Adoption of nitrogen stabilizers to transition to low-carbon agriculture

- Feedback & response -

July 8, 2025

Overview

This document outlines the feedback received during the public consultation period on version 0.95 of the GHG methodology for N stabilizers, detailing how the feedback was addressed and its impact on the methodology, culminating in version 1.

Detailed feedback and responses

	Section	Referenced Text	Feedback/comment/suggestion	Response
1	0. List of definitions	*Ammonia volatilization*	Page 2 – "Ammonia volatilization - The process by which ammonia (NH3) gas is released into the atmosphere from ammonium-containing fertilizers (e.g., urea)." à Urea is not an ammonium-containing fertilizer	Agreed. Urea was deleted.
2	0. List of definitions	*Nitrogen stabilizers/fertilizers mixtures*	"Nitrogen stabilizers/fertilizers mixtures": From our point of view, it is not clear from the draft whether the fertilizer mix named here refers exclusively (UI/NI) to post-treated fertilizers or also to compound fertilizers that are composed of stabilized and non-stabilized components (i.e. bulk blending products). With regard to the use of inhibitors in Germany, such compound fertilisers are the rule rather than the exception, as they offer significantly more scope in terms of distribution and practical application. Therefore, their use should be taken into account in the certification and permitted.	We agree that the methodology should clearly allow for the inclusion of compound fertilizers composed of both stabilized and non-stabilized components, such as bulk blends. We have updated the definition of "*Nitrogen stabilizers mixtures*" in the List of Definitions (Page 6) to explicitly include partially stabilized compound fertilizers such as bulk blends. To maintain internal consistency, we have also updated Section 1.3 (Eligible products) to explicitly include bulk-blended fertilizers that combine stabilized and non-stabilized nitrogen components. Text added in Section 1.3 "*Compound fertilizers composed of both stabilized and non-stabilized nitrogen components … provided that appropriate documentation is included in the Project Overview Document (POD), and emission reductions are proportionally assigned.*"
3	1.1 Background	*Nitrification inhibitors slow the conversion of ammonium to nitrite and subsequently to nitrate, effectively reducing nitrate leaching and the production of nitrous oxide (N2O).*	The risk of nitrate leaching (nitrate leaching can still take place with NI e.g. in case residual nitrate after harvest is leached out)	While the current text does not suggest that leaching is entirely prevented, we agree that it should more explicitly reflect the conditions under which leaching may still take place. We have therefore updated the wording in Section 1.1 (Page 9) to acknowledge this risk, while still highlighting

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				the general mitigation benefit of NIs. Text updated in Section 1.1, Page 9 with a footnote: " *However, nitrate leaching can still occur under certain conditions such as after harvest if residual nitrate remains in the soil and is mobilized by precipitation.*"
4	1.1 Background	*Reduction in indirect N2O emissions: Nitrogen stabilizers reduce indirect N2O emissions by slowing down ammonia (NH3) volatilization from urea through urease inhibitors (UI) and by inhibiting the nitrification of ammonium through nitrification inhibitors (NI). These mechanisms reduce nitrogen losses as ammonia (via UI) and nitrate (via NI), thereby limiting the processes that contribute to indirect N2O emissions*	how will this be accounted for?	The methodology includes specific accounting mechanisms for indirect N_2O emission reductions. These are covered in Section 4.2, with two dedicated equations: • Equation (4): Ammonia volatilization → indirect N_2O • Equation (5): Nitrate leaching/runoff → indirect N_2O These equations assist the quantification by using project-specific input data and appropriate emission factors. Moreover, it is clarified in Appendix A.1, Tier 1 emission factors may be used for indirect emissions when higher-tier data is unavailable. This approach is aligned with IPCC guidance
5	1.2 Applicability of the methodolog y	*Project developers must be able to provide scientific proof of the emission factors (EF) related to those baseline activities, through the IFA Emission Factor Database for Nitrogen Stabilizers , a relevant meta analysis, or original scientific literature.*	I suggest that we specify this further, the description of what EF can be used is very generic - e.g. can they just use the CFT data. Please recall that also the base line is critical e.g. this was the stumble stone of South Pole	The methodology indeed requires that baseline emission factors be selected using the same scientific rigor as for the project scenario. This includes conditions such as alignment with environmental and management characteristics, transparency of data sources, and experimental quality. These are all explained in detail in Appendix A.2. page 49
6	1.2 Applicability of the methodolog	*Project developers must be able to provide sufficient information proving that their project's characteristics and activities match with the most*	please be more concrete here, do you expect measurements, MRV or just secondary data	We agree that it is important to clarify what type of data qualifies as "sufficient information." Rather than expanding all detail here (which is not the purpose of this section), we have added a sentence clarifying that

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	y	*influential environmental and/or management practices that are described in the scientific proof source(s).*		detailed data requirements are provided in later chapters, specifically: • Section 6 (Monitoring, Reporting, and Verification) • Appendix A.2 (EF selection criteria, including alignment, experimental design, and replication) These sections describe acceptable evidence types, including farmer logs, remote sensing, field-level measurements, and validated secondary sources, depending on the tier and EF approach used.
7	1.2 Applicability of the methodolog y	*Project developers must demonstrate that nitrogen inputs were applied at appropriate rates based on regional agronomic guidelines or best practices, ensuring baseline fertilization was neither excessive nor deficient and aligned with standard agricultural management for optimal nitrogen use efficiency (NUE).*	I recommend rephrasing - as the focus of this carbon methodology (project boundary) is on the use of nitrogen stabilizers the base line assumptions need to be related to appropriate nitrogen rates. We can't ask the project manager to ensure this related to base line, only that this is ensured within their project	Segment has been updated. Note that baseline N rate is not defined as a historic N rate but rather the counterfactual N rate (which is the project N rate). See section 3 Baseline Scenario. "*This ensures that baseline fertilization is not excessive and avoids rewarding projects that apply nutrients beyond typical regional norms, which could otherwise inflate emission reductions linked to fertilizer substitution. Where regional baseline fertilization is excessive, project developers must clearly disclose this and structure their projects to support improved, agronomically appropriate nutrient application rates.*"
8	1.2 Applicability of the methodolog y	*The reported NUE should be compared to historical or regional benchmark NUE values to verify that the baseline practices are following the region's guidelines. The usage of the regional NUE is preferred. However, if no such information is available, then*	this is conflicting with the bullet point above - please clarify is the base line should reflect regional average (statistics) which can be far from optimum or best practice	Same as the previous response. Essentially we want to make sure that projects overapplying N are not rewarded. As such the starting point should be good farming practices.

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9	1.2 Applicability of the methodology	*Emission Factor Database for Nitrogen Stabilizers, a relevant meta analysis or original scientific literature.*	Do we all agree that the EF database of IFA is not a must have? This paragraph opens up for many alternative uses - why	The IFA Emission Factor Database is an important and recommended source, but it is not the only one. While it provides standardized and validated emission factors, the scientific literature evolves rapidly, and recent high-quality experimental results may not yet be included in the database. For that reason, the methodology also allows the use of emission factors from meta-analyses or original scientific studies, provided they meet the quality and alignment criteria outlined in Appendix A.2. In other words, the control of EF selection happens through these quality criteria (which have been vetted by the Scientific Committee). Regardless of the source (directly from a study or even the EF database), all EF selections are subject to third-party review by Verification and Validation Bodies (VVBs). The VVB must assess whether the EF is compatible with the project's environmental and management context
10	1.2 Applicability of the methodology	*This methodology is applicable to projects that introduce changes to management practices on top of the usage of nitrogen stabilizers (e.g., adopting improved tillage methods, introducing cover crops, or similar) if one of the following conditions are met:*	This looks like a back door to introduce all kinds of things - can create a risk for the project in terms of additionality. We are very specific with inhibitors and for the other practices we don't specify - I recommend to change into ---can be combined with other carbon projects e.g. those enhancing carbon removal	We fully agree that protecting the methodological integrity and avoiding scope creep are essential. However, we believe the current version already includes the necessary safeguards to prevent the risk you highlight. Specifically, the methodology requires that any additional management practice introduced alongside the nitrogen stabilizer intervention must either: • Be supported by scientific evidence with a corresponding emission factor, or • Be shown to have no negative effect on the stabilizer-induced emission reduction • States explicitly that when used in conjunction with another GHG methodology (e.g., for carbon

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				removal), the POD must disclose this, quantification must be kept separate, and monitoring frameworks must be distinct • Includes a list of non-exhaustive examples of possible side activities that must be transparently reported and monitored
11	1.2 Applicability of the methodology	*NUE*	Please use this document as your key reference for different indicators of NUE, and their different uses: https://sprpn.org/issue-brief/defining-nutrient-use-efficiency-in-responsible-plant-nutrition/ Agronomic efficiency and recovery (uptake) efficiency of applied fertilizer are defined in it. The main problem is that to calculate them one needs reference plots (or strips) with no N applied, which limited their practical use. Partial Factor Productivity of applied N (=grain yield/N rate or kg grain produced per kg N applied), on the other hand, is a very easy to calculate indicator that works well in cereal crops in particular. For me, there are three key indicators of NUE that one can use, ideally together: • Partial Factor Productivity as economically most relevant one for farmers: for well-managed cereals, should be in the 50-70 kg grain/kg N range (which requires high AE and high RE to achieve that) • NUE based on outputs/inputs (called NUEpb in the paper): we want that to be within 70-90% as optimal zone • N balance = Inputs - Outputs, kg N/ha: we want the N surplus to be less than 50-80 kg N/ha to reduce environmental risks	We agree with this recommendation. We have added an appendix presenting these different NUE metrics. Specifically: • Their definition • Their calculation method • Their practicality
12	1.2 Applicability of the	*NUE*	Calculation of NUE In considering NUE, there needs to be care to ensure that there is no disadvantage related to the fertiliser	The topic of application of nitrogen stabilizers to grassland is a complex one from an MRV point of view.

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	methodology		applied to grassland. When fertilizer is applied to arable crops, the NUE is directly estimated based on crop yield. To calculate NUE relating to grassland, it is usually the animal product that is considered - milk solids production or carcass weight. Care should be taken to avoid inadvertently excluding stabilised nitrogen fertilisers applied to grassland from the protocol.	As of this moment we decided to exclude grasslands from the methodology. However, the plan is to consider it carefully and if possible incorporate it into the next version of the methodology.
13	1.2 Applicability of the methodology	*Overall Comments on NUE as a measurement in regard to stabilizers and inhibitors*	This methodology does not distinguish between factors that influence NUE, thus NUE as an evaluation metric will be difficult to evaluate against just nitrogen stabilizers and inhibitors. Several factors can influence NUE and play a significant role in a plant's uptake of nutrients. Some of these factors include management and application of fertilizers, balanced crop nutrition with micronutrients, sulfur's role in nitrogen uptake, as well as potash role in nitrogen uptake, both impacting NUE. It will be difficult to distinguish between the other factors impacting NUE versus the adoption of stabilizers and inhibitors. For example: To limit the scope of this work to urease inhibitors or nitrification inhibitors ignores decades of research around the role that sulfur plays in NUE. This is especially true given that AAPFCO recognizes sulfur as an enhanced efficiency product for its role in assisting N use efficiency. Science also has acknowledged the role that potassium plays in nitrogen efficiency. Additionally, ignoring science and precluding slow-release fertilizers and biological nutrient use efficiency enhancement products seemingly ignores accepted science in this area as well.	We fully acknowledge that NUE is influenced by a variety of factors, including balanced crop nutrition, soil conditions, management practices, and crop type. This complexity is well recognized in agronomic science. However, in this methodology, NUE is not used as the sole basis for crediting emission reductions. Rather, it is applied as a supporting metric to: • Assess the appropriateness of baseline nitrogen rates • Identify deviations (e.g., potential yield declines → leakage risk) • Compare project vs. baseline efficiency trends over time The focus of this methodology is solely on nitrogen stabilizers (urease and nitrification inhibitors), as defined in Section 1.3. We fully agree that other products, including sulfur, potassium, slow-release fertilizers may also contribute to NUE improvement or N_2O mitigation. However, those would require separate methodologies with appropriately defined baselines, emission factors, and logic. We do not propose changes to the current scope or treatment of NUE, but we are already developing methodologies which cover some of these technologies.

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				Having said that, if there is scientific evidence that the use of inhibitors in combination with one of these technologies can have an (increased) impact on reducing N2O emissions, then this could be eligible under this methodology, as stated in the applicability section: "*This methodology is applicable to projects that introduce changes to management practices on top of the usage of nitrogen stabilizers (e.g., adopting improved tillage methods, introducing cover crops, or similar)...*"
14	1.2 Applicability of the methodolog y		How does the methodology handle reduced N + NI and joint interventions? Current: Concurrent reduction in N fertilizer is currently not supported because there are few scientific studies that document the effects of this combined treatment Suggestion: We hope that this will be revisited, perhaps in the new methodology. This limitation is likely to reduce adoption and usability because many entities developing GHG reduction programs would like to concurrently reduce N fertilizer since the GHG reduction is more reliable and larger than stabilizer use alone.	We fully agree that combining nitrogen rate reduction with nitrogen stabilizer use is a common and promising approach in many real-world farming systems. However, we found that there is not enough scientific evidence yet to separate the effects of both actions, especially when it comes to calculating how much of the GHG reduction is due to the stabilizer alone. Since this methodology focuses specifically on stabilizer adoption, and we want to avoid over-crediting, we decided not to include combined N rate reduction in this version of the methodology. In other words, the rationale behind our decision was because of the lack of scientific evidence rather than our support for N rate reduction initiatives. We will definitely consider it in future updates of the methodology.
15	1.2 Applicability of the	*Cradle to gate*	Will this methodology provide guidance and acceptable data for life-cycle analysis? LCAs do not have recognizable international standards. There are	In the methodology is indicated that: "*The PCF or LCA reports must comply with internationally recognized frameworks, such as ISO 14040/14044 (for LCA), ISO 14067 (for PCF) or similar,*

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	methodolog y		companies providing LCA assessments for companies, however, most companies have their own methodology and there are nuances in assumptions of those calculations	*ensuring that results are credible and comparable with each other.* *They must be independently verified by a qualified third party to ensure transparency, reliability, and adherence to industry best practices.*" In a next version of the methodology we might become much more specific into the list of accepted PCFs (or international standards). However, due to the fragmentation of this market we need to be careful. For now, the biggest safeguard will be the VVB that will check the selection of the PCF. The most important aspect is that the PCF method between the baseline and the project products is at least consistent to make sure that we are comparing similar metrics. We clarified that as well in the methodology.
16	1.2 Applicability of the methodolog y	*EF and scientific studies*	Most fertilizer companies research product efficacy and benefits with university researchers and research institutes. However, those studies are proprietary data and most is not released in peer-reviewed journal publications. Most stabilizers and inhibitors in the market today have been researched and published in peer-reviewed articles, however, University research is still behind the industry in products currently in the market. Can you provide guidance on what is acceptable from a research study standpoint?	We recognize that many fertilizer companies conduct private or confidential experiments, often in collaboration with universities, to test the effectiveness of nitrogen stabilizers and inhibitors. These studies may not always be available in peer-reviewed journals, but can still be accepted for GHG projects. Here is how such data is treated under this methodology: • The quantification of emission reductions must be based on emission factors from scientific literature, meta-analyses, or validated datasets such as the IFA EF database, as described in Section 4.1 and Appendix A.2. • If the product used in the project is not yet published in peer-reviewed literature, the project developer must provide confidential documentation showing its mode of action and performance. This may include proprietary trial data, which can be reviewed by the VVB under a

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				non-disclosure agreement (NDA). • However, any such study must follow the minimum experimental design criteria outlined in Appendix A.2. This includes requirements such as appropriate controls, replications, statistical treatment of data, and alignment with the project's environmental conditions.
17	1.2 Applicability of the methodology	*best practices and agronomic recommendations*	The methodology references that project developers must demonstrate nitrogen inputs are applied at appropriate rates based on regional agronomic guidelines. This is somewhat of a challenge in the U.S. All agronomic guidelines are developed and published by Land Grant Universities, however, many of the state agronomic fertilizer recommendations are outdated and based on 1970s and 1980s nutrient recommendations that have not kept up with high yielding crop varieties. Will agricultural retailer data or industry recommendations be accepted as best practices?	The methodology already accounts for this by requiring project developers to use regional agronomic guidelines or best practices. The inclusion of "best practices" allows for the use of well-established industry benchmarks, agricultural retailer data, or validated proprietary recommendations, as long as they are: • Clearly documented • Justified as representative of standard practice in the sourcing region • Consistent with achieving optimal nitrogen use efficiency (NUE) Project developers must explain why these alternatives offer a more appropriate representation than official LGU rates, and all assumptions are subject to review and approval by the VVB We added in section 1.2, page 10 some examples in brackets: *"(e.g., nutrient recommendations from agricultural retailers, industry-supported agronomy platforms, etc)"*
18	1.2 Applicability of the methodology	*For Land Management Unit (LMU) type of projects, project developers must demonstrate that nitrogen inputs are applied at appropriate rates based on regional agronomic guidelines or best practices, ensuring*	No, currently in the U.S. there is no accurate national or regional database showing local or national NUE trends due to the different definitions and calculations of NUE. There is a platform called NuGIS that The Fertilizer Institute manages that provides estimated NUE information based on fertilizer tonnage sales (AAPFCO) and USDA NASS data survey information.	See above

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		baseline fertilization is neither excessive nor deficient. This is to ensure that projects are not rewarded for overapplying N, compared to the common regional practices, and thus generating additional emission reductions. This means we are requiring that the project NUE be benchmarked against regional-historial NUE. *● Do you agree with this approach?*	This platform provides estimated NUE information using the partial productivity factor for NUE. To acquire a more accurate regional database on NUE, a project developer will need actual farmer field level data that currently is owned by the farmer and establishing trends of NUE over time. Please see first comment above on NUE.	
19	1.2 Applicability of the methodolog y	*For Land Management Unit (LMU) type of projects, project developers must demonstrate that nitrogen inputs are applied at appropriate rates based on regional agronomic guidelines or best practices, ensuring baseline fertilization is neither excessive nor deficient. This is to ensure that projects are not rewarded for overapplying N, compared to the common regional practices, and thus generating additional emission reductions. This means we are requiring that the project NUE be benchmarked against regional-historial NUE.* *● Do you agree with this approach?*	The concept is clear, however, there is potential for issues related to defining the spatial applicability of "regional" recommendations and the availability of location and crop specific historical data to benchmark NUE. Availability of county-level, crop-specific historical data is widespread in the US, but not always consistent across time or location. With potential reductions in federal staffing and budget resources, this type of data could become more sporadic. University / agricultural extension recommendations are extremely valuable, as they incorporate local crop experts and often account for agronomic advances, local variability, and long-term research datasets. However, the update frequency of this form of agronomic guidance is highly variable and often dependent on state/university staff and budget resources. Ideally, benchmarks can be created at the farm level, and flexibility should be offered to growers entering the program that allows in-program benchmarks to be developed over the course of several years of participation. With this being said, it will be important to understand	While regional or national datasets are preferred when available, the methodology will allow for farm-level benchmarking over time, especially where public data are not available or inconsistent. This flexibility is particularly useful for multi-year programs, where in-program monitoring can be used to establish a credible baseline. To clarify this flexibility, we have added the following sentence to Section 1.2 of the methodology: "Where regional data is unavailable or unreliable, project developers may propose farm-level NUE benchmarks, provided they are supported by transparent historical records and justified environmental comparability." Regarding the appropriate concentrations rates, the methodology addresses the correct application rate and concentration of stabilizers in several places: ● Section 1.3.2 (Regulatory Compliance) requires that stabilizer products comply with all applicable local, national, and international regulations, including maximum allowable concentrations of AI.

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			the data quality and granularity of the upcoming database associated with this project suite, as that may complement national/regional inventories and address gaps. It will also be vital to ensure the agronomic condition/environment (region, climate, weather, soil, crop combination) are considered. Additionally, should it be stated, and how do we track, that the stabilizers/inhibitors were used at the correct rate/concentration to have the desired effect?	• Section 6.1 (Monitoring) obliges project developers to report the product name, application rate, and method of application, allowing the VVB to assess whether the stabilizer was applied correctly and in line with scientific or manufacturer guidance. • Appendix A.2 outlines minimum requirements for scientific studies used to justify emission factors, including proper dosage and application design. We also fully acknowledge the value of greater clarity on acceptable minimum efficacy thresholds. Therefore, for a future version of the methodology, we plan to (try to) develop a reference table of minimum and maximum application rates (AI %) for different stabilizers, based on available peer-reviewed literature and field-proven efficacy. We require from the project developer to follow the regulations and the recommendations from the inhibitor/stabilized fertilizer producers. On top of that we added "*To further ensure consistency with scientifically validated performance levels, it is recommended that project-level application rates of nitrogen stabilizers (on a per hectare basis or per w/w ratio) remain within ±25% of the application rate reported in the supporting reference studies. If the supporting reference studies do not specify an application rate, the project developer must select an appropriate rate from another independent and credible source that aligns with their cropping system. This choice must be strongly justified. Particular attention should be paid to ensuring that the selected rate allows for the intended environmental benefits of the stabilized fertilizer to be achieved, without causing any adverse impacts (see Section 1.7 Risks). In such cases, the Validation and Verification Body (VVB) must carefully verify that the application rate was selected appropriately and in accordance with these criteria.*"

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20	1.2 Applicability of the methodolog y	*For Land Management Unit (LMU) type of projects, project developers must demonstrate that nitrogen inputs are applied at appropriate rates based on regional agronomic guidelines or best practices, ensuring baseline fertilization is neither excessive nor deficient. This is to ensure that projects are not rewarded for overapplying N, compared to the common regional practices, and thus generating additional emission reductions. This means we are requiring that the project NUE be benchmarked against regional-historial NUE.* *Do you agree with this approach?*	Project NUE and yield should be benchmarked against regional-historical NUE and yield.	Agreed, text has been adapted to include yield.
21	1.2 Applicability of the methodolog y	*Same as above*	We support this approach	:)
22	1.2 Applicability of the methodolog y	*NUE*	Will you set a threshold as regards a Minimum N-Efficiency reached?	The methodology does not define a fixed minimum NUE threshold, and this is an intentional choice. Due to the high variability in farming systems, agroecological conditions, and crop types, setting a universal threshold for NUE would not be scientifically robust or operationally feasible. It would also be very useful for us and this methodology if such extensive guide was out there.

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				Instead, NUE is used in the methodology as a supporting indicator to: ● Assess whether baseline fertilization was excessive or appropriate; ● Confirm the effectiveness of the stabilizer We will explore the inclusion of NUE thresholds in the next version of the methodology
23	1.3 Eligible products	*Types of nitrogen stabilizers*	Studies have shown that nitrapyrin remains effective at higher temperatures, but its efficiency can decrease as temperatures rise above 30°C. Nitrapyrin's inhibitory effect on nitrifying bacteria like Nitrosomonas europaea is significant, but prolonged exposure to high temperatures can accelerate its degradation. Whereas Dicyandiamide (DCD) is generally less sensitive to temperature fluctuations compared to nitrapyrin. However, its effectiveness can still be compromised under extreme heat. High temperatures can increase the rate of DCD degradation, reducing its ability to inhibit nitrification. The performance of these inhibitors is also influenced by soil properties such as pH and moisture content. In arid climates, sandy soils with low organic matter can further challenge the effectiveness of nitrification inhibitors. Question now arises: what strategies should be implemented to enhance the performance of nitrification inhibitors under the high temperatures typical of arid climates?	We agree that environmental conditions can significantly influence the effectiveness of nitrogen stabilizers, particularly nitrification inhibitors. To address this, we have added clarifying language under Section 1.3.2: Regulatory compliance and application rate, specifically in a new paragraph titled "Effectiveness." This addition emphasizes the need for project developers to ensure that the selected stabilizer is appropriate for the agroecological context in which it is applied. The new text outlines that: ● Supporting evidence (e.g., from peer-reviewed studies, manufacturer data, or regional field trials) must be provided when using stabilizers in challenging environments (e.g., high temperatures, sandy soils). ● Where needed, documentation of adjusted agronomic practices (e.g., timing, formulation) must be included. ● Importantly, it reiterates that emission factors (EFs) must reflect the stabilizer's performance under the specific project conditions, with guidance provided in Appendix A.2 to ensure appropriate EF selection. Note that this is one of the limitations of using emission factors for quantifying the climate impact. It is important that the project developer selects an EF that is representative of the conditions of the project

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				and at the same time conservative. The emission reduction calculation is made ex-ante, with the check on NUE and yield being the only ex-post.
24	1.3 Eligible products	*Application methods*	How can nitrogen stabilizers be optimized for use in drip irrigation systems commonly used in arid regions?	The methodology does not prescribe specific instructions for using nitrogen stabilizers in drip irrigation systems or other precision application methods. However, project developers must demonstrate the effectiveness of the stabilizer under the proposed application method, including drip fertigation. They need to provide supporting evidence such as scientific studies, technical documentation, or field trial data.
25	1.3 Eligible products	*Regulatory compliance*	The draft guidance states that nitrogen stabilisers must be registered in the country in which they are applied. Globally, many countries do not formally register these products. It may be sensible to loosen the wording to say – 'must meet the regulatory requirements for use in the country of application'.	We adopted the suggestions and the text has been updated.
26	1.3 Eligible products	*Nitrogen stabilizers/fertilizers mixtures: Fertilizers mixed with nitrogen stabilizers before application, either at the farm level or through distribution channels.*	how will it be guaranteed that the treatment is properly executed	To ensure that the treatment is properly executed and effective, the methodology includes the following requirements: • In Section 6.1 (Monitoring Requirements), developers must report the application method, timing, product name, dosage, and whether the stabilizer was mixed pre-application. This allows the VVB to verify proper field implementation. • In section 1.3.2 Regulatory compliance and application rate Also note that there is a difference in what is required based on the selected spatial boundary.
27	1.3 Eligible products	*Post-application treatment: Nitrogen stabilizers applied*	Is there a risk of overapplication of inhibitors - reputational risks of this project?	On 1.3.2 we added a sub-section on Application rates.

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		separately after fertilization to control nitrogen transformations in the soil.		There are essentially 5 balance checks: ● The regulatory compliance ● The compliance with the recommendations of the stabilized fertilizer/ inhibitor producers ● The cross check with the scientific literature citing the emission reduction ● The cross check by the VVB on the application rates and selected EF ● The reported application rate in the verification of the project. For now, this should provide enough transparency from a credibility point of view. As a next step of this methodology we will try to create a pre-defined range of application rates of the inhibitors for different cropping systems.
28	1.3 Eligible products	*These details, including the total fertilizer application rate, AI percentage, and supporting documentation, must be provided in the Project Overview Document (POD) demonstrating their efficacy under the specific conditions (of the project).*	this deserves a new paragraph as it is not part of the regulation	We agreed and we adopted the suggestion in the methodology. We change the title of the section to " 1.3.2 Regulatory compliance and application rate" and we distinguished the paragraph that discusses the application rate of nitrogen stabilizers See page 13, 14
29	1.3 Eligible products		From which application does the application form "Post-Treatment-Applications" result? We are not aware of any practical procedure where this is or should be applied.	The post treatment application may occur, when the nitrogen stabilizer is being applied after the fertilizer at the optimal timing.
30	1.3 Eligible products		Local legislation might use other definition. Example: In France we got a homologation for ammonia volatilization reduction. Will this fall under UI?	We are aware that there is a big diversity of national regulations related to chemical inputs. The specifics will be assessed by the project developer when there is

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				knowledge that the project will take place in the specific region/country
31	1.3 Eligible products		The document mentions the EU fertilizer regulations (pg. 13) Is there a problem if the product it registered for more than one claim? For example under the FPR under PFC 1C. Inorganic fertilizers & PFC5. Inhibitors	No there is no problem, as long as it is registered as a stabilizer and that there is proof related to its efficiency in reducing emissions
32	1.3 Eligible products		How does the methodology determine allowed NI AIs and products? Current: Eligible NIs are deferred to other regulatory bodies, including FIFRA in the U.S. EPA Suggestion: Allowable ingredients must be represented in the EF database, and we suggest that efficacy requirements are considered, based on literature values and similarity to "mean" values. For example, to be able to use an EF from another ingredient, a study must be presented that shows it is within 25% of the representative ingredient. Rationale: In the US, the EPA/FIFRA do not provide sufficient regulation on efficacy of products for oversight and validation. Registrants are required to have efficacy data but it is not submitted for registration. Efficacy is only required to be submitted in California. E.U. does not have any efficacy requirements for nitrogen stabilizer registrations based on our knowledge. Most of the regulation requirements are based on environmental toxicity and longevity of the molecule NOT actual efficacy, which is the responsibility of the manufacturer[1]. This is a gap that must be addressed to support rigorous N2O reduction	We agree that current regulatory frameworks focus primarily on toxicity and environmental safety, and do not sufficiently address product efficacy, particularly with regard to active ingredient (AI) concentration. The methodology currently mitigates this issue by requiring project developers to: In section 1.3.2 Regulatory compliance and application rate ● Comply with regional regulations and use the product within recommended AI concentration ranges, as stated in Section 1.3.2 (Regulatory Compliance and Application Rate); ● Demonstrate efficacy under their project's conditions using scientific literature, peer-reviewed studies, or confidential data evaluated by the VVB (see Section 6.1 and Appendix A.2); ● Report the application rate, AI concentration, and supporting documentation in the Project Overview Document (POD), ensuring that the use aligns with producer recommendations and falls within a scientifically supported range;

[1] REGULATION (EU) 2019/1009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCILof 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003 (21) Certain substances and mixtures, commonly referred to as inhibitors, improve the nutrient release pattern of a nutrient in a fertiliser by delaying or stopping the activity of specific groups of micro-organisms or enzymes. For inhibitors made available on the market with the intention of them being added to fertilising products, the manufacturer should be responsible for ensuring that those inhibitors fulfil certain efficacy criteria. Therefore, those inhibitors should be considered as EU fertilising products under this Regulation. Furthermore, EU fertilising products containing such inhibitors should be subject to certain efficacy, safety and environmental criteria. Such inhibitors should therefore also be regulated as component materials for EU fertilising products

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			projects with N stabilizers.	• Justify that the emission factor (EF) used is appropriate for the stabilizer product and its concentration. We also fully acknowledge the value of greater clarity on acceptable concentration ranges and minimum efficacy thresholds. Therefore, for a future version of the methodology, we plan to (try to) develop a reference table of minimum and maximum application rates (AI %) for different stabilizers, based on available peer-reviewed literature and field-proven efficacy. We also included the suggestion in the adapted "1.3.2 Regulatory compliance and application rates" sub-section.
33	1.3 Eligible products		How does the methodology determine effective NI active application rates to ensure sufficient microbial suppression and thus N2O mitigation? <u>Current</u>: Product must be registered in the country/state and application rate should comply with regional regulations. Relies on recommendation of the manufacturer/supplier for use rates. Assumes that manufacturer have extensive datasets on efficacy from a wide range of environments and these are used to determine recommended rates. <u>Suggestion</u>: Project NI application rates must be comparable to what is used in the reference studies that are used to generate the EF values. We recommend that project application rates of NI (per acre) should be within 25% of the per-acre application rate in the reference studies. <u>Rationale</u>: Suppliers may suggest lower rates to reduce costs, and while some efficacy of N stabilization may be generated, most of those studies use nitrate testing studies, and not N2O. If the goal is to provide robust guidance on use rates that create a particular outcome for N2O, this should be based on actual published N2O	Agreed and adapted. See similar comments to AI rates.

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			Data. The methodology cannot solely rely on manufacturer/supplier supplied data, to ensure robustness it should include peer reviewed and independent validation of claims.	
34	1.3 Eligible products		How can new active ingredients be incorporated into the guideline that ensures robust scientific evidence of efficacy in mitigating N2O emissions, but has a reasonable data burden that allows new products to be utilized in projects? Current: No guidance given Suggestion: We suggest that at least 2 independent field trials (ideally 2 years) of the product are submitted that show evidence actual N2O mitigations in agricultural settings. These study outcomes should be consistent with the data generated by the manufacturer of the nitrogen stabilizer compound (active ingredient). For extension to other environments, small laboratory studies may be used to show comparability with other well-studied ingredients. This is sufficient for a probationary term (i.e. 3-5 years), after which, more extensive testing data is required to ensure that the product shows effectiveness in the regions where a project may be implemented.	For now the quality criteria for including new studies is the only guidance given. To be fully fleshed out in the next version. This feedback will be taken into consideration
35	1.3 Eligible products		How are N-containing active ingredients managed regarding total N2O emissions Current: No guidance given Suggestion: Some NI actives, like Pronitridine, also include some slow-release N forms. These should be considered a different product class and require specific efficacy studies for N2O to be eligible. Rationale: N-containing stabilizers likely have different efficacy and emissions profiles, and should not be lumped together with other actives that have direct	We acknowledge that some nitrification inhibitors, such as Pronitridine, are chemically N-containing compounds. While these molecules contain nitrogen as part of their structure, we are not aware of any published evidence indicating that this nitrogen is mineralized or contributes to plant-available nitrogen under normal agronomic conditions. Available literature instead emphasizes their biochemical function as inhibitors, not as nutrient inputs. Furthermore, Pronitridine is registered under the U.S.

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			modes of action and are not N-containing	EPA's regulation as a nitrification inhibitor, confirming its recognized regulatory status. Therefore, it qualifies as an eligible product under this methodology, as stated in Section 1.3.2 (Regulatory Compliance and Application Rate). Additionally, we highlight in section 1.2 Applicability that appropriate emission factors (EFs) that reflect the stabilizer's impact under relevant agronomic and environmental conditions are required. If such data is lacking, the product is not eligible for use under this methodology, ensuring scientific robustness and transparency in GHG quantification. Finally, in future methodology versions, we aim to include a reference table of eligible active ingredients, along with literature-supported concentration ranges and accepted efficacy thresholds. In the meantime, we encourage developers using such products to submit robust, ingredient-specific efficacy data, including evidence of direct N_2O impact under field conditions.
36	1.3 Eligible products	*Application rate*	What about the concentration of stabilizer in the fertilizer? There is a wide range of DCD ppm in commercial products in the US. Some products deliver concentrations so low that it is unlikely that they would have any measurable effect on nitrification	The methodology does not fix specific minimum or maximum concentration thresholds, but it does require project developers to demonstrate the effectiveness of the product at the applied concentration. This includes submitting scientific evidence or technical documentation showing that the dosage used is aligned with levels proven to reduce emissions. This requirement is outlined in: • Appendix A.2 (page 34): Which specifies the minimum criteria for scientific studies used to justify emission factors, including the need for proper dosage and experimental design. • Section 1.3.2 (page 12): Which requires compliance with regulatory limits on active ingredient concentrations. See other comments related to this topic as well.

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37	1.4 Additionality	*Prevalence: The project developer must prove that the introduction of the use of nitrogen stabilizers is not a common practice in each region included within the project area.* *Common practice is defined as greater than 20% adoption*	how will this data become available	It is recommended that either regional or national data are used or if not available market research is performed by a relevant (external) company.
38	1.4 Additionality	*Financial additionality: The project developer must prove that the financial incentive from* *the carbon finance will lead to the increased adoption of the nitrogen stabilizers by the farmers.*	how, by a declaration from the farmer?	• A signed declaration by the farmer (or project participant) confirming that the use of nitrogen stabilizers is not standard practice on the farm and that carbon finance was a decisive factor in adopting the practice. • A financial barrier analysis or cost-benefit model demonstrating that the stabilizer cost outweighs direct economic returns for the farmer, without the carbon revenue.
39	1.4 Additionality		From our point of view, it is a clear disadvantage with regard to the intended dissemination of the use of inhibitors of applications that are already prescribed by law can no longer be certified. The basic assumption behind this is that due to the legal regulation, all market participants work in accordance with the law and that the associated GHG reduction is already effective across the board. However, this is only the case in an ideal world. In Germany, for example. The use of a UI on urea has been mandatory for several years and yet we have to assume that currently only about 50% of the HS used in Germany is actually applied with a UI. For the (financial) motivation of the use of UI (as well as NI), it should therefore be discussed again whether applications that are already required by law can and should not be included in a certification.	This is a tricky issue. Indeed we want to incentivize the use of inhibitors, in cases that were not used. However, it would be problematic if we promoted the incentivization of practices not following local legislation. If a farmer in Germany was already mandated to use inhibitors but didn't, then should they be rewarded for it? Would their baseline in the project document then be proof that they were not complying? To add to that, how would compliant farmers see a program like this? Would they not become even more disadvantaged compared to a non-compliant farmer? This issue is more related to the quality of the control mechanisms to enforce the regulations.

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			With regard to the final goal (i.e. the "comprehensive" reduction of GHG emissions), a financial incentive is ultimately the best way to achieve the desired expansion of the use of inhibitors, as it creates competitive advantages for producers and users and thus accelerates their distribution, while legal regulations without adequate control mechanisms (current status quo) mainly benefit those who are willing to circumvent this regulation. In the case of the latter, the GHG reduction then only takes place on paper, which is certainly not in the spirit of this project.	
40	1.4 Additionality	*Regulatory additionality (pg. 14):*	The project developer has to show that the N stabilizer use was not the result of regulatory restrictions. Proving a negative is very difficult (e.g., proving that there are no regulations and no subsidies). We suggest that all matters related with regulation are kept in an up to date database to which all project developers can refer.	That would be a great addition for the next version of the methodology. Unfortunately covering all regulations from all countries is a gigantic task and falls outside the scope of the current version of this methodology. For now, we assume that the project developer is capable of researching the regulatory landscape that they are operating under.
41	1.4 Additionality	*Prevalence*	Same comment as the above	Same answer as above.
42	1.4 Additionality		Additionality needs to be revised. North America nitrogen use has been steady for decades with continuous increases in crop yields while national average nitrogen use has decreased by approximately 12%. It will be difficult to prove additionality at a regional or farm level nitrogen use. This section of the methodology disregards decades of nitrogen use efficiency improvements in key agricultural regions.	The focus of the additionality is on the use of the stabilized fertilizers rather than the NUE improvements.
43	1.4 Additionality		The requirements additionally state that the use of inhibitors is not common. Common practice is defined as greater than 20% adoption. Use of inhibitors	What needs to be controlled, is that if in a region the majority of the farmers are using inhibitors consistently, then there is no additional benefit to

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			requires a decision at every application of fertiliser. The financial circumstances driving use may change at each application. Effectively by introducing a criterion on existing use, a disadvantage is being placed on early adopters. For example, the current use of urease is on over 50% of urea sold in New Zealand. No regulatory requirement is in place to promote use, and no incentives are in place. The use pattern has been prompted by provision of consistent information and advice to farmers and by being clear that by using the coated product, there is an opportunity to use less nitrogen product. With changes to the price of nitrogen fertiliser, the use pattern for stabilised nitrogen has declined, mainly due to issues of affordability.	finance the intervention. Early adopters can still be rewarded. Remember, the baseline is defined retroactively: as you mentioned the decision to use an inhibitor or not is made every year. A consequence of this is that if the program is successful in the longterm, then it can make itself obsolete. In other words if this program becomes successful and everyone starts using inhibitors (and continues to do so), then there would be no need for this program.
44	1.5 Crediting period	*The methodology proposes a crediting period of up to a maximum of 7-years. How suitable do you find this duration for ensuring both environmental integrity and project viability? Please share your reasoning and any suggestions for alternative durations.*	Seven years seems like a meaningful time period. Consideration should be given as to whether the original baseline is recalculated after the seven-year period.	The methodology already incorporates mechanisms to ensure baseline validity over time, particularly tailored to the baseline approach selected: For the Land Management Unit (LMU) approach, the baseline is defined for each crop cycle and does not rely on static historical data. It represents a dynamic counterfactual scenario, reflecting what would have occurred without the stabilizer in that season. Therefore, recalculation is inherent to the approach, as the baseline is re-established annually. For the Sourcing Region-level approach, the methodology explicitly requires that project developers re-establish the baseline at least every three years during the crediting period. This includes updating assumptions about regional fertilizer use, management practices, and emission factors to ensure continued alignment with business-as-usual conditions. Additionally, as noted in Section 2.3 (Crediting Period), at the time of crediting period renewal (e.g., after seven years), project developers must demonstrate that the

	Section	Referenced Text	Feedback/comment/suggestion	Response
				baseline remains valid. If regional practices or data have shifted, the baseline must be updated accordingly.
45	1.5 Crediting period		Who determines the crediting period? Is it a fixed period or can it be changed in the course of the project (e.g. because of changing regulations)?	The crediting period is determined at the moment of the validation of the project (by the project developer). After that the baseline needs to be re-established, additionality checked, and a new project document must be submitted to a VVB. Essentially this is a moment to re-assess if the GHG program can continue.
46	1.5 Crediting period	*The methodology proposes a crediting period of up to a maximum of 7-years.* *How suitable do you find this duration for ensuring both environmental integrity and project viability? Please share your reasoning and any suggestions for alternative durations.*	ok	ok
47	1.5 Crediting period	*The methodology proposes a crediting period of up to a maximum of 7-years. How suitable do you find this duration for ensuring both environmental integrity and project viability? Please share your reasoning and any suggestions for alternative durations.*	7 years is a fair duration, however, further clarification is needed as to how that number was selected, as this is an annual decision (at least for row crops). Note, CAR NMP is 10 years. At the end of the first year, farmers will know their product cost, yields, and incentives to evaluate the feasibility of the practice change for their operation. The "enough time to demonstrate environmental impact" doesn't make sense for row crops. In the context of emission reductions, this also doesn't make sense. If they determined new technology will require an update every 7 years, then that's an evaluation of product development and pace of industry change, but is that a viable argument for establishing new benchmarks? For the retro-active crediting, it is positive to see	The 7 year period is the duration that the project is eligible for crediting under the POD. After that time the POD needs to be re-validated, with all the required analysis done again (baselining, additionality checks, risks, etc.). This would effectively renew the 7 year crediting period. At some point it is assumed that the additionality would be lost (because regulation might come in or the use of inhibitors becomes widespread), so the crediting period would not be able to be renewed again. As for the choice of 7 vs 10 years, we have received input from industry experts that 7 years is a fair duration. Since it is renewable we do not foresee any significant risks.

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			additional flexibility and rewarding of early adopters. However, there are limitations here with additionality and requiring that it was added due to financial incentive. If a grower is getting credit for 2 years before validation, but needs to be paid to show additionality, that will severely limit the applicability of this feature. Remember, harvested products can move slowly through some supply chains. If a node/tier of a supply chain gets a crop or downstream product 1 or 2 years after harvest, is there a mechanism to pay for that incentive, make a claim on at least 1 node, and qualify a grower that way?	For the mechanism of rewarding the systems mentioned, we would like to refer you to the *Decarbonization Claims Guidebook* which is to be published in a few months. It is currently in stakeholder consultation. Essentially a market based insetting mechanism would be able to solve this issue.
48	1.5 Crediting period	*The crediting period is the timeframe during which a validated project can generate Carbon Credits for verified emissions reductions. After the end of the crediting period, the project needs to be validated again, to ensure that additionality*	Who is doing that?	Project developers
49	1.5 Crediting period	*Note: The crediting does not "force" farmers in the project to use nitrogen stabilizers, but allows them to generate credits if they do. For example, if a farmer applies nitrogen stabilizers in only 4 out of 7 years, they would receive credits only for those years.*	When do they receive the credits - at the end or before the credit project period?	After the end of the crop cycle in scope and the verification of the reported harvested crop yield.
50	1.5 Crediting	*Retroactive crediting*	How can the farmer prove additionally if he started	• Documentation of why the intervention was

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	period	*This methodology allows for retroactive crediting, in the case the application of nitrogen stabilizers was introduced within a maximum of two years prior to the submission of the validation of the POD. In such cases, the crediting period will begin at the moment the intervention was first implemented, provided that the project developer can fulfill the requirements set by this*	before?	not business-as-usual at the time it was adopted • Evidence of financial barriers (e.g. price premium) • Confirmation that stabilizer use was not common practise in the region at that time
51	1.6 Co-benefits	*They must implement appropriate mitigation measures to address any identified potential risks and negative impacts, ensuring that the project does not adversely affect local ecosystems or communities, particularly vulnerable populations.*	Who is taking the risk? E.g. if some new findings compromise the success of the project and the farmer paid the cost of the inhibitor?	The methodology requires that project developers assess and mitigate risks to avoid negative impacts on ecosystems and local communities, particularly vulnerable populations (see Section 1.7 – Risks). However, it is important to clarify that the financial and operational risks related to input decisions (such as the cost of stabilizers) are not transferred to the farmer by default via the methodology. The party that bears these risks (e.g. farmer, project developer, or implementing entity), depends on the contractual agreements established at the project level. Typically, that would be the project developer.
52	1.6 Co-benefits	*To mitigate potential risks, project developers must ensure that nitrogen stabilizers are applied in accordance with the manufacturer's guidelines,*	I recommend to delete the sentence here and use it as intro to the next chapter - risk	Agreed, and adapted the text.

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		which already outline safe and effective usage. At the same time, the likelihood of such an event occurring is extremely low due to associated costs.		
53	1.7 Risks		How should potential ecotoxicity of N-stabilizer be incorporated in the project? This should be rather part of the Eligibility or Quality criteria? Tackling the risk of not actually using the inhibitor when sold separately → This is covered by the financial burden of the buyer. Reselling (by a farmer) will come with a loss hence automatically not of interest	To prevent the ecotoxicity risk, evidence of proper application rate of N stabilizer is recommended. This should also be covered in the subsection “1.3.2 Regulatory compliance and application rates”, which has been adapted. In the next version of the methodology we will try to create a table of the accepted range of application rate of the inhibitor, which would cover the toxicity risks. For now, the burden of proof falls on the project developer.
54	1.7 Risks	*Referencing bullet #2 on nitrogen stabilizer incorporated into the manufacturing process*	There is no evidence that a farmer pays for a stabilizer or inhibitor and then resales that product. There are several stabilizer products that are sold via the agricultural retailer and incorporated into blends. Some are sold directly to the farmer to apply based on recommendations for their fields. We believe that limiting the applicability of the methodology to manufactured inhibitors vs. those blended will place unfair preference on certain products. To reduce any risk associated with the referenced bullet point, you should clearly define what level of records are needed, such as as-applied field documents or bill of sale to show that the farmer indeed purchased the stabilizer. Further, we recommend placing reliance on the farmer’s purchase as proof of his use of the product.	We fully acknowledge that nitrogen stabilizers reach farmers through various supply chains, including: • incorporation during fertilizer manufacturing, • agricultural retailer blending, and • direct farmer application following field-specific recommendations. The methodology is designed to be inclusive of all these application modes and does not limit eligibility to pre-treated fertilizers only. As outlined in Section 1.3.1 (Methods of Application), both pre-treated products and mixtures applied at the farm or distribution level are eligible under this methodology. To ensure traceability the methodology requires that the project developer provide evidence of stabilizer use, regardless of where in the supply chain the stabilizer was added. The Monitoring Requirements Table in Section 6.1 provides guidance on the types of documentation

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				accepted for verifying stabilizer application. These include: ● Purchase records or bills of sale, ● As-applied field data, ● Retailer or service provider logs, ● Product batch information, and ● Any other documentation sufficient to verify product identity, application rate, and timing.
55	1.7 Risks		Section 1.7 covers the range of risks that may need to be considered. Consideration of the risk of food residues through the use of stabilised nitrogen products could be included in this list.	Accepted the suggestion. The mitigation plan would be to ensure that the application rate falls under safe boundaries and that the product is registered under regional regulations. See also the sub-section "1.3.2 Regulatory compliance and application rates"
56	1.8 Leakage & permanence	*The methodology includes a method to account for leakage related to crop yield decrease (NUE check). Do you agree with this method?*	Yes, but not only a NUE check but a yield check. NUE can remain at the same level with low nitrogen application (low N application and low yield). It can encourage bad fertilization practice.	Great suggestion. Added as part of the checks for leakage.
57	1.8 Leakage & permanence	*The methodology includes a method to account for leakage related to crop yield decrease (NUE check). Do you agree with this method?*	There is also a need to consider the situation where NUE results in the reduction in the need to apply nitrogen fertiliser. Should additional credit be given for the reduction in nitrogen use.?	The baseline is defined in a counter-factual approach rather than a historic or regional one. As such, the calculation of the emission reduction does not account for any reductions in N rate. Proving the cause-effect for N rate reduction is not an easy thing to do, as agricultural management practices are affected by a myriad of circumstances. As such, for now we decided to only account for the emission reduction caused by the application of inhibitors. To be considered how in a future version of the methodology such a (very positive) practice can be rewarded, in a practical and verifiable way.

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58	1.8 Leakage & permanence	*The methodology includes a method to account for leakage related to crop yield decrease (NUE check).* *● Do you agree with this method?*	The leakage concept presented here is standard, but the methods to account for decreased yields will require additional detail; either equations or more detailed discussion of number of years and types of historical data that are accepted or not accepted (Field level? Farm Level?). What are the geographic boundaries of "regional" historical data. CAR NMP has a detailed methodology for this calculation that is currently being used. Note, as with benchmarking, the eligibility of the field during a leakage screen will likely be driven by historical data availability, NOT by field performance. 10% yield window is generous, not disagreeing, but that's a higher number than what is currently used. How is current year's performance validated to historical performance - how do we account for natural year over year variation in weather on yield?	The leakage check is done at the end of the crediting period, so the number of years is defined based on that. The historical data are the actual project data that are collected during that period. These are already collected and submitted as part of the project documentation, so no further action is needed by the project developer. Just the calculation as presented in this section. A section on how the NUE is calculated as well as which other metrics can be used has also been added. For the natural variation over the years we have two tools in the methodology: ● From the leakage section: "*comparing average within-project NUE (excluding years with extreme weather events) during the project period to the average baseline NUE during the historical period*". So such significant variations are automatically excluded (the project developer must still justify it properly) ● In the Appendix C we present how the moving average approach can be used to flatten out such variations
59	2.1 Scope of activities	*Introduction of the use of nitrogen stabilizers, while keeping the fertilizer nitrogen application rate the same* *○ Optional: This methodology allows for the inclusion of other management practices in addition to the use of nitrogen stabilizers, provided there is sufficient scientific evidence*	I have some doubts if there is sufficient data available to scientifically demonstrate synergistic or antagonistic effects of applying other agricultural practices together with inhibitors. Example: adding a NI to low tillage systems could even trigger soil microorganisms to lock up more ammonium nitrogen with the abundance of organic compounds in the litter as energy sources	We fully acknowledge that the interaction between nitrogen stabilizers and other agricultural practices (such as reduced tillage, cover crops, or fertilizer formulation changes) is a complex subject with evolving scientific evidence. Your concern regarding the limited availability of conclusive data on synergistic or antagonistic effects is valid. To address this complexity, the methodology intentionally takes a precautionary approach: it only allows the inclusion of such complementary practices when sufficient scientific evidence is available to

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		demonstrating that these practices do not lead to an increase in GHG emissions. For instance, combining different agricultural practices, such as tillage, cover crops, or changing fertilizer types, might create synergistic or antagonistic effects on N2O emissions (Fuertes-Mendizábal et al 2019, Pokharel and Chang 2021). Therefore, it is essential that the implementation of these practices is backed by scientific evidence to ensure they do not negatively impact the effectiveness of nitrogen stabilizers in reducing N2O emissions.		demonstrate that these additional practices do not undermine the efficacy of nitrogen stabilizers in reducing N_2O emissions. This safeguard is designed precisely to avoid the risk of overestimating emission reductions or unintentionally introducing adverse effects, such as microbial competition for ammonium as you mentioned. In practical terms, project developers must provide supporting scientific literature or experimental data that validate the compatibility of any additional practices under the specific agroecological conditions of their project. Furthermore, the methodology requires that any such interventions be clearly disclosed in the Project Overview Document (POD), and monitored separately, to ensure that their impact on emission outcomes is transparently reported and evaluated
60	2.1 Scope of activities		Discusses the importance of synergy v antagonistic effects of the use of NIs with other practices (e.g., tillage) If the efficacy of the inhibitor is enhanced by certain practices, this might need to be considered as a separate EEF for that AI.	The methodology already emphasizes that when nitrogen stabilizers are combined with other agricultural practices, such as reduced tillage or the use of cover crops, these interventions must not compromise the effectiveness of the stabilizers. Specifically, the methodology states that such combinations are only eligible under two strict conditions: • There is scientific evidence supporting the joint intervention, and an appropriate emission factor (EF) can be derived from such studies, or • There is sufficient proof that the additional practice does not negatively affect the

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				GHG-reduction performance of the stabilizer (i.e., at minimum, the effect of the inhibitor is not diminished).
61	2.1 Scope of activities		The draft guidance (Section 2.1) provides for the introduction of nitrogen stabiliser while at the same time ensuring that the fertiliser nitrogen rate does not increase. When urease inhibitors are used, there is an option for farmers to reduce the amount of nitrogen applied, because losses have been reduced, and the NUE increased. Consideration should be given as to whether additional credit should be given for the reduction of nitrogen fertiliser compared with the baseline when urease inhibitors are used.	While it is acknowledged that reduced nitrogen application is a legitimate agronomic benefit of urease inhibitors, incorporating it into GHG calculations would require consistent and scientifically validated emission factor (EF) data specifically linking N rate reductions to GHG outcomes in the context of N stabilizer use. Such evidence is currently limited. That said, this is a valuable insight and may be considered in future versions of the methodology, as more data on the combined effects of stabilizers and N rate optimization becomes available. See also from previous response: *"The baseline is defined in a counter-factual approach rather than a historic or regional one. As such, the calculation of the emission reduction does not account for any reductions in N rate. Proving the cause-effect for N rate reduction is not an easy thing to do, as agricultural management practices are affected by a myriad of circumstances. As such, for now we decided to only account for the emission reduction caused by the application of inhibitors. To be considered how in a future version of the methodology such a (very positive) practice can be rewarded, in a practical and verifiable way. "*
62	2.1 Scope of activities	*Are there any potential sources of emissions or additional factors that the methodology has not considered? Please specify any that should be included*	No other emission factors	ok

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		and explain their significance (with references).		
63	2.1 Scope of activities	*Are there any potential sources of emissions or additional factors that the methodology has not considered? Please specify any that should be included and explain their significance (with references).*	1. Application of nitrogen stabilisers to urine patches. In grazed pasture systems, approximately 80% of nitrous oxide emissions are associated with animal urine patches. The application of nitrogen stabilisers to such urine patches ot reduce emissions is an active area of research in New Zealand. Should the draft protocol be expanded for such potential uses? New Zealand's agricultural greenhouse gas inventory includes an emsions factor related to the application DCD to urine patches, even though DCD is no longer used in New Zealand. 2. Emission factors associated with minor crops. The development of detailed emission factors for minor crops is often not economically justified. On page 11 of the methodology, it is indicated that the methodology is not applicable to crops for which there is no supporting scientific evidence. An alternative approach would be to allow consideration of emissions factors associated with comparable crops. For example, the estimation of emissions associated with peach growing could be used as an estimation surrogate for many other stone fruit crops.	1. At this stage, grazed grassland systems, including the application of nitrogen stabilizers to animal urine patches, are not within the scope of this methodology. The current version focuses on managed croplands and related fertilizer applications. Expansion to include grassland and pasture-based systems is already being considered for a future version of the methodology, where appropriate emission factors and guidance will be integrated. 2. We agree that for minor or under-researched crops, the use of emission factors from agronomically comparable crops can be a pragmatic solution. We updated the text: *Crops, cropping systems, and agroecological zones must be supported by scientific evidence demonstrating the impact of nitrogen stabilizers on GHG emissions to be eligible under this methodology. In cases where such direct evidence is unavailable for a specific crop, project developers may propose the use of emission factors from agronomically and environmentally comparable crops. This approach is acceptable when supported by a robust justification, demonstrating similar nitrogen use patterns, management practices, and environmental conditions. All assumptions and rationale must be transparently documented in the Project Overview Document (POD).*
64	2.1 Scope of activities	*Are there any potential sources of emissions or*	There is clearly a need to isolate and focus on NI in this program, but it is highly unlikely that there would be a	We fully agree with this comment.

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		additional factors that the methodology has not considered? Please specify any that should be included and explain their significance (with references).	scenario with a grower not implementing another practice. Fundamental 4R practices are entry-level for emission reductions, and NI are an optional practice change to complement sound agronomic practices. It is important to note that NI use is geography and climate limited - whereas an Agronomic and 4R approach can reduce emissions anywhere regardless of conditions. Not all geographies are a good fit for NI and emission reduction results will vary. Furthermore, agriculture represents a dynamic system, wherein individual practices are not often simple to combine towards a cumulative result. As stated in the text, "combining different agricultural practices … might create synergistic or antagonistic effects on N2O emissions." Robust science will be needed to evaluate the combination of practice changes beyond simplified linear calculations. Integrity here is essential.	There was a conscious decision however to focus only on stabilized fertilizers, as their effects and intricacies require special focus. It could also be the case that other programs with 4R management use this methodology to account for the stabilized fertilizer impact on in field emissions. We also believe that a "toolbox" approach is the way to go for reducing emissions. Even though not mentioned specifically in the methodology, a farmer could easily combine: • Use of low carbon fuel to power their machinery • Add inhibitors to their manure organic fertilization • Use a low carbon (inorganic) fertilizer • Etc. ..all under the same fertilization of a crop, and be rewarded for it under this methodology. This would of course require to combine this with other methodologies that can account for such emission reductions. The examples stated here (and more, such as CRFs) are part of the toolbox approach in our methodologies.
65	2.2 GHG sources		Methane emission should be included, particularly for rice, with increased yields and biomass due to stabilizers, it may also increase CH4 emissions due to more release of root exudates (substrate for methanogens). Studies show contradictory results--some increased, but some decreased, so for C credit purpose, it should be included. Otherwise there could be argument that reduced N2O emissions could be offset of increased CH4 emissions	We have updated the methodology to include CH_4 emissions as conditionally in scope, specifically for crop systems that involve anaerobic conditions such as flooded rice paddies, where stabilizer-induced yield or biomass increases could influence CH_4 fluxes. To reflect this, we have added a clarifying note directly below the GHG sources table, stating that CH_4 is to be included only when applicable, and that project developers must assess and report it using appropriate

	Section	Referenced Text	Feedback/comment/suggestion	Response
				emission factors or measurements, as outlined in the Appendix and section 4
66	2.2 GHG sources	*Effect of crop yield increase on GHG emissions:* *It is possible that the crop yield increases, as a result of the introduction of the use of nitrogen stabilizers. This is an additional benefit which:* *● Does not impact the reduction of the GHG emissions per hectare (see section 5. Net reduction of GHG emissions)* *● Does impact the reduction of GHG emissions per tonne of crop, which is relevant for the Product Carbon Footprint of the crop (see section 6. Different metrics of GHG emissions)*	could you please add, if both units are applicable for a carbon credit project?	Both are applicable to present in the POD. The one reporting on the emission reductions can use the appropriate measure. What matters the most is the actual emission reduction compared to the baseline, which is essentially given t CO_2e . After you have that, then it can be presented/adjusted in the metric that is most useful to the reporting company.
67	2.2 GHG sources	*Although this methodology focuses on the intervention of N-stabilizers, we do want to make sure that integrity of this claim is sufficiently supported by preventing increases in other sources on fields during the project period. To address this, the methodology states that "The project developer must be transparent and report on additional activities that happen along with or because of the introduction of*	Yes.	Ok

	Section	Referenced Text	Feedback/comment/suggestion	Response
		N stabilizers, which can lead to material changes of emissions on the field." *Do you think this approach is sufficient?*		
68	2.2 GHG sources	*Same as above*	Yes	Ok
69	2.2 GHG sources	*Although this methodology focuses on the intervention of N-stabilizers, we do want to make sure that integrity of this claim is sufficiently supported by preventing increases in other sources on fields during the project period. To address this, the methodology states that "The project developer must be transparent and report on additional activities that happen along with or because of the introduction of N stabilizers, which can lead to material changes of emissions on the field."* *Do you think this approach is sufficient?*	It takes significant resources already just to establish fertilizer rate baselines. Historical product information data will take even more. This is not a red flag from science standpoint, but collecting that type of information at scale will be challenging and likely exclude growers depending on their equipment/software and record keeping capabilities. At minimum, this is a giant data lift (likely manual for most growers). In general, growers will not change large scale management practices, equipment, etc JUST by adding nitrification inhibitors. But, if a grower is willing to try a newer technology like NI products, they are also likely open to trying other products, new equipment, etc to fine-tune their operation. One would almost always classify these as occurring along with and independent of NI, NOT because an NI product was added.	One of the main goals when developing this methodology was to be both scientific but also practical. Being scientific in many cases means that we need to have sufficient proof of data to support the claims that we want to make. If the data can not be supplied, then unfortunately this would restrict the use of this methodology. As such the decision was made to start with those who can essentially make strong claims backed by the necessary info and then in the future expand carefully. At the same time, an industry effort should be made at some point to set fertilizer baseline rates by regions. This of course is not an easy thing to do (and might reveal harsh realities) however it would be for the benefit of the improvement of agricultural and climate practices. It is not in scope of this methodology to create such a comprehensive baseline. A proper agri-food based market research company could support this during a GHG project.
70	2.2 GHG sources	*Effect of crop yield increase on GHG emissions:* *It is possible that the crop yield increases, as a result of the introduction of the use of nitrogen stabilizers. This is an additional benefit which:* *Does not impact the reduction*	It is not correct to say that "increasing yield does not impact the reduction of the GHG emissions per hectare" (2.2), Since Ninput = Nuptake + Nemission, so if Nuptake Increased Nemission must decrease. Yield should be considered in all methodological assumptions.	We agree with the concept behind this comment. We adapted the wording. In principle, an increase in nitrogen uptake due to higher yields could reduce emissions, since more nitrogen is taken up by the plant and less is lost to the environment. However, in this methodology, emission reductions are

	Section	Referenced Text	Feedback/comment/suggestion	Response
		of the GHG emissions per hectare (see section 5. Net reduction of GHG emissions). Does impact the reduction of GHG emissions per tonne of crop, which is relevant for the Product Carbon Footprint of the crop.		quantified based on emission factors (EFs), not nitrogen mass balance equations (in other words the calculation is ex-ante). The delta in emissions, and therefore the creditable reduction, is entirely derived from the difference in EFs between the baseline (no stabilizer) and the project intervention (with stabilizer), per unit of nitrogen applied. This means that we cannot recalculate emissions based on crop yield alone. While yield may improve NUE and potentially lower emissions, proper equipment (e.g. gas chambers) cannot be installed in every field to measure the actual fluxes, neither lab analysis of samples is feasible to measure the N uptake of the crop. The EFs already integrate the average response under specific conditions (including, in some cases, crop performance), and applying an additional yield-based adjustment would introduce double-counting or untraceable assumptions.
71	2.3 Spatial boundaries	*Sourcing region*	In the sourcing region approach, who is responsible for reporting the total sales of stabilized N in the given sourcing region? No single dealer can claim to know the total.	In the Sourcing Region approach, the responsibility for reporting the total sales of stabilized nitrogen fertilizer lies with the project developer. Ultimately, while a single dealer may not have full visibility, the burden of compiling reliable, region-wide estimates falls on the project developer, using all accessible and justifiable data channels. The project developer can only claim what they do have proof about.
72	2.3 Spatial boundaries	*Project developers must justify the spatial boundaries based on factors such as the size of the agricultural operation, the type of crops being cultivated, and the potential*	this is unclear, I would have expected that factors like homogeneity and level of insights would be critical. The baseline requirements have been already described above	Adapted the text.

	Section	Referenced Text	Feedback/comment/suggestion	Response
		environmental impacts of nitrogen use in the surrounding area.		
73	2.3 Spatial boundaries	*During verification, where the actual implementation of the project is assessed, the reported scenarios must be grouped based on similar management practices. The emission impact shouldthen be calculated separately for each group to maintain methodological consistency and accuracy in reporting.*	Please outline, whether the carbon credits will also be grouped and how the carbon is allocated to the groups e.g. to ensure that the credits are within the scope 3 boundaries of the reporting company to allow for insetting	The relevant "Decarbonization Claims Guidebook" will be published soon and you can refer to it for topic related to the allocation of the credits. The grouping can happen upstream or downstream of the intervention. Upstream would be the same stabilized fertilizer used and downstream would be based on the produced crop.
74	2.3 Spatial boundaries	*This methodology allows two types of projects: Land Management Unit level and Sourcing Region. From the methodology: "Sourcing region type of projects can be used when LMU field level type of data can not be accessed. In this case, aggregated emission factors must be used , which is expected to come with a higher standard deviation due to the compounding of uncertainty when aggregating for regional EFs, thus being on the conservative side. As such, project developers are expected to be incentivized in opting for LMU based projects due to the higher emission*	Agreed, imposing additional penalties will undermine the project's viability. The existing conservative assumptions and higher uncertainty already act as an implicit safeguard	We are happy to see that you agree

	Section	Referenced Text	Feedback/comment/suggestion	Response
		reduction potential, caused by the lower uncertainty. This is aligned with SBTi's and GHGp's directions of moving towards field level projects which can offer more transparency and traceability." Do you agree with this approach? Or should there be any additional penalties for regional based projects?		
75	2.3 Spatial boundaries	*Same as above*	Data is valuable. It would be a much smarter incentivizing action to reward growers for providing field level data to incentivize the transition to better tiers/quality of data through relationships with farmers instead of punishments. Additional penalties beyond a lower reduction potential should be avoided, as that is disincentivizing for participation of growers that are doing their best with what is available. This can also play a role in avoiding regional premiums for default factors that perform better than other regions on average. Project developers have a responsibility to use the best available data. Additionally, this seems like something that the database associated with this project suite can contribute to with continued growth in scale and quality.	We understand the rationale however in practice the result is the same. Note that the punishment in the emission reduction is inherent to the use of the EF rather than an extra penalty that we impose. The methodology intends to reflect this by allowing both Land Management Unit (LMU) and Sourcing Region project types, while transparently communicating the trade-offs in terms of conservativeness and data quality. We recognize that field-level data collection may not be immediately feasible in all contexts, and thus regional approaches serve as a practical entry point for project developers. As you correctly noted, the reduction in emission credit potential due to higher uncertainty already acts as a natural disincentive for remaining at lower-tier data quality. Therefore, we do not propose additional penalties. Instead, we aim to encourage a transition to LMU-based projects by highlighting the greater emission reduction potential and transparency benefits of LMU approaches.
76	2.3 Spatial boundaries	*Same as above*	The draft methodology focuses on the assessment and estimation of emissions reduction at a land	Great questions here. We plan to publish a "*Decarbonization Claims Guidebook*" for the agri-food

<table>
<tr><th></th><th>Section</th><th>Referenced Text</th><th>Feedback/comment/suggestion</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td>management or sourcing region based on the GHG protocol:
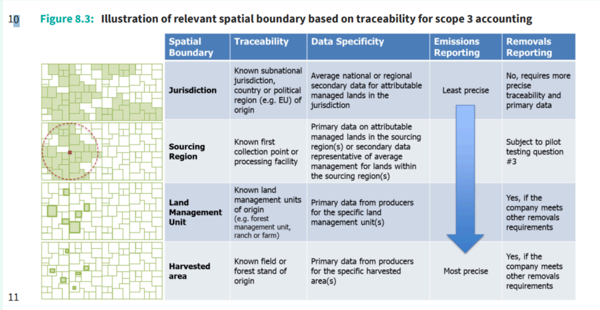
Figure 8.3: Illustration of relevant spatial boundary based on traceability for scope 3 accounting
<table>
<tr><th>Spatial Boundary</th><th>Traceability</th><th>Data Specificity</th><th>Emissions Reporting</th><th>Removals Reporting</th></tr>
<tr><td>Jurisdiction</td><td>Known subnational jurisdiction, country or political region (e.g. EU) of origin</td><td>Average national or regional secondary data for attributable managed lands in the jurisdiction</td><td>Least precise</td><td>No, requires more precise traceability and primary data</td></tr>
<tr><td>Sourcing Region</td><td>Known first collection point or processing facility</td><td>Primary data on attributable managed lands in the sourcing region(s) or secondary data representative of average management for lands within the sourcing region(s)</td><td></td><td>Subject to pilot testing question #3</td></tr>
<tr><td>Land Management Unit</td><td>Known land management units of origin (e.g. forest management unit, ranch or farm)</td><td>Primary data from producers for the specific land management unit(s)</td><td></td><td>Yes, if the company meets other removals requirements</td></tr>
<tr><td>Harvested area</td><td>Known field or forest stand of origin</td><td>Primary data from producers for the specific harvested area(s)</td><td>Most precise</td><td>Yes, if the company meets other removals requirements</td></tr>
</table>
It is unclear whether the application of the guidance at the sourcing region could include assessment and estimation at a fertiliser supplier scale? Could a fertiliser supplier, who chooses to coat a fertiliser product with inhibitors, be able to assess and claim credits based on their supply? Based on the paper, we are assuming this is the case, particularly in the context of the inclusion of Appendix C.
Applying the methodology at such a scale has the advantage that a fertiliser supplier may be more likely to have the resources to adequately quantify and estimate the emissions reduction, particularly where the fertiliser supplier is generating nutrient management plans for the purchaser. By enabling credit in this way, there would be an opportunity to mitigate the higher costs associated with use of stabilised fertiliser, increasing uptake, and as a result, emissions reduction. We assume that this is the type of approach that is envisioned by the ‘sourcing region’ methodology.
Further clarification of such an intent would be useful.</td><td>supply that should answer all of these concerns. This document is currently in stakeholder consultation. The official version is to be published in the coming months.

Overall, you are indeed correct that it is the intention of the Sourcing Region that we allow interventions such as the ones described in this comment.</td></tr>
<tr><td>77</td><td>2.4 Temporal boundaries</td><td>Same as above</td><td>A temporal boundary of one year seems appropriate for the sourcing of regional types of products.</td><td>Ok. Thank you</td></tr>
</table>

	Section	Referenced Text	Feedback/comment/suggestion	Response
78	2.4 Temporal boundaries	*Same as above*	This is all practice and management dependent. If equivalent boundaries are placed on target years and benchmarks, then it works. Harvest is almost always the end date. The questions surround start date, as variability is introduced related to crop rotations, cover crops, fallow years, etc. 1st fertilizer application is a good option, but there might need to be language that accounts for other legacy N from prior crops.	Because the methodology relies on emission factors (EFs), which are typically derived from studies that define intervention windows based on fertilizer application and crop growth, it is critical to maintain consistency in how this boundary is defined. Most EFs do not include legacy nitrogen as a parameter, and thus incorporating it into the calculation could introduce misalignment or overestimation of reductions. It is expected that the legacy-related emissions would be equivalent between the baseline and project scenarios, as such preceding practices (e.g., cover cropping, manure application) occur prior to the application of stabilizers and are therefore assumed to be identical across both scenarios.
79	2.4. Temporal boundaries	*For regional level projects:* *● The recommended period for the temporal boundaries is 1 year.*	Please explain why	We added in the text: "This temporal boundary is used because, at the sourcing region scale, fertilizer sales and corresponding N stabilizer use may span multiple cropping systems and planting seasons. Within one calendar year, it is possible to capture several crop cycles for short-duration or row crops (e.g., maize, wheat, vegetables), reflecting an accurate representation of nitrogen use and related emissions across a variety of cropping systems and management practices."
80	2.4. Temporal boundaries	*For LMU type of projects the temporal boundary is defined explicitly based on the specific management practices and is aligned with many academic studies.* *For the Sourcing Region type of projects the temporal boundary is 1 year. This is*	While the current one-year boundary offers consistency, adjusting the temporal boundaries to better align with dominant crop cycles and region-specific fertilizer application schedules could more accurately reflect underlying management practices and nitrogen dynamics. This refinement could enhance the precision of emission estimates without introducing significant complexity	Same as above "*We added in the text: "This temporal boundary is used because, at the sourcing region scale, fertilizer sales and corresponding N stabilizer use may span multiple cropping systems and planting seasons. Within one calendar year, it is possible to capture several crop cycles for short-duration or row crops (e.g., maize, wheat, vegetables), reflecting an accurate*

	Section	Referenced Text	Feedback/comment/suggestion	Response
		because there can be many different crops and management practices in a Sourcing Region. But it can limit the potential of finding good emissions factors because of varying post season emissions which are hard to quantify. Do you see opportunities to improve the temporal boundary definition for Sourcing Region level to reflect more the underlying management practices?		*representation of nitrogen use and related emissions across a variety of cropping systems and management practices.""*
81	3 Baseline scenario	*1. Field level approach The baseline scenario at the field level is defined as the application of the same nitrogen rate as the project intervention but without the use of a nitrogen stabilizer. Rather than relying on historical fertilizer application records, the baseline reflects current agricultural management decisions. Each season, untreated nitrogen fertilizer serves as the baseline, as it remains a viable and accessible alternative. This approach captures the additional emissions that would occur if a stabilizer were not used,*	please review the beginning of the document, as this is not fully aligned - I recommend to add a comment that for classical scope 3 reporting the historical practices are required, while for credits generation the benchmark "as-is" without intervention is required	This is more related to Scope 3 than emission reduction certificates and is addressed in the "Decarbonization Claims Guidebook" for the agri-food supply. This document is currently in stakeholder consultation. The official version is to be published in the coming months.

	Section	Referenced Text	Feedback/comment/suggestion	Response
		allowing for the calculation of measurable and additional GHG emission reductions with each application.		
82	3 Baseline scenario	*2. Regional level approach The baseline scenario is defined based on the amount of stabilized fertilizer sold, with emissions calculated assuming the same nitrogen application rate but without the stabilizer. A key aspect of this approach is identifying and substantiating common agricultural management practices in the region 17 . This includes assumptions about average fertilizer application rates, crop yield, and typical crop management practices for similar crops in the area. By using these factors, an average baseline emission factor can be derived, reflecting the typical emissions associated with untreated nitrogen fertilizer use.*	I would recomemnd to include "current" common agriculture	We adopted the suggestion
83	3 Baseline scenario	*The methodology outlines steps for determining the*	Approach 2 Terminology and scope require clarification: The phrase "based on the amount of	We added for clarification purposes "*total amount of stabilized N fertilizer sold within the defined sourcing*

	Section	Referenced Text	Feedback/comment/suggestion	Response
		baseline for the different kinds of spatial level projects. Specifically: 1. Land Management Unit (LMU) Approach: The baseline is defined at the field level and assumes the same nitrogen application rate as the project but without using a nitrogen stabilizer. It reflects current seasonal decisions, with untreated fertilizer serving as the reference. This counterfactual baseline is updated every crop cycle and ensures that emission reductions are only attributed to the use of stabilizers, not to changes in N application rate unless justified by improved nitrogen use efficiency (NUE). 2. Sourcing Region Approach: The baseline is established at a broader regional scale, based on average fertilizer practices and the quantity of stabilized fertilizer sold. Emissions are calculated assuming standard regional practices without stabilizers, incorporating region-specific data on fertilizer rates, yields, and management. This average emission factor is revised at least every two years and emphasizes representativeness and conservativeness to avoid	stabilized N fertilizer sold" is vague. It is not specified where this fertilizer is sold, whether this refers to total sales within the sourcing region, among participating farmers only, or across a broader area. Additionally, it is not clear how the sales data translates into a representative baseline, especially when considering varying crop types, soil conditions, and management practices across the region.	*region…"* The methodology already specifies that this sales-based quantification must be accompanied by a thorough characterization of regional practices, such as average fertilizer application rates, crop types, yields, and typical management systems to ensure that the resulting baseline emission factor is representative. Please refer to the Baseline section once more which has been significantly enriched to distinguish how N-rate, NUE and fertilizer type are defined as the baseline.

	Section	Referenced Text	Feedback/comment/suggestion	Response
		overstating project benefits. How clear and practical do you find these approaches? Please provide your feedback on the clarity and feasibility of these guidelines.		
84	3 Baseline Scenario	*Same as above*	The stated approach is very data intensive. There is concern that utilization of these methods will be limited due to the amount and specificity of data required. This is not a criticism of the science of the approach, but a statement on the reality of large-scale agriculture data collection encompassing both historical and current crop years across farms with different equipment, data collection technology, and the potentially different personnel a single farm will have over time. This challenge applies across N-management protocols, but including NI in this conversation shouldn't magnify the existing challenge.	We adapted the baseline section to 1) clarify how the N-rate, NUE and fertilizer types are defined in the baseline 2) simplify/clarify the requirements especially for Sourcing Region projects, which are expected to reach higher scales and thus must be more practical in their implementation.
85	4 Calculation of GHG emissions	*If multiple interventions take place in the project, then:*	As this method is only about one intervention, it should be as specific as possible - as discussed in our last meeting - please explain how to calculate direct and indirect emission reduction and include the units - e.g. the GHGe reduction due to the use of fertilizer (kg CO2e per ha or t of crop?)	Please refer to: • 4.2 Equation of each activity step • Appendix C: Different metrics of GHG emissions Those should flesh out how these metrics are calculated. In addition the "Appendix A: Emission factor description and usability" has been significantly reworked to offer clarity as to how to select the sources of the calculations (EFs).
86	4 Calculation of GHG emissions	*Table 2:* *Approach 2: Emission factors from scientific*	shouldn't these be covered in approach 1? Even if newer / specific info, what qualifies these to be used over approach 1?	While Approach 1 prioritizes the use of emission factors (EFs) from the Nitrogen stabilizer EF database, Approach 2 recognizes that new high-quality scientific studies may become available that are not yet reflected in the database. To ensure scientific rigor and flexibility, the methodology allows the use of EFs from

	Section	Referenced Text	Feedback/comment/suggestion	Response
		literature		recent peer-reviewed literature under Approach 2, provided they meet the criteria outlined in Appendix A.2.3 To be crystal clear, the Quality Criteria, which were vetted through the Scientific Committee, act as a safeguard for both the database as well as the GHG projects (EF selection).
87	4 Calculation of GHG emissions	*Table 2:* *Approach 3: Direct measurement*	What qualifies these over EF use from the database (approach 1), when assuming a much lower data set with high level of variability/variation?	Direct field measurements fall under the Tier 3 category of emission factor estimation which, in accordance with IPCC guidance, is considered the highest priority and most project-specific approach. The methodology emphasizes that, when properly designed and executed (as detailed in Appendix A.2.3: Quality Criteria of Experimental Design, direct measurements can yield high-confidence, site-specific EFs that better reflect the actual mitigation achieved
88	4 Calculation of GHG emissions	*Table 2:* *(iv) Stabilizer cradle-to-farm-gate emissions*	Please explain why the IFA database can't be used for carbon footprinting - this is a critical limitation of the work.	Because the IFA EF nitrogen stabilizer database includes only emission factors of direct and indirect N_2O emissions originating from the agricultural field. Cradle-to-farm-gate emissions (PCFs) are not in scope of the database.
89	4 Calculation of GHG emissions		Calculations(pg. 24 etc.) The specificities of fruit tree/perennial crops should be taken in consideration (e.g. continuous application of nitrogen via drip irrigation)	The methodology relies on emission factors (EFs) derived from scientific literature to calculate fertilizer related emissions. For perennial crops, including fruit trees, these EFs are based on field experiments that reflect the specific agronomic practices used in such systems like methods such as fertigation through drip irrigation. As long as the selected EF originates from a study with

	Section	Referenced Text	Feedback/comment/suggestion	Response
				similar environmental conditions and nitrogen application practices (e.g., crop type, application method, fertilizer form), the emissions estimate will appropriately reflect the realities of perennial crop systems.
90	4 Calculation of GHG emissions	*How clear is the calculation methodology for all included activities?* *Are there any parts that could be better explained or any aspects that might lead to ambiguity?*	It is clear.	Thanks
91	4 Calculation of GHG emissions	*How clear is the calculation methodology for all included activities?* *Are there any parts that could be better explained or any aspects that might lead to ambiguity?*	The calculation methodology is clear and makes sense. However, achieving practical implementation may present challenges. The key takeaway here would be the same as elsewhere in the survey – focus on NI, don't try to re-invent the wheel and approach this as a complement to other methods. It is unlikely that many folds are measuring emissions with chambers in the field outside of a controlled industry or university study. The program should differentiate between what's feasible in practice at scale commercially and what needs to be followed in a research study. For the EF confidence level in section 4.1, why 90%? Isn't 95% CI more common is scientific studies and statistical analysis?	Great inputs, thank you. With the changes now made in the methodology we hope that both approaches (LMU and Sourcing Region) should be feasible in practice at scale commercially, if the emission reductions are significant (which of course depends on the cropping system). As for what should be done in new research studies, the purpose of this methodology is not to provide such guidance. Ideally, the research gaps of EFs should be filled to allow more and more cropping systems to be eligible under this methodology, which would mean that the use of inhibitors would be further incentivized. As for the 90% we adopted it to the common practice of 95%.
92	4.1 EF data references		Use of emissions factors The draft allows for the use of emissions factors, included in the IFA database, relevant meta-analyses or original scientific literature (page 11). It would be useful to clarify that IPCC default emission factors, or	Agreed. The text has been adapted in A.1.1. Prioritization of EF sources and Tiers

	Section	Referenced Text	Feedback/comment/suggestion	Response
			emission factors derived at a national level for greenhouse gas inventory reporting, should also be applicable.	
93	4.1 EF data references		EF-data reference approaches (pg. 29) An inhibitor with a AI not included in the IFA database or with insufficient scientific (public) data), can still be used in an emission reduction project if there is local data generated throughout the project? In this case, it needs to be better defined how (% of fields covered in the project, inhibition efficacy to reach,...) Approach 4 is not referring to in field emissions so incompatible with the other approaches Quality criteria; Important in recording the performance of stabilizers from literature is also to record local weather and soil factors.	Regarding the quality criteria that you mention (local weather and soil factors) we already mention them in the Appendix in section A.2.3 as the data that needs to be reported during the experiment "*Environmental conditions (e.g., soil texture, rainfall, air or soil temperature)*" As mentioned in the applicability section, it all starts with having robust scientific evidence. If proper trials are done (which follow the quality criteria), then these can be included. In the next iteration of this methodology we would like to include a pre-defined list of eligible AI and the range of their eligible concentrations, to streamline the projects.
94	4.1 EF-data reference approaches		what is the method or instrument to measure the emission	Section 4.1 describes the Emission Factor (EF) data reference approaches, which include both literature-derived EFs and direct field measurements. Specifically: Approaches 1 and 2 rely on the utilization of emission factors sourced from high-quality scientific studies, either from the IFA EF database or peer-reviewed literature. To ensure reliability and consistency, detailed guidance on acceptable study design, quality criteria, and environmental representativeness is provided in Appendix A. Approach 3 allows for direct measurement of emissions from the field, which enables the use of Tier 3 EFs, the most project-specific and preferred option under IPCC guidance. An example of acceptable measurement

	Section	Referenced Text	Feedback/comment/suggestion	Response
				method is “Static chamber techniques” Project developers selecting this approach must follow the minimum experimental design standards and data requirements outlined in Appendix A.2.3 and transparently document their methodology in the Project Overview Document (POD) for third-party validation.
95	4.1 EF-data reference approaches		This is the heartpiece of the methodology and I am confused to see the low level of stringency. I have assumed that IFA is holding this method and the corresponding EF reduction coefficients. There are too many back doors.	The control in the EF selection is based on the Quality Criteria, which were vetted through the Scientific Committee. These act as a safeguard for both the database as well as the GHG projects (EF selection). The project developers and the independent VVBs will have to check the selected EF against these quality criteria.
96	4.1 EF-data reference approaches	*For the quantification of GHG emissions (direct and indirect N2O emissions), EFs originating from the IFA Emission Factor Database can*	I would expect a value proposition for the IFA database here - highly recommended as it is the most consolidated data base available, science based, verified etc.	The methodology sets strict criteria for the selection of alternative EFs, as described in Appendix A.2.2 – Emission Factor Selection Criteria based on Scientific Studies. These criteria require: • The use of peer-reviewed scientific literature or meta-analyses, • Matching environmental and management conditions between the project and the EF source, • Transparent documentation of how the EF was derived and why it is appropriate for the project. Regarding the use of field measurements (direct quantification), the methodology includes clear guidance in Appendix A.2.3
97	4.1 EF-data reference	*Approach 4: LCA or PCF data This approach utilizes*	please clarify how this project fits to the main guidance and why the IFA data base is not applicable	LCA or PCF information are related to the production emissions of the fertilizer products. The IFA database

	Section	Referenced Text	Feedback/comment/suggestion	Response
	approaches			incorporated data that are only related to the emissions that occur on the field, due to the usage of fertilizers
98	4.2 equation of each activity		Regarding the direct N2O emissions calculation (pg. 30) How is the process of ammonia volatilization & leaching (indirectly) effecting greenhouse gas emissions? What is the CO2eq assumption per kg of NH3/NO3 loss? These losses are not mentioned as required data reporting in the experimental design standard (pg. 47) The calculation assumes that organic and synthetic nitrogen applications have the same direct N2O emissions per kg N whereas slow mineralization will cause less losses. Hence, need for different EF for organic v. inorganic N sources? The nitrogen type (e.g. urea, nitrate, ammonia) is not taken in consideration but there is a clear relation on the inhibitor type used and the part of the nitrogen that can actually be protected by it so this should be considered.	• On the indirect effects of ammonia volatilization and nitrate leaching: The methodology accounts for these losses in the calculation of indirect N_2O emissions. As stated in Section 4.2.2, these losses are quantified using Tier 1 emission factors, as recommended by the IPCC. While the methodology does not specify a fixed CO_2e assumption per kg of NH_3 or NO_3^- lost, the corresponding EFs for indirect N_2O (e.g. 0.01 kg N_2O-N/kg NH_3-N volatilized) are detailed in Appendix A.3 and aligned with IPCC default values. • In Section 4.2 "Equations for Each Activity Step", the methodology explicitly distinguishes between the emission factors (EFs) to be applied for synthetic and organic nitrogen fertilizers, recognizing their differing mineralization rates and emission dynamics. • On N form (urea, ammonium, nitrate) and compatibility with inhibitor types: Inhibitor efficacy is indeed dependent on the chemical form of N. This is reflected in Appendix A.2.1 and Section 1.3.1, where it is specified that the project developer must provide details on the form of N, the stabilizer used, and their compatibility, including application rate and supporting efficacy evidence.
99	5 Net reduction of GHG emissions	*An Uncertainty Factor (UF) is applied to the calculations to avoid overestimating the benefits of a project. This UF includes the*	Please indicate where could the uncertainty might come from in this specific project - wild fire, flood or drought?	The uncertainty section has been updated to be more practical. The uncertainty comes from the aggregated EF selection which groups EF with similar environmental conditions and management practices.

	Section	Referenced Text	Feedback/comment/suggestion	Response
				In essence, the more we group the higher the uncertainty. See 4.3 Uncertainty
100	5 Net reduction of GHG emissions	*How clear is the guidance on the types of data and parameters required for making accurate calculations? Are there any additional data points or parameters that should be collected to ensure robust outcomes?*	It is clear.	Thanks :)
101	5 Net reduction of GHG emissions	*How clear is the guidance on the types of data and parameters required for making accurate calculations? Are there any additional data points or parameters that should be collected to ensure robust outcomes?*	It is refreshing to see that this methodology is using previously approved methodologies, and not trying to make their own. However, there is concern that the text repeatedly includes conservative values, uncertainty ranges, and laying uncertainty beyond what's reasonable. The final result must be a conservative estimate of emission reductions, but is it going too far? This needs to be tracked, and the program must make sure efforts to be conservative and not overstate reductions aren't actually way below a reasonable range. The program needs to balance practicality and giving credit where its due.	We agree that achieving the right balance between methodological conservativeness and recognition of actual emission reductions is essential. To address this, the methodology includes a (newly added) dedicated uncertainty management section (Section 4.3) and detailed guidance in Appendix B. It provides two distinct approaches tailored to the project type and data tier: ● For LMU projects using Tier 3 data, we require a quantitative uncertainty assessment using the GHG Protocol Initiative's Uncertainty Tool, in line with IPCC Guidelines. This approach enables more precise project-specific estimates, allowing higher reduction claims when uncertainty is well quantified and transparently reported. ● For LMU and sourcing-region projects using Tier 1 or Tier 2 data, a simplified conservative approach is mandated. In this context, "conservative" does not mean arbitrarily low. As explicitly stated in the methodology: "While **not necessarily the lowest value**, selections should lean towards the lower half of the range to avoid overestimating emission reductions."

	Section	Referenced Text	Feedback/comment/suggestion	Response
				We hope that this approach strikes a balance between practicality and scientific rigor.
102	5 Net reduction of GHG emissions		Metrics that can be used for the project GHG emissions Metric Description Example (pg. 21 & 32) As the nitrogen use efficiency is impacted as well, besides having reduction of emissions, there should be a stronger emphasis on the use of GHG reduction per unit of crop produced.	In Appendix C we present the different metric of GHG emissions. GHG emissions reductions per unit of crop is described in this section with relevant examples. The project developer can select the metrics that better fit with the incentivization mechanism selected. Please refer to the "Decarbonization Claims Guidebook".
103	6 Monitoring, reporting, and verification (MRV)	*The MRV process is a structured*	Please specify what needs to be measured, reported and verified in this specific project. I don't see why we need generic information here	The introductory paragraph in the MRV section is intentionally general to provide context for the reader (e.g. project developers) who may be unfamiliar with GHG crediting programs. The purpose and importance of MRV processes in ensuring transparency, accuracy is highlighted in this paragraph. The subsequent sections of the MRV chapter outline in detail what needs to be measured, reported, and verified.
104	6.1 Monitoring Table	*Subcategory name: Fertilizer type*	Please include fertilizer application method (kind of application and timing, splitting) and organic and mineral sources, pre-crop, cover crops - e.g. to take into consideration harvest residues and biological N fixation	We have updated the Monitoring Table (Section 6.1) under the subcategory "Fertilizer type" to explicitly include the fertilizer application method, including timing and splitting practices
105	6.1 Monitoring Table	*Subcategory name: N stabilizer application rate*	Formulation can be also critical	We agree that formulation is critical to the performance of nitrogen stabilizers. This consideration is already incorporated in the information required under the "Type of Nitrogen Stabilizer" subcategory in the Monitoring Table.

	Section	Referenced Text	Feedback/comment/suggestion	Response
106	6.1 Monitoring Table	*Category name: crop yield*	Do you mean marketable yield? What is about harvest residues used for bioethanol production?	In the Monitoring Table (Section 6.1), under "Crop Yield," the term refers to the total yield produced in the field, typically measured as total biomass or grain yield per hectare, not just the marketable portion. With regard to harvest residues used for bioethanol production, such downstream uses are considered outside the scope of this methodology, which focuses on field-level emissions reductions linked to nitrogen stabilizer use
107	6.1 Monitoring Table	*NUE/ proof required for project "Calculated based on crop yield and N rate"*	NUE should be N input vs N output (N removal). If in doubt on N content of harvest use default values. Example: higher protein content in wheat increases NUE, but is not reflected by focusing on yield only. In addition higher NUE lowers risk of excess N at harvest, which is prone to leaching (indirect N2O). It has been shown that NI may do not reduce yield, but can have lower protein in wheat vs no NI	In Section 6.1 Monitoring Table, the methodology acknowledges that multiple metrics can be used to assess Nitrogen Use Efficiency (NUE) depending on data availability and feasibility at the project level. While the default calculation is based on crop yield and N fertilizer rate, we recognize that this approach does not fully capture N output, especially in cases such as higher grain protein content, which is particularly relevant for crops like wheat. To provide flexibility and improve accuracy, the Appendix now includes a table outlining different NUE indicators, such as Partial Factor Productivity (must always be presented and tracked), Agronomic Efficiency, and N balance, which may be used individually or in combination, based on the level of data accessible to the project developer.
108	6.1 Monitoring Table	*Category name: Additional management practises*	What if additional management practices increase a risk for higher EF? E.g. low tillage and more residues boosting N2O by denitrification?	This is already addressed under Section 1.2 and 2.1, where the methodology allows additional practices only if there is scientific evidence they do not undermine or negatively affect the GHG mitigation associated with nitrogen stabilizers. If evidence suggests that certain combinations (e.g., low tillage + high residue retention) may increase N_2O emissions, those practices must be excluded or justified through high-quality studies or adjusted emission factors.

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109	6.1 Monitoring Table	*Category name: nitrogen stabilizer* *Subcategory: type*	Share of nitrogen treated with inhibitors - all inputs or only minerals? What input has been treated?	The methodology requires clarification on the share of N inputs treated with stabilizers. (see section 1.3.1 Eligible product/application method of stabilizer/compound fertilizers. Both organic and mineral sources can be reported, but only the stabilized portion (and the type of input treated) will be eligible for crediting. This must be documented in the monitoring plan
110	Additional feedback		On the basis of conservativeness, it would perhaps be preferable to move all references to GWP from AR5 to AR6. It is important to show consistency on these values, and AR6 (the most up to date reference value), in the context of N2O emissions, will yield better emissions results for growers. How does this methodology incorporate the concept of error ranges given the requirement for conservativeness? Is it possible that measured results may be better than but not be statistically different from the baseline?	1. Uncertainty Quantification and Guidance Section 4.3 and Appendix B provide concrete instructions on how to manage and propagate uncertainty: • For Tier 3 projects (e.g., field-level with direct measurements), a quantitative uncertainty assessment must be conducted using the GHG Protocol Initiative's uncertainty tool. This tool follows IPCC guidelines for inventory-level uncertainty analysis. • For Tier 1 and Tier 2 projects, a simplified conservative approach is used. This includes: Choosing values from the conservative half of EF ranges: "While not necessarily the lowest value, selections should lean towards the lower half of the range to avoid overestimating emission reductions." or Applying fixed deductions, such as the 5% regional deduction for sourcing region-type projects, to account for broader uncertainty in aggregated data. 2. Conservativeness in the Context of Statistical Significance • You are correct that in some cases, the measured impact may be directionally better (i.e., lower emissions) than the baseline, but the difference is not statistically significant. In

	Section	Referenced Text	Feedback/comment/suggestion	Response
				such cases, conservativeness is maintained by either: • Applying higher uncertainty bounds in the estimation (i.e., wider error margins reduce the credited volume), or Requiring multiple seasons or replications to improve the robustness of the dataset, which is encouraged under the methodology. This ensures that only emission reductions supported by statistically meaningful evidence or conservative interpretations are eligible for crediting, thereby avoiding over-crediting while still allowing credible improvements to be rewarded.
111	Appendix C: Different metrics of GHG emissions	*present the impact of the intervention using differrent metrics that*	Does that mean that the project will calculate all these dimensions to allow a flexible use for all actors in the value chain?	The intention of Appendix C: Different metrics of GHG emissions is to provide guidance on how emission reductions can be expressed in various formats. However, this does not mean that all projects must calculate and report every metric listed. The core requirement remains the reporting of absolute GHG emission reductions in tCO_2e, as per standard crediting frameworks. The additional metrics are optional tools, recommended where relevant, to help projects communicate impact more effectively to end users, especially in supply chain insetting contexts
112	Appendix C: Different metrics of GHG emissions	*When calculating the impact per tonne of crop produced (for the PCF of the crop), it is essential to account for variations in annual crop yield, which can be heavily influenced by external factors such as weather patterns, pests, or regional events.*	I am getting lost here, because still the PCF is lower than without the intervention and we assume that the use of inhibitors is not having a negative impact on yield - This point relates more to classical scope 3 reporting, but should not be critical for credit generation	The impact per tonne of crop produced is de facto based on the yield, something that is not part of the calculation of the emission reductions (remember that the calculation is done ex-ante based on EF which are only based on N inputs). So if one wants to include this metric then they need to go into a bit more detail (e.g. including the crop yield and possibly using a moving average to smooth out any fluctuations). All of these must be crystal clear in the POD..

	Section	Referenced Text	Feedback/comment/suggestion	Response
113	Appendix C: Different metrics of GHG emissions	*A moving average is a statistical method used to smooth out short-term fluctuations and highlight longer-term trends by creating a series of averages from subsets of data points. Mathematically, it is a type*	I don't see how you can apply a moving average for an annual reporting - the granularity of the baseline should be the same as for the reporting? Happy to learn more...	We agree with this concern. To clarify the use of the moving average is not to serve annual reporting, but rather smooth out any significant variations when showing the impact per crop produced metric. The project developer must show both and be transparent on the calculations and assumptions. For the annual reporting case there is a difference between inventory and project accounting of emissions (reductions). Clarity on how this can be done is presented in the Guidebook.