Stanford Law School

Crown Quadrangle
559 Nathan Abbott Way
Stanford, CA 94305-8610
Tel 650 723-2465
Fax 650 725-0253
info@law.stanford.edu
www.law.stanford.edu

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Dear Climate Action Reserve RCPP Working Group,

Thank you for the opportunity to comment on the Rice Cultivation Project Protocol V1.0. My name is Michael Wara, I am an Associate Professor at Stanford Law School where I teach environmental law, energy law, real property, and international environmental law. My research concerns the design of carbon markets with a particular focus on offset regulation and policy. I must preface these comments with the disclaimer that they in no way reflect the views of either Stanford Law School or Stanford University.

I commend CAR and the working group on the excellent work so far on the protocol.

My comment concerns section 5.17 and Appendix C, both of which detail the protocol's approach to model structural uncertainty. The approach taken is a good one provided that there is evidence that all assumption required for it to work are true (or approximately true) and there is sufficient data to calibrate the uncertainty model. **Given the importance of this model in quantification of credits under the protocol, it is important that, even in V1.0, both proof of underlying assumptions and calibration datasets be adequate.** I am concerned that they are not yet of sufficient quality to allow for quantification of reductions with a similar accuracy and precision as other CAR protocols.

Given the data included in Appendix C and in the underlying work by EDF[1] I question whether there is sufficient evidence either to support the second and third assumptions necessary to apply the uncertainty approach or that the data is sufficient to allow for quantification. The fundamental problem at this point is that there is only 1 field measurement made from a field that employed dry seeding and it is not clear whether or not this field then adopted the recommended practice in the Protocol of delayed flooding.

Appendix C states that three assumptions must hold in order for the uncertainty quantification to produce accurate results. First, the model error must be multiplicative. I see no reason to question that this assumption is correct. Second, the model calibration technique must produce no bias and a

[1] Environmental Defense Fund. (Period Covered by Report: October 1, 2007 to September 30, 2010). Creating and Quantifying Carbon Credits from Voluntary Practices on Rice Farms in the Sacramento Valley: Accounting for Multiple Benefits for Producers and the Environment. Final Report for Conservation Innovation Grant (CIG). Agreement Number: NRCS 69-3A75-7-87 Report published: 2011.

log normal error distribution. I would simply ask what evidence we have that this is in fact the case? How sure can we be that the calibration process adopted in the protocol does not lead to bias and or some other error distribution? Given that EDF only measured one field adopting the practice most likely to be credited under the protocol, it's not clear to me how this can be demonstrated with any confidence. **Please explain what other evidence the protocol development team has for the claim that assumption 2 is valid for the RCPP.**
The final assumption required in order for the uncertainty estimate to be valid, is that baseline and alternative treatment must be 100% linearly correlated. Given the complexities of redox chemistry, I would find it rather surprising if this were the case. Given that the evidence we have for the RCPP that it is the case involves comparison of several measurement-model pairs of the baseline treatment but only ONE measurement-model pair for the dry seeding treatment, we cannot be sure that this is the case. There is no way to establish a linear correlation of the type described in Appendix C with only one data point for the treatment. **Please explain what other evidence the protocol development team has for the claim that assumption 3 is valid for the RCPP.**

Finally, it's worth noting that, even if the assumptions presented in Appendix C turn out to be valid for rice cultivation in California with various treatments, the data presented in the Appendix are likely inadequate to characterize the response of fields to treatment. Again, I must repeat that there is only one measurement in a field employing the practice most likely to be adopted under the protocol. Given the variance in modeled emissions demonstrated for California rice fields in the EDF report, this seems inadequate. In order to calibrate a model, we need to know how a representative sample of fields that span the range of conditions relevant to CH4 emissions will actually respond to the treatment of dry seeding and delayed flooding. **CAR, in cooperation with stakeholders, needs to generate a dataset from a representative set of fields employing the project activity that will allow for accurate and precise estimation of structural errors. Alternatively, CAR should explain why this is not necessary in order to calibrate the model and estimate its structural error rate.**

The protocol mentions that as and if data becomes available, it will be incorporated into the assessment of structural uncertainty. **This updating is inadequate since credits will have already been issued (and potentially overissued) from projects that use V1.0 if and when such data becomes available**. I would emphasize that I am not suggesting a massive field campaign is required. Merely that we have more than 1 data point per project activity. Even a handful of measurements of emissions from each treatment would go a long ways towards increasing confidence in assumptions and error estimates. We need to have better data before we credit, not after. This is particularly true if this protocol is intended to be incorporated into the AB-32 cap-and-trade program, which will expose the buyers of these credits to liability if structural uncertainty turns out to have been underestimated.

In closing, I want to again emphasize what a tremendous accomplishment the RCPP V1.0 is. This protocol has the potential to produce the first highly credible and widely applied agricultural offsets. It also may become the first compliance grade agricultural offset. CAR and interested stakeholders have a strong interest in getting this protocol right and getting it right the first time. A relatively quick fix in terms of data collection this season could go a long ways towards insuring that farmers, compliance buyers, ARB, and environmental NGOs come to view this protocol as precedent for how agricultural offsets can be done right rather than an example of offset regulation gone awry.