# LIMITED SCOPE VVB ASSESSMENT REPORT: IMPROVED MANAGEMENT IN PADDY RICE PRODUCTION SYSTEMS

Logo (optional)

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| **Methodology Title** | Improved Management in Paddy Rice Production Systems |
| **Version** | 1.0 |
| **Sectoral Scope(s)** | Sectoral scope(s) applicable to this methodology |
| **Document Reviewed** | VM00xx Improved Management in Paddy Rice Production Systems_OC_06Jun2024 |
| **Date of Issue** | 17-December-2024 |
| **Expert Assessor** | Anjana Sharma – Team Leader<br>Pankaj Sharma – Sectoral Scope Expert<br>Krishnan Namboodri KC - Team Member.<br>DNV Business Assurance India Private Limited |
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# 1 INTRODUCTION

Verra is funding and managing the development of a new VCS Methodology for Improved Management in Paddy Rice Production Systems (ID#M0253). Per section 2.1.2 of the *Methodology Development and Review Process, v4.4*, this methodology is being developed through an alternative process that has been deemed more efficient and equally robust. The alternative process included:

- Replacement of Section 3.5 Step 5: Validation/verification body assessment of methodology with review by a group of independent experts.
- Conducting the review by a group of independent experts in parallel to the public consultation

Based on their experience in the measurement and monitoring of GHG emissions in rice systems and project development for the carbon market, Verra hired DNV Business India Private Limited (DNV) to provide an expert assessment of the proposed methodology. The scope of DNV's expert assessment is:

1) Verifiability: Assessment of whether the methodology is sufficiently clear and specific for VVBs to assess projects using the methodology and complete validation and verification with high confidence.
2) Structure and clarify of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to implement projects consistently and transparently report project results.

# 2 ASSESSMENT APPROACH & FINDINGS

DNV reviewed the draft methodology[1] that was published for the public consultation and provided feedback to Verra. Verra worked with the consultant hired to draft the methodology, ATOA Carbon, to prepare responses to the expert assessment findings and update the methodology accordingly. DNV reviewed the responses and provided confirmation of the planned updates to the methodology. See Appendix 1 for the detailed list of expert assessment feedback received and responses.

[1] Draft methodology from June 11, 2024, available here: https://verra.org/wp-content/uploads/2024/06/VM00XX-Improved-Management-in-Paddy-Rice-Production-Systems_PC_06Jun2024.pdf

# 3 ASSESSMENT CONCLUSION

DNV has completed the expert assessment of the draft *VM00xx Improved Management in Paddy Rice Production Systems*[2] and confirms the draft methodology, and proposed updates adhere to the criteria established.

# 4 QUALIFICATION

DNV was accredited by the National Accreditation Board for Certification Bodies (NABCB). DNV has been an active validation and verification body within the VCS Program since 21/02/2024.

# 5 SIGNATURE

Signed for and on behalf of:

Name of entity: _____

Signature: _____

Name of signatory: Sharma, Anjana — Digitally signed by Sharma, Anjana

Date: Date: 2025.05.19 21:59:32 +05'30'

[2] Draft methodology from June 11, 2024, available here: https://verra.org/wp-content/uploads/2024/06/VM00XX-Improved-Management-in-Paddy-Rice-Production-Systems_PC_06Jun2024.pdf

# APPENDIX 1 – EXPERT FEEDBACK

| Section 2 – Summary Description of the Methodology | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 1 | The crediting baseline and additionality are determined via a project method. The baseline scenario assumes continuously flooded rice paddies and the continuation of historical rice cultivation practices. The management practices in the baseline scenario are determined by applying a historical look-back period to produce an annual schedule of activities (i.e., irrigation, planting, fertilization, and harvest events) for each quantification unit within the project area (e.g., for each field).Each project must include activities that materially reduce soil methanogenesis (reducing CH4 emissions) and may optionally include further practices including avoided biomass burning (reducing CH4 and N2O emissions), more efficient nitrogen fertilizer usage (reducing N2O emissions), and more efficient fossil fuel usage (reducing CO2 emissions). Any quantitative adjustment in optional further practices (e.g., decrease in fertilizer application rate and/or fossil fuel use) must exceed 5% of the pre- | Footnote refers to periodic review of the project baseline. It would be good to include frequency of reassessment and basis for arriving at that frequency. | Thank you for your comment. The footnote deliberately refers to the 'latest version' of the VCS Standard, so that as the VCS Standard is updated, the guidance in the methodology is updated accordingly. |
| 2 | | Basis for considering this figure? Are the regional stats considered in arriving at this 5% threshold? | Thank you for your comment. No, this refers to a >5% change in monitoring period activity levels relative to baseline activity levels, both informed by actual project implementation levels and not regional levels. Other parts of the methodology specifically refers to a 5% materiality threshold with respect to emissions. When referring to the later, the following definition is given in the methodology: "Specific carbon pools and GHG sources may be deemed de minimis and need not be accounted for (i.e., value set to zero) where together the omitted decrease in carbon stocks (in carbon pools) and increase in GHG emissions (from GHG sources) amounts to less than 5% of the total GHG benefit generated by the project." We've made updates throughout the methodology to more clearly refer to this quantitative de minimis materiality definition. With respect to a change in activity level, as opposed to emissions associated with a pool, a useful example is total nitrogen applied. If the project field applied total nitrogen at 100kg/hectare in the baseline, and wanted to be credited for a reduction in total nitrogen applied, the field would have to reduce the total nitrogen applied by at least 5kg/ha. |

| Section 2 – Summary Description of the Methodology | | | |
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| | existing value to qualify as a practice change. | | |

| Section 4 – Applicability Conditions | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 3 | Furrow irrigation or cultivation of row rice2 | It is ok though not in wide usage in India. Row rice is rice sown over ridges and irrigation through furrows and is an alternative to flood irrigated / TPT rice | Thank you for your comment. Please note 'furrow irrigated rice' and 'row rice' have been removed an an eligible option. |
| 4 | Furrow irrigation or cultivation of row rice2 | what is meant by "row rice" ? guideline vide note 2 below looks not relevant to this | |
| 5 | Improvements in nitrogen management (i.e., reduction in N-application rate and/or the use of nitrification inhibitors or slow-release N-fertilizers) | Application timing of fertilizers and pesticides to improve bio efficacy and hence reduction of their usage | Thank you for your comment. This methodology only credits for total N reductions and possibly also for the introduction of interventions such as nitrification inhibitors given that project proponent can use literature data for developing their own emission factor. |
| 6 | Projects that introduce or implement quantitative adjustments (e.g., decrease in fertilizer application rate, decreased burning of rice straw residues, or use of fossil fuels) must exceed five percent of the pre-existing value of annual emission reductions of all fields under the project area. This emission reduction is calculated as the | Basis for arriving at 5% threshold is not clear. | Thank you for your comment. The guidance in the methodology has been updated to the following: "Specific carbon pools and GHG sources may be deemed de minimis and need not be accounted for (i.e., value set to zero) where together the omitted decrease in carbon stocks (in carbon pools) and increase in GHG emissions (from GHG sources) amounts to less than 5% of the total GHG benefit generated by the project." We've made updates throughout the methodology to more clearly refer |

| Section 4 – Applicability Conditions | | | |
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| | average value over the historical look-back period, developed for the baseline schedule of activities (see Section 6). | | to this quantitative de minimis materiality definition. |

| Section 6 – Baseline Scenario | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 7 | The schedules of activities for the baseline and monitoring period must contain information on dynamic conditions, including irrigation patterns before and during the cultivation period, the type and amount of synthetic N fertilizers and organic amendments, and the duration of the cultivation season. All the data from these dynamic activities are critical and mandatory for the stratification of project areas into homogenous quantification units | Also the usage of pesiticides (+ / -) as a result outcome of DSR activity in the specified monitoring land parcels should be captured in reference to the Baseline scenario. This should also envisage the contamination of land / water as a result of increased / decrease usage in either cases | Thank you for your comment. Please note that elements such as pecticide usage, and contamination of lands, will be relevant in the context of safeguards, and thus should be captured in that context. |
| 8 | Static conditions (e.g., soil type and climatic zone) are required when modeling under Quantification Approach 1 and may optionally be used for stratification when using | The level of comparison should always be under similar conditions with only change of methodology of cultivation to assess the emissions | Thank you for your comment. The guidance has been updated as follows: "For parameters listed as 'static' in Table 3, data must be provided for such parameters when using Quantification Approach 1. When using Quantification Approach 2, parameters listed as 'static' |

| Section 6 – Baseline Scenario | | | |
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| | 9=Quantification Approach 2. | | are not required, but may optionally be used to stratify the project area." We dissagree that only irrigation changes should be considered relevant with respect to stratification, as the other factors listed as mandatory will have a sigificant impact on CH4 emissions. This is demonstrated through the emission factors provided by the IPCC pertaining to such factors, as set out in Chapter 5 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. |
| 9 | Soil pH | Soil pH 4.5 – 5.5 is acidic character. | Thank you for your comment. This tabel is not intended to recommend pH or list most suitable pH, but is intended only as an optional stratification criteria. |

| Section 7 - Additionality | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 10 | Projects must take into account existing and forthcoming government policies or legal requirements that directly impact rice paddy production, such as restrictions on water usage or burning biomass, when analyzing regulatory surplus. | consideration of " forthcoming policies and regulations" could lead to some kind of arbitrariness. | Thank you for your comment. Please note the additionality requirements have been updated to align with the new VCS additionality tool. |
| 11 | The project proponent must determine whether one or more distinct barrier(s) to project implementation exist. These may | reference to guidance to section 3.5.4 is not essential, as the section does not include any further guidance | |

| Section 7 - Additionality | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| | include: | | |
| 12 | The project proponent must assess whether the main project activity(ies) reducing soil methanogenesis is common practice with a penetration rate greater than 20%. To be eligible, the penetration rate of each single proposed main project activity must be below 20%. | This is anyhow lesser than 20% across regions e.g. India | |

| Section 8 – Quantification of Estimated GHG Emission Reductions | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 13 | Where the project involves the introduction of a new cultivar with a materially different root biomass to the cultivar(s) used in the baseline, the project must account for the changes in biomass to soil (via changes to the ROA parameter in Equation ()). | In my opinion, this should just not be a new cultivar of varied biomass be it of Root or shoot, duration of cultivar also should be considered for calculations of overall emissions. Needless to say even in baseline or the Additionalilty, this will also play vital role of checking GHG emissions | Thank you for your comment. This guidance pertains only to the impacts material changes in root biomass may have on Soil Organic Carbon. Cultivation season duration is dealt with elsewhere, as a critical input. |
| 14 | Figure 1: Equation map of this methodology | Equation map need to check and for use of correct equations .Example Defaullt EF- CO2, FF add equation 2 and for liming add 'equation 5. | Thank you for your comment. The equation map has been updated. |

| Section 8 – Quantification of Estimated GHG Emission Reductions | | | |
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| # | Paragraph from Draft Methodology | Comment | Developer's Response and/or Update |
| 15 | Nitrous Oxide Emissions from Nitrogen Fertilizers | Submitted here is that the Losses of Nitrogen also as a result of the excessive or lower irrigation (Leaching / Evaporation) should also be calibrated in both the scenarios.<br><br>Eg: if the Nitrogenous fertilizer is applied in wet field than the standing water field, the emissions would be lesser than in standing water field and hence the Fertilizer use efficiency. Even the timing of application will also substantiate findings.<br><br>This triggers another domain of curtailing the excessive fertilizer use against the recommended practices.<br><br>As per my understanding this should surely be taken into consideration in the assessment process and prepare SOPs further as against Baseline scenarios. | Thank you for your comment. N2O resulting from leaching and runoff is included (see Equations 12, 13 and 14 in particular). With respect to timing of fertilizer applications, such timing will be captured when using Quantification Approach 1, but the impacts thereof cannot be quantified when using Quantification Approach 3, as the IPCC emission factors do not provide for that. Please note that with respect to timing of feritlizer application, the following new guidance has been added to the methodology: "With respect to timing of when AWD events are to occur, it is recommended, but not required, that farmers undertake their first AWD drainage event at least 21 days after the initial flood, to ensure the pre-flood N application has time to be absorbed and is not washed away." Please note that the training provided to project implementation staff and farmers must include training specific to the eligible project activities being employed. Training must at a minimum cover all of the eligible activities employed by the project, and must provide holistic agronomic guidance regarding the new cultivation system being deployed. |
| 16 | Calculate the average emission rate of a chamber measurement per plot: | why multiply with "sl"(Slope of line of best fit (mg/min), as equation 23 also multiplied with 'Sl"? | Thank you for your comment. Sl will be removed, as it's a typo. |
| 17 | N2O correction factor for calculating N2O emissions flux due to period of drying on rice fields; value of 0.00314 kg N2O/kg N-input must be used | 0.003 in IPCCC Table for "continous flooded and "disaggregated", Check and confirm | Thank you for your comment. We mistakenly referred to the incorrect equation. The correct equation in the PC draft was (26). Thank you for the correction. |
| 18 | Emission factor for embedded emissions associated with fertilizer production for synthetic fertilizer type | source ? | Please note that the option to account for embedded emissions in upstream fertilizer production has been removed from the methodology. |

| Section 8 – Quantification of Estimated GHG Emission Reductions | | | |
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| | SF (t CO2e/t fertilizer) | | |
| 19 | Monitoring period yield averages must be based on data collected in the previous 10 years. Yield averages must not include data that are more than 10 years old. Where yield has improved, stayed constant, or declined by less than 5%, no further action is needed. Where a reduction in yield of greater than 5% is observed, complete Step 2. | Monitoring period data for 10 years is substantial.<br>In my opinion even if 3 – 5 years are considered for the monitoring period, the data will substantiate. Though I also would mention that under the new technique of DSR (all three methods of DSR) the soil structure is changed w.r.t the transplanted rice. Still to create POC 5 years is fair enough.<br>Due to lot many new innovative varieties/Hybrids coming into rice with reduced Seed to Seed durations, thinking about 10 years will be too high expectation | Thank you for your comment. The guidance stipulates the data must be no more than 10 years old, not that 10 years of data is required. The guidance has been updated as follows to make this clearer: "Monitoring period yield averages must be based on data that is no more than 10 years old. Yield averages must not include data that are more than 10 years old. Where yield has improved, stayed constant, or declined by less than 5%, no further action is needed. Where a reduction in yield of greater than 5% is observed, complete Step 2. |

| Section 9 - Monitoring | | | |
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| 20 | The training provided to project implementation staff and farmers must include training specific to the eligible project activities being employed. For example, where a new cultivar is introduced as part of the project, guidance must be given regarding any unique requirements for optimum cultivation of the new | "Project monitoring is just not the irrigation, cultivar or depth of water under the field regimen. Its also about the various effects because of changes in the causes. | Thank you for your comment. The guidance on training you cite contains this specific text "guidance must be given regarding any unique requirements for optimum cultivation". That statement arguably reflects exactly the type of holistic guidance you are advocating for. Nonetheless, we have updated the guidance to include a clearer statement, that 'training must at a minimum cover all of the eligible activities employed by the project, and must provide holistic agronomic guidance regarding the |

| Section 9 - Monitoring | | | |
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| | cultivar. Where implementing AWD as a project activity, project proponents must demonstrate that irrigation water falls to approximately 15 cm below the surface of the field during each drying event, for example by using a field water tube (pani pipe). | | new cultivation system being deployed'. |
| 21 | Sources of information for all undefined activity/management-related model input variables, and parameters – relevant to the baseline – must follow the requirements detailed below. | The training should be imparted holistically such that due to various diseases the plant may not start getting decomposed into the field giving rise to produce various other hazardous bacteria / fungi and acute loss in yield also which otherwise could have been mitigated given that the proper knowledge of disease pest conditions were there. | Thank you for your comment. The intent is that some of the monitoring tables give explicit guidance regarding sourcing data. Where such guidance is not given, Box 1 guidance should be followed. For clarity, that terminology is been removed. |
| 22 | A signed attestation from the farmer or landowner of the sample field during that period – where the attested value does not deviate significantly from other evidence-supported values for similar fields (e.g., fertilizer data from adjacent fields with the same crop, adjacent years of the same field, government data on application rates in that area, or statement from a local extension agent regarding local application rates). Digital technologies may be used to generate farmer attestations. For example, where an application is | So, not just the irrigation, cultivar are important but the complete knowledge of the crop response to various factors is inevitable – Pankaj Sharma" | Thank you for your comments. We agree that farmer adoption will be challenging in many settings. The intent here it to provide flexible means to source project data. We are not trying to recommend or predict what will be successful in terms of project implementation, as that is the responsibility of the project proponent. We have seen a growing use of phygital options, including specifically in India. It remains to be seen whether the market will absorb the higher costs associated with such options. |

| Section 9 - Monitoring | | | |
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| | used to present information to a farmer and digitally record their acceptance of the information as accurately reflecting their cultivation practices, such a digital record is considered a farmer attestation. The validation/verification body (VVB) must determine whether the data are sufficient. In circumstances where this requirement is not met, Option 4 must be followed. | | |
| 23 | All sampling must take place between 09:00 and 11:00 in the morning. Sampling must commence within one week after initial flooding at the commencement of each cultivation season. Gas samples must be taken at least weekly and measurements should continue until any significant fallow period commences (i.e., after harvest). Records must be kept demonstrating the timing of each sample, and the relevant management practices being deployed in each sample location. | "Sampling in the open field in the given time is fine but in my understanding Paddy is grown in acute weather conditions with temperature from medium to very high and humidity conditions. | Thank you for your comment. We have updated the guidance in Section 9.1 to direct that each project must ensure their sampling and analysis protocol is optimized for sampling for rice systems, including any necessary adjustments for moisture and ambient 02, each project must report minimum detection levels, and ensure standard gas mixtures used to calibrate/validate their equipment spans the concentration ranges being detected. The guidance also provides links to the following two references: Optimisation of the gas chromatograph analytical protocol is detailed here: 10.1080/17583004.2015.1082233. & https://www.ars.usda.gov/natural-resources-and-sustainable-agricultural-systems/soil-and-air/docs/gracenet-sampling-protocols/ |
| 24 | Value depends on type and amount of organic amendment applied: | So, there must be at least three times like (9 – 11am, 12 – 1 noon, 3 – 4pm) for sampling. | Thank you for your comment. The scaling factor for >180 days has been corrected to 0.89 from 0.19, and the resulting calculation also updated. The other data and calculation is correct. The reference was also updated from Table 5.14 to Table 5.13. |

| Section 9 - Monitoring | | | |
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| 25 | Proportion of pre-fire fuel biomass consumed | One more sampling later than above times could also be included when the top dressing of fertilizers is done to understand the evaporation of gases also for creating POC about better NUE (Nutrient Use efficiency) | Thank you for your comment. This represents the volume of biomass that's destroyed in the fire. This description was adopted from VM0042, and has not been subject to change there, so we'll leave it as-is. |