C-AGG uncertainty workgroup update

Overview of Uncertainty Workgroup

- 1st version
  - Scoping of all issues
  - Lengthy
  - Too complicated for a more applied audience
  - Not in-depth enough for a technical audience
- 2nd version
  - Questions were introduced
  - More technical sections moved to appendices
  - Still hard to digest
  - Connection between the appendices was not immediately apparent

Overview of Uncertainty Workgroup

- 3rd version
  - Took a step back and discussed key statements with the whole uncertainty workgroup
  - Paper was completely restructured around the key statements and questions.
  - 3 closely related products
    - Key statements developed by the whole workgroup
    - C-AGG white paper that expands upon key statements and is meant for applied audience
    - Paper to be submitted for peer review

Peer-review paper

- Focuses on the statistical derivation of 2 key aspects
  - Impact of geographical scale on uncertainty and a mathematical derivation
  - Rationale for determining the geographic applicability area of a model.
    - When is a partial re-validation necessary?
    - When is a full re-validation necessary?
- Submitted to special issue themed around smallholder agriculture in developing countries

White paper v3

- Key statements = summary of the white paper
- Body of the paper = story of how key statements are connected
  - Sources of uncertainty
  - Structure of uncertainty
  - 2 key questions
    - What is good enough in terms of model performance?
    - How can we manage the remaining model uncertainty?

Key statements (1/3)

- **Statement 1**. Models (empirical or mechanistic) can be useful to quantify emissions when they are applied under the conditions for which they were developed.
  - Evaluating the applicability should include **key parameters** that are to be used to evaluate the applicability of a model. Empirical models should be **limited** to use in conditions under which they were developed, including soil types, climate, crop types and cropping systems, etc. Mechanistic—or process-based—models require parameterization and calibration to simulate agricultural systems, and careful analysis and decision-making is required to address the **adequacy** of these activities, including when re-calibration is required.
  - **Field data** to assess model accuracy, and ultimately improve model performance, is currently limited and varies in quality. Future analyses should take into account the potential **error of field measurement data**.
- **Statement 2**. More field data sets are required to support the implementation and expansion of models in agricultural offset programs. The creation of a **central data repository** to house these data sets is recommended.

Key statements (2/3)

- **Statement 3**. When models are used, analyses of both **structural and input uncertainty** related to their use must be completed. Structural uncertainty should only be quantified using measured field data which was not used for model development.
- **Statement 4**. If program integrity requires that GHG emission reductions are not overestimated, an **appropriate deduction** should be calculated and applied to model-estimated emissions reductions based on both input and structural uncertainty.

Key statements (3/3)

- **Statement 5**. When many sites are considered together, the **sum of their emissions** (or emission reductions) will have less uncertainty than any individual site considered alone. Therefore, the **deduction** for structural uncertainty will **decrease** as scale is achieved. Offset programs should pursue policies, such as **aggregation**, that mitigate this uncertainty and encourage greater participation from the agricultural sector.
- **Statement 6**. The most feasible level to account for model *structural uncertainty* is at the **program level**; *input data uncertainty* may be most appropriately accounted for at the site, project, or program level depending on a variety of considerations.