

C-AGG Meeting Summary

March 29-30, 2011

High-Level Summary

The Coalition on Agricultural Greenhouse Gases (C-AGG) held a meeting in Sacramento, CA on March 29-30, 2011. The meeting provided a forum for C-AGG participants to dialogue with California policymakers and leaders regarding the potential role of agricultural mitigation and offset opportunities in the California climate change program. Updates by the California Air Resources Board (CARB) and the Climate Action Reserve (CAR) kicked off the discussions, and provided the context for much of the remaining meeting. A cocktail reception continued these discussions, and included keynote addresses from Secretary Karen Ross of the California Department of Food and Agriculture; and Dorene D-Adamo, CARB Board member.

USDA updates and engagement allowed for C-AGG discussions in 3 areas: a report on activities of the Climate Change Program office; discussions and input development for the USDA Federal Register notice on GHG methodologies; and updates on ecosystem market activities and opportunities for the agricultural sector.

Several panel discussions provided for more detailed examination and discussions of specific agricultural methodologies and GHG protocols, encompassing scientific and research updates, protocol applications and updates, and policy-relevant discussions. These included a nitrous oxides science, measurements, and applications panel, followed by a nitrous oxides protocol review and update panel; and a panel on rangeland protocol development that included a science update and presentations on rangeland protocols under development.

C-AGG continued to have a robust discussion on sustainable supply chain initiatives, and structuring value for agricultural producers within those initiatives. Potential convergence with carbon markets was discussed, as well as issues of harmonization of metrics, standards, and activities across initiatives.

Feedback was solicited from the group in follow-up to an earlier C-AGG workshop on GHG accounting meta-methodologies; and an update from the C-AGG 'sister group', T-AGG was presented.

Participants agreed that the richness of thoughtful dialogue as reflected by the diversity of participation continues to be a key strength of C-AGG, and we are thankful to all who participated and contributed to the meeting.

This document provides a summary of the meeting and its outcomes. The meeting agenda and PowerPoint presentations from the meeting can be accessed at <http://c-agg.org/resources.html>.

For questions about the meeting, or further information on C-AGG, please contact Debbie Reed, C-AGG Executive Director, at: dreed@drdassociates.org

AB32: An Overview, How Agriculture Fits into the Program, and Program Status

The first presentation of the meeting was delivered by Richard Bode, Chief of the Emissions Inventory Branch of the California Air Resources Board (ARB). Bode provided an overview of AB32, California's Global Warming Solutions Act, and the role of agriculture within the upcoming cap-and-trade program.

AB32, passed in 2006, aims to reduce greenhouse gas (GHG) levels to 1990 levels by 2020 through clean car standards, renewable electricity standards, and a cap-and-trade program, among other measures. The cap-and-trade program was adopted by the ARB in December and is currently undergoing final modifications before implementation is set to begin in 2012. Under this program, agriculture is not a capped sector and is therefore able to provide offsets. Offsets within the system will provide environmental, social, and economic benefits from uncapped sectors. Capped entities can offset up to 8% of their emissions; offset reductions are required to be real, additional, quantifiable, permanent, verifiable, and enforceable. Additionally, offsets must be a part of an ARB approved protocol, such as the Livestock Manure Digester Project Protocol, the Urban Forests Project Protocol, the Ozone Depleting Substances Protocol, and the Forest Project Protocol. ARB continues to work with the Climate Action Reserve (CAR) on protocol development, but is also open to work being done by others.

Bode explained that he is following C-AGG to see what opportunities exist in the agriculture sector. He sees many challenges, including water use, practice types, impacts of climate change itself, and the risk of reversal. However, Bode noted that there is a huge opportunity for emissions reductions from agriculture and he is interested to learn about ongoing and future research which can bring solutions and new project types. ARB hopes to schedule a meeting on agricultural offsets and protocol opportunities in summer, 2011.

Update for Climate Action Reserve (CAR) on Agricultural Protocol Development and Related Initiatives

Kathryn Goldman, Senior Policy Manager at CAR provided an update on agriculture protocol development at the reserve. CAR develops national standards, manages third-party

verification, and maintains a database of GHG emission reductions. CAR is currently developing three new protocols focused on agriculture:

- Rice Cultivation Project Protocol, for methane emission and residue management (goal is to have a completed protocol by winter, 2011)
- Cropland Management Project Protocol, for soil management and conversion of cropland to another use (goal is to have a completed protocol by early spring, 2012)
- Nutrient Management Project Protocol, for reducing the use of nitrogen

Each protocol under development has a dedicated website. For each of these protocols, internal scoping has been completed and issue briefs written. Workgroups have started meeting to discuss these protocols, or will soon. Science Advisory Committees were formed for the Cropland and Nutrient Management Project Protocols to interpret research and advise CAR; this represents a new part of the process for CAR. These committees are meeting informally now and will formally meet and review draft protocols, once they are developed.

Key points from the questions and discussion included:

- CAR has been working to involve agriculture stakeholders in the protocol development process through briefings and workgroup representation.
- Many open questions remain, including, for instance, whether to include soil systems, whether to measure GHG emissions per acre or per yield, and whether and how to include perennial crops.
- There is a tradeoff between scientific rigor and practicality. Aggregation may be a way to address scientific uncertainty.
- The California ARB is collecting information on CAR's protocol development process as it establishes its own protocols. It was noted that these protocols will need a regulated system in order for farmers to benefit financially.

Update from USDA Climate Change Program Office

Diana Pape, Vice President at ICF International (ICFI), provided an update on USDA's project, Developing Science-Based Methods and Technical Guidelines for Quantifying Greenhouse Gas Sources and Sinks in the Forest and Agriculture Sectors, for which she is the contracted Project Manager. Marlen Eve first presented on this project at the October 2010 C-AGG meeting. The project, mandated by the Farm Bill, aims to create a standard set of GHG quantification guidelines and methods for USDA and the public, and will be available for use by other government agencies. USDA and ICFI will be looking at current tools, and how they can be integrated into their work product(s). It is undecided whether one method or multiple tiered approaches may be utilized. The product(s) will be consistent with national inventories, and will include a tool, and training materials.

Pape reported that ICFI's stakeholders for the project are agricultural producers. Three workgroups have been formed for this process – Forestry, Croplands and Grazing Lands, and Animal Agriculture – and are beginning to meet in person. Individuals for the expert review process are being identified and a “review of the reviews,” providing a summary of the current science and findings, has been completed. They have recently published a Federal Register notice and are accepting public comments. Moving forward, ICFI will continue to collect names for the expert review, write responses to the Federal Register comments, and continue to work on producing the tool and its training materials. Federal agency reviewers from EPA, DOI, CEQ, DOE and others will act as an interagency technical advisory group, and review the products.

Key points from the questions and discussion included:

- C-AGG participants urged early engage of farmers in the process. Farmers have not been robustly engaged so far, as a result of the focus on science-based methods. Financial incentives were suggested as the easiest way to bring in farmers.
- The scope of the project is limited. There has not been an effort to launch project level accounting or link this effort with project level work and, as a result, leakage and additionality are not included. USDA also does not intend to use this project for other work in this space, such as that by CAR or T-AGG. USDA plans only to use the tool developed for farm-level management.
- ICFI has created a SharePoint site with all the assembled information for the workgroup writers. This may be made publicly available in the future.
- Pape is seeking suggestions for tools (a list of tools included in the SharePoint site was shared with C-AGG participants) and expert reviewers, including experienced practitioners, who should be included in the process.
- USDA is taking advantage of the work already done for 1605b.
- The workgroups are focused primarily on the method, rather than the type of tool right now. While COMET is the preferred tool for USDA, the workgroups have not yet considered the type of tool.

T-AGG Update: New T-AGG Reports and Products

Lydia Olander, T-AGG Director, provided an update on the work of the Technical Working Group on Agricultural Greenhouse Gases (T-AGG) and a review of their most recent reports and products. T-AGG has completed several reports, including *Assessing the Greenhouse Gas Mitigation Opportunities and Implementation Strategies for Agricultural Land Management in the United States*. T-AGG has several new projects underway (or potentially underway), including an Endnote library and mitigation potential database to be publically available; outreach and educational materials; tracking, summarizing, and original meta-analyses; adding livestock into their analyses; and international agriculture work with the FAO.

Olander presented some preliminary results from T-AGG's recent work. Of the 42 agricultural practices that T-AGG has examined, five have been found to have a high mitigation potential in limited regions with a clear net positive impact, while eight have been found to have lower mitigation potential in all regions with a clear net positive impact. T-AGG found there are still many data gaps. Standardized additionality and data approaches were found to have significant data gaps at the national level. Modeling has been recommended as a preferred quantification approach, due largely to its relative cost effectiveness.

Key points from the questions and discussion included:

- The report will be available in the coming weeks. Peer reviewers are being sought for the assessment report.
- T-AGG plans to write a research needs paper.
- T-AGG is not planning further work on site-level uncertainties, but CAR may be doing more work on this in the future.

Nitrous Oxides Panel: Status of Science, Measurements, and Applications in Agricultural Systems

A panel discussion on the status of science, measurements, and applications of nitrous oxides emissions/emissions reductions in agricultural systems included:

- Johan Six, Professor in Agroecology at the University of California – Davis
- William Horwath, Professor of Soil Biogeochemistry at the University of California – Davis
- William Salas, President and Chief Scientist of Applied Geosolutions, LLC
- Steven De Gryze, Managing Director at Terra Global Capital, Carbon Analytics
- Sonja Brodt, Academic Coordinator for Sustainable Agricultural Research and Education at the University of California – Davis

Johan Six presented his research on nitrous oxide emissions from agricultural systems. Six's research has shown that emissions of nitrous oxides are highly variable, both temporally and spatially, and there is need for more research on nitrogen. His research on almonds, tomatoes, biochar from walnut shells, lettuce, and wine grapes has shown that while nitrous oxide emissions from agriculture are significant, they are much more complex than simple emission factors, and simple default or emissions factors do not work for nitrous oxides.

William Horwath presented his research examining annual and seasonal nitrous oxide emissions in response to nitrogen fertilizer rates and management in lettuce in the Salinas Valley. He has found that, while the literature has summarized emissions factors to be 1%, these are simplistic and incorrect. Horwath has found that nitrous oxide emissions are highly event-based, with events contributing up to 80% of emissions. Additionally, he has

found that when only half of the normally applied nitrogen is used in lettuce fields, generally the field was able achieve 90% of the yield, in spite of the reduced nitrogen use.

William Salas presented his work modeling nitrous oxide emissions using the DNDC model. In California, the DNDC model is being used for a project on rice with NRCS, Environmental Defense Fund (EDF), and the California Rice Commission. It is also being used as part of ARB's database and as a decision support tool for almond and winegrape growers. Salas noted that, while the model has been extensively validated, it requires calibration and a lot of inputs and is traditionally very difficult to use for stakeholders. Moving forward, tools will need to be scientifically sound to estimate field and farm level emissions; to capture local conditions and a broad range of management alternatives; and will have to be easy to use. Salas noted that an advantage of process-based models is that they can provide information on far more than just GHG emissions. The models can also link with spatial GIS databases. New roles for models include regional assessment and inventories, and decision support and policy applications.

Steven De Gryze presented on the opportunities for nitrous oxide emissions reduction projects. De Gryze recognized a few keys to bringing nitrous oxide projects to the market: ensuring that reductions are real and additional, third party verification, and aggregation. In order to ensure that reductions are real and additional, an uncertainty deduction of up to a half may be required to bring projects to market. The theory is that uncertainty deductions will depend on statistical confidence, and the deduction decreases with increasing aggregation and increased number of participating fields. This also confers comparability on projects. Third party verification is also a challenge, since verification is needed several times a season, when fertilizer is applied. While aggregation is going to be a challenge, De Gryze sees it as an important risk insurance mechanism, as well as a way to make projects performance-based for the market.

Sonja Brodt presented the work has been done thus far on the California Nitrogen Assessment. The Assessment was developed through stakeholder consultation, and seeks to answer:

- What are the biggest sources of nitrogen pollution in CA?
- What practices are the most effective at mitigating nitrogen pollution?
- What are the policy challenges and opportunities?

Thus far, the assessment has worked to identify and quantify the stocks of nitrogen in and coming into California and the flows out of the state, on an annual basis. The Assessment is examining the relative forcing due to nitrous oxide and has found that relatively few crops contribute a high proportion of emissions.

Key points from the questions and discussion included:

- Nitrogen that isn't taken up by plants is lost to leaching or converted to gas. While most models include leaching, there are few direct measures and the uncertainty is

large. While it is possible there is less leaching when managing organically, this is not a foregone conclusion.

- Almonds, wheat, and cotton are the highest impact crops.
- A sensitivity analysis of model inputs is needed. While many variables feed into a model such as DNDC, most or many are relatively unimportant. If the important variables could be pinpointed, the models would be more user-friendly and accessible to farmers. However, it was noted that models must be used only for the areas for which they have been calibrated.
- There is still a lot of work to be done examining the appropriate levels of uncertainty, though, in this case, uncertainty is only a one-sided confidence interval. There is no problem with providing greater reductions than estimated or predicted.
- While in the Mid-west U.S. there tends to be a curved relationship between profit and nitrogen use, it tends to be a direct relationship in California.
- Indirect emissions only become a problem in modeling when they increase rather than stay constant.

N₂O Protocols Panel: Mini-review of Protocols, and Updates on Applications and Field Demonstrations

A panel discussion provided updates on three different nitrous oxide protocols, including:

- Adam Diamant, Senior Project Manager of Electric Power Research Institute's (EPRI) Global Climate Program, presenting the EPRI-Michigan State University (MSU) N₂O GHG Emissions Offsets Protocol,
- Nick Martin, Chief Technical Officer of the American Carbon Registry (ACR), presenting the ACR Methodology for N₂O Emission Reductions through Changes in Fertilizer Management, and
- Rob Janzen, VP of Western Canadian Operations of ClimateCHECK Corporation, presenting the NERP Protocol for the Alberta Offset System.

This panel allowed presenters to provide updates on their protocols, previously presented at the fall 2010 C-AGG meeting in Chicago, IL. Adam Diamant began the panel, discussing the protocol that has been developed by EPRI and MSU. This protocol requires farmers to reduce the rate of nitrogen application on their fields. The protocol is undergoing its second validation with the Verified Carbon Standard (VCS). It has also been submitted to the American Carbon Registry (ACR) and will be out for public comment this year. A pilot project is being selected to work through the protocol and work has begun collaborating with Australia's Carbon Farming Initiative.

Nick Martin continued the panel with a discussion of ACR's protocol, released last year, which is based on the DNDC model. This model is currently undergoing field trials and ongoing research. The model has received robust feedback from aggregators, who have

found that aggregation keeps the costs down and reduces the uncertainty. They have found that complexity isn't nearly as important as predicting the credit per acre for farmers at the beginning of the process. As a result of the complexity of this protocol, verifiers are relied upon heavily to complete the work. Flexibility has been identified as this protocol's greatest strength.

Rob Janzen presented an update on the NERP Protocol Plus, which was built for the Alberta Offset Program. This model accredits nutrient managers to help farmers develop a nutrient management plan and ensure compliance with the plan. This protocol is already in use in parts of Canada and will be adapted for more areas. Farmer extension is being added to the system as well as continued research to refine the system. There are plans to adapt this protocol to the U.S. and roll it out as a part of the 4R program.

Key points from the questions and discussion included:

- While there may not be large financial incentives for producer participation in these protocols, the panelists noted other benefits for farmers and the importance of even small incentives.
- Nutrient managers that the NERP Protocol accredits are generally individuals already working as crop advisors looking for a professional certification. Nutrient management is not a service often offered by crop advisors.
- While the ACR protocol may be stackable in the future, it does not currently certify other benefits. However, EPRI is actively working on stacking water quality with carbon.
- Yield increases and decreases per acre of land are addressed differently in different protocols. The ACR Protocol accounts for yield changes in the calibration of the DNDC model. The NERP Protocol examines nitrous oxide emissions as a function of yield, rather than area. Yield loss is neither penalized, nor credited. Aggregation is seen as a way to protect farmers from losses as a result of yield loss, and the resulting loss of offsets, under this protocol. The EPRI-MSU protocol accounts for changes in yield as a change in the baseline as well. The baseline in this model, which includes indirect sources of nitrogen, is determined by historical records, either from the farmer or at the county level.
- While uncertainty can be problematic when developing protocols, it is not a show-stopper. Scientists see uncertainty as something to be quantified and accounted for, so in these protocols, as uncertainty rises, the deduction (from credits) to account for the uncertainty rises as well.
- Many people have suggested comparative or overlaid road tests of the three models via field trials, and all agreed that this would be a useful exercise.

GHG Accounting and Agriculture: A Comparison of Meta-Methodologies

Debbie Reed, Executive Director of C-AGG, and Karen Haugen-Kozyra, Director of M-AGG, led a discussion of a white paper on meta-methodologies for GHG accounting and agriculture, based on a January 2011 C-AGG Expert Workshop held in Washington, DC. The workshop focused on comparing and contrasting high-level approaches and accounting methodologies for agricultural activities, including CDM style approaches ('bottoms up'), ISO 14064-style approaches, whole-farm approaches (e.g. COMET-VR), and regional scale quantification approaches ('standardized'). The initial goal was to define and describe the various approaches in a white paper for policymakers, and to create a matrix comparing them, in terms of quantification approaches, scale, units, baselines, additionality, leakage, etc. The white paper was to describe how the approaches differ, identify knowledge and data gaps, and provide analysis of implications for policy development. Through the process of drafting a white paper, a different approach has been taken, based largely on the need to find an approach that provides utility to policymakers. Haugen-Kozyra presented the latest draft paper, which covers the overarching framework (programmatic v. market-based approaches); the scale of implementation (farm-scale v. regional-scale); and the delivery process (describing necessary components of the delivery system, including a continuous improvement model, and building on the learnings from Alberta, British Columbia, CAR, and elsewhere). The draft white paper attempts to create a framework that could be used to evaluate various options during the development of a program. The next phase of work on the paper will be to employ the framework and describe how to decide on the design of the system, given project-level considerations.

Key points from the questions and discussion included:

- Supply chain initiatives are another important category (somewhat different than carbon market approaches) that should be compared and assessed as a part of this exercise. Supply chain initiatives were considered by some participants to be an alternative to other (carbon market) approaches, while others considered them to be complimentary.
- Whatever the final system design, it should facilitate the convergence between market needs, supply chain initiatives, and existing USDA programs that farmers already know and trust.
- Knowing the target audience for a project such as this was seen as an important consideration in system design. While this hasn't been fully examined, it was suggested that this could serve as a valuable resource for USDA. Additionally, defining the audience will help to better define the end product.
- In order to make this exercise relevant to grower groups, it was suggested to focus more on the implementation mechanism, rather than the macro-level as the white paper is written.

- Not all variables should be given the same weight in the decision framework. Ease of use and ease of scaling up should be deprioritized, while uncertainty should be given greater consideration. How to prevent the system from penalizing early adopters and how to incorporate environmental services benefits are both serious issues still to be resolved.
- Two types of uncertainty were identified – structural uncertainty in the model and uncertainty inherent in the data.
- The cost to the producer is another issue still to be resolved. If a voluntary program is costly, it will not be implemented (unless the benefits far outweigh costs).
- Decisions about the system design will have implications for its consistency with other efforts. The more common data sets used, the better.
- There are a lot of considerations bundled into the variables identified in the white paper still to be teased apart. One method for this would be to revise the original version of this paper to reflect the recent work by T-AGG and M-AGG.
- There is a large educational value to farmers of an exercise such as the one proposed.

Discussion of C-AGG Input into the Federal Register Notice

USDA published a notice in the Federal Register on February 22, 2011 seeking input on guidelines for farm- or entity-scale estimation of greenhouse gas emissions and carbon sequestration. In advance of this meeting, C-AGG participants had submitted comments and a draft C-AGG response was circulated. This session provided the opportunity for participants to provide further input and refine the response document.

Key points from the questions and discussion included:

- Participants wondered what the goals of the program are, and whether the system design should be altered to function better with carbon offsets. There is no mandate in the project design for a market-based system for carbon offsets and as a result USDA cannot consider this within the project. USDA doesn't have the authority to develop a crediting scheme and they don't want to get ahead of Congress by widely interpreting their authority. However, participants agreed that comments to help the project dovetail with carbon offsets should be included, understanding the limitations of USDA's authorities.
- For purposes of deciding which minor emissions to count (in response to the questions posed), perhaps any minor sources that, in the aggregate have a material impact on the national inventory should be counted.
- Life-cycle analysis should be coordinated with the national inventory.
- A tool with multiple interfaces to increase accessibility for farmers is recommended. For example, farmers should be able to use the tool both online and in hard copy. Additionally, the guidance for the tool should be embedded in the tool itself.

- As in past submissions, the response will be signed from C-AGG as a whole, rather than contributing organizations, unless individual organizations also wish to add their names together with C-AGG's.

Update from USDA NRCS on Ecosystem Market Activities

Mark Nechodom, Senior Policy Advisor for Environmental Markets at USDA, provided an update on USDA NRCS's work on ecosystem markets for ecosystem services. USDA has been involved in a lot of work on nitrogen and phosphorous credit trading by power companies in order to improve water quality. USDA sees significant cost savings by stacking and bundling these credits together with credits for GHG emissions reductions and is working to prepare at the policy level for this. He noted that, in addition to credit-worthy practices, metrics are necessary. USDA has separated the policy-making around environmental markets, now in the Office of Environmental Markets (where Mark is running the Regional Environmental Markets Program), from the work under the Chief Economist, which is focused on creating a capital asset class out of environmental services. This allows USDA to begin working on the ground to write checks to farmers while the environmental markets are still in development.

Key points from the questions and discussion included:

- Additionally is an important concern, particularly as multiple markets are developing for multiple environmental benefits of the same practices. In the end, a policy decision will need to be made whether farmers can receive multiple payments for the same practice. The government will need to become the arbitrator in voluntary markets as well. Additionality rules under EQUIP are already exposing the need for a clear decision on this.
- Stacking is very difficult, currently, because of differing design structures of the existing systems for crediting. If stacking were to be allowed, investments in system redesigns and harmonization or standardization would be required.
- USDA is working on making performance based metrics for environmental investments a greater proportion of Title 2 conservation programs.
- Outside of a pure policy frame, quantifying the contribution of farmers to environmental improvements would help make these efforts more real to farmers.

Sustainable Supply Chain Initiatives: Structuring Value for Agricultural Producers

Ricardo Bayon, Partner at EKO Asset Management, moderated a panel discussion on sustainable supply chain initiatives that included:

- Steve Ruddell, consultant to and representing World Wildlife Fund (WWF)

- Alison Jordan, Executive Director of the California Sustainable Winegrowing Alliance
- Dennis Trémorin, Manager of Sustainable Production at Pulse Canada
- Erin Fitzgerald, Vice President of Sustainability at the Innovation Center for U.S. Dairy and Dairy Management Inc.
- Dan Sonke, Senior Scientist at SureHarvest, Inc., representing The Almond Board

Steve Ruddell is working on a project funded by WWF, the Dutch Government, Rabobank, Unilever, and Coke to create “credible carbon.” This program will measure the embedded carbon content in commodities and allow this carbon to be sold as a part of the product along the supply chain. They now are working through an expert review process and plan to begin pilot projects next year. In this work, increased market access has been critical for engaging commodity buyers.

Alison Jordan discussed how, while the California Sustainable Winegrowing Alliance is still in its early stages of developing a supply chain initiative, they are working to lay the foundation for carbon becoming a tradable commodity. Additionally, she noted that the Alliance has been working on protocol development internationally with New Zealand and Australia and improving the models they work with, particularly the DNDC model. While there has been some reticence exhibited within the winegrowing community to these efforts, they are trying to promote understanding and engagement.

Dennis Trémorin explained that the food industry has been increasingly interested in carbon, driven by consumer and retailer interests. He noted that for pulse crops grown in Western Canada, many beneficial practices have already been adopted and the industry has a good story to tell. He reiterated that carbon foot printing and other sustainability efforts are being driven by market access opportunities. While the cost for these efforts thus far has been borne by the producers, it hasn't been unbearable.

Erin Fitzgerald offered that, in the dairy industry, the driver for sustainability programs are the retailers. The dairy industry learned a lot from the life cycle analysis completed for a gallon of fluid milk, both about the drivers of milk's carbon footprint and about how to gather data like this from farmers. This information has been critical as the industry works to reduce its carbon intensity by reducing energy use. She noted that, like the pulse crops, the cost of this effort was borne by the farmers.

Dan Sonke agreed that retailers and increased market access are driving the move toward eco-labeling. While consumers express an interest in lower carbon products, with few exceptions, they will not pay a premium. He noted that the next big issue on the horizon for farmers and growers is onerous paperwork requirements. The California offset market is expected to have a relatively inexpensive reporting burden, but this may not be true for all markets.

Key points from the questions and discussion included:

- Supply chain initiatives and eco-labeling are often seen or used as a proxy for quality.
- Harmonization of the scientific tools, measurement, and reporting will be important for engaging producers. Buyers are feeling audit fatigue from food safety reporting requirements and the same thing could happen with producers and sustainability. Aligning quantification methods is a challenge, but there are options, such as the Cool Farm tool.
- There may be a government regulatory role in order to standardize these efforts, but voluntary harmonization can also accomplish this without regulation.
- It is still unclear whether sustainability will become, like food safety, a hurdle that must be cleared in order to enter the market. Farmers are wary of creating additional market hurdles, and want to ensure that any standards are rational and necessary.
- Additionality and third party verification aren't much of an issue in supply chain initiatives.
- There are many ways to incentivize farmers to participate in these types of initiatives. Buyers can pay farmers a premium or provide technical assistance. Insurance companies can provide lower premiums for participating farmers, if participation is shown to lower risk in a relevant manner.
- C-AGG plays an important role in cross-sectoral stakeholder communications, including growers, industry, and NGOs. It can help to identify efficiencies and opportunities for harmonization. C-AGG can also help to recognize the link between sector-based and value chain-based management and prepare farmers for increased transparency.

Rangeland Protocol Development: Science and Policy Applications

A panel on rangeland protocol development introduced the idea of managing greenhouse gases on rangelands to C-AGG and presented the current state of knowledge on rangeland carbon management. The panel included:

- Whendee Silver, Professor at the University of California – Berkeley
- Rich Conant, Ecosystem Ecologist at the Natural Resource Ecology Laboratory at Colorado State University
- Belinda Morris, Regional Director of the Working Lands Program at Environmental Defense Fund (EDF)
- Randall Dell, Regional Biologist in Environmental Markets at Ducks Unlimited
- Forrest Mertens, Chief Operating Officer at SunOne Solutions

Whendee Silver provided background on rangelands, their role in mitigating climate change, and discussed her project to reduce carbon emissions by applying composted green waste to rangelands. Soil carbon management on rangelands can make an enormous difference in soil carbon pools. She has found that by applying compost to rangelands at a rate of 12 to 15 metric tons of carbon per hectare, plant and forage production increased and 90% of the nutrients remain on the rangeland. Additionally, there are significant co-benefits for soil fertility, water holding capacity, soil stability, sustainability, and productivity. She is currently working to test promising management approaches.

Rich Conant explained that the data on rangelands is severely limited. While rangelands are important, they are often not perceived this way. Unfortunately, the limited data has made modeling very difficult. For example, models of soil carbon stocks tend to fall apart when changes in grazing management are introduced. Additionally, there is very limited data on nitrous oxide emissions and rangelands.

Belinda Morris discussed a carbon protocol that EDF is developing through a USDA/NRCS CIG grant. They are working with the CENTURY model on three different project types - avoided conversion of native rangelands and Conservation Reserve Program lands to croplands; the restoration of cropland; and the improved management of rangelands. Once the protocols are developed, they will be tested and the environmental and economic impacts will be quantified.

Randall Dell presented another protocol for avoided conversion of non-forested ecosystems, currently being assessed by the VCS. This protocol is analogous to REDD for forested lands and aims to prevent soil carbon loss from rangelands being converted to cropland. The protocol will add to the two improved grassland management protocols already under VCS.

Forrest Mertens discussed SunOne Solutions work as a project developer for rangelands. They began registering land under a Chicago Climate Exchange rangeland protocol. Mertens explained that the first two stages in the process – feasibility analysis and the carbon inventory – hold the most risk for project developers. By the time a project is verified, the risk is substantially reduced, since the project is much closer to showing farmer profits. He noted that benefits to producers -- both the type and timing -- are very important to a project's success. Farmers are responsive to benefits that can be pre-sold but they don't want to opt out of future ecosystem services markets.

Key points from the questions and discussion included:

- There is a lot of gray area in the difference between rangelands and grazing lands for livestock and pasture; some differentiate them by the degree of management. The divisions between rangeland, forest, and fallow field can also be blurry.
- Measuring the current or baseline carbon in the soil can be very difficult. It is often done through modeling or field sampling, or a combination of both.

- There is enough data to begin to bring rangelands into voluntary markets, but more may be needed for a regulatory framework.
- Inter-annual variability is a significant challenge for an offset market. Models often have a hard time predicting soil carbon changes as a result of climatic changes.
- C-AGG can help by refining the modeling and identifying new ideas and innovative practices. C-AGG can also help through information sharing, pointing out flaws in the current frameworks, and by engaging additional scientists.

Roundtable Discussion: The California Context and Next Steps

Eric Holst, Managing Director of the Center for Conservation Incentives at EDF, moderated a roundtable discussion on the next steps for California, which included:

- Derik Broekhoff, Vice President for Policy at CAR
- Mark Nechodem, Senior Policy Advisor for Environmental Markets at USDA
- Cynthia Cory, Director of Environmental Affairs at the California Farm Bureau Federation

Derik Broekhoff explained that California has been the bright light for market mechanisms since federal climate legislation stalled. For California to be successful in the next 18 months, CARB has a lot of infrastructure to build. Regulations need to be finalized and a registry and tracking system for offsets developed. Questions about enforceability still need to be resolved and more protocols need to be developed.

Mark Nechodem commended the people working on the leading edge of developing carbon markets and acknowledged that there are always failures when one is on the forefront. He noted that the federal government is watching California to see how the system works and to learn from it. If and when a federal system for carbon credits is established, participants in the California market will benefit from their experience, and will likely have an advantage over those who do not.

Cynthia Cory defined success in California as the ease of use and quantity of reductions achieved by the three agriculture protocols. Achieving benefits for farmers and ecosystems, without the system evolving into a regulatory program is of principle importance to farmers. She noted that farmers will only engage if there is a real incentive and a contract to sign (or in other words, actions for farmers to engage in now to receive defined benefits in a defined timeframe).

Key points from the questions and discussion included:

- Through the end of this year, the ARB will be focused on getting the basic infrastructure in place. In 2012 it will be able to make progress on approving additional protocols.

- USDA/NRCS CIG grants for GHG that were recently noticed will be very important for testing protocols and showing their effectiveness in opening carbon markets, and as a result, gaining farmer buy-in. However, the upcoming round of grants may not be completed in time or have reportable outcomes that can influence early protocol development in California. This first round of grants also may not commit enough money to make substantial progress in leveraging investment and mobilizing implementation.
- Transparency in the California program will be critical and C-AGG can play a role in helping to promote and ensure transparency.
- Innovative approaches will be critical in achieving environmental quality goals on a national level.

C-AGG Wrap-up and Next Steps

The highest priority following this meeting was the revision and submission of the response to the Federal Register Notice by April 19, which has subsequently been achieved. Debbie Reed, C-AGG Executive Director, asked participants to think about areas of focus that could benefit from workgroups or issue-specific webinars to help continue discussions and make progress on specific topics between C-AGG meetings and workshops.

Next steps and action items:

- Bill Salas suggested a working group to address the issue of certainty/uncertainty, and how much is necessary or appropriate for different activities, projects, or markets.
- Agricultural GHG accounting meta-methodologies – organize and prioritize feedback from discussion, and develop next draft of the white paper. Begin to address the idea of convergence of sustainable supply chain initiatives (GHG component) and carbon accounting/carbon markets. There is likely overlap or synergies with WWF's carbon bundling project, though the C-AGG/M-AGG focus would be more domestic.
- Supply chain initiatives: the concept of assessing available tools and metrics being utilized by various initiatives, with an eye towards standardization or harmonization will be pursued.
- CIG GHG Grants – once awards are announced, Debbie/C-AGG will reach out to awarded projects, and explore both how best to track and share information about projects as well as potential areas for C-AGG engagement and input into projects.
- Next C-AGG meetings: Debbie proposed scheduling future meetings in July (Chicago), November (Washington, DC), and February (Sacramento). Based on feedback from participants, meeting dates will be selected to allow for advance planning by participants.