

Alternate Wetting and Drying FRC Feedback

-Responses to Stakeholder Questions and Comments-

The following document presents Sylvera's responses to questions and feedback submitted during the Framework Review Committee (FRC) for comments period on the Sylvera Alternate Wetting and Drying (AWD) Framework Version 1.0.

CARBON ACCOUNTING

1. Monitoring Method & Farmer Behaviour

- a. Scoring metrics: The metrics confirm that photos or drones are used to capture the AWD process, which is a positive step.
 - Thank you for the comment, Sylvera's framework will score projects that use site specific geospatial data such as drones, or synthetic aperture radar (SAR) data to confirm the claimed baseline scenario and implementation of AWD, through observation of flooding and drainage events highly within the the monitoring elements of the carbon accounting score. Other site specific data, such as farmer records (e.g., logbooks) are also deemed strong supporting data – recognizing there may be practical limitations in applying geospatial data.
- b. Monitoring accountability: While I agree with the scoring metrics in principle, a key question remains unanswered: who is responsible for conducting the monitoring, and who is financing it? This process is time-consuming and requires a degree of technical skill. If farmers are expected to carry out the monitoring themselves, they will need adequate training, which in turn requires its own financing. It should be clarified whether the carbon credit buyer will be responsible for covering these costs.



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- Sylvera considers that it is important for monitoring of the implementation of AWD activities to be conducted to ensure that claimed emission reductions reflect on-the-ground activities, and can be appropriately adjusted in the event of any deviation from the proposed management plan. This is especially important for projects relying on modeled approaches using emissions factors and scaling factors based on assumptions around land use management practices to quantify emissions. If gas fluxes are not directly measured using gas chambers, there is no direct measurement and verification of project performance. If actual implementation varies from the applied assumptions, this may lead to skewed emissions reduction claims. As such, it is important for all elements of land management that may materially affect gas fluxes in rice paddies to be reported and monitored.
- Although we recognize there may be some technical limitations to implementing such monitoring and record keeping, data transparency, and clear emissions accounting is key for trust and integrity in project claims within the carbon markets.
- It is not Sylvera's role to define how projects decide to handle internal operations, this is the role of registries, carbon standards, and developers themselves. However, in our view, we would assume that the burden of cost to enact is taken on by the project developer, funded through carbon revenues generated from the sale of credits, or other financial agreements. Monitoring of key parameters such as water levels, and other land use practices (e.g., organic amendments, fertilizer inputs, etc.) may be organized by developers or self-reported by farmers through farmer engagement processes maintained by the developer. As part of their operations, developers may decide to provide training and support to farmers.

c. Paid monitoring as an incentive: If farmers are compensated for conducting monitoring, this could directly address one of the more significant practical challenges of AWD adoption. Under conventional rice farming, farmers typically visit the field only once a month to check that it is flooded, and in the meantime earn income from alternative sources. AWD, however, requires farmers to visit the field every other day to check via a field tube that the water

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level has not dropped more than 15 cm below the surface. If farmers can also carry out monitoring activities during these visits and be paid for doing so, this would help offset the increased time burden and make the transition to AWD more viable.

- Sylvera agrees that if farmers are taking on significant roles in projects, such as project monitoring, it would be favourable for farmers to be compensated through benefit-sharing mechanisms, or similar mechanisms. Such elements are assessed in the *Safeguarding & Co-benefits* component. Compensation mechanisms may also help to incentivize adherence to AWD activities and any record keeping requirements, and in-turn could increase the integrity of project claims.

2. CH₄ Flux Monitoring

- a. Chamber methodology: The scoring should include clear guidelines on the exact number of chambers to be used per hectare, along with the required number of replicates. It should also specify at which stage of the AWD cycle measurements are to be taken – whether when the field is flooded, dry, or both. Additionally, a baseline measurement of emissions under continuously flooded conditions prior to AWD implementation should be required to enable meaningful comparison.
- The scoring aims to avoid overly prescriptive recommendations to avoid conflict with methodologies and maintain a methodology agnostic approach, and to avoid single components determining whether a project may be deemed of high or low integrity.
 - However, the scoring defines different monitoring regimes with different levels of quality. These score mappings have been informed by research into existing carbon crediting methodologies and standards, as well as scientific literature. The scoring defines that multiple chambers (i.e., > 1) chamber per stratum to



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be the minimum requirement, more chambers per strata (i.e, 3 or more) is deemed the highest quality.

- We welcome feedback on specific scoring components through ongoing developer engagement and methodology development if more prescriptive guidelines for best-practice become consensus.

b. Soil pH as a predictor of N fertiliser impact: CH₄ flux monitoring should also include measurements of soil pH, as there is an established correlation between soil pH and the impact of nitrogen fertilisers on methane emissions. For reference, see: Global Change Biology – Wiley Online Library.

- Soil pH is currently only used as an indicator of potential yield losses under the *Leakage* component under the *Carbon Accounting* pillar. We are considering adding more nuance to other components by factoring in future site conditions into risks associated with other emission sources.
- Within our research we also found that soil pH can influence CH₄ emissions intensity. However, given the level of detail provided on field level soil pH in project documentation, we felt that the research did not provide enough certainty to define clear risk thresholds across projects. To avoid potential over penalization, or arbitrary results, we chose to not consider this in the first framework version. However, we are open to adding this to future versions, pending further research and discussion.

3. Project Management Plan & Farmer Training

a. Organic manure and methane fluxes: There is relevant literature on how organic manure applications can affect methane fluxes in rice paddy fields, which could inform guidance on fertiliser practices. The project management plan should consider providing advice on the types of fertilizer application best suited to reducing methane emissions. For reference, see: ScienceDirect – Benefits of organic amendments on soil C stock.

- Thank you for the comment on the impacts of manure application and methane fluxes. While Sylvera agrees that manure application can influence



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methane fluxes, it is not within the scope of Sylvera's frameworks to provide guidance on project design or practices to maximise project performance and emission reductions.

- Sylvera's frameworks provide an actionable insight into the integrity of a project's claims depending on what practices they choose to enact. For example, a project that achieves a lower emissions reduction, but reports it accurately receives the same rating as a project that achieves a greater reduction that is also reported accurately.
- *The Project Management Plan* component serves to assess whether the project has provided information on all land management practices that could have a material impact on gas fluxes in rice paddies to assess if the level of confidence that a project's emission reduction claims reflect on-the-ground practices. This assessment includes checking that the project has described manure, and amendments that could influence emissions, and has factored these into carbon accounting assumptions. However, the type of application does not affect the score; the score is only concerned with whether the application has been described, and its effects accounted for.

b. Farmer training content: The training module should provide a clear overview of the foundational skills required, including how to construct a field water tube, how to measure and interpret readings from it, and what water levels are considered acceptable. It could also explore the extent to which farmers can experiment with allowing the field to dry further – for example, testing whether water levels can drop to 20–25 cm below the surface without adversely affecting crop health, rather than defaulting strictly to the 15 cm threshold.

- It should be noted that Sylvera's framework does not provide specific guidance to farmers on AWD implementation. The framework is designed to assess whether the project has reported that farmers have been provided with

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training to implement AWD activities and how to record water-levels to assess confidence in the project's on-the-ground implementation and reporting.

- If projects wish to engage in more exploratory practices, this is acceptable under the framework provided they are well documented and the effects are tested in a reliable manner (such as robust gas chamber monitoring regimes) to verify that exceeding "safe" AWD standards have not caused increased emissions from N₂O or SOC losses that have gone unaccounted for.

4. Soil Type: Soil type classification should not be confined to SOC loss accounting alone. It should also be incorporated into the emissions sources section and N₂O accounting, as different soil types – for example, clay versus loamy soils – can have materially different emissions profiles and should be treated accordingly.

- Thank you for the comment on soil types. Soil type is currently only used in the *SOC Loss Accounting* component, as our research found the clearest correlation with soil type and SOC losses.
- We are considering adding more nuance to other components by factoring in other site conditions into risks associated with other emission sources. Within our research we also found that soil type can influence N₂O emissions intensity. However, given the limited level of detail provided on field level soil type in project documentation, we felt that the research did not provide enough certainty to define clear risk thresholds across projects. To avoid potential over penalization, or arbitrary results, we chose to not consider this in the first framework version. However, we are open to adding this to future versions, pending further research and discussion.

5. Leakage: One practical approach to estimating leakage would be to assess the total land area owned by each farmer and determine what proportion of it has been enrolled under AWD. This could provide a straightforward method for identifying whether farming activity has simply shifted to non-enrolled plots.

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- Thank you for the comment. Sylvera agrees that this would be a useful and interesting approach to capturing activity displacement and leakage.
- However, project documentation often does not provide enough granularity on farmer land-holdings, or provide shapefiles of farmer land that is not enrolled into the project (i.e., outside the project area) for third parties to assess if activity has been shifting into other portions of their land.
- If a project were to provide such, and analysis to support their leakage accounting, we would welcome this level of information and factor it into our risk assessment.
- We are open to deepening our approach to leakage, with the potential to leverage geospatial data, pending further research and development of in-house geospatial datasets to conduct such an assessment.

6. Emissions reduction monitoring: Some methodologies already allow the use of BGCMs, while others are considering adding this in the future. However, the framework currently considers only direct measurements and default factors. Given that a BGCM approach still requires a substantial direct measurement dataset for calibration and validation, how would the framework currently assess cases such as QA1 under VM0051?

- Sylvera would like to clarify that the framework considers biogeochemical models under the “measure and model approach” option within the *Emissions Reduction Monitoring* component. The full list of considered approaches will be detailed in the AWD whitepaper, to be published.
- Sylvera would consider a peer reviewed, accepted model underpinned by robust direct measurements to be a strong approach to monitoring. The approach would include checking that the model is accepted and peer reviewed in scientific literature, and that direct measurements to inform the model have followed a robust sampling regime and laboratory assessment of samples.

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ADDITIONALITY

7. Barriers to Adoption

- a. Fragmented farmer outreach: The need to engage a large number of individual farmers simultaneously can significantly hinder scale-up.
 - b. Unclear demand signal: There remains limited clarity on demand for AWD credits in the market, which creates uncertainty for project developers and farmers alike.
 - c. Financial burden on farmers: Perhaps the most significant barrier is the financial impact on farmers. AWD requires daily field visits for monitoring, compared to the once-monthly visits typical of conventional flooded rice farming. Without adequate compensation, this increased time commitment is likely to deter adoption.
- Thank you for highlighting these points. All three barriers mentioned (fragmented farmer outreach, unclear demand signal, and financial burden on farmers) are captured within the framework's existing Additional Barriers assessment, a subscore within the Common Practice subpillar of Additionality.
 - The Additional Barriers assessment is designed to determine whether communities face significant barriers to implementing AWD activities, including knowledge gaps, insufficient support, and inadequate infrastructure. The three barriers raised map directly onto this criterion.
 - Where evidence of significant barriers is identified, the framework assigns the highest modifier level and requires the analyst to document the specific barriers faced in the commentary. This means the granular detail raised in points 8a–8c would be captured in the assessment narrative, even though the scoring operates at the aggregate barrier level.

PERMANENCE

No Comments



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SAFEGUARDING AND CO-BENEFITS

8. Community Co-benefits: From a community perspective, AWD can facilitate easier crop residue management. Because soils are better aerated under AWD conditions, farmers are better positioned to incorporate rice straw and other crop residues directly back into the field rather than burning them. This has positive implications for local air quality and broader environmental health. For reference, see: Capital – AWD: Method, System, Price, International Framework.

- Thanks for highlighting another potential co-benefit. Under *Community SDGs*, we assess the project's design and match any activities that clearly align with SDG targets and indicators. Under this framework, a project has the potential to contribute towards any of the 17 SDGs as long as the project provides clear evidence of a positive impact on the given SDGs.
- We've included consideration of whether projects demonstrate an improvement in rice straw management (a change in baseline practice of burning), which would be rewarded with contributions to SDG 3 (Good Health).

9. Environmental Damage & Pollution Prevention: It would be valuable to compare outcomes against a baseline monitoring dataset, as wet-dry cycles characteristic of AWD are known to suppress the overgrowth of invasive aquatic plants such as duckweed. Capturing this as a measurable benefit would strengthen the environmental co-benefits case for AWD.

- Under *Biodiversity SDGs*, we check whether projects demonstrate clear evidence of positive impact on SDG 15, Life on the Land. The more activities a project contributes to and monitors, the higher the score.
- This includes consideration of whether projects document invasive species coverage before and during project implementation. Projects that demonstrate a reduction in growth would contribute to a higher score.



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10. Going back to farmers' welfare from AWD, what is a ballpark estimate for the amount of additional annual income (USD per hectare per year) from carbon revenue is considered to be meaningful?

- When assessing farmer welfare from AWD projects, we evaluate whether carbon revenue provides a meaningful contribution to farmers' seasonal costs. We consider the proportion of seasonal input costs covered by carbon revenue to be the most relevant measure of impact, recognising that absolute dollar-per-hectare figures are difficult to compare across geographies with different input cost structures.
- We acknowledge the following limitations in available data:
 - MRV costs vary, as do structures for how project developers aggregate and distribute costs to farmers
 - Disclosure of the proportion of costs covered by carbon revenue is frequently limited; where reported, figures are typically given as additional annual income rather than explicitly as a share of costs
 - Available benchmarks are sparse and largely drawn from single-project pilots, making it difficult to set universal thresholds
- Given this, we do not apply fixed cutoff percentages at this stage. However, we would consider carbon revenue that covers a meaningful share of seasonal input costs to be a positive indicator of farmer welfare, with higher proportions indicating a greater impact. Projects that disclose this figure in quantified terms are assessed more favourably, as transparency is itself an indicator of equitable intent.

OTHER COMMENTS

11. Framework Scope: Is there a specific reason why DSR activities (including improved irrigation management) are out of scope in the framework, while they are explicitly covered under the respective methodologies?

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- Thank you for raising this. The current AWD framework has been scoped specifically to address Alternate Wetting and Drying practices, and does not extend to other rice cultivation activities. This is a deliberate boundary of the framework's current scope rather than a reflection of those activities' merit.
- We recognise that the underlying methodologies – including those from Verra and Gold Standard – do accommodate a broader set of water management interventions. However, Sylvera's assessment framework was developed with a defined scope of work in mind, to expand coverage to AWD activity types following an internal prioritization process, and scoping decision.
- Expanding the scope of the framework to other activities requires its own dedicated development process to ensure the rigour and specificity that our ratings are built on.
- We are continuously reviewing where to extend our framework coverage as the market evolves. If DSR activities are of particular interest, we'd welcome a conversation about how that might be factored into future roadmap considerations.

12. As a rough range, how much CO₂e does a typical hectare of rice farming emit per year with continuous flooding

- Based on the literature, a typical continuously flooded rice paddy emits roughly 8–12 tonnes of CO₂e per hectare per year, with methane (CH₄) being the dominant driver given the anaerobic decomposition conditions.
- In practice, the range can vary widely – figures can be as low as 4–5 t CO₂e/ha/yr up to 15–20 t CO₂e/ha/yr or more – depending on several factors, including:
 - Region/climate
 - Season length and number of crops
 - Organic matter inputs
 - Soil type
 - Water management history



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- The IPCC default emission factor for continuously flooded rice (no organic amendments) is around **1.3 kg CH₄/ha/day**, which translates to roughly **8–9 t CO₂e/ha** for a 120-day season.

13. Can you say anything about the current state of methodologies vs your requirements?

- Thank you for the question. The Sylvera AWD framework has been designed to be methodology-agnostic – it does not prescribe or favour any particular registry methodology, and projects registered under Verra, Gold Standard, or other crediting programmes are all within scope for assessment.
- Rather than evaluating whether a project conforms to a specific methodology, our framework focuses on the underlying quality indicators that determine whether the claimed emissions reductions are credible: the robustness of the baseline, the rigour of water level and emissions monitoring, quantification approach, additionality evidence, and safeguarding outcomes.
- In terms of how current methodologies map to our requirements, there are areas of strong alignment – for example, where methodologies require direct water level monitoring, gas chamber measurements, or field-level baseline documentation, these tend to score well under our framework. Areas where we observe more variability across projects include the granularity of baseline characterisation (particularly distinguishing field-level versus regional data), the robustness of CH₄ flux monitoring design, and uncertainty accounting – all of which our framework assesses with a degree of specificity that goes beyond what most methodologies mandate as a minimum.
- In short, compliance with a methodology is a necessary but not sufficient condition for a strong Sylvera rating. Our framework is designed to differentiate quality within and across methodologies, not to validate methodology conformance itself.

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