



**C-AGG Meeting Summary**  
**Tuesday-Wednesday, November 5-6, 2013**  
**Madison Loews Hotel – Washington, DC 20005**

*All speaker presentations are available on the C-AGG website*

<http://www.c-agg.org>

*This is a summary of the proceedings from the November 2013 meeting of the Coalition on Agricultural Greenhouse Gases (C-AGG).*

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## Executive Summary

Key areas of discussion and outcomes of the meeting were:

- coordination between carbon and other environmental markets;
- C-AGG comments on the USDA GHG quantification report;



- a proposed approach to aggregation and verification for agricultural offset projects, with a primary objective of identifying a successful approaches for ARB consideration within the CA Cap-and-Trade program;
- continued discussions about the need for access to agricultural data for environmental market-based opportunities for the agricultural sector; and
- Federal agency and legislative briefings and dialogues on carbon market opportunities, successes, and challenges for the agricultural sector, focusing on the importance of partnerships and collaboration as key to success. The joint USDA-C-AGG briefing celebrated the ongoing collaboration between USDA and C-AGG, particularly working with and supporting the GHG CIG projects. The briefings were delivered by C-AGG participants invested in and engaged in projects, and provided the perspectives of:
  - agricultural producers;
  - project developers/aggregators;
  - carbon offset/market registries; and
  - agricultural carbon offset buyers.

Access to agricultural data was discussed in response to the update on the USDA GHG Quantification Report, and in the subsequent discussion of C-AGG comments to USDA on the draft report. It was also identified as a main element in the discussion of aggregation and verification for agricultural offsets. Project developers indicate it has been difficult to get data from USDA National Agricultural Statistical Service (NASS) and from the ARMS survey due to privacy concerns of the growers; however, it can also reduce data collection burdens on growers for the purposes of participation in environmental services markets. This data is deemed necessary or useful for establishing baselines for practices and use of inputs, for building rate tables as well as for use of methodologies and tools. Another anticipated need was data for price discovery, and it was suggested that C-AGG reach out to USDA's Agriculture Marketing Service (AMS) about ways to provide market transparency. Separately, there are private companies that routinely collect data to support farm operations and who might have an interest in providing data as a value added service to their clients, but they will not do this without approval of their clients (growers). At present, the economic driver for data sharing is not there. It was concluded that there needs to be a path to have discussions with growers about the value of sharing this data. USDA also wants to strategically reach out to producer groups on this, to better understand the challenges and the reasons for their reluctance. A high priority for C-AGG is to hold data workshops with USDA, and to begin to more specifically define data needs for ag offset markets. C-AGG has sent a written request to USDA for data workshops, and has funding for these – providing they take place prior to the end of the funding cycle, in April 2014.

A focused discussion was held on the potential for C-AGG collaboration with a new *National Network for Consistency and Integrity in Water Quality Trading*. A key concern identified by the network is the need for consistency among tools and guidelines for the multiple environmental markets and conservation programs so that farmers can more easily consider whether and which programs to participate in. There



is also a need for consistency across water quality initiatives, which have to date developed separately in single watersheds, and standards are needed for multi-state schemes. Key points from the discussion:

- EPA buy-in is important.
- At present, Winrock is considering including water quality in the ACR registry. VCS considers it only as a co-benefit, and CAR considers it from an additionality perspective.
- Payments for water quality may be more significant but combined with carbon payments could leverage large reductions in nitrate leaching.
- Carbon markets have evolved with quite rigorous requirements because of the international dimension but this is also important for water quality and the framework may be of interest to the IJC for the Great Lakes.
- An important difference between these markets is that water quality is easier to measure and has localized impacts. Carbon buyers rely on information that comes with the credit – additionality is everything.
- Another observed difference between these markets is USDA support. Might USDA be able to engage in and provide a foundation for water quality markets?
- It is important to get money on the table for demonstrations that allow all the necessary dimensions to be tested, identified, and worked through.

Marlen Eve gave an update on the USDA GHG Quantification Report, which aims to bring together all farm and forest activities behind the farm gate into a seamless GHG flux estimation tool. In response to prior C-AGG input, USDA is beginning a more coordinated approach to tool development – in particular, regarding the new tool and COMET-Farm.

In the discussion, trade-offs between certainty and ease of use were discussed. It was suggested that the tools be regionalized, so that communications can be tailored for those with particular cropping systems and in particular regions.

Following a walk-through of the preliminary and new comments submitted by C-AGG on this report, it was specifically suggested that these include a recommendation that the report ensure the tools are not overestimating GHGs, that it help users understand how uncertainty is addressed, and consider including emissions from land conversion. Road testing was also suggested, to identify regional differences, and help avoid unintended consequences.

In response to some of the comments discussed, Marlen Eve offered clarifications:

- As it is now, Table 8 (in the draft report) is intended to indicate where information is incomplete, provide transparency as to what we do and don't know, and show that there are limits to calculating uncertainty. However, there is the intent to add Probability Density Functions to the cells.
- The “Q tool” will ultimately be integrated into COMET Farm.



- Although the tool may be useful for EQIP decisions about cost sharing, for now there are no plans to tie the tools to conservation programs. The tools and methods are only intended to develop USDA's in-house capability to quantify GHG emissions and emissions reductions linked to agricultural and forestry activities.
- A USDA report is anticipated in the future that will link economics to GHG estimation.
- On-farm energy use will be part of the tool, and changes in fuel use will need to be considered if economic and GHG impacts are considered, but the report does not provide guidance on this since it falls under the purview of other federal agencies.

Regarding aggregation and verification for agricultural offsets, a review of recent C-AGG activities in this area was used to kick off the discussion. At an October 9 C-AGG workshop on this topic, held in Sacramento, C-AGG proposed a new concept to ARB to reduce the costs of verification, in which aggregators serve as the legal entity interfacing with ARB. A single verification, involving a risk-based statistical sampling approach, would be required for all fields participating in a single project. ARB considered the proposal, but indicates an entirely new approach such as this is problematic, and suggested C-AGG seek an approach consistent with their cooperatives framework found in ARB's forestry protocol.

In a more detailed discussion of an approach consistent with this, continued concerns about costs were voiced. Volume is needed to achieve economies of scale for agricultural projects, but a 20% verification sampling rate would require expensive field visits. Given sufficient volume, the use of an aggregator is more efficient because it lowers verification costs. A large enough farmer may be able to do this, but most would not.

The American Carbon Registry (ACR) and the Climate Action Reserve (CAR) provided updates on newly developed methodologies and those under development, and also discussed their approaches to aggregation and verification. These updates generated some discussion about whether the numbers are realistic in the CAR approach to verification – aggregates of 10 fields would not produce nearly enough revenue to make sense to an aggregator. It was suggested by an aggregator that for a project to be economically viable it needs to generate at least 50,000 tons of carbon offsets per year. One ton per acre is optimistic for rice in California. The required number of site visits would not be feasible or economically viable.

In developing a modified approach to aggregation and verification to address ARB's feedback, the group reviewed what the overall process of aggregation would look like, what is missing from current approaches, and what it will take to make it work. A key issue was how to handle cases in which fields become inactive for various reasons, (e.g., the farmer dies, is found fraudulent, or refuses to provide information to the aggregator). As a general rule, zero credits would be reported for these fields but the project as a whole would not be terminated unless systematic error in the project is detected. If a farmer is found fraudulent after the fact, the verifier is likely not doing a good job. If fraudulent credits are sold, the buyer could go after the project developer. Also discussed were the pros and cons of locking farmers into 5 year contracts in order to recover the upfront costs of project implementation.



Although it was recognized that some of this is the cost of doing business, some commitment and mutual understanding is necessary because a new baseline would be needed if a farmer drops out and joins again. Management of agricultural data was identified as the key element of adequate aggregation and verification (see data discussion, above). There are projects in the voluntary space that are expected to provide proof of concept but they are small. There are also lessons from Alberta for very large projects.

It was concluded that the model proposed and discussed at the meeting is plausible but data needs are still an important factor for success, and data is expensive. There is a strong desire to field-test the approach, e.g., a pilot project to demonstrate the feasibility to ARB, and it was suggested that USDA might be the place to look for investment.

*Key Outcomes/Messages from day 1 included the following:*

- ARB engagement continues to be complicated. A smaller working group might be needed to go to the next step.
- USDA has been taking action on many of the initial C-AGG comments and recommendations regarding the GHG quantification report, and looks forward to additional comments.
- A breakthrough is needed on the carbon/water interface to create market-based opportunities for the agricultural sector.
- Economies of scale are critical for making sure that all parties are able to get what they need from the revenue stream in ecosystem service and GHG markets for agriculture.
- Dollars don't currently match the needs. The process needs to be simplified to be feasible for farmers or their hired help.
- Carbon alone is not a sufficient source of revenue.
- Execution enables learning. The participants would like to field-test an aggregation/verification approach (as proposed and discussed) within a demonstration project, but financing and data are required. USDA was suggested as a partner and source of financing.

The morning of the second day of the meeting was dedicated to prepping for the afternoon's joint USDA/C-AGG briefing, and the Senate Committee staff briefing; and the afternoon was dedicated to the briefings. At the joint USDA-C-AGG briefing, a key message and outcome is that continued partnerships and collaboration will help to foster ongoing successes and to leverage resources needed to build out the infrastructure and the programmatic underpinnings of successful market-based ecosystem and carbon offset opportunities for the agricultural sector. USDA's leadership expressed a continued interest in opportunities to highlight projects that demonstrate the positive role of agriculture and forestry with respect to climate change mitigation. There was some discussion about the importance of producing publications based on C-AGG's experience, including articles in peer-reviewed journals. Key issues are simplifying complexity so as to increase the farmer's and project developers/aggregators' return on investment (ROI), while increasing accuracy of measurements. Also, carbon revenues are currently not sufficient to build a business case for action, but many of the practices for GHG emissions reductions have associated water quality and other ecosystem service benefits which need to be



accounted for and stacked to generate additional farmer revenues for these services. The learning and rigor gained through the GHG CIGs can be applied to other conservation programs.

The C-AGG GHG CIG presentation was redelivered in the Senate, where attendance was good, and questions related particularly to incentives for producers and buyers.

Key outcomes and messages from day 2 included the following:

- Overall, the briefings were a successful opportunity for C-AGG to communicate its role in partnerships and leadership in the agricultural GHG mitigation space;
- C-AGG's outreach and documents and reports help to identify and address critical programmatic and policy-related needs to develop successful frameworks for agricultural GHG mitigation opportunities, particularly voluntary, incentive-based opportunities; and
- C-AGG's multi-stakeholder approach continues to promote strategic opportunities and add value by contributing to critical on-the-ground demonstrations that show carbon offsets can work for the sector, and by identifying continued challenges and future needs.

## **Actions and Information Items**

- The next two C-AGG meetings are scheduled for March 4-5, 2014 in Sacramento, CA, and July 15-16, 2014 in Denver, CO.
- Minor additions were suggested to the draft C-AGG comments to USDA on the GHG Quantification Report, which were deemed ready for final submission to USDA.
- Debbie will follow-up with USDA on federal data workshops to begin discussions of specific current and future data needs; and pursue potential USDA financing of a demonstration project utilizing the aggregation/verification approach proposed and discussed at the meeting.
- More publications documenting C-AGG's learnings are desirable, including peer-reviewed, published articles.
- C-AGG will inquire about receiving systematic updates from USDA on development of the Regional Climate Hubs.
- A desire was expressed to provide continued input to USDA on research priorities for market-based ecosystem and carbon offset opportunities.



## FULL MEETING SUMMARY

**Tuesday November 5, 2013**

### **Introduction, C-AGG Background, Meeting Objectives**

Debbie Reed, Executive Director of C-AGG, welcomed participants and introduced Laura Wood Peterson, the newest member of steering committee. She then provided an overview of C-AGG and did a walk-through of the meeting objectives.

#### *Meeting Objectives:*

- Discuss C-AGG input to the USDA GHG Quantification report, following an update on the status of the report by Marlen Eve from USDA;
- Discuss proposed agricultural offsets approach to aggregation and verification for consideration by the CA ARB;
- Discuss a collaborative opportunity with the National Network for Consistency and Integrity in Water Quality Trading; and
- To brief relevant staff of the US Administrative and Legislative branch on C-AGG activities.

### **Assessing the Landscape**

As part of what has been a historical piece of C-AGG meetings, "Assessing the Landscape," the group was asked: What is happening out there? What are participants tracking? What about the Farm bill?

- There is a preference for the Senate version of the farm bill
- The rice protocol will be considered for adoption by ARB in the Spring - a key concern is how to handle aggregation for purposes of ARB compliance
- A Biochar protocol is under development by The Climate Trust and partners, including the International Biochar Initiative
- CA ARB policies are being tracked and closely watched by C-AGG participants
- There exists overlap and challenges of coordination between carbon markets with water quality trading and other environmental markets, e.g., how to set baselines and determine eligibility. Lessons that can be derived from the more rigorous carbon markets for targeting other conservation dollars
- Integration is sought among data intensive tools for quantifying carbon and other relevant nutrients for agricultural ecosystem service market opportunities (e.g., DNDC and NTT models)
- Guidance on stacking and bundling is limited - it is important to many and should be discussed at future meetings.
- The development of policy measures and tools for tracing and enhancing the environmental footprints of supply chains continues. The Rainforest Alliance is working on this in partnership with TFA 2020.



- C-AGG letters to USDA on learnings from the CIGs and preliminary comments on the GHG quantification report and Q tool were much appreciated by USDA.
- C-AGG should track the Regional Climate Hubs - selections are expected by early December. Stay tuned for more information and let USDA know that the ability to receive systematic updates is important to the group.
- The recent Federal government furlough may impact farmer income and delay the next EQIP sign up. The furlough impacted the Natural Resource Conservation Districts because many of these share office space with NRCS, and, it brings more uncertainty to conservation funding.
- Shrinking conservation funding has led to increased emphasis on public-private partnerships at USDA.

## **National Network for Consistency and Integrity in Water Quality Trading (NNWQT)**

C-AGG Steering Committee members Jimmy Daukas (American Farmland Trust) and Laura Wood Peterson (National Association of Conservation Districts) introduced and led a discussion on this new alliance, which was formed to align nutrient and water quality issues with carbon.

There are many overlaps between different environmental markets (e.g., carbon, water, habitat), but in the end there is only one set of farmers, landowners, or ranchers who are the focus of these multiple programs. Therefore, coordination of efforts is very important. The farmer needs to consider whether and which programs to participate in, and having many different tools and guidelines complicates decision-making and participation. Water quality trading (WQT) has largely developed in single watersheds over the past 10 years. There is a need for coordination and consistency among these initiatives as well as across states. Key initiatives include the OH basin activities and the Willamette effort in the PNW – the network is getting these groups together to review progress and to develop white papers, and to identify best practices for approaching these issues. The network mission is to improve consistency and integrity, and ultimately, create robust markets.

A key point is that standards are needed for multi-state schemes. For example, there are 3 states in the OH basin. NACD involvement is relatively new, but conservation districts have credibility with the farming communities and can play an important role in aggregation, verification and technical assistance to enable new revenue opportunities for producers, and to implement programs more cost effectively.

Key partners funding the network include WRI, the Willamette Partnership, and USDA. Other partners include AFT, NACD, Freshwater Trust, and EPRI. Participants are included from both the Supply and demand sides, but more suppliers and market developers are needed.

12 core trading program elements have been identified that affect how markets work:

1. Regulatory Instruments to Support Trading
2. Eligibility for Water Quality Trading
3. Determining Baseline & Additionality Requirements

4. Quantifying Net Uplift
5. Trading Ratios and Reserve Pools
6. Credit Characteristics
7. Project Implementation & Quality Assurance Standards
8. Verification and Certification
9. Registration
10. Compliance Determination & Appropriate Enforcement Actions
11. Adapting Program Elements & Tracking Effectiveness Over Time
12. Roles, Responsibilities, & Transaction Models

Option papers on these elements will address how to evaluate options, and will be published for public comment in spring 2014. The goal is to have set of final documents by next fall that project partners can sign on to.

*Discussion:*

EPA has been supportive of the effort and has participated in meetings, and has made an effort to move the discussion forward. It was suggested that the network involve the advisor to the EPA administrator for agriculture, Sara Bittleman.

Asked whether voluntary registries have considered adding water quality impacts to their GHG and carbon trading efforts, VCS indicated it considers water quality as a co-benefit, but it may be worth looking at how to bring these together in one program. Winrock is looking at the prospect of including water quality in the American Carbon Registry (ACR). Jon Winsten noted that he has been working in water quality longer than GHG and was attracted to carbon markets because they are comprehensive and performance-based, and are also further ahead (technically). At the farm level, payments for water quality services may be more significant, and since many of the same practices reduce GHG emissions also, carbon payments may build a stronger business case. Carbon payments might be small, but combined, the approach could lead to significant nitrate/nitrous oxide reductions.

In rice cultivation, the focus is on N management and irrigation water management which are compatible. An additional benefit of water quality practices is often reduced energy use. However, rice acreage in the US is limited. The Mississippi basin initiative is one that should be looked at. Conservation districts may be a good local sponsor for some demonstration projects.

Clarification: For key program elements of water quality trading systems, NNWQT aims to identify which have agreement among partners. Where there isn't agreement, the network aims to identify options.

Comments in response to concern with parallel play among programs: WQT programs are often watershed or state specific. What is needed is to move forward with pilot trades that provide experience with addressing verification issues, and to link activities already underway. The lack of dialogue across existing programs can hinder market development, and a few bad markets that lack integrity can hinder



markets elsewhere. Key issues are: how to develop markets faster, how to identify best practices, and how to share valuable lessons learned, and bring everyone to the table early on.

Question: There are procedures for demonstrating additionality for carbon. To what extent can the methodological framework for water credits be linked to those for other markets?

Answer: There is no consistency across water quality systems themselves. There is a lot of separate work on similar issues that is not using or building on work already done. Water quality trading is similar to carbon in terms of protocol development, but is a Clean Water Act requirement. In carbon markets there is a baseline requirement. We need to identify best practices between markets.

Comment: Water crosses borders, so international aspects need to be considered. Water quality trading started earlier but carbon markets have developed further due to the UNFCCC. The International Joint Commission (IJC) for the Great Lakes might be a natural partner here to jumpstart movement in water quality markets, and engage farmers early on.

Comment: Regarding additionality, carbon and water quality markets are more in sync than we think. However, there is a need to build experience in water quality trading as has been done with carbon.

Clarification: The intent is not to produce an academic paper on additionality or other aspects of water quality trading, but rather to examine what is being done in various places, to identify consistencies that would help move things forward, and to enable learning from experience. These markets are moving in a complimentary direction.

Comment: We need to evaluate what makes sense for markets before figuring out what science and policies are needed to make them work. The difference between water quality markets and carbon markets is that nutrients in water are easier to measure and have more localized impacts. Carbon buyers rely on information that comes with the credit, but with a water credit, impacts are more direct and measurable. Additionality is everything for the carbon market because without offset quality we are not necessarily reducing GHGs.

Comment: \$10/ton for carbon ends up being \$5-6/ton for the grower, after all other costs are considered. The priority should be to get money in early and see how it works rather than to undertake more studies. In Arkansas there is a serious water quality effort and they are looking at reduced fertilizer applications, but it is not clear where that fits into these approaches.

Response: What if a farmer can get \$1000 an hour for the effort to collect data records? As context, The Climate Trust has just signed checks to farmers which were the equivalent to \$1000/hour for data collection if looked at in terms of value for time. But the market has to be created first. Without a credible, profitable market we are wasting time.

Response: Data collection can double a farmer's management time until they know what to collect and how to collect it.



Comment: The carbon market space is vastly different from water quality trading in part because climate change is more pressing, and in part because USDA has been supporting it. What if USDA was able to pay for water quality outcomes according to some protocols and lay the foundation for water quality trading markets?

Comment: Regarding fertilizer application rates: we see the same challenge on multiple fronts: water, carbon, and sustainability. These are tied to the application rate because that is an easy metric, but quantifying only on rate is not accurate. We can see gains in efficiency and productivity by changing the practices and not the rate. For example, if a corn grower in the Midwest has been applying 200 lbs of N in the fall and switches to 100 lbs on N in the fall with an inhibitor; then applies 50 lbs around planting and another 50lbs as side dress he has applied the same 200 lbs, but in a way that it is more available to the plant when it needs it.

Unfortunately, right now, rate is the best metric available because we lack sufficient research to be able to accurately quantify emission reductions based on practices. The literature review within the USDA methodologies report draws a similar conclusion. The same thing is happening with water quality trading - we don't know the effects of particular practices. The fertilizer industry has created a 4R Research Fund to fill in some of the gaps regarding effects of 4R related practices, but the needed effort is still beyond what we can currently accomplish.

Concluding comment: We can now apply practice to theory with on-the-ground projects; until C-AGG started working with the GHG CIG projects a lot of our discussions remained theoretical or based on/in research.

## **USDA Climate Change Program Office – Update on the Draft USDA GHG Methodologies Report and Linkage of USDA GHG Tools and Calculators**

Marlen Eve, from the USDA Climate Change Program Office (CCPO) discussed development of the report on ***“Developing Science-Based Methods and Technical Guidelines for Quantifying Greenhouse Gas Sources and Sinks in the Forest and Agriculture Sectors.”***

He thanked C-AGG for their input over the years and said that a response to C-AGG’s (August) letter on tools is in the mail. The effort that went into it raised concern about the coordination of tools to the Undersecretary level. After he provided background and context on the Methods report there was a discussion of how they are beginning a more coordinated approach to tool development.

USDA’s report shows the development of science based methods and technical guidelines for estimated GHG emissions and emissions reductions from agriculture and forestry. The mandate for this came from the 2008 farm bill:

“The Secretary shall establish technical guidelines that outline science-based methods to measure the environmental services benefits from conservation and land management activities



in order to facilitate the participation of farmers, ranchers, and forest landowners in emerging environmental services markets” with priority given to carbon (GHG) markets.

CCPO aims to create standard methodologies and tools to quantify GHGs that are user friendly, transparent, science-based, and can help landowners understand the impacts of their practices. USDA’s Office of Environmental Markets (OEM) is looking at other environmental services.

The proposed methods are for use on a whole farm/forest basis, i.e., a land entity in total. There has been much work on crop and forest land. The question is how to bring together all activities behind the farm gate into a seamless GHG estimate?

Key considerations for the authors:

- Transparency
- Consistency
- Comparability
- Completeness
- Accuracy
- Cost effectiveness
- Ease of use

The Report’s intended use is to provide a blueprint and scientific basis for estimates as well as background information on tool and methodology development. Although the tools are intended to provide landowners with a better understanding of the GHG impact of their decisions, and enable them to decide if and when to enter markets, the report itself probably won't be seen by producers.

The Report will also be used by USDA to assess GHG performance of conservation programs, for example, to determine if EQIP practices produce GHG benefits. USDA hopes the information will also be of use to other stakeholders, i.e., registries, industry, and sustainability initiatives.

The science based methods were developed by expert panels and put through several rounds of review. The first draft was circulated to USDA technical staff and sent back to authors for revisions. The circle was then broadened to other agencies, resulting in more feedback, discussion, and changes to the document. It was then sent to scientific expert reviewers - an initial list of 360 recognized experts was narrowed to 50, of which 30 accepted, and 29 sent in a total of 920 comments. It took a long time for USDA to incorporate responses to all of those comments.

The Report was then sent out for public comment, which happened to overlap with the Federal government furlough. Therefore the comment period has been extended to November 11 but comments can no longer be submitted through the Federal Register portal – instead, they can be sent to Marlen Eve via email. Authors will be asked to respond to the public comments. The report is expected to be published in spring of 2014.

Notable changes:

- New N<sub>2</sub>O methodology developed.
- New approach to forestry included, which integrates dynamic modeling
- Uncertainty assessment: This is a huge area that will continue to develop. The question is how to look at uncertainty of multiple activities at the farm scale? They have a good idea of uncertainty around cropland soil and forest carbon, but know little about the impacts when these are combined into one estimate.
- Research and data gaps: the research teams were asked to identify these and they hope the report will be used to drive research and data collection effort towards closing these gaps, which will strengthen the tools.

The report is 565 pages, broken down by sector (see slide below), with uncertainty at the end:



Regarding a few of the specific chapters:

- Land Use Change is a complicated area. The key question is: What happens when land use is changing between sectors after the individual sectors have been evaluated?
- Wetlands: Like N<sub>2</sub>O, there is a lot of missing data but it is included to elevate the discussion.

What is not included in report?

- Emissions related to on-farm energy use – because it is the role of EPA and DOE to provide energy guidance. But NRCS is moving in the right direction with respect to the tool for this.

- Indirect emissions due to manufacture or transport of management inputs (i.e., fertilizer, pesticides) – because the focus is on inventory behind the farm gate, and when the landowner decides to apply or implement a practice. USDA decided against including a lifecycle analysis.
- Policy specific frameworks such as additionality and leakage – because they cannot provide guidance on this absent a federal policy, and this report is not the place to create definitions. Concern about this was expressed by agencies involved in creating those definitions.

Summary slide of methodologies (below): the table lays out a tiered approach to quantification.

	IPCC Tier 1	IPCC Tier 2	Modified IPCC or Empirical Model	Processed-Based Model
Croplands/Grazing Lands	<ul style="list-style-type: none"> <li>• Indirect N<sub>2</sub>O Emissions</li> <li>• CO<sub>2</sub> from Urea Fertilizer Application</li> <li>• CH<sub>4</sub> Emissions from Rice Cultivation</li> </ul>	<ul style="list-style-type: none"> <li>• Direct N<sub>2</sub>O Emissions from Drainage of Organic Soils</li> <li>• Soil Organic C Stocks for Organic Soils</li> <li>• CO<sub>2</sub> from Liming</li> <li>• N<sub>2</sub>O Emissions from Rice Cultivation</li> <li>• Non-CO<sub>2</sub> Emissions from Biomass Burning</li> </ul>	<ul style="list-style-type: none"> <li>• CH<sub>4</sub> Uptake by Soils</li> <li>• Direct N<sub>2</sub>O Emissions from Mineral Soils</li> </ul>	<ul style="list-style-type: none"> <li>• Biomass Carbon Stock Changes</li> <li>• Soil Organic C Stocks for Mineral Soils</li> </ul>
Wetlands				<ul style="list-style-type: none"> <li>• Biomass C</li> <li>• Soil C, N<sub>2</sub>O, and CH<sub>4</sub></li> </ul>
Animal Production Systems	<ul style="list-style-type: none"> <li>• Swine</li> <li>• Other Animals (Goats, American Bison)</li> </ul>	<ul style="list-style-type: none"> <li>• Poultry</li> <li>• Poultry-Manure</li> <li>• Aerobic Lagoon- CH<sub>4</sub>, N<sub>2</sub>O</li> <li>• Temporary Stack and Long-Term Stockpile- CH<sub>4</sub></li> <li>• Composting</li> </ul>	<ul style="list-style-type: none"> <li>• Dairy Cattle, Sheep, Cow-Calf, Stockers, Feedlot Cattle</li> <li>• Temporary Stack and Long-Term Stockpile- N<sub>2</sub>O, NH<sub>3</sub></li> <li>• Aerobic Lagoon- NH<sub>3</sub></li> <li>• Anaerobic Lagoon, Runoff Holding Pond, Storage Tanks</li> <li>• Combined Aerobic Treatment Systems</li> <li>• Anaerobic Digester- CH<sub>4</sub></li> </ul>	
Forestry			<ul style="list-style-type: none"> <li>• Establishing, Re-establishing, and Clearing Forest</li> <li>• Harvested Wood Products</li> </ul>	<ul style="list-style-type: none"> <li>• Forest Carbon</li> <li>• Forest Management</li> <li>• Urban Forestry</li> <li>• Emissions from Natural Disturbances</li> </ul>

One purpose of the report is to provide a scientifically vetted means for GHG estimation so that landowners can determine when to enter carbon markets. The intent is to align these with other USDA tools and other environmental markets, by aligning input needs and reporting structures such as COMET-Farm; and to achieve consistency between USDA and EPA national GHG inventories.

Tool development (based on the Report) will be collaborative effort. C-AGG input has been strategic and USDA is working towards a coordinated effort. A USDA wide tool, COMET-USDA, is ultimately envisioned.

Also important will be the ability to update, revisit, and revise. New information could lead to revisions by existing authors. After the 5 year period, a review will be done by new author teams, in order to utilize the best methodologies available.



*Comments and questions:*

Question: What is the process for taking new information into account and updating it?

Answer: USDA is working on this now – the process will include author teams/experts, provide opportunities for stakeholder input, and steps for documenting that feedback. There is a need for a guidance document from USDA as to criteria for new material to be included.

Question: What is the user perspective on use of tools and use of more granular information by USDA?

Answer: USDA has been discussing how to draw in other data from other USDA agencies so they can use the data without infringing on privacy concerns. They also have a stakeholder engagement plan and will strategically reach out to producer groups to find out challenges and reasons for reluctance. Internally, USDA will roll out a streamlined GHG quantifier for conservation staff, as a means to help deliver this to producers in the field.

Question: Do you see CIG tools being modified? Are you going to look back and ask contractors or other collaborators to modify existing and ongoing projects?

Answer: You will see modifications integrated into future CIG rollouts. Once tools get more traction you will see language in proposals for new projects regarding the use of tools for estimation. You will also see an effort to take lessons from existing CIGs into account in new methods. Contract modifications to existing CIGs are not anticipated.

Question: Once users enter their data, could NASS enter theirs? NASS data has proven difficult to get, and to get in a useful format. However, it might bring detail that has been missing.

Answer: Tools could make use of data stored by NASS and NRCS. Basic landowner information could reduce the information input burden on the landowner. A secure login space is needed so that landowners are confident that their privacy is protected. The issue is how to reduce the burden on the landowner and retain privacy.

Question: How does the development of tools impact approaches to standardization in existing methodologies, and the intent to create a standard for quantification that can be used by project developers?

A: This is difficult to answer. USDA's goal is for these tools to become standard for USDA to establish benchmarks. They are looking at all practices across an entity. Registries, aggregators, and project developers might view this as useful or not. It will be available to them and if found useful, it will support their application. Many of the methodologies in the report already align with existing protocols. Some are specific to certain geographies and/or practices. California will continue to lead the way; USDA will be looking to keep up.

*Perspective of registries?*



Max from CAR: hasn't yet looked at the report deeply, but has been looking at the N<sub>2</sub>O methodology to see if can be adapted and used.

Belinda from ACR: The report is complementary in terms of information sharing. We still don't have all the science. In the end, all efforts will lead to a higher level of rigor. The science is not there to get this into the ARB cap and trade program. Alignment in the future will be critical.

Question: Is there a chance to consider an electronic handshake with the agricultural library for the data needed for LCA? It may be a good place to park data in a way that can be mined.

*Plans for distribution and summary version?*

There will be an executive summary. USDA is trying to make sure it captures the essence of the Report. They are also talking to author teams about moving certain portions to a peer reviewed publication.

Comment: The tool has to be driven by land managers on their timeline. USDA should consider ways to regionalize the report and the tool, to make it more “bite-sized”, to allow its use within a particular cropping system, for instance.

## **Review and Discussion of C-AGG Draft Response to USDA Federal Register Notice/Public Comment Period on GHG Report**

Debbie Reed did a walk-through of C-AGG's draft comments and led a discussion of what else should be included. This discussion started at the July meeting before the report came out. Preliminary comments were submitted August 19. The task at hand is to get sign off on comments to be submitted by November 11.

*Recap of preliminary comments (i.e., comments submitted by C-AGG based on July, 2013 meeting discussions):*

- There is confusion as to when existing methodologies are useful and applicable. Producers and even project developers don't always know which ones to use for a given application. A synopsis is needed that goes beyond what is in report.
- The report should cross-reference and integrate tools, calculators, guidelines and models to be more consistent, compatible, and user-friendly, and enable project developers to look at codes behind the models.
- COMET farm is a good introductory tool that farmers are familiar with. Apportioning of output to sinks and sources would be helpful.
- How will the Q-Tool be the linked to or different from COMET-Farm?
- A common approach is advised – should the newly developed N<sub>2</sub>O approach be included in both COMET-Farm and the Q tool?

- Suggests that COMET-Farm might be nested inside the Q-Tool, such that data entered into COMET-Farm might be less rigorous, but if more rigor is desired, that data can be uploaded to the Q-Tool, and additional data added without the need to re-enter anything.
- Recommend the development of baseline scenarios using hybrid IPCC Tier 2/Tier 3 approaches when historical data is not available.

*New comments specific to draft report, for submission by November 11 deadline (high-level):*

- The Report is comprehensive and will have great utility for many users. It is a huge undertaking that brings together lots of information and identifies state of art methodologies.
- How does stakeholder engagement fit into the update process?
- How will the Report be of use to farmers and landowners, given that it is long, dense, and highly technical?
- USDA indicates the Report will be useful in assessing impacts of conservation programs and improving GHG inventory efforts; the question is who will collect the data for these purposes? Will landowner participation be voluntary or mandatory? What is the final intent of USDA?
- Although it is intended to produce entity wide estimates, can it be used for just one practice? If so, is there anything missing?
- Baseline methodology development should be addressed.
- Right now under Executive Order (EO) 13514 federal agencies cannot use carbon offsets to meet obligations to reduce footprints; and the EO does not apply to private landowners. Is the reference to EO 13514 in the Report intended for use of offsets or GHG emissions reductions on public lands, or is there another implied intent?

*Lower level new comments*

Chapter 1: Introduction

- The tool for estimating on-farm mobile emissions should be embedded so a farmer doesn't have to utilize a separate source.
- The interface with other tools should be addressed, to avoid the risk of redundancies and the need to input the same data into multiple tools.

Chapter 2: Considerations when estimating GHG emissions and removal

- There are many caveats and limitations given at end of each chapter – these should be synthesized to give potential users a higher level appreciation for the shortcomings of the tool (and the multiple methodologies) in the form of one application. It is not clear-cut, and this needs to be better captured and conveyed.

Chapter 3: Quantifying GHG Sinks and Sources in Cropland and Grazing Land Systems

- USDA should consider developing IPCC Tier 2 factors for indirect N<sub>2</sub>O emissions.

## Chapters 4-7: Quantifying Sinks [in other systems]

- No comments noted - anyone else?

## Chapter 8: Uncertainty Assessment for Quantifying GHG Sources and Sinks

- The Monte Carlo approach used for uncertainty is complicated. Who is going to do it? It will require experts and quite advanced computing capabilities, which presents a logistical challenge. How does USDA envision this happening for each individual landowner?

Some of the GHG CIG projects tried undertaking their own Monte Carlo analyses, and found that runs take many hours of computing time on a desktop;

- As to research gaps: the report indicates that only the highest priority research areas are listed – but won't that depend on the ultimate purpose or use of the report? Priorities might drastically change if this is ultimately to be used for estimating impacts of conservation programs, versus use for carbon offset or ecosystem service markets, for instance. Unless the ultimate purpose is made clear, it is hard to determine whether there is agreement on the highest priority research areas.

### *Answers to the 6 questions posed by USDA in the FR notice:*

Q1: We are not aware of missing sources and sinks. Methods seem complete but are variable – it is hard to ascertain whether they are consistent.

Q2: Greater transparency is required on N<sub>2</sub>O methodologies. Registries want more documentation on how these are developed. Compatibility of methodologies is not assured. Accuracy of data is difficult to assess given the mix of methodologies.

Q3: There may be some additional peer-reviewed published data sources on rice that are not included in the report.

Q4: We don't know of any.

Q5: User-friendliness is hard to address without access to the tool.

Q6: There are big research gaps - it would be good to have stakeholder input on high priority gaps.

Question: Is there enough evidence to substantiate the impact of changes in land and use on emissions? From a farmer perspective, it is matter of urbanization. There is not much new land to be found. Do we need to be worrying about these or should we view them as a non-starter in long term?

Answer (Debbie Reed): The report looks only at farm scale land use change, not external LUC. How uncertainty estimates come out in the end is opaque.



Answer (Marlen Eve): Uncertainty analysis is a work in progress. It is only framed in the report. Authors were tasked with doing as much as data will support. How it will be assembled in the final tool is still unknown.

Question: When might we see the actual tool?

Answer/ME: Phase 1 will involve implementation of the tool itself. Phase 2 will have worked out the full accounting, to include uncertainty assessments, and that will likely be within the next 18 months. Probability distributions will be built in to the interface, which might require additional input for some users/uses; e.g., for a dairy herd, how many cows are milked. But this is mostly built in to the background so that it is not adding to burden on users.

Regarding sampling uncertainty: in the forest sector, if there is a management plan in place, there is a field inventory. Chances are that how they do sampling will provide the needed information. The diet of dairy animals probably changes seasonally. The tool handles this month by month. They may need to ask producers about the timing of changes in feed but are trying to keep these questions to a minimum.

Ultimately, USDA anticipates the Q-tool will be integrated into COMET Farm, and eventually this will become "COMET-USDA". The forestry part will be built in such a way that it can be included.

*What else should be in the comments?*

Comment: It should make sure the tools are not over-estimating and help understand how uncertainty is addressed. This may not always be obvious.

Question: Is there a place for land use change in looking at land shifting? Depending what it is compared to, it may be a sink or source. If land moves out of agriculture what are the implications for GHG emissions? It is not clear if it fits in chapter 7 – it may need to be picked up some other place.

Answer: This is a valid question – it is not clear how to account for land use change (e.g., to non-agricultural uses) in a model like this, which seeks to capture GHG changes at the farm scale.

Question: The tables in section 8 are confusing. What is the intent of the tables?

Answer (Marlen Eve): The tables are an attempt to get at probability density functions (PDF). Jay Breidt at CSU worked on tabular input models that provide the framework for PDF inputs. The table is intended to show what we do and do not know at present. If we could fill out all the tables we could estimate uncertainty well. They are there for transparency, to show that we don't have complete information, and there are limits on the ability to calculate uncertainty.

Answer (Diana Pape): The tables reflect what data the working group was willing to provide. We will be going through the tables to assign a probability density function to each cell. Farmers will have a knowledge base for their farm, e.g., amount of feed, numbers of heads.



Question: Will there be consideration of the economic impacts of implementation – i.e., will economic data be added to this tool, including data from ERS? Also, is it USDA's intent that use of the tool will be a requirement for participation in conservation programs?

Answer (Marlen Eve): For now the tool is intended to develop in house (USDA) capability. He has not heard of an intent to tie its' use to conservation programs thus far, though it may be useful for EQIP decision making about cost share. Economic impacts have been discussed. A colleague recently finished a report on the economics of adoption of various mitigation practices. A follow-up publication is expected. He expects these to come together to tie economics to GHG estimation.

Question: Would it be stepping on other agencies to add on-farm energy use to the tool's functionality?

Answer (Marlen Eve): It will be part of the tool but USDA hesitated to offer guidance on energy use in the report. However, if economic impacts are considered, changes in fuel use will have to be considered.

Comment: A word of caution: EQIP rules called for utilizing national ranking criteria which are not controllable at the state level. Until the tool is regionalized you don't want to go there. Road test it first to identify regional differences and to assure there are no unintended consequences.

Comment: There is an opportunity now to look at CSP enhancements related to climate change and to compare with this tool. Key questions are: Are these (methods and estimates) right? How can they be improved? How can we build on them? There is an opportunity for C-AGG in looking at CSP. Regarding ERS – it could be a good side issue to look at questions that should be asked in ARMS surveys. It is better if it comes from C-AGG than from CCPO.

Question: Has USDA discussed the Report or the tool with stakeholders to find out whether they see utility in its use?

Answer: USDA is eager to engage on this and is always looking to make its work useful to stakeholders. However, this engagement will require sitting down with small groups of actual landowners to get their take on the data inputs required, and utility and usability.

Comment: The end goal is important for deciding where to invest, e.g., in helping landowners with conservation programs and compliance, or in market development.

Comment: Landowner perspectives need to be balanced with those of other stakeholders. There is little awareness of this process at the state level, or even of COMET Farm.

Answer (Marlen Eve): There are two avenues. The conservation delivery streamlining initiative is to be rolled out through state and field offices. This project will focus on grower groups and on conservation groups as a way to get in front of landowners.

Answer (Adam Chambers): If the NRCS user base can be educated, they will provide a valuable conduit to producers as a trusted partner. However, it may take time because the conservation desktop



represents an enormous adjustment in how NRCS does business. NRCS fought hard to get GHG on the front page of the desktop but there are not many additional GHG requirements in it. It will be necessary to consider business requirements associated with that, and the input that will be needed. It is a waiting game until 2015. Regarding ARMS data – it has been a dead end trying to get access to it and be able to make it public.

Comment: ARMS data is key information for building carbon market. Lack of access to this data has hampered the GHG CIG projects – it is necessary for building rate tables, for instance. It would also be useful for developing protocols and methodologies and other market tools as well.

Question: The Q tool will go away and become part of COMET but what about Conservation Desktop? Will this be accessible to the public?

Answer (Adam Chambers): The path is for Conservation desktop to be accessible only to authenticated NRCS users who have clearance. It will be based on methodologies and tools in the report but will be abbreviated. An external tool will be accessible to everyone and able to go into more detail.

Answer (Marlen Eve): The methodologies will be driven by what is in the report. There could be divergence in output reporting, depending on the purpose.

Comment: C-AGG has sent a written request to USDA for data workshops. There is willingness on both sides and there is C-AGG funding to do these, but the grant season ends in April. It is highly relevant because USDA retains a lot of data, and will benefit by considering future data needs and ways of sharing it.

Question: What are 3-5 specific data points needed from ARMS?

Answer: NASS collects data that would help establish baselines for practices, and use of inputs, at various levels, such as at the country level. The Chairman of NASS said this data could be made available at the county level, but it would take some additional work.

Comment: Those of us in the sector doing LCA work have the same issues and are perplexed with new ways of slicing and dicing the data to make it useful. Therefore we did our own farmer surveys but this is not sustainable. We have to be able to define specific needs. There will be a point in time at which price discovery will be needed. We should also be talking to USDA's Agriculture Marketing Service about ways to provide transparency to the marketplace.

Comment: Workshops are needed figure this out. Some of the GHG CIG projects put together specific data need sheets already. We need to begin this discussion with USDA now.

Conclusions of this session:

- The discussion of data needs should start now.
- Thumbs up on the draft C-AGG comments – they are good to go, with noted additions.



## Review and Discussion of C-AGG Recommendations to CA ARB on Aggregation and Verification for Agricultural Offsets

This session included a brief history of C-AGG's work on this issue, responses and concerns raised by ARB, additional relevant context and background for this session, and, to start off, the perspectives of the voluntary registries on how they have approached aggregation and verification within their agricultural and forestry offset protocols.

Debbie Reed began with a history of discussions with ARB on aggregation and verification. In August of 2013, C-AGG submitted a redline version of existing ARB regulatory language intended to provide a streamlined approach for individual producers to aggregate into a project within agricultural offsets. A key objective of that approach was to not require that every participating farmer create a CITTs account.

C-AGG then held a workshop in Sacramento on October 9, revising and further developing the August approach. The concept was to create aggregators as a new 'legal' entity within ARB's regulations, as a parallel entity to OPOs or APDs – to specifically allow for aggregation of agricultural projects.

The proposed role of the aggregator:

- Aggregator holds and manages credits.
- Aggregator would establish a CITTs account, rather than every landowner.
- Aggregator manages an instrument tracking system that can be shown to ARB. Data for MRV and information on every field would be held by the aggregator, not ARB.

Landowner participation in the aggregate would be voluntary.

Legal and contractual issues:

- Aggregator needs to contract with landowners as well as with those farming rented/leased land
- Aggregator needs to confirm land tenure/ownership
- Contractual agreements would define the relationship between the aggregator and the participants, i.e., would clarify roles and expectations for participants such as how benefits are to be allocated and how bad actors handled.

The aggregator could represent multiple fields joined up in a single project, for which there would be just one verification, thereby reducing verification costs. There could be multiple baselines. Sampling and verification would be across the entire project. The proposed risk-based statistical sampling requirements and approaches are based on what is currently used by voluntary registries.

Sampling time frame: rank by risk and uncertainty. This is based on experience from Alberta. High risk fields would be put into a different sampling category.



There would be a requirement for background checks on aggregators because of fear of fraudulent practices that could happen if fly by night outfits create credits that don't exist. There would also be minimum staffing requirements for aggregators.

Irrefutable data from remote sensing could replace the need for site visits (if extensive enough).

How to deal with failed sampling? If there is a bad actor, the entire project would not be terminated but a percentage of credits would be invalidated. When would this happen? If/when there is systematic error. Anomalous errors could be corrected.

Response from ARB to above C-AGG proposal: ARB feels strongly that aggregators have to be able to trace emissions reductions to specific fields. Rather than create a new “aggregator,” ARB suggests they prefer to stick to their existing language and approaches, e.g., the cooperative approach found in the forestry protocol.

Comments: The intent is to minimize the number of field visits. There are two factors: the price of credits and the volume needed to achieve economies of scale. It won't make sense for those with a small number of acres without an aggregator. Looking at it across protocols, it comes down to price, volume, and costs. The 20% sampling rate as suggested by ACR and CAR would require expensive field visits. There was discussion of using a verification methodology.

The aggregator should be a technical consultant who can write project documents. Farmers are doing the work but are not technically proficient at protocols and methodologies and verification. Aggregators can lower verification costs; this is the most efficient approach in the end.

Large enough farmers could possibly do the verification themselves.

Comment: Water management alone is a major issue for verification.

Question: What kind of aggregator liability is entailed?

Answer: The aggregator would be trained and subject to insurance requirements.

## Voluntary GHG Registry Updates

### ACR Update

Belinda Morris provided an update on ACR. She began by noting that much of the ACR approach is captured in the C-AGG proposal for aggregation and verification.

*Published ACR methodologies:*

- 2 Fertilizer N management methodologies - changes in fertilizer management and reduced use
- Rice management (2)
- Restoration of deltaic wetlands and
- Avoided conversion of grasslands/shrub lands

The latter was just released and could be of interest to ARB in the future. It is very specific to the Great Plains but should look at relevance to California, where there is concern with conversion to development.

*Methodologies under review and in development:*

- Changes to the fertilizer management protocol (V2): changes being considered would allow crediting of early adopters. They would be able to be credited for a number of years if the number of adopters goes up. These changes would also be more manageable from a modeling perspective because they would allow for variation due to weather, and provide guidance on structural uncertainty. Changes will be posted for public comment within the next month.
- Rice management - Mid south module: This is currently under peer review. ACR expects it to be published in December or January, so that ARB can include it in the protocol.
- Grazing land and livestock management: This includes a variety of practices using a modular framework; is currently in peer review.
- Reduced carbon intensity in fed cattle: The public comment period just ended. It is now in peer review. ACR expects to publish it next year.
- Emissions reductions from biochar projects: This protocol is still in the public comment period, which has been extended to November 22. The high level of comments is indicative of interest. There may also be interest from ARB once approved.
- Compost additions to grazed grasslands: This methodology was just received and will soon go out for review.
- California wetlands: Funding has just been received to work on this. The intent is to add modules and adapt it to California. It is of potential interest to ARB.

ARB has expressed interest in N management but is concerned that the science isn't there. They have also expressed interest in grasslands and enteric methane, but a large scale is needed.

*How ACR handles aggregation:*

There is a chapter within the existing ACR forest carbon project standard that looks at aggregation in forestry projects. An ACR Ag standard is under development. Agriculture projects are considered methodology by methodology. A pool of farmers is treated as a single project. The requirements for verification apply statistical targets at the aggregate level and are risk-based. Therefore, not every field must be visited with each verification cycle, and there is more flexibility. Crediting is to the aggregators who contract with farmers.

*How ACR handles verification:*

ACR identifies the most efficient least cost methodologies with which to verify each parameter. The completeness audit consists of a desk review of monitoring parameters for all fields. An in depth audit consists of random and risk-based sampling of fields. Of those subject to an in-depth audit, sampling is required for the greater of 20% or 2 randomly selected fields. Industry experts may be used for site

visits. They triangulate farmer records with other sources. A GPS enabled camera automatically uploads date-stamped photos to an account that is accessible by VVB. Remote sensing can replace field visits for activities that are detectable by remote sensing.

If a field is removed for inability to verify, the rest can still generate credits, depending on the size of the aggregate.

If satellite imagery can be used to verify dry seeding, by determining whether it occurred before flooding, a site visit is not needed unless the imagery is weak or non-existent.

## CAR Update

Max DuBuisson/CAR: CAR adopted v 1.1 of a rice protocol in June 2013. When they have related protocols that have been developed at different times, advances in one can lead to leapfrogging in the other. Existing agricultural protocols include:

- Rice cultivation (V 1.1, June 2013),
- Nitrogen management(NMPP) (V 1.1, January 2013),
- Livestock ( V 4.0, Jan 2013 – for voluntary market; earlier versions are basis for ARB compliance protocols),
- Mexico livestock (V 2.0, Sept 2010),
- Organic waste digestion (V 2.0, June 2011; V 2.1 soon), and
- Organic waste composting (V 1.1, July 2013).

*Next steps:* CAR is currently scoping to determine whether to move forward with an expansion of the NMPP protocol, and is moving ahead with a grassland soil carbon protocol. Scoping activities for NMPP include:

- A case study with CO corn data to assess the minimum data standard.
- An internal evaluation of USDA's new mixed-tier N<sub>2</sub>O methodology.
- Developing the data standard in Appendix D of NMPP into a stand-alone document and data submittal process.
- Reconvening the Science Advisory Committee.

### *CAR's Overall approaches to aggregation and verification:*

The overall goals of aggregation are to reduce costs, and to distribute risk and uncertainty among multiple sites. The approach was introduced in CAR's Forest protocol, refined through the Rice protocol, and further refined in the N management protocol. The latter is the best source to understand their current thinking on best approaches.

The goal of verification is to reduce risk and assure offset quality, which is somewhat opposite the goal of cost reduction. It is expensive. Any changes intended to reduce costs need to consider negative impacts on risk or offset quality.

CAR verification requirements for rice and nitrogen are summarized in a table in the following slide:

<b>Verification of Aggregates: Rice &amp; Nitrogen Management</b> 		
	<b>RICE</b>	<b>NITROGEN</b>
Small aggregates	Up to 10 fields	Up to 20 fields
	2 SV/field/CP, 20% ann.	1 SV/field/CP, 20% ann.
Large single-participant aggregate	>10 fields managed by a single grower	>20 fields managed by a single grower
	SV = $\sqrt{\text{Fields}}$ (annually)	SV = $\sqrt{\text{Fields}}$ (annually)
Large multi-participant aggregate	>10 fields managed by more than one grower	>20 fields managed by more than one grower
	minSV = $\sqrt{\text{Fields}}$ (sample first PPs, then subset of their fields)	SV = 5% min (up to 15%); highly risk-based.
Sampling	Random	Combination of Random and Risk-Based (informed by CSNT)

The N test is quick and cheap. It is used to determine which fields to visit.

In the forest protocol,

- Every project has a site visit upon joining the aggregate.
- Individual projects must meet all of the protocol requirements.
- There must be a 90% confidence level for the aggregate.
- Targeted sampling error on a sliding scale:
  - 7% for 2 projects; and
  - Up to 20% for 15 or more projects.
- Within an aggregate, 50% of sites are to be visited over a 6 year period; 100% within 12.
- Desk audits are conducted annually.

Some clarifications given in response to questions:

- Field size depends on the practice.
- The N test is an indicator rather than a decider. It is one more data point, and provides a basis for guidelines for the site visit schedule.
- The grasslands protocol will probably be similar to what has been done by ACR et al.

Comment: As an aggregator active in Alberta, these numbers seem unrealistic. Consider real numbers as to field size: if the average field is 60 acres, 10 fields are 600 acres. \$10,000/year in revenue won't make

sense to an aggregator. Hundreds or thousands of fields would be needed to make it viable, i.e., enough to generate 50,000 tons a year. A large project is >400 farms of 400,000 to 500,000 acres, or the equivalent of all rice in CA. 1 ton per acre is optimistic for rice in CA.

Comment: In the mid-south rice project, they have small fields because of the water. The fields also move. One size does not fit all.

## C-AGG Discussion of the Process Flow: Making Aggregation and Verification Work for Agricultural Offsets

At the Detroit meeting there was a good dialogue about stakeholders which suggests there is an emerging process flow for aggregation. As a result, C-AGG developed recommendations for aggregators, as an entity separate and distinct from farmers, to contain costs. However, based on ARB feedback, let's reconsider the proposal for a cooperative. The basic idea, which gives hope, is that multiple owners join together in one project which would allow for one report and one verification.

See below diagram outlining the anticipated process flow, in which a farmer is approached by a developer; the two enter into a contract. The farmer provides to the developer information needed for an ARB CITSS account. This includes: two forms of id (notarized), and proof of having a bank account. The farmer supplies data to the developer but the burden is kept as low as possible. The developer then implements the project, files with a registry and contracts with a verifier. The verifier looks at a subset of the project. If the registry gives a green light, the developer gets credits. A single report is filed for multiple farmers.



*Q: Does this approach work? Are there any missing details?*

Fundamentally or in theory it works, but for the last bullet point: all lands credited together depend on success of others. Can a farmer pull out? What if the farmer dies? Key points and issues raised in the discussion:

- If the cooperative approach requires that all participants in the project succeed or fail simultaneously (i.e., one bad actor invalidates the entire project), this will not work.
  - If bad actors or deceased actors are allowed to remain in the project but just report zero results, that works. For instance, if the farmer dies the field becomes inactive – i.e., the field goes into sleep mode until the end of the contract. No credits would be issued for that field – the aggregator would just report zero.
  - If one farmer is fraudulent, e.g., provided inaccurate records of when drainage was done, or something occurred that invalidates credits – there is a problem with the verifier not doing due diligence. The verifier has to check data and is on the hook too. If both the developer and the verifier have the wool pulled over their eyes, there is a bigger problem.
  - If a farmer is fraudulent and credits are sold, the buyer will go after the developer. It is irrelevant whether the risk is distributed among farmers. There is too much risk if the project as a whole is invalidated, so that approach will never work. So it is important to go after just the person who commits a violation, if one occurs.
  - If the aggregator can't get information from a farmer, they would enter a zero report.
- Q: How to take low density carbon projects and get them into high density markets?
- There is confusion between the definitions of landowners, farmers, and fields. A field has to be tracked over a long period of time but may have multiple farmers/landowners over that time period. Therefore, there can't be one baseline for everyone. Instead, there can be cohorts. The will not work if a field can't drop out.
  - However, farmers cannot come into a project and out and in again; this would create baseline issues. However, if a drought occurs, a farmer may opt out. In agriculture, there are many potentially difficult conditions that we have to be honest about. So we have to think through an approach with the highest scientific rigor, that doesn't require high boots on the ground, which will be too costly.
- ARB is managing to the lowest common denominator because it assumes they will get blamed if anyone cheats or steals, but this leads to very costly approaches.

Comment: Growers are not interested in entering into a contract with anyone that doesn't give them the option of saying it didn't work, I'm done. If there are too many regulations or problematic conditions they want the option of backing out.



Comment: If farmers can back out, that makes the project more expensive (for aggregators/project developers) because the credits can't be included, and it changes the business case scenario for the project developer – so they are taking on risk.

Question: Why would a farmer be asked to sign up for 5 years?

Answer: To make money. The aggregator does not want to have to recruit new farmers to participate every year. A certain investment of time is needed to make the business case.

Answer: Another view was that it is in the best interest of the aggregator to not lock anyone in for 5 years – it is even harder to get data from an angry farmer. An aggregator is not a cell phone company.

Answer: There is also the issue of baselines. In year 1, one might have pretty good idea what is going on, but a farmer might then quit, load up on N in an off year. Another baseline would have to be done if the farmer rejoined.

Question: Could a farmer move to another aggregate?

Answer: Aggregators want farmers to commit to the entire period because of the work involved in determining the baseline, which has to occur before implementation and verification, and before any revenue flows back. The costs are all frontloaded to the aggregator.

It is best to under promise and over deliver. Even without locking in the farmer, there needs to be a commitment and an understanding of the risk.

Comment: This crosses the line into business decisions outside the scope of here now. We need to define and get a better understanding of the rules. Farmers may leave or pass away – this is the cost of doing business. The question is: if we are lucky, will it work? At some point, we need to quit talking, and start doing. We need a reasonable size project that uses an agricultural methodology in the voluntary space and we need to implement it and see if it works. When we do that, ARB will be able to watch, learn, and ask questions. We will have real data.

Comment: There are people in the room already trying to do this in the voluntary market.

*What is missing that can be learned from that experience that can be used in the compliance market?*

We are missing the agricultural data management component. Companies that have such data also have the ability to collect more or less of it as needed, but carbon markets are not even on the radar for them. Private enterprises that work with cooperatives and retailers will not share data without the blessing of growers. They work for the growers and will not compromise that relationship. There needs to be a clear path to having a discussion with growers about the value of the data in order to access it from third parties.

What about having a discussion with large companies that support use of variable rate technology? They may have an interest in doing this as value added service to clients and be willing to provide data if it



keeps their farmers happy. They are starting to recognize the value of sustainability issues. There is the potential to get data if there is farmer buy in.

Comment: Among rice growers, there are 2 companies interested in participating but they are remaining quiet. The market side is interested but the dollars are not there to drive it economically.

Comment: This is the kind of thing USDA/NRCS could step into, for instance, a pilot project that buys credits. If this model could be used by USDA, we could better field test such an approach. The project would include buyers (financing) to test the system. Data has to be paid for; right now, it is just too big an ask. We need financed demonstrations to get things off the ground.

On the water quality side, we are working with business groups to look at precision agriculture and whether it can be justified by the payout. There is some participation in one CIG project.

Another approach: present organizations with tools and help facilitate analysis as an FYI so they will know the potential of their fields and will be able to make informed decision. It would be framed as “a new way to look at your data: if you like it, here is how to do it on an ongoing basis.”

Ryan mentioned an example in WI of a bottom up approach. WI wants farmers to use a UW developed tool, and offers trainings on it. They have good coverage in key WI watersheds and have contours for the fields. They are working with conservation districts which are key because they have to enter information as a compliance obligation. They needed to go through the steps to see what the value was. State support and user friendly tools are key. If were able to marry this data with the outputs of COMET, perhaps they would do this voluntarily. In sum, nutrient management plans are used as a driver to enter data.

Comment: The farmers were probably not happy to spend the time to enter all that data. Are there ways to get data that are less intrusive than on-site visits?

**Summary of discussion:** The proposed cooperative model is plausible, and provides fodder for conversation. The pitch point: data is expensive, but is absolutely needed. There is a strong desire to field-test the approach, e.g., a pilot project to demonstrate the feasibility to ARB. USDA might be the place to look for investment.

Max D: Voluntary registries are still a great testing ground. It is easier to change what they do.

Question: But can they find a buyer? Buyers are often surprised by what doesn't/didn't count.

There are projects in the voluntary space in the works - they are small; but provide proof of concept. The first one was in Alberta 2007, when the registry was first started – projects ranged in size from 30,000 to 1 million tons. However, Alberta is different. The smallest project was 13,000 acres. The price range was from \$7/ton to \$13.95/ton, with a recent low of \$11. Of this, 60% goes to the farmer, 40% to the aggregator.



## Wednesday November 6, 2013

Agenda for the day: Context setting for C-AGG briefings, followed by a dry run, finishing up at 11:30. Following an early lunch, the group went to the Whitten building for the USDA briefing; and then to the Senate for Committee Staff briefings.

### Thoughts and reactions to Tuesday's session

Some of the takeaways:

- Marlen's presentation shows we have come a long way. When the report started we had a lot to say about what should be done and a lot of it has been done.
- ARB engagement continues to be very complicated; the conversation and the game plan developed should be further pursued. The ARB situation is complicated and loaded with subtleties, but we don't want this to be a barrier. Take away: it might work but we may need a smaller working group to go the next step.
- We need a breakthrough on the carbon/water interface.
- Discussion on realities of the economies of scale. When doing a project with adequate verification, and each party takes what they need from revenue stream, there is not much left for the farmer.
- The dollars don't match needs. On the positive side, the bundling of conservation practices makes sense but there is a need to better understand the farmer's needs. Quite often hired hands are doing the actual work, so this needs to be simple.
- The market is not going to get kick-started on carbon funds alone. Carbon is enabling expansion of other conservation programs but other sources of funding are needed. \$13.50 is the going rate right now. In CA, it is probably \$8.50-9.00. A stronger signal is needed from the carbon market.
- An early privilege in Chris Chopyak's career was working with corporations to define corporate sustainability. After spending about a day arguing about the definition, the participants realized that until they tried it they couldn't define it because the actual execution was necessary to enable learning. We heard yesterday from the voluntary registries that things change as projects are implemented – this is scary, but it is ok. It means there is a willingness to try and experiment. There is an impetus to start building, through which leadership can be established. It is important to get insights from the periphery, and it is ok to disagree.

### Preparation and Review of C-AGG Afternoon Briefing Activities

Debbie Reed - The USDA briefing will be repeated in the Senate, but keep in mind it is a different audience, largely without the background or knowledge that these activities are happening.

Purpose of USDA briefing: to make recommendations and showcase achievements and progress. The C-AGG Report in the briefing packet summarizes key learnings and recommendations. In the introduction



we will provide an overview only. We hope to then have a robust discussion and walk through of how a project comes together, from soup to nuts. The desire or intent is to show complicated it can be but that it can work, that we have great collaboration in this, and will provide recommendations for moving forward.

Purpose of Senate briefing: Same message but more of an educational effort. Much of the staff is unaware of how much is happening. Focus on ecosystem services/GHG and show that there are actual projects on the ground.

There was then a dry run of the briefings, which resulted in a recommendation that they be shortened, with emphasis on hitting key points. The key message:

This is the first time there has been a concerted and collaborative, multi-stakeholder effort to work on the ground in this space, to gather lessons learned, and to document them and make recommendations for further development. We have been able to learn a lot but there is lot to be done.

## Briefings

### USDA Discussion

#### *Introductions and pre-briefing discussion*

At USDA, Adam Chambers opened the briefing with a welcome and introduction to Undersecretary Robert Bonnie.

#### *Opening remarks by Undersecretary Robert Bonnie*

He began working on offsets late 1990s, and worked with Debbie in the UNFCCC process. At the time they were only able to talk theoretically. There was suspicion in the environmental community and many were not convinced of the benefits. A few years ago, in the Waxman-Markey process, he saw that some of these same problems continue.

He is excited about C-AGG because it is bringing together the science and the opportunities through collaboration and partnerships that have been needed for a long time. The NRCS investment has been critical but C-AGG brought a lot to the table in terms of expertise and resources. USDA is interested not just in the GHG benefits but in something that makes sense for farmers. The President's Climate Action Plan provides a strong hook to further these investments, and we are looking at what USDA can do to help, to contribute to the Plan.

#### *Remarks by Jason Weller, Chief of NRCS*

Why is this important? Looking at the big picture, one can see three pillars that support quality:

- Technical and financial assistance – this is the agency's bread and butter.



- Regulatory side -The Clean Air Act (CAA) and the Clean Water Act (CWA). We have probably seen the maximum extent of the reach of those pillars for this generation. Currently: less money is invested in assistance. There is no political will to expand the second. Instead we are looking to streamline these programs as we enter an era of resource constraints. The question is whether we have tools to face the challenges.
- Private marketplace – To the extent that there are willing buyers and sellers, there is a potential untapped demand for good conservation action. Private capital is available for either profit or philanthropic (or CSR) reasons.

Why we are here today: USDA is investing in programs. We need to start to structure [market activities], and provide a signal to the marketplace as to what good stewardship means. It is huge and will have long term value for society.

*Debbie Reed*

Introduced C-AGG as a multi-stakeholder coalition that aims to voluntarily incentivize the reduction of GHG emissions from agriculture. She also mentioned that much progress has been made working with USDA that has been invaluable. Today we want to discuss work with the USDA GHG CIGs which has taken it to whole new level and has led to significant advances. We have compiled lessons learned, along with recommendations to USDA. In the briefing, we will walk through the successes and challenges from the producers through to the buyers perspective. The work with USDA is all about partnerships.

*Briefings*

These notes present the briefing presentations that took place at USDA and in the Senate. Speakers were not all from one project, but the goal of the briefing was to address four distinct components of bringing a project through all the steps needed to generate carbon credits. Speakers:

- Dennis Carman, White River Irrigation District, Mid-South Rice Project –providing a producer’s perspective
- Ryan Anderson, Delta institute –discussing the role of project developer/aggregator, and the need for innovative tools and partnerships to link producers to environmental markets
- Belinda Morris, American Carbon Registry – will discuss market-based methodologies for quantification that can leverage USDA conservation investments
- Sheldon Zakreski, Climate Trust -- will discuss what buyers are looking for in the regulatory and voluntary markets

*Dennis Carman, White River Irrigation District (WRID), Mid-South Rice Project.*

Dennis has worked with farmers for 40 years, with boots on the ground. Almost half of the nation’s rice is grown in Arkansas. Other rice growing states are: California, Louisiana, Mississippi, Missouri, and Texas. Although Arkansas is water blessed, the water is not necessarily at the right time, place, or rate, so levees are used to control it.



Steps in rice growing: The land is first precision graded, seed beds are prepared (in April), ditches are plowed, poly pipes are put in for water distribution, N fertilizer is applied, and the land is flooded.

Under baseline conditions (prior to precision grading and use of poly pipes), contour levees and levee gates control the water level in each paddy, which is inefficient because water has to flow through all fields to get to the last field, furthest from the well. One water pump feeds 6 fields. Contour levees can use up to 3 1/2 feet of water. In July, a second application of N fertilizer is done, from the air (airplane) because the land is wet. The pre-flood application of N is 100 lbs/acre. The mid-season application is 75-80 lbs/acre, for a total of 180 lbs/acre. This typically yields 200 bushels/acre.

Conversion to a straight levee system began in the 1980s, which requires fields to be precision leveled, allowing for better water management and savings of up to a foot of water per season. A field management unit is 35-40 acres.

Why change management conditions? Rice has a large GHG footprint due to methane generation from flooding (anaerobic conditions). Changes in the flooding regime have allowed just one pre-flood application of N while maintaining yields. This reduces N use to 125 lbs/acre and saves water. The use of poly pipe allows control of water into each field separately. This reduces water use by one foot or 25%, saving \$20 to \$30 an acre. The reduction of N reduces costs by \$80/acre. Carbon credits could add \$6 an acre for a total of \$110 an acre. But it is not a no-brainer.

Why is it not routinely done? Leveling a field has high upfront cost (~\$300/acre). There is also fear of change in technology and many are not convinced about the economics. The unknown is a real and a perceived risk. Even land grant universities are just now catching up with the science.

How to influence change?

- Need to clearly demonstrate practices through implementation, and state the pros/cons.
- Utilize CIG projects to demonstrate proof of concept.
- Focus EQIP on key practices that support the CIG.
- Synergy between in place practices, university/ARS research, CIG with Entergy, and carbon market opportunities.
- Integrate carbon trading income into the business case.
- Add technical and/or industry specialists to the team.
- Integrate environmental benefits into marketing, e.g., climate friendly rice.

WRID was awarded a 3-year \$633,500 CIG this year for nutrient and water management. An Entergy grant of \$210,000 was awarded to the Terra Global/WRID partnership.

They have a great mid-south team. ARS is monitoring flux. U of A and MSU are monitoring plots. Farmers are participating in yield monitoring, associated with change from contour levees to zero grade straight levees. There is a lot of interest: there were 86 EQIP applications, of which 21 were funded.



Sensors are being installed to monitor water depth and soil moisture – these were developed with the CIG grant. The process is being automated with a camera that can auto take a picture of a field at any particular day and time. So they are essentially doing verification. Each well is monitored. Remote sensing can be used to look at flooding. They can provide real time ground truthing. A drone has been acquired that may be used for next generation monitoring, paid for through WRID.

*Ryan Anderson, Delta Institute, Chicago*

The focus of the Delta Institute has been on the Great Lakes region and the upper Midwest. They are expanding to MI and have staff in Chicago and Lansing.

3 priority areas:

- Transform waste from a liability to an asset
- Disrupt the energy status quo
- Catalyze ecosystem stewardship

Their entry to environmental markets started with the IL Conservation and Climate Initiative (2005). The state of IL saw the carbon market opportunity and Delta was the only group willing to put all the pieces together. They could see the value of a state sponsored program, which they later replicated in MI. US Senator Durbin (IL) helped get the word out.

Leveraging \$20,000 in funding from the state, and using their own risk capital, the Delta Carbon Program (2006-2010) was active in 18 states, resulted in 1,385 contracts covering 388,000 acres, and returned over \$2 million to producers and forest owners. Several protocols were developed. Strong partnerships and accessible tools were key. Working through local conservation districts, they were able to go to scale quickly. Project sizes ranged from 1-2 to 35,000 acres.

Their current focus for agricultural GHGs is on a 2011-2014 GHG CIG with several partners, including AFT, CTIC, OK Conservation Commission, and OSU. Delta serves as the aggregator. Science and modeling support are provided by ACR and DNDC-ART – a modeling firm in NH. EKO Asset Management Partners are the credit broker. They are also looking to partner with potential voluntary buyers. They really do need the many different actors because of the technical details involved in translation.

Delta is attempting to make aggregation work by using USDA's COMET-Farm as an engagement tool; they are considering how the tool can be used in the field, how to make it work in a market context, and how to take GHG transactions to the next level.

Using COMET-Farm, a farmer can log on, select field boundaries, look at alternative scenarios, and examine the carbon supply potential of different management practices on his/her land. It allows for quick estimates and can be used by farmers as a planning tool. The export function of the tool is valuable, as it allows data to be used for other purposes, i.e., one can email data to another service provider or take it to a registry. However, there is no protocol behind the tool. They need tools endorsed by registries and want to make sure the information does not have to be entered again either in models



or by registries. They have worked with USDA to get additional functionality included in the tool so that data can be exported for use in models.

The initial project in NE MI was a research site for the MSU/EPRI partnership where daily N<sub>2</sub>O fluxes are being measured by MSU, working with a farmer, to provide GHG offset credits attributable to changes in corn growing practices. This may be the first agricultural N<sub>2</sub>O project to receive carbon credits. If it goes well, the farmer will enroll more fields, and neighbors will see it and hopefully replicate it.

They are also trying to leveraging their experience for water quality through two initiatives in WI and MI:

- In WI, Delta is partnering with Winrock and the Sand County Foundation on a Pay-for-Performance initiative to reduce phosphorus loading in the Milwaukee River watershed under a grant from the Great Lakes Protection Fund. This work is taking advantage of legislative momentum around phosphorus. They want to see if they can use USDA tools, including SWAT and the APEX/Nutrient Tracking Tool, and a local WI based tool (SnapPlus), an enhanced WI phosphorus index, to tie field-level implementation to water quality improvement at the sub-watershed level. WI requires farmers to submit a nutrient management plan which could be a source of data. They are looking into how much of a lift is needed to go from these plans to something that would enable trading.
- In MI, Delta conducted a reverse auction for sediment reduction via the Great Lakes Restoration Initiative. There have been two auction rounds over the past 3 years. Farmers submit the price at which they are willing to provide the service. The management approach involves cover crops, filter strips, and reduced tillage. They are using the MSU sediment calculator originally developed by TNC for the Paw Paw.

Transparency is important: we learn through shared failures. Delta seeks to motivate farmers to submit information, not just for compliance but because of the upsides. This is a multi-year process that requires a lot of partnerships and upfront investment. USDA plays an important role in the development of rules, tools and frameworks for the use of science. The policy driver is crucial.

The government does not need to be involved in all the paperwork – a private market can be set up to do all of that, but a signal of some kind is still required. The 2008 farm bill mandated USDA science-based methodologies, which led to the development of COMET-Farm. Our hope is that this can continue to be supported in the future, although there are some challenges to be addressed within federal programs such as data sharing rules.

3 main points:

- The GHG CIGs have worked; though experimental for USDA, the GHG CIGS made it possible to tackle these technical barriers, and filled a critical gap in funding needed to gain momentum after the decline of the Chicago Climate Exchange (CCX, a pilot carbon-trading project). Delta is considering how to take this model forward to other audiences and other environmental service markets.
- The COMET Farm investment was also critical because it allows for quick estimates, e.g., of nitrous oxide emissions. It is also a planning tool for farmers.



- There is far more demand for farmer participation in GHG mitigation initiatives than had been anticipated or for which funding was available – there were more applications than could be handled. There is a need for pay-for-performance approaches. It takes more than one round of funding, and there are many groups and collaborative committed to doing it.

*Belinda Morris, American Carbon Registry*

Belinda began by asking how many participants had ever purchased a carbon offset, and pointed out that the purpose of a registry is to elevate the level of product confidence, i.e., to certify that one is actually receiving a ton of CO<sub>2</sub>e if that is what one is paying for.

ACR, formed in 1996, was the first GHG registry, and was acquired by Winrock in 2007. Winrock international has its roots in US agriculture but has grown to have an international focus. To date, almost 39 million tons of carbon reductions have been registered through ACR. ACR develops and approves its own methodologies as well as outside ones. These add integrity to the market. ACR has been approved by CA as an offset registry, and supports the CA offset program to insure its integrity.

Elements of GHG methodologies: sound science, performance-based quantification, and third party verification. Winrock's commitment to sound science and economics is critical for market integrity. In addition to science, also needed are: a third party verification process, measurement of performance rather than practices, and opportunities for farmers to earn additional revenue. If yield is impacted there is risk of leakage, in addition to impacting the farmer.

CA has a compliance market, which has created a real demand. Total demand to 2020 is expected to be around 200 million tons if every entity complies. Agriculture is a voluntary sector because it does not fall under the cap. ARB is committed to including agriculture in offsets markets, but wants rigorous methodologies to enable participation. Prices are not as high as was hoped. They are currently \$8-10/ton, depending on when the analysis was performed. They are expected to rise to just over \$20 by 2020. The reserve price is \$45. The voluntary price is \$5-6/ton.

Carbon markets alone won't change the agricultural landscape. There is a need to leverage other programs and opportunities to keep carbon in the soil and to mitigate GHG emissions, through practices that provide multiple benefits. Through partnerships, ACR has just published an Avoided Conversion of Grasslands methodology, which presents a great opportunity to leverage funding from carbon markets to keep lands under conservation that are coming out of the CRP and are therefore threatened by conversion. There is also a great partnership to move forward with a project using this protocol.

The expected reductions are 2 -3 tons C per acre. If the protocol is accepted by ARB, this would bring \$20 an acre. This may not be sufficient to keep the land in conservation over the long term, but it presents an opportunity to see how it works. Additional funding will need to be leveraged from beyond the carbon markets.



Current ACR agriculture GHG methodologies are: Fertilizer N Management, Rice management, Grazing land, Avoided conversion of grasslands, Enteric methane, Wetlands, and Biochar. Many of these need testing/demonstration.

In conclusion:

- Kyoto was a big deal in jump-starting carbon markets, but we have a long way to go.
- USDA CIG and EQIP funding have helped us get to here, but we are just getting started.
- There may be more value in water quality markets that also reduce GHG emissions.

*Sheldon Zakreski, The Climate Trust*

A consumer perspective on why to buy agricultural offset credits, what a buyer considers, and TCTs experience.

The Climate Trust was established in 1997 and is a mission driven buyer. They go into uncharted territory, and look to use dollars as a battering ram to knock down barriers. They have been buying carbon since 2001. They expect to issue another RFP in 2014. They have successfully executed transactions for \$2 million, but money can only go so far.

Over the past several years they have invested in projects involving aggregation as a tactic for unlocking agricultural supply. They have engaged with partners through the GHG CIG process – these include the Fertilizer Institute to address fertilizer management issues, and Ducks Unlimited for technical and design advice. They have structured a sale to Chevy as part of the company's carbon commitment, and recently signed a contract with a voluntary buyer that cannot yet be named. They have evolved to focus on the supply side, to assist offset developers and suppliers.

*Why buy agricultural offsets?*

There is a pent up demand for agricultural offsets and they have unparalleled PR value. This is because they provide reputational advantages for voluntary buyers. Individual scale agricultural projects can position CSR dollars in a way that trickles down to benefit the family farm, and they are seen as cutting edge. Chevy had \$40 million in their portfolio to spend on offsets.

On the compliance side - in CA or federally – TCT sees offsets as a cost containment issue and as a bridge to a reduced carbon future. TCT is looking for sectors that will be eligible over the long term. Agriculture and forestry will be there for many years to come. TCT worked with EPRI to study aggregation, i.e., how to enroll multiple landowners and interest large companies interested in aggregation to unlock supply.

Scalability – Compliance buyers are looking for large scale offsets. In a nutrient management example: there are an estimated 40 million tons obtainable from this sector. One can get maybe 200 offsets a year from an individual farm so many farms will need to be enrolled.

Why is scale important? For example, in an RFP for \$5 million, the budget is divided up in three ways:

1. *Selection and contracting.* This is upfront funding, i.e., the amount one has to spend to spend, e.g., to find the project, go through due diligence, have confidence in the purchase decision, and pay attorney fees. An attorney will always be needed somewhere in the process. It is almost always a forward purchase, for 5-10 years, so it has to be done wisely. If the project doesn't perform, these funds don't come back. Transaction costs matter more than the purchase price.

TCT looks for suppliers who are strong counter-parties, able to deliver on promises, since this requires entering into a 5-10 year contractual relationship. Typical questions they ask in the vetting process:

- What are their channels to landowners? Does the aggregator have relationships with farmers?
  - Do they have executed contracts and enrollment agreements? What type of contracting infrastructure do they have?
  - Risk mitigation - data management systems:
    - Mitigation management: is there risk sharing? Are there fixed payments? Where is risk assigned?
    - Do they have a computerized data management system? A paper based system is not sufficient - it needs to be digital and electronically archived.
2. *Purchase budget* – this is the easy part.
  3. *Contract management budget*, to manage and ensure delivery over a 5-10 year period.

On the voluntary side the drivers are PR value and potential for scale. There is a lot of pent-up demand and buyer interest. However, a few more barriers need to be knocked down before dollars can flow in a meaningful way and enable projects to scale up. This is where policy and government assistance can help.

Key barriers remaining:

- transaction costs out of line with market returns;
- counterparty expertise/experience; and
- methodology risk. We need to make sure we have great methodologies that can be applied on the ground. There are often situations where a business case scenario promising to deliver 10,000 tons turns out to actually be 5,000 tons.

***Post-briefing discussion at USDA:***

*Bill Hohenstein, Director, Climate Change Program Office:*

Going back to where we started – there has been a lot of interest and debate. In the Waxman-Markey process, the debate was whether agricultural offsets would work or would undermine the integrity of the system. However, there was not a lot of information or practical experience on how these might



work. There was an urgent need to gain expertise and insight. To that end, the CIG GHG initiative was launched.

What have we learned? It comes down to innovation, and providing freedom to explore ways of doing things, technological methods, infrastructure for cap and trade, and how registries and financing can work. These are all core elements of agriculture offsets that have been explored through this program.

The whole is greater than the sum. Thanks to C-AGG for providing a forum for sharing information and the exchange of ideas, NRCS is using this approach with the water quality CIGs. It is based on partnerships and collaboration.

The path forward is in a different landscape from when the climate bills were debated, but there are still significant if different opportunities. Improving efficiency: rice is a good example of this and demonstrates that there are economic benefits. Importance of rigor: show that is based more on science, less on fear, and can be done in a responsible way. Finance: not an either or. There will be gains to conservation programs, by making them more efficient, and enabling them to defend dollars spent. We want to explore how to bolster USDA's role in that. Regulatory markets: USDA is following what is happening in CA (carbon markets) and in OR (water quality markets) – it is encouraging but has gone in different directions than was anticipated.

*Robert Bonnie, Under Secretary Natural Resources and Environment*

The climate debate is still mostly about energy but there is an opportunity to talk about the role of agriculture, forestry and land use. USDA is very interested in opportunities to highlight projects, get them out in the press, and show the positive role agriculture and forestry can play in GHG mitigation.

Question: How does USDA intend to take results and lessons learned, formalize them, and perpetuate performance and continuity? This work needs to get into peer-reviewed journals. There is an innovation side that needs to be perpetuated. How to effectuate delivery and complete the handshake?

Answer/DR: C-AGG's stakeholder community includes academics and researchers. C-AGG tries to bridge some of the outreach gap, and specifically develops products targeted to different audiences. We are also expanding internationally. This means we need publications for use in different arenas, and with different audiences. The World Bank is starting a new agriculture smart climate alliance and has reached out to C-AGG because they are trying to replicate what we have been doing, in terms of a multi-stakeholder approach based on on-the-ground learning.

Comment: Something more permanent is needed than a website, particularly to bridge the academic community and those working on the ground.

Belinda M: C-AGG has played an important role in rice protocol development, thereby setting the stage for opening up ARB to other protocols which will eventually be in regulations.

Question: If asked, what will it take to actually get a market? What could Congress do?



Answer: We have learned that potential revenues from carbon markets are not sufficient and that other drivers are needed, but often the same practices used for emissions reduction result in water quality benefits. A necessary focus in carbon markets is on performance. Conservation dollars for water quality could become performance based and be a pull factor for more performance based environmental markets.

Comment: The next World Congress on Conservation Agriculture will be held in Manitoba and provides a good outlet for these stories.

Comment: The innovation piece is transactions. Grasslands for example, can be conserved with appropriate market-based methodologies, which creates volume for compliance markets, which parlays into transactions. There is lots of interest. As the markets move forward new program needs further develop, The Climate Trust has \$15-20 million to put into transactions, and there will be more in the next few years.

Comment: We should not measure the success of the GHG CIGs only in terms of market transactions. The learning and rigor can be applied to other conservation programs, so that these are not just practice based. There is potential to test these in the context of farm bill programs and take advantage of the investments in CIGs. Markets take a while and need regulatory drivers, but in the meantime we can deliver P and N reductions.

### **Post-Briefing Discussion in the U.S. Senate:**

Question: What if you go through all the steps of setting up a project and generating credits and there is no buyer?

Answer: This has been the challenge of the past 2 1/2 years. Right now we are still working out the process. We are currently challenged to get farmers to act based on carbon markets alone; the business case is just not there. We have to look at it differently: what is actually happening, and what are the benefits beyond GHG mitigation, that might provide incentive to a farmer? GHG is not at top of farmer minds and is not what will draw them in. It is another tool and service that can be offered, such as enhanced bottom lines, efficiency improvements, reduced inputs, etc.

Question: Are their agricultural projects within the CA marketplace, currently?

Answer: There is a methane digester protocol, and a forestry protocol. Other ag protocols are still under development.

Question: Some farmers in traditional programs have issues with paperwork needed to get payments. Are these one-time credits?

Answer: They would be signing up for a multi-year period, and conceivably, no, these are not one-time payments, but they also will be time-limited. Once a practice exhibits enough market penetration, it



becomes business as usual and would no longer be considered as additional and thus no longer qualify as an offset that can generate carbon credits.

Question: What are the incentives for purchasers?

Answer: On the compliance side, it comes from regulations. In CA, a number of sectors fall under the emissions cap. They can meet part of their obligation with offsets, which may be cheaper, and therefore provide a more cost effective way to meet obligations.

On the voluntary side: buyers like to be perceived as cutting edge and as exhibiting corporate social responsibility. This is a way to demonstrate that: the hug test – you can hug a tree or a farmer.

In the CA market, you can get anywhere from 0.25 to 2 tons per acre. The price for offsets in CA averages \$10/ton and is expected to increase in line with the cost of allowances. The minimum price for allowances increase approximately 7% per year as required in the regulation - this is approximate because the regulations state that the increase is 5% + CPI.