source location for imported manure and/or compost
- Transport mode for imported manure and/or compost
- Composting practices
- Energy and heat use

### **3.3.2. Verifying Data**

To continue their Project enrollment, the Supplier's project must be verified (Also see Section 5). Once a Supplier decides to move forward with Project verification, Nori provides all Nori validated Verifiers a project information page. This document contains all the project information, including land ownership, number of fields, acres, county location of fields and contact information for verifiers to provide a bid to the Supplier. Additionally, Nori makes the project information in the application available to Verifiers. The Verifiers bid the Nori Project and the Supplier chooses the winning proposal. Once the Verifier is chosen and the Supplier has given permission, Nori provides additional information, in the form of a verification report template and field ranking spreadsheet to the chosen Verifier. Nori does not own the confidential data/information included in the report and Nori will not directly share any such report with any entity other than the owner of record. Any data sharing with a Verifier is at the sole discretion or with the permission of the Supplier.

The Verifier completes the Verification Report, including assigning levels of assurance and returns it to the Supplier. The Verifier may find cause to recommend adjustments to the data template that generated the initial verification request, in which case the Supplier will submit a replacement data template to Nori, a new model will run and the verification process will begin..

### **3.3.3. Finalizing Data**

When the Supplier and Verifier are both satisfied with the Verification Report, the Supplier can officially register their project in the Nori Marketplace by submitting the Verification Report to Nori. The Supplier will then be sent Nori's NRT agreement to be reviewed and signed. The NRT agreement term is initially 10 years, a period for which certain commitments made by the Primary Contact and Nori, to each other, shall hold. Those commitments are detailed in the [NRT Agreement](#). Rejection of the NRT Agreement constitutes cancellation of the application, though the Supplier can restart the process at any time by re-submitting their Verification Report which is valid for one year.

### **3.3.4. The NRT Agreement**

Under the Nori NRT agreement (also see Section 1.4), the Supplier commits to update the data template for the project once each year, on or before the anniversary of the execution of the NRT agreement. Nori commits to issue NRTs reflecting the Croplands Methodology that was in effect at the time the NRT agreement was executed. Suppliers will have the choice, but not the obligation, to adopt a new version of the Croplands Methodology that might be approved during the 10-year project term, except as otherwise stipulated in this Methodology or the NRT Agreement.

### **3.3.5. Annual Data Updates and NRT Issuance**

The Primary Contact must annually update their field records in the Nori app. Upon receipt of each complete annual data update, a new NRT projection based on this data will be made available to the Primary Contact.

A Primacy Contact who fails to update their data template annually is in breach of their NRT Agreement with Nori.

### **3.3.6. NRT Verification**

While a Primary Contact must update the project data template annually, they do not have to verify NRTs more frequently than once every 3 years. NRTs are only issued upon a verification event.

To receive NRTs, the Primary Contact is required to repeat the verification process described above in Section 3.3.2. Data adjustments and new verification templates may be generated in an iterative process similar to that outlined above, but the method for converting carbon removal claims to NRTs and NRT scores are not appealable.

### **3.3.7. Selling NRTs**

The Primary Contact is responsible for setting the floor price for their NRTs in the NRT agreement. This price is good for 30 days after the execution of the NRT agreement, at which time, the Supplier may change the price at any time for any reason. The NRT is listed on the Nori marketplace in a First In First Out (FIFO) queue. In the FIFO queue, the oldest vintage credits of the oldest projects are sold first and then subsequent vintage NRTs are sold next until the project is sold-out. Once the project is fully sold-out, the next project becomes available in the queue. When a Supplier sells an NRT in the FIFO market the NRT is “retired” (not re-tradable) on the blockchain.

### **3.3.8. The Final Project Audit**

A final audit at the end of the NRT Agreement will be required for Nori projects (“Final Project Verification”). Currently, two models are being considered. In one, a statistically relevant sample of projects will be audited or, in the second model, every project would be audited. In either case, a Nori-approved Verifier will complete a Final Project Verification within 120 days of the end of the NRT agreement 10-year term. The purpose of this verification event is to confirm the 10+ year soil organic carbon stock change estimate attributable to the change in soil and cropping management, and to establish probability of longer-term carbon retention. The Verifier who completes the Final Project Verification must not have

acted as initial project verifier i.e verification of the project at inception (“Initial Project”) or interim data verifier i.e. verification of the project at 3, 6 and 9 years after initial listing as required by the NRT contract (“Interim Projects”), as described below, for the Nori Project.

### **3.4 Co-Benefits**

Nori is a dedicated carbon removal marketplace, and the primary objective of this Methodology and NRT documentation and verification processes outlined above is to quantify incremental CO<sub>2</sub> drawdown and C retention to convert into tradable and usable NRTs.

However, for a majority of Nori Croplands projects, the dataset that is used to document incremental CO<sub>2</sub> drawdown will often form the basis for documenting a range of environmental co-benefits, including but not limited to changes in:

- Direct nitrous oxide (N<sub>2</sub>O) emissions from synthetic fertilizer applications and organic matter additions
- Soil organic carbon sequestration in woody biomass (orchard and vineyard crops)
- CO<sub>2</sub> emissions associated with urea fertilizer use and liming
- Carbon monoxide (CO) and methane emissions from biomass burning
- Methane and N<sub>2</sub>O emissions from flooded rice cultivation
- Soil health and ability to retain nitrates and other biological oxygen demanding nutrients that would otherwise leach from the soil to rivers and water bodies

When the Primary Contact signs the NRT agreement, they agree to not register any carbon removal (CR) claims on the Nori marketplace that are also listed for sale in another market. CR claims that are converted into NRTs cannot be double-credited or double sold on other carbon marketplaces or registries. But registration in the Nori market does not preclude listing other related ecosystem services (e.g. avoided GHG emissions, GHG emission reductions, water quality services, etc.) in other markets, as long as those other markets approve the splitting of environmental services that derive from one project, or set of activities, when that project is registered in the Nori marketplace.

# 4. Carbon Removal Quantification

## 4.1. Collecting Data

Suppliers can use one or more of the following pathways to collect and submit data:

- Manual data entry— The farm operator directly uploads required data to Nori using the data entry form, either by themselves or through a data manager. Nori then utilizes the GGIT platform for the project.
- Transfer data— Nori has an open sourced data spec that allows for the direct transfer of data stored in a farm software into the Nori app. Operators who already hold data in another farm management system may be able to directly import their data into Nori, depending on Nori's working relationship with these companies. Please note that the implementation of this transfer may be a lengthy development process.

## 4.2. Establishing Smart Defaults

Some Suppliers will not have the capacity to provide all of the historical operating data requested to model the Project. Potential Suppliers will have the option of asking Nori to complete the data template by filling in missing parameters from publicly-available sources appropriate to the project location and scope. In the continental US, these sources currently cover the following categories:

- Cropping sequence from 2008 through 2020, or as early as 2000 in some states, from the NASS CDL<sup>8</sup>
- Typical planting and harvest dates by state and crop<sup>9</sup>
- Tillage methods and dates of tilling
- Rate, timing, type and application methods for fertilizers and nutrients
- Irrigation method and water use rates

If data from the CDL are not accessible for a given time period or area, Nori backfills the historic information by assuming the cropping system, based on the most

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<sup>8</sup> [https://www.nass.usda.gov/Research\\_and\\_Science/Cropland/metadata/meta.php](https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php)

<sup>9</sup> [https://www.nass.usda.gov/Publications/National\\_Crop\\_Progress/](https://www.nass.usda.gov/Publications/National_Crop_Progress/)

recent historic data for that given area, to populate the full time period needed to run the Nori project.

To qualify for grandfathered NRTs, Suppliers must participate in the Nori Pilot and be able to provide complete sets of verifiable farm records-backed data for at least 3 years prior to the first year for which grandfathered NRTs will be issued.

### **4.3 NRT Quantification**

Nori generates Soil Organic Carbon Stock Change (SOCSC) estimates, which are the basis of NRTs from GGIT. These model runs include actual agronomic, weather, and soil data from past and the current years and estimated agronomic, and weather data for future years.

Nori primarily uses two outputs from GGIT runs: annual SOCSC changes, and a 10 year average change, beginning from the project switch year, in soil organic carbon, based on the difference between SOCSC associated with 1) baseline practices and 2) newly adopted regenerative practices. Initially, the annual estimates and 10-year average estimates have large uncertainties because any future data reflects entirely hypothetical land use, practice and weather assumptions.

Nori has chosen to be conservative when calculating and issuing NRTs because 1) the uncertainty intervals associated with the hypothetical data could result in an overissuance and 2) to assure NRT buyers that the NRT is a true reflection of carbon sequestration. Therefore, Nori issues NRTs based on the lesser of the estimated annual and the 10-year annualized average for each NRT vintage year. Because the initial NRT issuance is the lesser of the estimated annual and the 10-year annualized average—not a point on the 10-year trend - means that the Nori initial NRT issuance will be conservative.

The process of quantifying NRTs is as follows:

Each Project will have actual data (i.e. data from grandfathered years) from, at earliest, 3 years prior to the switch year or project start year to 2021 and hypothetical data for 2022-2031. Once the model is run and complete, it provides both a 10-year annual average and a yearly average (Table 1). Nori takes the lesser of these on a yearly basis, and issues one NRT for each tonne of sequestered



carbon for all verified years (i.e. years where the data has been attested to by a third party verifier) (Table 2). In the situation described above, NRTs would be issued for 2018-2021 and a projection of future NRTs, based on the hypothetical data would be provided for 2022-2025.

**Table 1.** Example of GGIT output. Soil organic carbon stock changes (SOCSC) based on a 10 year annual average for the course of the project (2017 - 2025) and yearly changes.

GGIT OUTPUT					
Field	10 year average	2018	2019	2020	2021
SOCSC (1 tonne CO <sub>2e</sub> )					
1	35	102	-5	33	36
2	68	191	119	11	103
3	24	0	32	96	53

**Table 2.** NRT issuance based on lesser of the annual estimate and the 10 year annual average.

NRT ISSUANCE				
Field	2018	2019	2020	2021
SOCSC (1 tonne CO <sub>2e</sub> = 1 NRT)				
1	35	-5	33	35
2	68	68	11	68
3	0	24	24	24

In the future, when the Primary Contact elects to verify their data (required by Nori a minimum of every three years) the model is run for the same 10 years as the initial model. However, more of the hypothetical practice and weather inputs are replaced with actuals often resulting in a different 10-year annualized average. Nori then repeats the same process as above and takes the lesser of the annual or 10 year average from the most recent GGIT run to calculate NRTs resulting in new totals for the 2018-2021. Nori then subtracts the NRTs already issued from the new total to determine the updated NRTs to be issued for 2018-2021. Additionally, any years that now have current data (i.e. 2021) are issued NRTs.

Using this process means that, in the early years, the NRT issuance might appear low, but over the 10-year reporting term, uncertainty levels shrink as hypothetical

parameters are replaced with actual data and the NRT issuance begins to reflect increased certainty.

#### Calculation Process:

- NRT quantification will be calculated in a manner that is consistent with quantification based on GGIT output, that is:
  - Initial grandfathered NRT issuance for any vintage year will reflect the lesser of the indicated year-to-year change or the 10-year average annual SOCSC trend (Table 1, 2). This is done by field and the total grandfathered NRTs are the sum of each field.
    - If a field is negative and the Supplier wants to keep that field in the project, the negative is divided evenly between the remaining fields.
      - Supplier has a project with 11 fields, 10 fields are positive and one field is negative in 2018. The negative field has -20 NRTs. The -20 is divided by 10 (# of fields). The resulting -2 NRTs are applied to each field in 2018;
      - This same process is applied to all negative fields in each year;
      - If this results in a new field becoming negative, then the negative values are carried forward to the next year for that field;
      - If a whole project is negative for the 10 year period and Nori elects to move the project forward, Nori is liable if, after 10 years, the project remains negative.
  - This process is repeated each time a Project is verified and NRTs are issued.

## **5. Verification**

As described above, when a Supplier has provided all required data and decides to move forward in the Nori market, Nori generates a project information sheet that is provided to all Verifiers who may want to bid on the project. See Section 3.3.2 for more detail

### **5.1. Verification Tasks**

In the verification of the Project, if the Primary Contact can provide any of the following pieces of evidence, a site visit is not required.

#### **5.1.1. Right to Register the Project**

Verifiers must affirm that the Primary Contact has the right to register the project. It is critical that the Verifier reviews land boundaries. If the land is owned by the farmer, this can be verified through reviewing a deed, a map associated with the land boundaries, or other proof that the individual has the rights over the land. The Verifier may also access online databases showing land records, such as AcreValue.com.

If the land is leased by the farmer, the Verifier requires evidence that the project participant has permission from the landowner to participate in the Nori marketplace.

#### **5.1.2. Evidence Replicability**

The Verifier will conduct statistical representative sampling of the Primary Contacts records. This includes seed purchase, fuel purchase, crop and implement sales and receipts, etc. to verify that the operating data claims that the Supplier submitted to GGIT are consistent with evidentiary records.

### **5.1.3. Appropriateness of Project Switch Date**

The Verifier must confirm that the Switch Date represents the date the Supplier adopted eligible project activities. The Verifier may accept attestations, review seed purchases, satellite imagery, and reported data from farm management software.

### **5.1.4. Not Double Selling**

The Verifier must confirm that real interest in the NRTs represented in the verification report are not directly or indirectly listed for sale, or have not been sold, through other registries or carbon markets. The Verifier may accept attestations that this is the case from the Supplier.

### **5.1.5. Legal Compliance**

The Verifier will confirm that the Supplier and any associated entities are in full compliance with existing laws and regulations that are material to the project scope.

### **5.1.6. Conflict of Interest**

The Verifier must disclose if they have a conflict of interest or potential conflict of interest with the listed Nori Project and/or its owner(s).

## **5.2. Final Audit**

A final audit at the end of the NRT Agreement will be required for Nori projects ("Final Project Verification"). Currently, two models are being considered. In one, a statistically relevant sample of projects will be audited or, in the second model every project would be audited. In either case, a Nori-approved Verifier will complete a Final Project Verification within 120 days of the end of the NRT Contract 10-year term. The purpose of this verification event is to confirm the 10+ year soil organic carbon stock change estimate attributable to the change in soil and cropping management, and to establish probability of longer-term carbon retention.

# Appendix 1. Version History

## Version 1.0 - Initial release.

### Version 1.0.1 - Additional guidance and clarifications in the following areas:

- Treatment of rental lands (section 2.2)

### Version 1.1 - New and updated sections:

- Segmenting chapter 1
- Merging of chapters 3, 4, and 5
- Addition of procedures for carbon quantification in chapter 4
- Updates to verification chapter 5
- Linking to <http://go.nori.com/verification-guidelines>

### Version 1.2 - New and updated sections:

- Limiting to Pilot
- Clearer discussion of quantification
- Removal of CometFarm references
- Removal of future methodological updates including scoring
- Update on verification process including removal of Path C
- Removal of GHG claims discussion

### Version 1.3

- Updated for 2022 dates
- Removed 5 grandfathered years and updated to 4 grandfathered years
- Grammatical changes