Adoption of nitrogen stabilizers to transition to low-carbon agriculture

- Feedback & response -

March 31, 2025

Overview

This document outlines the feedback received from FoodChainID on version 0.9 of the GHG methodology for N stabilizers, detailing how the feedback was addressed and its impact on the methodology, culminating in **version 0.9** submitted for expert review.

Note: further changes have been made after the public consultation period (v0.95). These are reflected in a separate feedback and response document.

Feedback contributors

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Detailed feedback and responses

	Section	Referenced Text	Feedback/comment	Response
1	1.2 Applicability	*Project developers must be able to prove that because of the intervention (e.g. project), the introduction of the nitrogen stabilizer leads to the reduction of the net GHG emissions, which are in scope of this methodology*	1. Define the crops, cropping systems and agroecologies in which the methodology is applicable (or perhaps focus on what is not applicable). For example, the application of N stabilizers in crops like paddy will disrupt the GHGs cycle and will affect the net flux (particularly CH_4). Also, in high rainfall and lowland agroecosystems, the effectiveness of N stabilizers may not be up to the mark and has potential to increase N_2O flux.	1. The scientific proof of GHG impact, which is a pre-requisite for a project, defines the available crops, cropping systems and agroecologies in which a project can happen. As such, if there is no scientific evidence for a specific crop, then such a project does not pass the *Applicability* criteria. We added this text to reflect that. (also see *Comment 25*)
2	1.3 Eligible products	*Method of application: The following methods of integrating nitrogen stabilizers into fertilization practices are eligible:* • *Stabilized fertilizers: Fertilizers pre-treated with nitrogen stabilizers during manufacturing to ensure uniform distribution.* • *Nitrogen stabilizers/fertilizers mixtures: Fertilizers mixed with nitrogen stabilizers before application, either at the farm level or through distribution channels.* • *Post-application treatment: Nitrogen stabilizers applied separately after fertilization to control nitrogen transformations in the soil.*	1. As nitrogen fertilizers are reactive and may be subjected to different reactions, application of N stabilizers in different forms (premix and post-mix) and time-periods may not have the same impact on the N_2O emissions and may be subjected to variability accordingly. Hence there is a need to explicitly define the terms and conditions for N stabilizer applications in the field.	1. The actual impact of the N stabilizers is defined based on the scientific evidence provided, for which we ask that: "*Project developers must be able to provide sufficient information proving that these project characteristics and activities match with the most influential environmental and/or management practices/variables that are described in the scientific proof source(s).*" In other words, the Project Developer must make sure that the GHG claims of the project match the most influential circumstances in the field

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3	2.2 GHG Sources	*Moreover, cradle-to-farm-gate emissions must be accounted for both the baseline fertilizer and the project fertilizer. The project fertilizer may refer to either a stabilized fertilizer or a combination of a conventional fertilizer and a separately applied stabilizer.*	1. Clearly define how nitrogen stabilizer production emissions will be accounted for (e.g., include emissions from chemical synthesis and transportation). 2. Each commercial product will have different emissions. How will you account for these with commonly available EFs?	1. Added text to be more specific on what production emissions are in scope, and what kind of proof is required. 2. The project developer is responsible for finding the most appropriate PCF EF of the stabilized product. If that is not available only then can they use a more commonly available EF. Updated text to reflect that.
4	2.2 GHG Sources	*While it is acknowledged that there are other GHG sources on agricultural fields, such as CO_2 emissions from soil respiration or methane (CH_4) emissions from organic matter decomposition, these sources are not expected to be affected by the nitrogen stabilizers (Chen et al., 2023). Therefore, these emissions are considered out of scope for the purposes of this methodology, as they do not directly contribute to the emission reductions associated with the use of nitrogen stabilizers.*	1. The methodology includes both direct and indirect N2O emissions in both baseline and project areas but did not include the other GHGs flux. However, the lack of any GHG accounting for other sources and sink within the project boundaries may result in serious 'red flags' for investors and project quality rankers. For example, your approach safely assumes that all variables stay the same year to year other than the N usage (i.e., tractor passes, tillage, residue retention, etc.). We know this is highly unlikely. A very strong and detailed justification section needs to be added to this methodology to support your current approach. To generate even higher integrity claims, the entire GHG sources and sinks should be accounted for in the monitoring plan and a Tier 3 approach should be taken when feasible (i.e., for SOC). 2. The interruption in the nitrogen cycle may also influence the biogeological cycles of other elements like carbon, may change the plant nutrient uptake patterns, and may affect the soil microbial community transformations. These all could cumulatively impact the GHG emissions, which need to be accounted for rather than only accounting for N2O emissions.	1. This methodology is designed to only account for and measure the impact of adding N stabilizers to the farming practices (which only impact the nitrogen based emissions, rather than CO_2, CH_4, etc.). It is a good point, however, that there is a possibility that on the farm level, even though N stabilizers are introduced, on the other hand other activities happen (along with / because of the introduction of the N stabilizers) which can increase the total GHG emissions. For this reason, we updated the methodology to account for this. Now, the project developer must be transparent on additional activities that happen along with the introduction of N stabilizers and report on these emissions. Since these activities can be numerous, we only give some non-exhaustive examples. 2. This is a potential risk which we are now more transparent about on the methodology. However, to the best of our knowledge current scientific knowledge does not go into such depth to account for the long-term impact of microbial activity and there is no current realistic way to account for that. If more scientific evidence is available we will update the methodology.
5	3. Baseline	*In case the project intervention*	1. If the baseline practice includes overuse of N,	1. This comment is already addressed in the following

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		includes the reduction of N rate (f.i. because the historical NUE was too low, and N was overapplied), then the baseline N rate must be set as the project N rate (with the higher NUE), so that the emission reduction is not overestimated.	reducing N inputs may overestimate emission reductions. The methodology needs to provide a standard correction method for proper estimation of emissions. 2. Also, regional estimates can introduce higher uncertainties. We suggest including a section on uncertainty quantification when using regional averages.	note: "*In case the project intervention includes the reduction of N rate (f.i. because the historical NUE was too low, and N was overapplied), then the baseline N rate must be set as the project N rate (with the higher NUE), so that the emission reduction is not overestimated.*" We now integrated the note more clearly into the actual text. Overall, project developers are required to demonstrate that nitrogen inputs are applied at appropriate rates based on regional agronomic guidelines or best practices, ensuring that baseline fertilization practices are neither excessive nor deficient. 2. For regional projects an aggregated EF must be used, which is expected to come with a higher standard deviation due to the compounding of uncertainty when aggregating for regional EFs. Since we require that project developers use conservative values, we believe that the issue is already addressed using the current method. However, since moving towards field level projects can offer more transparency, traceability and is more aligned with SBTi's and GHGp's directions, we could add an additional penalty to the emission reduction of regional based projects. By doing this we project developers will have an additional incentive to move towards field level projects.
6	4. Calculation of GHG emissions	-	1. It is unclear of how Approach 1 and Approach 2 differ, as we would expect the IFA database includes EFs from many of the same scientific studies. While we recognize that the Database is still under development, we strongly suggest that before this methodology is released for public consultation, a very explicit summary is included here that outlines the procedures for compiling the database that ensure repeatable, high-integrity evaluation steps for	1. Indeed Approach 1 and 2 are very similar. In theory, project developers should be able to come to very similar EFs if they followed the guidelines from the IFA database. The reason we are creating this open-access and science-based database is to create a form of standardization. Everyone will be able to check the results and suggest improvements on it. Nevertheless, we added a text describing briefly the procedure of developing the IFA database. When

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			identifying and including product-level EFs into the database. For example, will there be a Proba-led review committee? If I am a proprietary owner of a product, may I pay a tremendous amount of money to get my EF (that was internally derived) listed on the Database? (We know that sounds like a non-sensical example, but your explicit summary must be clear that that would not be the case.) 2. The methodology uses different EF sources (Tier-3, IFA) but lacks clear ranking criteria (e.g., priority should be given to direct field measurements over default emission factors). 3. Also, the default emission factors may not be available for all the regions, and in some cases, there might be lack of published literature, where conditions should be clearly mentioned.	the database is released we will publish a "*Procedure for developing the EF database*" document which will explain in great detail how the database was developed, what calculations have been made and how the results will be validated and updated. To the last point, the only way a product and an EF can be added to the database, is if there is validated scientific evidence accompanying it (see "*Quality criteria*" in the methodology). 2. We included ranking criteria in the methodology, prioritizing direct field measurements (Tier 3) over default emission factors (Tier 1). Tier 2 will be used when Tier 3 data is unavailable, with preference given to relevant scientific literature. 3. Again, the usage of this methodology is dependent on the availability of scientific evidence to back up the emission reduction claims. We clarified that in regions where data or literature is lacking, emission reduction claims cannot be made, and project developers must document the absence of such data.
7	1. Definitions	*Pg.no. 3; Additionality* *"Refers to the concept that any GHG Project should result in greenhouse gas emissions improvements that would not have occurred without the Project".*	1. Here instead of using the greenhouse gas improvements you can use any other appropriate word like mitigation as improvement may give some other sense.	1. We accepted the suggestion and we decided to update the definition: "Refers to the concept that any GHG Project should result in greenhouse gas emissions mitigation (GHG reductions or removals) that would not have occurred without the Project."
8	1. Definitions	*Pg.no. 3; Baseline Scenario* *"Hypothetical reference case that best represents the conditions most likely to* *occur in the absence of a proposed GHG Project".*	1. Comment: The term "hypothetical reference" may not be appropriate, as the baseline is established using historical trends, regional datasets, or modeled scenarios. When based on historical or regional data, it represents actual conditions rather than a hypothetical situation.	1. We updated the definition to align with the focus of the methodology. "The baseline scenario represents the emissions that would occur based on the business as usual agricultural management practices. In other words, this includes fertilizer management and other relevant activities, without the use of nitrogen

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				stabilizers”
9	1. Definitions	*Pg.no. 4; Conservativeness*	1. Comment: What is key here is that if given a choice between one or more assumptions, values, methodologies, and procedures, the more conservative choice (more likely to generate less GHG emissions reductions or removals) will be selected. Please clarify.	1. We updated the text: “*When there is uncertainty or a choice between two or more assumptions, values, methodologies, or procedures, the option that is more likely to result in lower estimates of GHG emission reductions or removals must be selected. This approach ensures that claimed climate benefits are not overestimated.*”] a. Also a footnote was added to the section 3 Baseline Scenario for clarity purposes: “*Specifically, the project developer must select the emission factors, fertilizer application rates and any other relevant data so that the total baseline emissions are not overestimated and the total project emissions are not underestimated.*”
10	1. Definitions	*Pg.no. 4; Cradle-to-farm-gate “A life cycle assessment boundary that includes all greenhouse gas emissions associated with a product's life cycle stages up to the point it reaches the farm gate. This includes emissions from raw material extraction, production, and transportation but excludes emissions from field application or any subsequent stages beyond the farm gate.”*	1. Comment: This statement is incorrect: “...excludes emissions from field application...” It does include emissions related to field application of fertilizers.	1. We updated the definition. “*Cradle-to-gate: A life cycle assessment boundary that includes all greenhouse gas emissions associated with a product's life cycle stages up to the point it reaches at the project's location. This includes emissions from raw material extraction, production, and transportation to the project's location. It excludes emissions from field application or any subsequent stages beyond the project's location*”
11	1. Definitions	*Pg.no. 4; Cumulative emissions “Total GHG emissions calculated over a specific period, integrating*	1. The cumulative emissions can be calculated both from direct and indirect methods, however, here only direct methods have been specified. Following revision could	1. We adopted the suggested text and we updated the definition “*Total GHG emissions calculated over a specific period, leveraging direct or*

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		periodic flux measurements taken using specialized equipment, such as gas chambers or spectrometers"	make it clear "……. direct flux measurements using specialized equipment (e.g., gas chambers, spectrometers) or estimated using emission factors or models"	*indirect methods . This means these can be calculated with either direct flux measurements using specialized equipment (e.g., gas chambers, spectrometers) or estimated using emission factors or models*"
12	1. Definitions	*Pg.no. 4; Denitrification definition "A microbial process in which nitrate (NO3–) is reduced to gaseous forms of nitrogen, including nitrous oxide (N2O) and nitrogen (N2), typically occurring under anaerobic conditions in soil."*	1. Comment: Improve clarity by stating denitrification involves nitrate (NO3–) being reduced to nitrogen gas (N2). N2O can accumulate instead of fully being reduced to N2O.	1. We adopted the recommendation and the definitions is updated: "*A microbial process in which nitrate (NO_3^-) is reduced stepwise to nitrogen gas (N_2), typically under anaerobic conditions in soil. During this process, nitrous oxide (N_2O) can be produced as an intermediate product and may accumulate instead of fully being reduced to N2O*"
13	1. Definitions	*Pg.no. 4; Emission factors definition*	1. Suggestion: Reference IPCC tiers classification (Tier-I, II and III) to clarify that they are derived differently depending on the level of detail, specificity, and data requirements.	1. We adopted the suggestion and the definition is updated: "*Emission factors are coefficients that quantify the amount of greenhouse gases released into the atmosphere per unit of activity, substance, or process. They are essential tools in calculating emissions based on fuel consumption, industrial processes, or agricultural practices, facilitating the estimation of a project's total greenhouse gas emissions. The Intergovernmental Panel on Climate Change (IPCC) has established a three-tier system for the development and application of emission factors (Tier 1, Tier 2, and Tier 3). These tiers are presented in Appendix A.1 Tier definitions.*"
14	1. Definitions	*Pg.no. 5; GWP Definition*	1. Comment: Please update to a more scientifically clear definition used by IPCC, including the term 'radiative forcing'. GWP is very often mis-defined in our field, surprisingly! 2. I appreciate Woolf's definition is a variety of his papers, but you can rewrite for easier digestibility. For	1. We adopted the suggestion and we updated the text: "*It is defined as the time-integrated radiative forcing resulting from a pulse emission of a specific greenhouse gas, relative to the radiative forcing from a pulse emission of an equivalent mass of carbon dioxide (CO_2) (Woolf et al., 2021). It provides a common scale to*

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			example, "...defined as the time-integrated radiative forcing due to a pulse emission of a given component relative to a pulse emission of an equal mass of CO2 (p. 14798)." (Woolf, D., Lehmann, J., Ogle, S., Kishimoto-Mo, A. W., McConkey, B., & Baldock, J. (2021). Greenhouse gas inventory model for biochar additions to soil. Environmental science & technology, 55(21), 14795-14805)	*compare the climate impact of different gases over a specific time horizon, typically 100 years."* 2. And we added the reference in the related section "References"
15	1. Definitions	*Pg.no. 5; Insetting*	1. Comment: Here you may restrict only to insetting, as there is already a separate definition given for offsetting.	1. While this may lead to a repetition of the definition of offsetting, we consider it essential to clearly highlight the distinction between insetting and offsetting for the benefit of the readers and to ensure conceptual clarity.
16	1. Definitions	*Pg.no. 5; Nitrate leaching*	1. Comment: Make this definition clear and restrict it only for definition. You may use "The vertical movement of nitrate through soil profile into deep layers along with irrigation water or rainfall". It may not be necessary to describe the fate of nitrate.	1. We have adopted the suggested text; however, we will also retain the description of the fate of nitrate, as we consider it important for the understanding of the process.
17	1. Definitions	*Pg.no. 6; NUE definition "Nitrogen Use Efficiency (NUE) refers to the effectiveness with which crops utilize applied nitrogen for growth and yield. It can be influenced by several factors."*	1. Comment: Too vague. Keep it simple: Biomass production per unit of N applied to the crop.	1. In our view, the description of NUE is important and should remain in the text. We will, however, include the additional text you have suggested as a complement.
18	1. Definitions	*Pg.no. 6; Offsetting*	1. Comment: The definition lacks clarity and you may ignore the crediting sources. This version appears to be optimal. "Offsetting refers to the practice of compensating for greenhouse gas (GHG) emissions by supporting projects outside a company's value chain that reduce or remove emissions. This is	1. Agreed. The text has been adjusted.

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			typically achieved by purchasing Carbon Credits from verified initiatives”.	
19	1. Definitions	*Pg.no. 6; Stabilized Fertilizer*	1. Comment: As fertilizers include broad elements, you may use Stabilized Nitrogen Fertilizer	1. Agreed. We now use the “Stabilized N fertilizer” term all over the document.
20	1. Definitions	*Pg.no. 7; Tier 1, 2 and 3 data definition*	1. Suggestion: Remove ‘data’ in the title to simply state “Tier 1, 2 and 3”, as they refer to a hierarchy of methodological complexity (included data).	1. Agreed. The text has been adjusted.
21	1. Definitions	*Pg.no. 7; Verification and Validation Bodies “Third-party entities tasked with ensuring that a project’s claims of emissions reductions are accurate and credible.”*	1. Suggestion: "Third-party assurance entities, preferably ISO-accredited, are responsible for verifying that a project's activities and claims of emissions reductions and/or removals are conducted in accordance with established standards and methodologies, ensuring their accuracy and credibility."	1. Agreed. The text has been adjusted.
22	2. Abbreviations	*2. Abbreviations Pg.no. 8.*	1. For Nitrate and Nitrite add charge, (NO3 - and NO2-)	1. Agreed. The text has been adjusted.
23	3. Introduction	*3. Introduction Pg.no. 9; 1.1 “...a greenhouse gas that is 273 times more potent than CO2 (IPCC, 2021).”*	1. Comment: This is misleading. Suggestion: “...of nitrous oxide (N2O), a GHG with a Global Warming Potential 273 times more potent than CO2.”	1. Agreed. The text has been adjusted.
24	3. Introduction	*Pg.no. 9; 1.1* *Page5* *“This may lead to higher crop yield.”*	1. Suggestion: Clarify to, “This may lead to higher crop yield per same plant available N.”	1. Accepted suggestion. The updated text is the following: a. *“Nitrogen stabilizers can enhance NUE due to reduction of N losses which improves the availability of nitrogen to plants. This may lead to higher crop yield for the same nitrogen input. As a result, the same amount of fertilizer can*

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				produce more output, reducing emissions per unit of agricultural product."
25	1.2 Applicability of the methodology	Applicability Pg.no. 10; 1.2	1. Suggestion: Clearly define the crops and agroecological zones where this methodology is applicable. The use of nitrogen stabilizers in certain crops, such as paddy rice, may alter the greenhouse gas (GHG) cycle, affecting net emissions. Additionally, in high-rainfall and lowland agroecosystems, the effectiveness of N stabilizers may be limited and can shift nitrogen pathways, sometimes leading to unintended GHG trade-offs. Hence the methodology should clearly specify suitable crops and agroecosystems, excluding cases where stabilizers might have limited benefits or negative effects. 2. Comment: In many regions, farmers commonly use fertilizers that contain multiple nutrients, such as N, P, and K, in formulations like DAP, MAP, NPK blends, and ammonium sulfate nitrate. How does the methodology account for these types of fertilizers?	1. (Similar to *Comment 1)* The scientific proof of GHG impact, which is a pre-requisite for a project, defines the available crops, cropping systems and agroecologies in which a project can happen. As such, if there is no scientific evidence for a specific crop, then such a project does not pass the Applicability criteria. In future versions, if we find conclusive evidence of certain agroecosystems which must be excluded, we will specifically exclude them. We added this text to reflect the comment:. a. *"As such, crops, cropping systems, and agroecologies for which there is no supporting scientific evidence of the impact of N stabilizers on the GHG emissions, are not applicable under this methodology."* 2. Added the following text to clarify: "*The baseline fertilizer (i.e. the product that would be used in the absence of the N stabilizer) may contain multiple nutrients (e.g. nitrogen, phosphorus, and potassium) and come in various formulations (e.g. DAP, MAP, NPK blends, ammonium sulfate nitrate, etc.). These fertilizer types are within the scope of this methodology. However, the impact of the N stabilizer is attributed only to the nitrogen (N) component of the product.*"
26	1.2 Applicability of the methodology	*Pg.no. 10; 1.2* *"Project developers must be able to provide scientific proof of the emission* *factors (EF) related to those*	*1. Suggestion: Specify the minimum number of peer-reviewed studies required to support EF selection.*	1. We updated the text to specify that "*...Where this alignment is demonstrated, even a single EF may be applied at the project or baseline level.*"

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		baseline activities, through the IFA Emission Factor Database for Nitrogen Stabilizers, a relevant meta-analysis, or original scientific literature."		
27		*Pg.no. 10; 1.2 "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)".*	1. Suggestion: Similarly, specify the exact sources for guidelines, whether they should be derived from peer-reviewed scientific studies, government agricultural extension reports, industry best practices, or other recognized sources. 2. Comment: In the project area are you suggesting undertaking a baseline scenario. This is vague, and needs to be framed clearly.	1. Accept suggestions. (Non-exhaustive) examples are now given. 2. Agreed. Text was updated: "*To ensure that the project's baseline (as defined in section 3 Baseline Scenario) accurately reflects nitrogen use efficiency (NUE), project developers must do a Performance Test.*"
28	1.2 Applicability of the methodology	*Pg.no. 11; 1.2 "To ensure that the baseline accurately reflects nitrogen use efficiency (NUE), project developers must do a Performance Test."*	1. Comment 1: What is the need for a performance test when historical and regional NUE data are already available? If this test requires establishing a baseline scenario within the project area, it may introduce unnecessary complexity and redundancy. 2. Comment 2: For readers, please clarify your reasoning/justification behind your concern with NUE. Personally, we see an agronomic lens, a commercial lens, and a carbon accounting lens. For example, if the project also improves NUE, carbon intensity of the crops will reduce. How does this translate into credit generation? However, I do not think this is the focus of this section, but rather to ensure crops are not	1. As mentioned in the text: "*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).*" a. This is only relevant for LMUs. We want to avoid rewarding projects that are overapplying N, thus generating higher emission reductions than they should. If on the other hand they are in line with

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			N-limited in projects. 3. Suggestion: Also, all equations should be numbered, and this one is missing the number.	the regional practices, then there is no issue. 2. Added this text: "*This is to ensure that projects are not rewarded for overapplying N, compared to the common regional practices, and thus generating additional emission reductions.*" 3. We updated the numbering of the rest of the equations
29	1.2 Applicability of the methodology	*Pg.no. 11; 1.2* *"To do that, project developers must be able to provide scientific proof of the* *emission factors (EF) related to those project characteristics and activities,* *through the IFA Emission Factor Database for Nitrogen Stabilizers, a relevant* *meta-analysis or original scientific literature."* *"Project developers must be able to provide sufficient information proving that* *these project characteristics and activities match with the most influential* *environmental and/or management practices/variables that are described in* *the scientific proof source(s).* *Information related to the most influential* *variables can be seen in (see Section 4.1. EF-data references approach)."*	1. Comment: These two sections are repeated from the prior page.	1. Agreed. The text has been adjusted. Now the two points are combined into a single bullet point that discusses the applicable way that the project developer should decide what emission factor to use to quantify the baseline and the project intervention.

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30	1.2 Applicability of the methodology	*Pg.no. 11; 1.2* *"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…"*	1. Comment: Again, this section needs a justification. What is the methodology aiming to do/prevent? Is this related to additionality? Or is this so that projects that are already implementing land management projects can follow this methodology in addition to the activities they are already doing?" 2. We do see the comment in section 2.1 ("This methodology can work synergistically with other GHG methodologies or programs that target emissions reductions or removals in areas outside the scope of this methodology (p. 20).") but it would still be important to clarify this point earlier in the document.	1. Agreed that extra justification should be given. The following explanatory footnote was added "T*his methodology aims to support multiple interventions on the fields (which might be the case for many projects), however it is crucial that these interventions do not negatively affect the impact of the N stabilizers (or on the other hand the N stabilizers do not interfere with other interventions already in place). For this reason the conditions were added.*" 2. Accepted comment. It has been moved in the applicability section, and a reference is made in the 2. 1 Scope of activities.
31	1.3 Eligible products	*Eligibility* *Pg.no. 12; 1.3* *"Post-application treatment: Nitrogen stabilizers applied separately after* *fertilization to control nitrogen transformations in the soil."*	1. Comment: Since N fertilizers are reactive and undergo various transformations in the soil, the application method and timing of nitrogen stabilizers (pre-mixed, post-mixed, or post-application) can significantly influence N2O emissions and may subjected to variability accordingly. Hence there is need to explicitly define the terms and conditions for N Stabilizer applications in field.	Similar to *Comment 2.* 1. The actual impact of the N stabilizers is defined based on the scientific evidence provided, for which we ask that: "*Project developers must be able to provide sufficient information proving that these project characteristics and activities match with the most influential environmental and/or management practices/variables that are described in the scientific proof source(s).*" a. In other words, the Project Developer must make sure that the GHG claims of the project match the most influential circumstances (environmental factors and management practices) in the field.
32	1.4 Additionality	*Additionality* *Pg.no. 14; 1.4* *"Depending on whether the project developer aims to use the generated claims* *(Carbon Credits) in either offsetting or insetting scenarios, different*	1. Comment: As a reader, this is the first time that insetting/offsetting was mentioned. Please add a line or two in the project applicability that refers to the fact that this methodology may be used in either cases, but there will be clear differences in the document of where project implementation may	1. We accept the suggestion and the text was updated: "*This methodology is applicable to both offsetting and insetting projects. In alignment with emerging SBTi guidance, insetting projects should prioritize direct mitigation, where the intervention can be physically linked to specific*

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		requirements apply."	deviate (e.g., additionality).	*emissions sources within the company's value chain through a robust chain of custody model. Where such traceability is not yet possible, indirect mitigation may be used as an interim measure, provided it supports the transformation of the relevant value chain over time. Section 1.4 Additionality, explains the requirements for these different types of projects"*
33	1.4 Additionality	*Pg.no. 14; 1.4* *"For the insetting scenario, the project developer is only required to demonstrate the regulatory additionality but should also be transparent on the prevalence and financial additionality in the POD."*	1. Comment: This is vague. The clearer you make this statement, the higher quality the 3rd party validation and verification can be, and thus more robust and high-integrity carbon claims will result!	1. Suggested adjustment in the text: a. *For the insetting scenario, the project developer must demonstrate regulatory additionality by confirming that the use of nitrogen stabilizers is not legally required. In addition, the Project Description (POD) must include clear and documented information on:* i. *Prevalence additionality: An explanation must be provided that the use of nitrogen stabilizers is not a common practice within the company's sourcing region, crop system, or market segment relevant to the intervention.* ii. *Financial additionality: An explanation must be provided carbon finance is positively affecting the adoption of nitrogen stabilizers within the company's sourcing region, crop system, or market segment.*
34	1.5 Crediting period	*Crediting period* *Pg.no. 15; 1.5*	1. Suggestion: What 'guidebook'? Lightly define Chain of custody or Book-and-Claim models and state why this is important, even reference certain international	1. Accepted. This part was dropped for clarity purposes.

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		"The duration of the crediting period may depend on the Chain of custody or Book-and-Claim models: The chosen model for tracking emissions reductions through the supply chain will influence the appropriate time frame, ensuring alignment with how reductions are credited (to be adjusted/expanded based on the Guidebook)."	guidance that may impact this (e.g., GHGP Land Sector and Removal Guidance; EU Carbon Farming regs).	
35	1.6 Co-benefits & no harm principle	*Co-benefits & no harm principle Pg.no. 16; 1.6 "Project Developers should adhere to the "Environmental and Social do not harm principle" by conducting thorough assessments to identify and evaluate potential environmental and social impacts of their GHG projects."*	1. Comment: Note that the word 'should' here will be that as a VVB, we will not be checking for this, as there are no clear guidelines of what Proba would expect. Perhaps this was intended to be optional, so just consider this comment as an 'FYI'. 2. Explicitly state whether projects are required to report co-benefits or if they are simply recommended for additional credibility. 3. The methodology mentions key performance indicators (KPIs) but does not specify the measurable indicators.	1. Accepted the comment. Adjusted "should" to "must", as this is an important check. 2. Adjusted the text: "*Project developers are recommended to report on co-benefits for credibility purposes.*" 3. Adjusted the text: "*If the project developer aims to claim one or more co-benefits, these must be clearly defined in the Project Overview Document (POD), along with how the impact is achieved, measured (e.g. through KPIs). In this case, relevant KPIs must be selected by the project developer and monitored throughout the years.*"
36	1.7 Risks	*Risks Pg.no. 17; 1.7*	1. Comment: Also, another potential risk, being that the producer did not actually apply the reported amount of product, either as an unintentional action or miscalculation or a deliberate error or falsification. 2. Suggestion: The section mentions risks of nitrogen stabilizer overdose leading to ecotoxicity (mention threshold toxicity levels), but mitigation measures are not specified. Some considerable measures like monitoring N dynamics (NO3-, NH4+ and N2O).	1. Accepted comment. Added in the text. 2. Agreed. Updated text: "*…To prevent this, evidence of proper application rate of the N stabilizer or, if that is not possible, monitoring of N dynamics is recommended.*" 3. This could indeed be a potential risk. However, current scientific knowledge suggests that this is not a risk. We updated the text as follows.: a. *Over time, it is possible that microbial*

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			3. Also, over time, microbial adaptation may reduce the effectiveness of nitrification inhibitors, where adaptive response mechanisms (adjusting dosage of stabilizers) could be considered.	*adaptation may reduce the effectiveness of nitrogen stabilizers. However, a study by Duff et. al. has shown that non-target bacterial and fungal communities were not significantly affected by long-term inhibitor treatments, supporting the notion that these nitrogen management strategies can mitigate emissions without disrupting overall microbial diversity and composition ([Duff et al., 2022](#)). In addition, they found that the effect of fertilisation on the microbial community is greater than the impact of N inhibitor use. As such, it is recommended that the project developer is transparent on this risk, and investigate if it is relevant for their particular circumstances. If this is the case, then an adaptive response mechanism (such as adjusting dosage of stabilizers) could be considered.*
37	1.8 Leakage & permanence	*Leakage and permanence Pg.no. 18; 1.8*	1. Comment: Leakage due to yield decreases is very clear. Beside yield-related leakage, there might be potential chance for indirect leakage, including the redistribution of excess fertilizer to non-project areas (fertilizer redistribution leakage) and shifts in land-use patterns due to changes in nitrogen use efficiency (land-use change leakage). Hence these leakages might be taken under consideration. 2. To demonstrate that crop yields have not declined by more than 10%, employment of remote sensing (e.g., NDVI-based crop productivity assessments), beside self-reported farmer logs could generate realistic insights.	1. This methodology does not include the reduction of N rate as part of the intervention, as such the redistribution of excess fertilizer or land use changes to non-project areas is not relevant. a. The only instance where N rate reduction is applicable is when N was overapplied compared to the regional average, in which case the leakage is expected to be minimal. b. In Sourcing Region based projects, where the N volumes (and thus potential N displacement) are expected to be much higher, this is indeed a leakage risk (assuming that N rate reduction is

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				systematically implemented). i. However, to the best of our understanding you can't control or even reasonably measure what happens outside the project boundaries. For example, lower production often leads to higher prices, which in turn curtails end use or forces end users to switch to another crop (e.g. wheat substituted for corn). We have no knowledge of the practices in the regions that move to fill the production deficit or which crops might fill the gap. Their practices might be better and actually reduce emissions. Again, this kind of accounting is impossibly complex at the global scale in which markets operate today. So it might be unreasonable to ask the project developers to perform such accounting. 2. Accepted suggestion. Text has been updated.
38	2.1 Scope of activities	*4. Project boundary* *Scope of activities* *Pg.no. 20; 2.1* *"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*	1. Comment: We would argue that there are little to no cases of sufficient evidence of this that would be directly applicable to a project scenario. As such, we suggest avoided this requirement, which is arguably too 'loose' anyway, and implementing a conservative percentage in the reduction in the number of GHG claims produced by the project to show an appropriate level of conservativeness.	1. It is true that there is not much scientific evidence for such cases. However, if for certain cases there is or if it becomes available in the future, then it would be useful if the methodology could allow it. a. We dropped the term "sufficient" since it is too vague. Using any percentage reduction in the claim potential would be too arbitrary and could still overestimate

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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."		the impact. The truth is that we are still limited by the scientific evidence and the methodology should reflect that.
39	2.1 Scope of activities	*"This methodology can work synergistically with other GHG methodologies or programs that target emissions reductions or removals in areas outside the scope of this methodology"*	1. Comment: Require a separate monitoring framework to ensure that combined interventions do not undermine stabilizer effectiveness in long-term consistency.	1. Accepted comment. Text has been updated (on top of being moved to the applicability chapter, based on comment 30): "*provide a separate monitoring framework to ensure that combined interventions do not undermine stabilizer effectiveness in long-term consistency*"
40	2.2 GHG sources	*GHG Sources Pg.no. 21; 2.2 "While it is acknowledged that there are other GHG sources on agricultural fields, such as CO2 emissions from soil respiration or methane (CH4) emissions from organic matter decomposition, these sources are not*	1. Comment: The methodology includes both direct and indirect N2O emissions in both baseline and project areas but did not include the other GHGs flux. However, the lack of any GHG accounting for other sources and sink within the project boundaries may result in serious 'red flags' for investors and project quality rankers. For example, your approach safely assumes that all variables stay the same year to year other than the N usage (i.e., tractor passes, tillage,	Similar to *Comment 4.* 1. This methodology is designed to only account for and measure the impact of adding N stabilizers to the farming practices (which only impact the nitrogen based emissions, rather than CO_2, CH_4, etc.). It is a good point, however, there is a possibility that on the farm level, even though N stabilizers are introduced, on the other hand other activities happen (along with or because of

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		expected to be affected by the nitrogen stabilizers (Chen et al., 2023). *Therefore, these emissions are considered out of scope for the purposes of* *this methodology, as they do not directly contribute to the emission reductions associated with the use of nitrogen stabilizers. The GHG sources* *that are in scope are presented in Table 1."*	residue retention, etc.). We know this is highly unlikely. A very strong and detailed justification section needs to be added to this methodology to support your current approach. To generate even higher integrity claims, the entire GHG sources and sinks should be accounted for in the monitoring plan and a Tier 3 approach should be taken when feasible (i.e., for SOC). 2. As the interruption in nitrogen cycle may also influence the biogeological cycles of other elements like carbon, may change the plant nutrient uptake patterns, and may effect on the soil microbial community transformations. These all could cumulatively impact on the GHG emissions, which need to be accounted rather than accounting only N2O emissions.	the introduction of the N stabilizers) which can increase the total GHG emissions. a. For this reason, we updated the methodology to account for this. b. Now, the project developer must be transparent on additional activities that happen along with the introduction of N stabilizers and report on these emissions. Since these activities can be numerous, we only give some non-exhaustive examples. 2. This is a potential risk which we are now transparent about on the methodology. However, to the best of our knowledge current scientific knowledge does not go into such depth to account for the long-term impact of microbial activity and there is no current realistic way to account for that. If more scientific evidence is available we will update the methodology. a. New text: "*It is also acknowledged that the introduction of nitrogen stabilizers can influence bioecological cycles and affect microbial community dynamics, potentially leading to impacts beyond direct and indirect N_2O emissions—such as changes in soil nutrient availability and other indirect emissions. However, these negative effects are assumed to be minimal compared to the reduction in N_2O emissions. It is the responsibility of the project developer to confirm that this holds true for their specific project and to transparently report any such effects if relevant under their environmental conditions and management practices.*"

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41	2.2 GHG sources	*Pg.no. 22; 2.2* *“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 ton of crop, which is* *relevant for the Product Carbon Footprint of the crop (see section 6. Different* *metrics of GHG emissions)”*	1. Comment: Under your current GHG accounting approach (fertilizer only), bullet point #1 above is agreeable. However, bullet point #2 is not acceptable. How can you assume ‘given all else stays the same’?	1. For the second bullet point, just to be clear, the credit generation (net emission reduction) is not affected. But if someone wants to attribute the emission reduction to the crop yield, then this can be done, and indeed it affects this metric (because the crop yield increases)
42	2.3 Spatial boundaries	*Spatial boundaries*	1. Comment: Clarify when to use field-level vs. regional-level boundaries. 2. In case of adopting regional level boundaries, require stratification based on climate, soil properties, and nitrogen application practices.	1. Accepted comment. Text has been updated a. “*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 (as explained in section 4 Calculation of GHG emissions), 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 reduction potential, caused by the lower uncertainty. This is aligned with SBTi’s*

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				and GHGp's directions of moving towards field level projects which can offer more transparency and traceability." 2. Accepted comment: Text has been updated: a. "*The regional boundary accounts for the collective impact of N stabilizer use in a broader landscape. This approach aggregates data from multiple fields, farmers, or cooperatives within a defined region (similar to Sourcing region as per the GHG Protocol). The quantification can be based on aggregated EF data from scientific studies (see 4 Calculation of GHG emissions approaches 1 or 2). To achieve that, project developers must stratify the region based on the most relevant environmental factors and management practices (see A.2.1 Alignment with the explanatory variables).*"
43	2.4 Temporal boundaries	*Temporal boundaries*	1. The temporal boundary is restricted to a single crop calendar and a one-year cropping cycle, but it is unclear on what basis this limitation was set and whether the project excludes perennial crops like plantations and crops like sugarcane (has more than 1 year crop growing period). 2. Also, the methodology ignores the accounting for post-harvest nitrogen leaching in fallow fields and delayed N2O emissions from residual fertilizer beyond the cropping cycle.	1. This is a misunderstanding. The temporal boundary is defined based on the entire cultivation cycle of the target crop, meaning that perennial crops are included. 2. This is addressed in the footnote of temporal boundaries "*It is acknowledged that the nitrogen can remain in significant portions in the soil till after the harvesting period, thus being at risk for later conversion and N losses as N2O emissions. At the same time, the stabilized N fertilizer can remain in the soil after the harvest, thus potentially reducing the emissions that would have otherwise occurred. However, this methodology relies on scientifically validated EFs*

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				for both the baseline and project intervention, which cover the same measurement timeframe…" a. So the emission reduction is based on a similar timeframe. If we were to measure past this time, then the stabilizer would have an even more beneficial effect. As such we are actually underestimating the benefit of the stabilizer.
44	3 Baseline scenario	*5. Baseline* *Pg.no. 25; 3*	1. Comment: What will be frequency for updating baseline?	1. Updated to be more clear: a. LMU: *Since this is a counterfactual baseline approach, the baseline is defined every crop cycle.* b. Sourcing region: *Project developers must re-establish their baselines, at least every 2 years during the crediting period.*
45	3 Baseline scenario	*"Field level approach:* *The baseline scenario at the fi eld 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."*	1. Comment: Alright, year by year comparison is clear. However, GHG emissions is not only related to amount of untreated nitrogen fertilizer, but timing for plant uptake and weather conditions. How are you addressing this? This is a concerning omission.	1. Indeed, there are multiple environmental factors and management practices that have an impact on N2O emissions (and N stabilizer induced emission reductions). Understanding how the different climatic conditions affect the impact of N stabilizers is a scientific effort which goes well beyond the scope of this methodology (note: the plan is to address it in a parallel running EF database & modelling workstream in the coming years). For now, the most pragmatic approach we have is to use the conservative values from the possible EF ranges given by the current scientific literature regardless of the actual weather conditions that happen on the field. a. Current scientific knowledge suggests that N stabilizers have the potential to **increase system resilience** to extreme weather by making nitrogen more stable

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				in the soil and reducing its susceptibility to loss as N_2O. This of course depends on the type of weather event. For instance, (Abalos, 2014) mentions that "*If there is a risk of intensive rainfall or high applications of irrigation water during the days following fertilizer application,then the effectiveness of the inhibitors could be further increased.*" b. For the plant uptake, as mentioned in the footnote (similar to comment 43): "*It is acknowledged that the nitrogen can remain in significant portions in the soil till after the harvesting period, thus being at risk for later conversion and N losses as N2O emissions. At the same time, the stabilized N fertilizer can remain in the soil after the harvest, thus potentially reducing the emissions that would have otherwise occurred. However, this methodology relies on scientifically validated EFs for both the baseline and project intervention, which cover the same measurement timeframe…*"
46	3 Baseline scenario	*"Where multiple options or data sources are available, conservative estimates must be used, to avoid overestimating the impact of the project interventions."*	1. Comment: Need a defined hierarchy for conservative assumptions (e.g., lower-bound N2O reduction rates, upper-bound fertilizer uses rates).	1. Accepted. Added a footnote to reflect that. Decided not to list every possible variable and the preferred boundary as this seems redundant. In every case the assumptions and variables must be selected so that the "*total baseline emissions are not overestimated and the total project emissions are not underestimated*"
47	4 Calculation of GHG	*6. Calculation of GHG emissions Pg.no. 26; 4*	1. Comment: However, the issue arises when a reference source contains an EF for one scenario (e.g., baseline)	1. It is a very unlikely scenario that a study focused on N stabilizers does not account for the

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	emissions	*"The approaches for quantifying baseline and project emission factors are listed in Table 2. In cases where more than one EF-data reference approach is allowed for a given activity, then the same approach must be used to calculate both the project and baseline scenarios."*	but does not provide an EF for the other (e.g., project scenario). Because a study or database might provide an EF for untreated nitrogen fertilizer (baseline) but not for the nitrogen stabilizer treatment (project scenario), or vice versa. 2. Also, this will become more complex in the situation of adopting multiple interventions.	fertilizer-only (baseline) emissions. If that is the case, then indeed there is an issue of finding compatible baseline - intervention EFs. This is something that the project developer must address. It is possible that no suitable match of baseline and project EF source of data is available, and therefore a project can not happen. For the database specifically, it is a prerequisite (based on the quality criteria) that studies include both the stabilized fertilizer and the non-stabilized fertilizer EF as part of the experiments. 2. Indeed multiple interventions are problematic since their effect on emissions (along with the introduction of N stabilizers) has not been extensively studied. This might limit the potential projects, but that is a scientific limitation that we have to accept.
48	4 Calculation of GHG emissions	*EF-data reference approaches Pg.no. 28; 4.1*	1. Comment: It is unclear of how Approach 1 and Approach 2 differ, as we would expect the IFA database includes EFs from many of the same scientific studies. While we recognize that the Database is still under development, we strongly suggest that before this methodology is released for public consultation, a very explicit summary is included here that outlines the procedures for compiling the database that ensure repeatable, high-integrity evaluation steps for identifying and including product-level EFs into the database. 2. For example, will there be a Proba-led review committee? If I am a proprietary owner of a product, may I pay a tremendous amount of money to get my EF (that was internally derived) listed on the Database? (We know that sounds like a non-sensical example, but your explicit summary must be clear	1. Indeed Approach 1 and 2 are very similar. In theory, project developers should be able to come to very similar EFs if they followed the guidelines from the IFA database. The reason we are creating this open-access and science-based database is to create a form of standardization. Everyone will be able to check the results and suggest improvements on it. Nevertheless, we added a text describing briefly the procedure of developing the IFA database. When the database is released we will publish a "Procedure for developing the EF database" document which will explain in great detail how the database was developed, what calculations have been made and how the results will be validated and updated. 2. The only way a product and an EF can be added

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			that that would not be the case.).	to the database, is if there is validated scientific evidence accompanying it (see "Quality criteria" in the methodology).
49	4 Calculation of GHG emissions	*"It offers validated EFs for a variety of scenarios, ensuring consistency and accuracy in GHG quantification while minimizing uncertainties."*	1. Comment: Does the IFA have the EFs data base for all the regions across the globe? If not, how can it be applicable to all regions.	1. The availability of EF data in the database, and the subsequent applicability in the methodology, is dependent on the availability of scientific evidence to back up the emission reduction claims. In regions where data or literature is lacking, emission reduction claims cannot be made. As more studies become available, the geographical coverage can increase. a. On the other hand, as mentioned in the methodology "*Project developers can extract EF from scientific studies that are relevant to their environmental factors and management practices and aggregate them to create relevant Tier 2 - type of EF. Along with the EF, the project developers must calculate the compounded uncertainty or standard deviation of the EF*". This means that emission factors can be extracted for regions where no studies have been made, based on a weighted stratification of (high importance) environmental factors (see Appendix A.2.1) and the corresponding regional analysis. In this case, the only limiting factor for the extrapolation of the EFs, is the available scientific evidence.
50	4 Calculation of GHG emissions	*Pg.no. 28; 4.1*	1. Comment: The methodology does not prioritize EF sources, hence there is a scope that project developers could arbitrarily select data that results in the highest emission reductions. Suggestions: The	Note: Similar to *Comment 6* 1. Agreed. We included ranking criteria in the methodology, prioritizing direct field measurements (Tier 3) over default emission

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			preference we suggest is, approach 3 > approach 2 > approach 1 > approach 4. The meta-analysis must be regionally stratified to align with the project's agroecological conditions and should use weighted averages. 2. As previously mentioned in the methodology industry-funded projects may introduce selection bias favoring lower emission estimates. Hence IFA EFs may need to be cross validated with the studies in project region.	factors (Tier 1). Tier 2 will be used when Tier 3 data is unavailable, with preference given to relevant scientific literature. We also updated Appendix A.1.1. Prioritization of EF sources and Tiers to reflect the suggestions, and updated the main text. 2. The only way a product and an EF can be added to the database, is if there is validated scientific evidence accompanying it (see "*Quality criteria*" in the methodology). Indeed cross-validation is a key aspect of the EF database.
51	4 Calculation of GHG emissions	*Equation of each activity step*	1. Comment: The methodology does not clarify how emission factors (EFs) are adjusted when nitrogen stabilizers are used.	1. Accept. We included an introductory sentence in this chapter: "*The following equations shall be applied to quantify direct and indirect N_2O emissions for both the baseline and project intervention. The differentiation between baseline and project conditions is reflected in the selection of the appropriate emission factors (EFs) used in the calculation*"
52	4 Calculation of GHG emissions	Pg.no. 31; 4.2 "(ii) Indirect emissions originated from ammonia volatilization"	1. Comment: The EF for volatilization (NH3-N loss) is not explicitly provided for either inorganic or organic fertilizers. Also, no equation or quantification technique was given to quantify.	1. In the methodology we added a footnote: "*If a project developer identifies separate emission factors (EFs) between inorganic and organic nitrogen fertilizers for volatilization-related N_2O emissions, they may apply these differentiated EFs. In such cases, project developers must adjust the corresponding quantification equations accordingly.*" a. However, it is important to clarify that this distinction is not based on differentiated EFs provided by the IPCC. Instead, the IPCC Guidelines (2019 Refinement, Volume 4, Chapter 11) provide a single emission factor (EF4) for indirect N_2O emissions resulting from

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				atmospheric deposition of volatilized nitrogen, without differentiating between nitrogen sources. The distinction made by the IPCC is at the level of the volatilization fraction (FracGASF for synthetic fertilizers and FracGASM for organic fertilizers), which reflects differences in volatilization potential between fertilizer types.
53	4 Calculation of GHG emissions	*Pg.no. 32; 4.2* *"(iii) Indirect emissions originated from leaching and runoff of N"*	1. Comment: The same leaching fraction (0.24 or 24%) is applied to both organic and inorganic fertilizers, which may not be accurate. Organic fertilizers release N more gradually, leading to lower immediate leaching losses compared to inorganic fertilizers.	1. The methodology accepts the use of Tier 1 EFs for the quantification of indirect N_2O emissions from leaching. Thus, we follow the default leaching fraction of 0.24 as provided by the IPCC 2019 Refinement, which does not distinguish between organic and inorganic nitrogen sources. a. We added a footnote: "If a project developer identifies separate leaching fractions between inorganic and organic nitrogen fertilizers, they may apply these differentiated EFs. In such cases, project developers must adjust the corresponding quantification equations accordingly."
54	4 Calculation of GHG emissions	*Pg.no. 32; 4.2* *"(iv) Nitrogen stabilizer cradle-to-farm-gate emissions"*	1. Comment: The methodology provides a single cradle-to-farm-gate EF; however they may be disaggregated based on fertilizer type, production method, and transport emissions.	1. The project developer must choose the appropriate PCF EF for their fertilizer / N stabilizer. The more specific the better.
55	7. Different metrics of GHG emissions	*7. Different metrics of GHG emissions* *Pg.no. 38; 6* *"A moving average is a statistical method used to smooth out short-term*	1. Comment: Nice concept here with clear explanation.	-

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		fluctuations and highlight longer-term trends by creating a series of averages from subsets of data points."		
56	8. Monitoring, reporting, and verification	*8. Monitoring, reporting, and verification (MRV) Monitoring Pg.no. 39; 7.1*	1. Comment: Table 4-6 are outlined excellently. Some small suggestions: Header: "Proof required" >>> Change to "Evidence required" 2. Comment: The monitoring approaches primarily rely on traditional methods such as farmer logs and market-based assessments. Integrating satellite monitoring, IoT sensors, and blockchain-based recordkeeping in regional approaches, wherever feasible (crop type and yield predictions), can enhance efficiency, accuracy, and transparency.	1. Accepted comment. Text updated. 2. Accepted comment. Added these technology options as suggestions (not requirements), since they might be hard to implement. From the new text: "*As seen in Table 4, the evidence required for these design parameters primarily rely on traditional methods such as farmer logs and market-based assessments. Where feasible, it is recommended to integrate for advanced approaches such as satellite monitoring, IoT sensors, and blockchain-based recordkeeping in regional approaches, to enhance efficiency, accuracy, and transparency.*"
57	General	*9. General Comments:*	1. Review document to make sure there is consistency in period use. 2. Review consistency of small capitalization consistency (e.g., "Table 1. GHG Sources in scope" >>>> Table 1. GHG Sources in Scope" 3. Use of e.g., ___ (make sure the comma is there!) 4. I would explicitly say what types of cropping systems are excluded from this methodology (i.e., rice systems)	1. Adjusted 2. Adjusted 3. Adjusted 4. See *Comment 25*