

C-AGG Meeting Summary

Tuesday-Wednesday, July 9-10, 2013

Westin Book Cadillac Hotel

Detroit, Michigan - USA

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Executive Summary

C-AGG participants continued discussions of agricultural offset opportunities within the CA Cap-and-Trade system, particularly with respect to issues of aggregation and verification. With significant upcoming action by the CA Air Resources Board regarding pending release of a draft rice offsets protocol, to be followed by a public comment period and ARB Board consideration of the protocol in the fall, the discussion trended toward aggregation for the rice protocol in particular, but with acknowledgment that the issues of aggregation and verification are critically important for all agricultural offset protocols, as well. Important progress was made on this issue, particularly in regards to the identification of roles and responsibilities of individual persons or entities within the entire offset system, and their stated or implied objectives. This led to a more direct discussion of the role of individual farmers, and how to engage them within the CA offset system in a manner that would allow for aggregation and yet still meet the rigor and regulations of the CA system, particularly with regards to the requirements for Authorized Project Designees (APD) and Offset Project Operators (OPO). The pros and cons of individual farmers in either role was explored, and the discussion seemed to weigh in favor of aggregators, such as agribusiness entities or similar groups, acting as OPOs on behalf of an aggregate of farmers, to reduce the burden on farmers and yet still meet the needs of the ARB system.

Updates from USDA on GHG tools and a pending GHG methodologies report generated a great deal of discussion about the intended use and audience for different GHG quantification tools developed by USDA, their differences and similarities, issues of compatibility, harmonization, and linkages, as well as the potential for different outputs even with the same data inputs. C-AGG will send additional comments to USDA in follow-up to that discussion. C-AGG looks forward to the release of both the new Quantifier Tool and the GHG Methodologies Report that USDA will be releasing for public comment in the near future (the latter during the month of July).

GHG CIG projects were another focus of discussion, including the fact that stakeholders and project participants have learned a great deal about agricultural offset protocol development, but that a 3-year funding cycle is definitely shorter than the 5-6 (or longer) year time period necessary to truly develop protocols and begin to deliver credits from land-based systems. C-AGG will begin drafting and circulating a synthesis report of lessons learned from the GHG CIG project experience, and GHG CIG project participants are asked to utilize the report as a prototype to build upon in order to send USDA a compilation of recommendations in early August related to a potential second round of funding for GHG CIG projects, including potentially providing additional funding to existing projects that could benefit from additional time and funding to deliver a successful outcome in the form of GHG credits.

Data needs and access to data for agricultural GHG emissions reductions opportunities, programs and policies was another major focal point of discussion. An excellent presentation on satellite-based imagery currently available to C-AGG stakeholders as well as enhanced capabilities and products to be available in the future provided a greater appreciation of the use of remote sensing and satellite imagery for many aspects of agricultural production and verification for agricultural offset protocols. C-AGG will continue to pursue the scheduling of federal data access workshops with USDA and other relevant agencies, to include the type of satellite imagery currently being collected by USDA, as well as imagery available to entities receiving US grants or funding.

Opportunities for beneficial collaboration with C-AGG on behalf of furthering mutual goals and objectives with two different organizations were also explored. The Michigan Agribusiness Association and the Stewardship Engagement Initiative presented two different yet incredibly relevant models for

engagement with C-AGG as a means of expanding outreach and overcoming some of the obstacles encountered with regards to farmer and rancher engagement in GHG mitigation activities, as well as access to data needed for market-based and supply chain related GHG opportunities that can enhance income generation and productivity for farmers and ranchers.

Finally, participants were highly impressed with the strategic visual maps created by Alchemy Consulting, and we urge participants to review and use them freely to benefit our collective efforts.

Action Items

- Refine and circulate C-AGG comments on aggregators and proposed regulatory language for ARB to consider with respect to aggregation for agricultural offset projects (for submission in early August);
- Draft C-AGG comments to USDA regarding GHG quantification tools, circulate and refine, and submit to USDA;
- Debbie will follow up with the Michigan Agribusiness Association and the Stewardship Engagement Initiative to pursue models for continued mutual collaboration;
- Debbie will circulate a prototype report of lessons learned and success stories from the GHG CIG projects to date, to allow all GHG CIG projects to contribute to the report, and include recommendations to USDA for future investments in GHG CIG projects (for submission to USDA in early August). note that this report will also serve as the basis for a future C-AGG synthesis report to USDA on lessons, challenges, and successes from the GHG CIG projects;
- C-AGG will continue to pursue a federal data sharing workshop with relevant stakeholders and USDA and other relevant federal agencies;
- C-AGG will begin to document data gaps relevant to data needs for agricultural participation in offset and ecosystem service markets and supply chain initiatives as a means to speed up incentive-based opportunities for the agricultural sector to participate in and benefit financially from GHG mitigation efforts.

Tuesday, July 9, 2013

Welcome and Introductions: C -AGG Overview and Background, and Meeting Objectives Debbie Reed, C-AGG Executive Director

Debbie welcomed the group to Detroit and reviewed C-AGG's purpose and background, and the main meeting objectives, the latter of which include:

- To delve further into key aspects of aggregation and verification of agricultural carbon offset projects, with a focus on the California AB32 Cap-and-Trade program.
- To discuss and begin synthesizing lessons learned from the cohort of ongoing USDA Greenhouse Gas (GHG) Conservation Innovation Grants (CIGs) for a C-AGG Report; and to discuss current challenges and needs for the projects, potential next steps, and key recommendations to USDA for future investments in this area.
- To continue to explore the trend of data needs for the agricultural sector, including access to and sharing of data for ecosystem markets and sustainable supply chain initiatives, with a focus on creating and effecting incentives and value for farmers and ranchers who participate in these programs.
 - The Michigan Agribusiness Association (MABA) is participating in the meeting, and Jim Byrum , MABA President, will discuss relevant programs of MABA and its

members, including agribusiness companies, farmers, certified crop advisors, and others, and opportunities for collaboration with C-AGG.

- Brett Thomassie of DigitalGlobe—a remote sensing and imaging company with 5 orbiting satellites —will present on its existing and new imaging tools and datasets – including a new satellite coming online in June 2014 with incredible new spectral features and agricultural applications, and explore access and availability of these datasets to C-AGG participants and stakeholders.
- C-AGG will continue to explore a federal agency workshop on data sharing to dive deeper into how to collect, share, and produce data for relevant applications that will benefit the agricultural sector’s participation in GHG mitigation and sustainability programs and opportunities.
- Participants were reminded that all documents and presentations, as well as the strategic “brain maps” / illustrations will be posted on the C-AGG website under the Meetings menu (organized by meeting dates) ; and the next C-AGG meeting will be held Tuesday and Wednesday November 5-6, 2013 at the Loews Madison Hotel in Washington DC.

Introduction to Alchemy Consulting: Facilitation and Strategic Illustration

Chris Chopyak, Senior Partner

Alece Birnbach, Strategic Illustrator

Alchemy Consulting

Chris provided a brief overview of Alchemy and her role as a strategic facilitator for C-AGG meetings.

- Chris co-founded Alchemy in 2000, and the company provides large- and small-scale facilitation at the strategy level in tandem with strategic illustration, derived from listening *for* content and *into* meaning. The result is the production of “brain maps”—illustrations that help us remember content and key messages by providing visual cues to jog our memory and connect the dots.
- Chris’ role for this meeting will be to help move the conversation along to maximize intellectual contributions from all participants. Her background is in science education and she has working knowledge of GHGs and climate change. Her role as a facilitator is to work with the group to drive, but not shape, the agenda as developed.
- Alece Birnbach of Alchemy will be capturing high-level content and important concepts by translating oral into visual messages.
- Chris and Alece welcome direct input and contributions from participants to the meeting illustrations and maps, both during and after the meeting.

Assessing the Landscape: A C-AGG Plenary Discussion of Critical Issues and Trends in Agriculture and Climate Change

Facilitator: Chris Chopyak, Alchemy Consulting

To open the meeting, the group was asked to contribute observations of key and emerging issues in the C-AGG space that participants are seeing in the field. The following observations were made:

- California Air Resources Board’s (ARB) rule-making processes on offsets, as well as the rice offset protocol, have advanced considerably in recent months.
- In June, President Obama made an announcement on climate change and outlined intentions for the federal administration to regulate GHGs. There is a section on agriculture in the announcement and this significant new effort has the potential to affect the overall work of C-AGG and its members.

- Also in June, USDA Secretary Vilsack announced several activities related to climate change adaptation including the launch of seven new “Climate Change Centers”. Further details on the Centers will be forthcoming in the near future.
- A question was raised whether fatigue is setting into the ag offsets space, but participants responded that in fact there is considerable excitement around progress in CA around agricultural carbon offsets, particularly with advances in the rice working group, and that awareness is being raised in the farming community largely through the GHG CIG process, the pending ARB adoption of the rice offset methodology, and continued advances within C-AGG and its stakeholders.
- C-AGG has new friends in high places at USDA; Krysta Harden has been nominated to be USDA Deputy Secretary and Robert Bonnie has been nominated as USDA Under Secretary for Natural Resources and Environment, and both have actively supported incentive-based ag GHG mitigation opportunities and policies.
- Continued failure of the US Congress to pass a Farm Bill means that policy directions at the federal level remain unclear.
- Farmers are increasingly being asked to participate in sustainability and supply chain initiatives that require provision of data to buyers such as Wal-Mart. These initiatives are proliferating and still in the early days, but a clear disconnect between agriculture at one end of the supply chain and companies at the other end is evident, and collaboration, mutual understanding of goals and objectives, and mutual value propositions will be required to make these work.
- It is becoming increasingly clear that changes in farming practice are being driven by mechanisms other than markets. For example, the recent and rapid expansion of cover crops in the Midwest is attributed to farmers seeing the resilience of these systems in severe drought conditions experienced in 2012. This highlights that the group has to be able to look at issues from the farmers as well as the environmental perspective i.e., management practices can deliver both environmental and economic benefits.
- We continue to observe and emphasize that money is not/will not be the sole driver for engaging the agricultural sector in carbon markets, since financial gains will be minimal for farmers. There is a continued need to engage farmers based on their needs and realities, and to identify value propositions for farmers that may include but are not solely based on the price of offsets.
- Because financial gains will not be large, agricultural offset opportunities are not a “silver bullet” approach to agricultural GHG mitigation, but that does not mean that the efforts to date are or have been for naught. Rather, the trend for agriculture is that it will be increasingly data driven, and we have made huge gains in addressing data needs and data sources and collaborators. For instance, crop advisors, feed mill operators, agribusiness entities and others have data that can be used for many of these efforts, and we need to further engage these non-traditional partners.
- The bio-economy is rapidly evolving and precision agriculture and high-tech applications represent the future of farming.
- There is a promising trend towards performance- and systems-based programs and approaches that recognize linkages between practices and processes in a more holistic systems framework.

USDA Climate Change Program Office- Update

- ***Draft USDA GHG Methodologies Report***
- ***Linkage of USDA GHG Tools and Calculators***

Diana Pape, Vice President, ICF International

Diana provided an overview of USDA’s project to develop science-based methods and technical guidelines for quantifying GHG sources and sinks in the forestry and agriculture sectors as mandated by the 2008 Farm Bill. There are two primary outputs from the project:

- Phase 1 – a report outlining comprehensive science-based methods for entity-scale GHG estimation.
- Phase 2 – a user-friendly tool (the “USDA GHG Quantification Tool”) that follows the methods report to provide landowners and managers with reliable and understandable estimates of GHG emissions and C sequestration.
- The methods report:
 - will cover the whole farm and interactions among systems e.g. manure on crops;
 - was developed by three working groups convened around crops, forestry, and animal agriculture;
 - is intended to provide farm, ranch and forest landowners as well as NGOs, state and local agencies, and project registries with the latest scientific methods to assess the GHG impact of conservation practices and programs on their lands;
 - has been in development since October 2011, and will be released for public review and comment in late July 2013, and finalized by November 2013.
- Notable items within the methods report:
 - a new N₂O estimation methodology developed by a group of experts that is a hybrid approach based on both process models and default values;
 - a model-based forestry methodology using USDA’s FVS model;
 - inclusion of an uncertainty assessment for all estimated values; and
 - highlights on existing research and data gaps.
- The USDA GHG Quantification Tool (*aka* Q-Tool):
 - is a blend of empirical and process-based modeling using IPCC Tier 1 and 2 models as well as modified IPCC/empirical models and process-based models;
 - is designed to estimate changes in GHG emissions based on management practices, and can inform farmers who may be considering participating in carbon markets ; and
 - will be available in 2014.
- A range of datasets back up the tool, including forest carbon stocks, land cover, weather and climate, soil types, and ammonia emissions, for instance.
- By way of example, the use of the Q-Tool to track N₂O emissions from cropland was described. The tool combines outputs from the DNDC and DayCENT models to estimate baseline emissions for conventional management. Scaling factors were then developed for different management practices e.g., tillage and irrigation, to develop estimates of differences in emissions between practices, at the field level. A separate calculation estimates yield based on changes in practices.
- In summary, the project is designed to produce a report and tool that are:
 - a scientifically vetted means for USDA to provide local-scale, standardized and transparent estimation of GHG fluxes;
 - consistent with USDA and EPA national GHG inventories;
 - aligned with NRCS COMET-Farm tool and other USDA GHG tools; and
 - coordinated with water quality or other tools to assess environmental service benefits.

Significant discussion ensued among participants around the need to harmonize the various USDA tools since there is confusion among stakeholders and agricultural producers regarding the intended applications and differences in applications of the various tools. (Note: This point was revisited in the afternoon presentation led by Adam Chambers of USDA NRCS.) Much discussion focused on efforts at USDA to either combine or harmonize the Q-Tool and COMET-Farm tool, in particular, as well as to better articulate the intended differences and applications of each if they are not combined into one tool. Some participants indicated that USDA should work towards developing a single tool that is more

rigorous (with regards to accuracy of estimates); while others indicated that, without a clear understanding of the intention of various tools which may have different, relevant applications, it is perhaps premature to recommend convergence of the tools into one. However, it was agreed that if multiple tools are maintained, they should not give different results. There was significant discussion regarding a major difference between the two tools, which is N₂O estimation capabilities, and whether the new N₂O methodology in the Q-Tool should be incorporated into COMET-Farm. Phil Robertson (a report contributor and one of the experts who contributed to the new N₂O estimation methodology) indicated that the methodology was portable, and with appropriate programming, could be incorporated into COMET-Farm. Some participants suggested that the different tools might represent a nested approach, whereby level one (e.g. COMET-FARM) would require a certain minimal amount of inputs; and level two (e.g. Q-Tool) might allow for additional data inputs, and higher quality (more accurate) outputs. Alternatively, various tools might be applicable for modeling different farming scenarios e.g., specialty crops vs. commodity crops vs. livestock systems. Debbie noted that C-AGG has submitted comments to USDA on some of these issues in the past; and we will draft, circulate, and submit additional comments on this issue to USDA in the near future.

Voluntary GHG Registry Updates: Climate Action Reserve (CAR) and American Carbon Registry (ACR)

Teresa Lang, CAR

Nick Martin, ACR

Teresa provided an update on CAR's agricultural protocol development activities.

- The following protocols have been rolled out and/or are under development:
 - rice cultivation protocol v1.1, approved June 2013;
 - nitrogen management protocol v1.1, issued January 2013;
 - livestock protocol v4.0, approved January 2013. This protocol is strictly for the voluntary market. An ARB compliant protocol for livestock is being developed, and projects registered under versions 1.0-3.0 are eligible as ARB Early Action Offset Projects;
 - Mexico livestock v2.0, approved September 2010;
 - organic waste digestion v2.0 approved June 2011; and
 - organic waste composting v1.0, approved June 2010. The public comment period just closed for v1.1, which will be approved shortly.
- Revisions to ACR protocols are made when project developers and/or verifiers identify practical issues that require resolution.
- Version 1.1 of the rice cultivation project protocol specifically:
 - incorporates Errata & Clarifications;
 - brings it more in line with CAR's nitrogen management protocol;
 - addresses minor issues raised during verification training; and
 - implements editorial changes to improve ease of use for project developers & verifiers.
- Version 1.1 of the nitrogen management protocol specifically:
 - allows for tile drained fields if they are present in the baseline project scenario;
 - allows projects to be developed in USDA designated wetlands and highly erodible lands (HELs) as long as they meet minimum conservation compliance standards; and
 - FracLEACH is used to estimate leaching based on guidance in the IPCC model. It was discussed and noted that the use of FracLEACH is a weak estimation at best of leaching because of broad assumptions in the model.
- Next steps for the nitrogen management protocol include improvements to the datasets embedded in the model, the reconvening of an advisory committee to guide further development, and consideration by CAR of expanding the protocol to new regions.

- Work on a grasslands protocol is tentatively planned to begin in Fall 2013. Several scoping meetings and research briefs have already been developed to lay the foundation for a grasslands protocol.
- Verification of aggregated parcels in the rice and nitrogen protocols is based on risk profiles depending on the size and aggregation of fields. Small aggregates, large single-participant aggregates, and large multiple-participant aggregates are all defined in the protocols and have different statistical and risk-based sampling requirements.

Nick provided a brief summary of ACR agricultural methodologies currently approved and under review and then dove deep into details of the rice methodology.

- Currently, ACR's agricultural methodologies are:

Title	Authors	Status
<i>Emission Reductions in Rice Management Systems</i>	Terra Global, Applied Geosolutions, EDF, CA Rice Commission	Parent methodology and CA module approved, Midsouth module forthcoming
<i>N₂O Emission Reductions through Changes in Fertilizer Management</i>	Winrock, Applied Geosolutions, Terra Global Capital	v1.0 approved, v2.0 forthcoming
<i>N₂O Emission Reductions through Reduced Use of Fertilizer on Agricultural Crops</i>	Michigan State University, EPRI	Approved
<i>Avoided Conversion of Grasslands & Shrublands to Crop Production</i>	Ducks Unlimited, TNC, Climate Trust, EDF, Terra Global Capital	2 nd round peer review – anticipated summer 2013
<i>Grazing Land & Livestock Management</i>	Winrock	1 st round peer review – anticipated fall 2013
<i>Reduced Carbon Intensity of Fed Cattle</i>	BIGGS / Prasino Group	In ACR review
<i>Quantification Methodology for Biochar Projects</i>	Climate Trust, Prasino Group, International Biochar Initiative	In ACR review
<i>Compost Additions to Grazed Rangelands</i>	EDF, UC Berkeley, Colorado State University, Terra Global Capital	In development
<i>NERP Iowa & Illinois</i>	ClimateCHECK	In development

- For Emissions Reductions in Rice Management Systems, the parent methodology and the California module were approved in May 2013. Currently, the Midsouth US module, covering the Mississippi Delta region primarily in Arkansas, is undergoing peer review. These modules address unique rice management practices in the respective regions and are being piloted with rice growers in CA and the Midsouth under a USDA GHG CIG.
- The methodology uses the DNDC model which is calibrated and validated with data from the four major rice growing regions in the US: California, the Midsouth, and the Texas and Louisiana Gulf Coasts.
- Eligible practices in the rice methodology are:
 - straw removal after harvest;
 - early drainage at end of growing season;
 - a switch to dry seeding (CA only);
 - intermittent flooding (Midsouth only) resulting in N-rate reduction and single N application; and
 - increased water use efficiency and/or energy use efficiency (Midsouth only) resulting from reduced fossil fuel inputs.

- A mechanism to credit early adopters so that they are recognized for their efforts is embedded in the rice methodology. It is based on existing common practice to establish a baseline by region.
- Verification under rice methodology entails:
 - a completeness audit consisting of desk review of monitoring parameters for all fields;
 - an in-depth audit consisting of random and risk-based sampling; and
 - a triangulation of farmer records with other data sources. For example, the use of GPS-enabled imagery with date stamps, or remote sensing in place of field visits.
- Methodologies for aggregating projects is not yet set. ACR is considering the use of scenarios in place in the ARB protocols including:
 - treating a group of growers in aggregate;
 - multiple growers designating the same project developer; or
 - multiple landowners combining into one project.
- There is an allowance for small (<25,000 tCO₂e per year) non-sequestration projects to verify only once every two reporting periods.
- The grazing land and livestock management (GLLM) methodology is a framework for beef or dairy operations that has an impact on enteric, manure, fertilizer or fossil fuel GHG emissions or biotic sequestration. Examples of practices allowed include:
 - Implement rotational and management intensive grazing in beef and dairy;
 - Dietary changes;
 - Monensin or other feed additives to suppress enteric methane;
 - Reduce fertilizer and natural gas emissions embedded in feed;
 - Change manure management system;
 - Tree planting (silvopasture);
 - Fertilize or irrigate pasture; and/or
 - Convert cropland to pasture
- The GLLM methodology utilizes a scaled approach to GHG accounting based on the estimated size of GHG reductions as follows:
 - “Microscale” projects with less than 5000 tons CO₂e/y use the IPCC model;
 - “Smallscale” projects with between 5000-60,000 tons CO₂e/y use the COMET-Farm tool, with separate modules for estimating enteric and manure impacts; and
 - Large projects with greater than 60,000 tons CO₂e use the full accounting module.

Trends in Michigan Agriculture and Opportunities for Collaboration

James Byrum, President

Michigan Agri-Business Association (MABA)

James’ presentation began with an overview of Michigan agriculture, and then he elaborated on MABA’s membership, priority issue areas, and sustainability programs. James highlighted that MABA has access to datasets on farmer practices through its members that work with farmers e.g., crop advisors, seed suppliers, pesticide/herbicide applicators, etc., and is willing to share this data with C-AGG to help enable further development of incentive-based opportunities for agricultural GHG emissions reductions. James and Debbie have been discussing how C-AGG and MABA can collaborate to promote our common agendas and goals.

- Michigan has a highly diversified agricultural economy that supplies a range of specialty crops in addition to the traditional commodity crops. Michigan agriculture is similar to California’s though at a smaller scale and with a shorter growing season.
- Michigan is the largest corn seed producing state, with 120,000 acres of production.
- MABA’s membership is comprised of:

- Agribusiness;
- agronomy suppliers, distributors and retailers;
- grain handlers;
- pesticide producers;
- seed and crop producers; and
- certified crop advisors and service companies.
- MABA activities include:
 - lobbying at the state and federal levels;
 - member education through workshops and publications; and
 - communications around priority issues for Michigan producers.
- The major issues that MABA focuses on are:
 - **Water quality.** Michigan is surrounded by two of the Great Lakes—the most abundant freshwater system on the planet; hence, water quality is a high priority for MABA. Since livestock production is of minor importance in the state, most of the water quality impacts are associated with fertilizer use, primarily phosphorous. To address the issue, MABA promotes beneficial practices including:
 - grid sampling;
 - site-specific agriculture (aka precision agriculture);
 - variable rate application; and
 - conservation management practices such as filter strips, waterways, cover crops, and reduced tillage.
 - **Water use.** The summer drought in 2012 affected Michigan, though not as severely as other Midwestern states. Since then, MABA has observed a large increase in installation and use of irrigation, particularly center-pivot systems, as a risk management strategy. Water extraction puts a stress on aquifers and surface waters. The Great Lakes are currently experiencing low water levels. There are also issues around access to aquifers. MABA is educating its members about responsible water use.
 - **Energy.** MABA has programs that focus on energy efficiency and reducing the cost of energy for MI farmers.
 - Efficiency work includes workshops on measures to increase on-farm efficiency, and the promotion of energy audits with private sector contractors.
 - Cost work focuses on increasing choice for farmers, promoting renewables such as solar and wind, and working with the Public Service Commission to improve energy rates for farm businesses.
 - **MABA Green Agribusiness Program.** This program was launched in response to a mandate from Wal-Mart for its suppliers to achieve sustainability goals. MABA helps producers by recommending sustainability practices. Currently, 77 agribusiness entities are participating in the program. MABA seeks to recognize businesses for what they're already doing with respect to practices that have an environmental benefit. MABA promotes and has access to data sets on farmer practices including site-specific agriculture, yield monitoring, and auto-steer and planter technologies.
- MABA also coordinates the certified crop adviser program in MI.
- In MI, the current agricultural situation presents the following challenges to specialty crops:
 - high prices for commodities are leading to the conversion from specialty crops to commodities;
 - because of labor constraints related to migrant workers, MABA advocates for immigration reform;

- risks due to increasingly erratic weather and market forces; and
- a trend in recent decades towards high-tech equipment that has led to lifestyle changes due to less demand on a farmer's time.
- James also noted that farmers recognize and acknowledge that climate change is happening, and that it is affecting agriculture. Farmers are witnessing extreme rain events, temperature swings, and mild winters where lakes don't freeze over anymore. The example of a changing climate on navy beans was given; MI used to control 97% of US production. In recent years, that production moved largely to the northern Midwest and is now shifting again -- to Canada.
- Changing attitudes towards climate change are in part due to a generational shift. The average age of producers in MI is plunging and their backgrounds are more diverse. These farms are profit-oriented, and growth and expansion driven by technology is the trend. While there will be space for small value-added producers, large farms will continue to be the norm. For example, the prediction is that corn production will nearly double from 2010 to 2025 to nearly 900 million bushels.
- An example of sustainability practices around water use was highlighted by a large layer operation with 6 million hens that supplies Wal-Mart. The farm pelletizes and ships its poultry litter off-farm, and has a very small water use footprint.

Q&A

Q: What is the level of regulation in MI?

A: Regulation in MI is not very onerous (and certainly not like CA!). There are issues one might expect in other states around migrant housing and pesticide application, for example. Regulations have not slowed productivity; there is a trend towards rapid growth in farming and in exports.

Q: Why do you think the use of cover crops is expanding?

A: This can be attributed in part to USDA incentives as well as the current positive market conditions for farming. When surplus cash is available, farmers make changes that enhance productivity.

Q: Why are there so many sustainability projects around livestock but not around fertilizer use?

A: Not sure, but anhydrous ammonia use is plummeting.

Q: How will lower corn prices affect farmers?

A: Crop insurance will be a factor but analyses show that even with lower prices most farmers will still do fine.

Q: What are the kinds of data that MABA has access to and how can it be used?

A: 75% of crop recommendations are made by retail and certified crop advisers that are MABA members. The data shows the benefits of reduced inputs, bigger equipment, and nutrient management plans. The data can be aggregated so that privacy is maintained but changes in behavior can still be documented.

Q: Why are farmers using variable variety seeding?

A: Variable variety seeding, i.e. a seed mix, is used to address in-field variability of soils in order to maximize productivity. Further, drones are now being used to identify and manage issues in specific areas of fields, so that if a pest outbreak is identified in one specific area, that area can be precision treated, rather than utilizing broad-scale application.

Q: How is the ethanol market affecting farmers?

A: This is the single largest factor in increasing farmer income in the last 30 years. In the 10 years since ethanol has been around, there has been a 100 million bushel increase in corn acreage in MI, which happens to coincide exactly with the demand from the five ethanol distilleries in the state.

Q: What lands are being converted in MI that will facilitate the expansion of agriculture in the coming years?

A: Most of the conversion is from abandoned farmland in northern MI – virtually none is from forested lands.

USDA NRCS Updates

- **New release of COMET-FARM GHG Tool**
- **Update on USDA NRCS GHG CIG Projects**
 - **EQIP Funding**
 - **Future Plans**
- **Ecosystem Service Markets**

Adam Chambers, USDA NRCS

Adam provided an update on COMET-Farm, USDA's farm and ranch GHG and carbon sequestration accounting tool. COMET-Farm is a whole-farm tool that uses modules to address the following management issues:

- Field Operations
 - Cropland
 - Grazing / Pasture
 - Orchards / Vineyards
 - Agroforestry / Forestry
 - Rice
- Livestock
 - All Major U.S. Livestock Categories - dairy cattle; feedlot cattle; swine; sheep; poultry; other cattle and bison; goats; horses, mules, and asses
- Energy Use
 - Tractors/Equipment
 - Irrigation
 - Animal Housing
 - Quick Energy Calculator
 - On-farm energy audits
 - Both Energy and Emissions
- The tool uses the DayCENT biogeochemical process model, developed at Colorado State University, to estimate GHG flows. The project began in late 2011 and is nearing completion. A public beta version was released for use last month.
- Speeches in June 2013 by President Obama and USDA Secretary Vilsack validate USDA efforts on agriculture and climate change.
- NRCS has officially stated that the tool is "being developed to support USDA programs and encourage best conservation management practices, and to support C sequestration and emissions reductions and reporting for current and future US programs and policies."
- Future plans include a focus on developing a streamlined "COMET-Farm Lite" version, for use by NRCS staff and conservation planners in the field.

Small group discussions around the tables resulted in many questions and a good deal of resulting dialogue regarding USDA's intended use for COMET-Farm and its relationship to the Q-Tool, as well as questions about similarities and differences, compatibility and linkages, and finally, whether a single tool might be preferable to two. Specific Q&A's and comments included the following:

Q: What is USDA's mission with these tools?

A: NRCS is seeking to put more conservation practices on the ground and to allow farmers and ranchers access to market-based opportunities. COMET-Farm will be part of the so-called "conservation desktop"—a suite of tools available for use by NRCS field officers (in the form of "COMET-Farm Lite") and farmers and ranchers.

Q: What is the output of the COMET-Farm tool?

A: Ranges of numbers for GHG sources and sinks on a particular farm -- but the challenge of establishing producer baselines remains.

Comment: It would be useful if the COMET-Farm tool would split up sources and sinks so that project developers can see where emissions and emissions reductions are occurring.

Comment: "COMET-Farm Lite" will likely also increase end-user accessibility.

Comment: Using the tool to systematically evaluate GHG impacts of farm practices is a positive step because that has never happened within NRCS.

Q: Are there known or logical impediments to including Q-Tool equations (in particular, the new N₂O methodology) into COMET-Farm?

A: The lack of harmonization to date is not because of prior investments in COMET-Farm, but rather due to different parts of USDA developing the tools, although there has been a great deal of collaboration between the offices, and the CSU team that helped to develop both tools worked to ensure similar interfaces.

This session provoked a robust discussion in the room around compatibility, linkages, and relationships between these two tools. The following points were raised:

- The methodologies in the Q-Tool, primarily in the N₂O module, represent consensus around the best available science; there should therefore be efforts to harmonize the Q-Tool with COMET-Farm.
- More guidance is needed from NRCS to articulate the different purposes of each tool, what each can do or is intended to do (and how they differ), how stakeholders should decide which tool to use in which circumstances, and how different estimations from each can be reconciled or explained.
- It was suggested that C-AGG should consider making formal recommendations to USDA regarding the issues articulated during the discussion, and that the group would revisit this point in the morning, to allow everyone to give further thought to the issues.

GHG CIG Project Roundtable Discussion:

Critical Assessment of Current and Future Issues, Needs for Success

Debbie Reed of C-AGG introduced the discussion by reiterating that C-AGG is drafting a synthesis report to USDA and policymakers of lessons learned from working with the GHG CIGs, and that there has been an incredible wealth of information and value-added experience that needs to be articulated and shared to continue the great progress attained by all GHG CIG participants and C-AGG, by extension. Adam Chambers discussed the background, current status and next steps being considered by USDA for the GHG Conservation Innovation Grants (CIGs), which led to a group discussion. Points made by Adam include the following:

- In June 2011, USDA awarded \$7.4M to 9 GHG CIG projects covering 24 states. The goal of the GHG CIGs was to determine baseline GHG emissions and C sequestration values of specific agricultural activities, and to develop and evaluate carbon offset protocols and opportunities for the sale of project credits in carbon markets.

- \$10M in EQIP funding was made available in 2013 to engage producers to implement GHG conservation practices. These include NRCS standards for different practices e.g., cover crops, and conservation tillage, conservation buffers, and improved rotations.
- Section 1619 of the 2008 Farm Bill prohibits the sharing of certain information by USDA on farming and conservation practices. This created a communications barrier within NRCS that prohibited the identification of EQIP participants for potential engagement in the GHG CIG projects. One potential solution identified was to ask field offices to have farmers sign a release form at sign-up, seeking their approval for their names to be shared with GHG CIG project developers.
- It is anticipated that \$30M in EQIP funding will be available in 2014 to further ramp up implementation. The challenge will be getting these funds to the GHG CIGs.

Comments:

- There was a recommendation from the audience to require COMET-Farm tool use by EQIP recipients to increase interest among NRCS state offices.
- A GHG CIG recipient in the audience suggested a means to help overcome the communications barrier to help identify eligible and interested producers for engagement in the GHG CIG projects. In North Dakota, the project implementer partnered with USDA FSA to identify farmers with expired CRP contracts, and then mailed them informational packets to apply for EQIP monies to implement GHG conservation practices. This represents an innovative partnership between multiple USDA agencies and non-profits.
- The Climate Trust announced a pending request for proposals for agriculture, forestry and biogas GHG offset projects. The Climate Trust intends to invest \$5M to support projects that are creating, or expecting to create, credits in the near future. These funds represent a potential bridge for the GHG CIGs. The Climate Trust is still in the process of developing an internal process for evaluating projects, but at a minimum projects should be expected to compile and submit numbers around GHG emissions, expected credits generated, and also have landowners signed on and committed to the projects in order to be eligible.

Q&A

Q: Will there be a GHG CIG RFP next year?

A: The NRCS Chief is open to this and positively views the GHG CIG experience. NRCS is currently looking to identify the next big idea around GHGs. It should also be noted that historically previous CIG recipients don't receive follow-on funding, though there are always exceptions to the rule.

Q: What are the criteria that NRCS will use to identify success with regards to the GHG CIG projects?

A: That's a great question, but I don't have a good answer.

Following discussion, there was consensus among the group that, because it takes years to develop a GHG project, it would be valuable to open up another round of GHG CIG funding, and that if possible, funding should be directed to or allowed to go to existing GHG CIGs, since many of the projects will be in a position to enroll farmers next year. It was agreed that C-AGG should write a letter of support to recommend continued GHG CIG funding, as well as to highlight success stories from the GHG CIGs. It was recommended that NRCS look at what other US federal agencies are doing to support longer term projects, on the order of 10 years or more.

Aggregation and Verification Approaches for Agricultural Offset Protocols

Robert Parkhurst, EDF

Robert facilitated a group discussion around aggregation and ways to approach it, based on past C-AGG discussions and some more in-depth discussions among a sub-group of participants. The session focused

on aggregation and verification in the context of California’s AB32 Cap-and-Trade program administered by the CA Air Resources Board.

- The foundation for a vibrant agricultural GHG offset market will be supported by:
 - a high volume of high integrity offsets;
 - strong and enthusiastic participation from the agricultural community in AB32;
 - integration and utilization of biogeochemical process models within ARB-adopted protocols; and
 - good publicity about the integrity and successes of these approaches to help inform stakeholders.
- The group brainstormed on who the stakeholders are that need to be involved, and what each of their goals and objectives are, in the context of agricultural offsets in particular:
 - farmers - \$\$, recognition, clarity, ease of participation
 - aggregators - \$\$, farmers (participants), buyers, acceptable risk
 - verifiers – data, certainty, explicit protocols, standards, credibility
 - crop advisers – data, good science, maintain positive relationship with growers
 - regulators – certainty, low risk, standards, the “5Ps”, supply
 - registries – protocols, transactions, projects
 - buyers – cheap, robust, low risk, volume, liquidity
 - environmental groups – certainty, low risk, real reductions (“5Ps”)
- A common theme identified is that everyone is concerned about *risk*.
- To participate in AB32, OPOs (offset project operators) – which in this case would be farmers – will need to have/complete a Compliance Instrument Tracking System Service (CITSS; aka “know your customer”) account. CITSS is a California system to make project participant information traceable and transparent. There was considerable discussion around this requirement in Wednesday afternoon’s session with Greg Mayeur of CA ARB.
- APDs (authorized project designee) i.e., aggregators, can handle the paperwork.
- The OPO could theoretically hand over all authority to APDs and walk away from the project.
- An audience member asked whether it is realistic to expect farmers to enroll as OPO’s, particularly if every farmer must have a CITSS account.
 - The consensus among the group was, no, because of the burdensome requirements.
 - There is a need to think about aggregation so that the burden is not placed on individual farmers.
 - Third party verifiers not associated with government agencies could provide some assurances to farmers hesitant to enroll.
 - Greg Mayeur of ARB responded that there is a strict requirement in AB32 that certain information such as name and address is publicly shared through CITSS. This is in response to scams associated with the EU Emissions Trading Scheme. It will be a tough sell to relax standards for agricultural offsets and not for other offset project types e.g., ozone depleting substances.
 - Don McCabe, a Canadian farmer, responded that there is a need to meet farmers in the middle. Systems that incorporate traceability but with anonymity such as food safety measures have been in place for years. These could serve as models for how farmers can participate in agricultural offset programs while addressing concerns around privacy.
- The question was posed, What can the C-AGG community offer that will assist ARB in implementing agricultural offset protocols?
 - Greg Mayeur offered the following thoughts:
 - Economies of scale can be reached with APDs;

- In existing forestry protocols multiple forest plots can be aggregated. This may serve as a model for how to aggregate crop fields;
- Tri-annual instead of biennial verification is an option. This may make entry more palatable; and
- ARB is not creating the requirements being discussed to be onerous but rather to ensure transparency and integrity of the system and the credits being issued.

Wednesday, July 10, 2013

Welcome and Introductions

Debbie Reed, C-AGG Executive Director

Announcements:

- Don McCabe shared information about the 6th World Congress on Conservation Agriculture (WCCA) on June 22-26, 2014 in Winnipeg, Canada. This is an FAO-initiated program and the conference is being organized jointly by the Soil Conservation Council of Canada and Conservation Technology Information Center at Purdue University. There is a call to provide input on the conference agenda. Attendance is typically comprised of about half producers/growers and half researchers, NGOs and other stakeholders. There will be a site visit during the event. The Congress website is www.ctic.org/wcca

Thoughts and Reactions to Tuesday's Session

Facilitator: Chris Chopyak, Alchemy Consulting

Chris asked the audience to share key insights from the previous day's sessions. The following observations were made:

- An analogy was made that we have a river to cross and stakeholders are trying to build a bridge from their respective sides—farmers on one side, and the climate and environmental community on the other—and it's not clear that we'll meet in the middle.
- The data and tools to make ag offset viable are out there, but there is work to be done to tie things together.
- Dialogue amongst the various stakeholders is important but we are all experiencing these issues from our own perspectives; we still need to find the common ground where success can happen.
- The saying "all models are wrong, but some models are useful" is relevant to these discussions. The group should consider whether expanding beyond an exclusive focus on agricultural carbon markets and the value they may create can produce other cost saving practices that reduce carbon emissions, and whether this approach may be more enticing to the farming community.
- A newcomer to the group noted that the carbon offset process seems cumbersome and data intensive and might (unintentionally) incentivize specific practices that are environmentally destructive in the pursuit of payouts.
- USDA has more influence and currency with farmers than voluntary GHG registries or CA ARB. It is therefore critical that USDA provide clear guidance to its constituents on how to use the tools and resources it develops. One of the most important roles of USDA is to set standards around farming practices.
- USDA should clearly articulate the purpose of the Q-Tool and COMET-Farm, their differences and similarities, how they should be used, and future directions.
- In response, an audience member posited a fresh perspective on the apparent struggle between the Q-Tool and COMET-FARM, which may be more functional than administrative. Perhaps the Q-Tool can be viewed as representing the best science for market participation, and COMET-Farm is one

step back, or removed from this, and is useful as a decision support tool to help quantify and understand the GHG and environmental impact of an agricultural operation.

- With respect to GHG CIGs, it is troubling that there doesn't seem to be sufficient support within NRCS to definitively pursue another round of funding.
- An example of parallel efforts to reduce NOx emissions from heavy tractors in the San Joaquin Valley was given. Information was collected under Section 1619 of the Farm Bill and used to help retire obsolete machinery. This shows how USDA can play a role in the process of “connecting the bridge” between the farming and environmental communities to achieve common goals and objectives.
- Offsets may not be the best fit for agriculture. Identifying cost effective methods for farmers to reduce GHG emissions may be a better way to entice farmers to change practices. The “cash for clunkers” program could be used as an example.
- In response to the previous comment, an audience member noted that offsets may not be working for agriculture under the current market design, but offsets from agriculture will be needed if there is to be a robust offset market. Market-based opportunities can make agricultural GHG emissions reductions a reality, but regulations are likely to fail in this respect.
- Returning to the issue of USDA tools, an audience member asked the group, Rather than saying what USDA tool should do, perhaps we should identify what we want to see in a GHG estimation and accounting tool?
 - It's not necessarily that we want just one tool, but rather *consistency* and compatibility among tools.
 - Clarity around when it is appropriate to use a particular tool e.g., COMET-Farm could be for a rapid assessment and the Q-Tool can provide a more rigorous estimation or accounting.
 - Stakeholders get tired of providing the same reporting requirements to different agencies. Can there be a consolidation of interfaces and portals for ease of use and reduced redundancy?
 - An analogy was made of a Russian tea doll; additional layers of data can be collected or added as the level of rigor required for various programs or uses becomes higher – but the initial data is retained, and the additional data is added as an overlay.
 - The COMET-Farm pop-up window to visualize the individual land parcel being analyzed is useful. Further, if there is historical data it should be used to calculate the baseline; if not, then a hybrid Tier 2/Tier 3 modeling approach should be used.
 - Rapid assessment would work better if the underlying code and model were transparent and user-friendly so that farmers could self-assess to determine how changes in management practices might benefit them financially.
 - In response to the previous comment, it was noted that Stanford University has a project working to integrate commercial agricultural management tools (from John Deere and other agribusiness entities) with financial decision-making tools. C-AGG should connect with the Stanford project, since collaborative engagement would seem to be mutually beneficial.
 - A “COMET-Farm Lite” version would be useful for NRCS as well as other stakeholders.
 - There is a potential need for a C-AGG working group to provide guidance to USDA; this could be an output of the GHG CIGs.
- Teresa Koper of The Climate Trust reviewed her “brain map” model of the flow of GHG CIGs knowledge chain (which is included in the meetings' Strategic Illustrations).
- It was noted that by August 8 Adam Chambers, NRCS, needs feedback from GHG CIGs on lessons learned. A template will be circulated by Debbie Reed to GHG CIG recipients to complete from their respective perspectives.

- There was a recommendation that the group come up with a working definition for *innovation* for the GHG CIGs to present to NRCS.

Introduction to the Stewardship Engagement Initiative

Jonathon Lehman, Grand View Group Consulting

Lisa Moore Lehman, Grand View Group Consulting

Jonathon and Lisa presented the model of the Stewardship Engagement Initiative (SEI)—a project designed to constructively engage producers to identify policy solutions to economic and environmental issues confronting their farming operations. Jonathon grew up on a dairy farm in South Dakota on land homesteaded by his great-great-grandfather. He and Lisa both began working on Capitol Hill in the late 1990's as legislative staffers on issues related to the Farm Bill. In the late 2000's they formed their consultancy, Grand View Group Consulting, to bring the farmer's voice to policy discussions in the US Legislature.

- To open the session Jonathon related a story of bringing an Illinois farmer to a meeting in South Dakota with two leaders in the ranching community. The ranchers, clad in knee-high leather boots and sporting impressive handlebar moustaches, inquired about the gentleman's short boots. He responded enthusiastically that they were easy to keep clean and slide off when the work was done at the end of the day. This reflected a lack of understanding that for these ranchers the work was not done at the end of the day; they couldn't simply kick off their boots and kick back – setting a negative tenor for the meeting. The lesson learned from this anecdote is that for most farmers the issues are very personal—farming is in their heritage and it's how they've supported their families for generations—and you need to engage them where they're at to reach positive outcomes.
- Lisa shared her story of how she got involved in these issues. She grew up in New Jersey but her interest in agriculture led her to her work with Senator Reid of Nevada on farming issues, largely focused on the 5-year Farm Bill cycle. Too often in her experience she witnessed policies developed without buy-in from the agricultural community. Lisa provided an example of a 2002 Farm Bill program on water rights that provided \$400M for water rights trading in Western states. The program was approved in 2002 but not implemented until 2010 because the agencies didn't have buy-in from producers, despite apparent mutual benefits.
- SEI was launched in 2011 to test new organizing methods for the surfacing and direct engagement of producers in conservation and environmental policy development. SEI creates roundtables that allow producers to drive the agenda, and scientists and policy makers listen first and then work with the farmers and ranchers to develop realistic solutions of mutual benefit. To create the roundtables, SEI first identifies a state partner with established trusted relationships with local farmers and ranchers, who is not perceived as having a predetermined agenda. The model has been successfully used to work on Endangered Species Act (ESA) and Total Maximum Daily Load (TMDL) water quality issues. SEI has regional programs:
 - SEI-West operates in 13 Western states and is focused around Greater Sage Grouse conservation. SEI-West creates conversations about management practices with positive financial and resource conservation impacts for the benefit of Greater Sage Grouse habitat;
 - SEI-Colorado is focused on in-stream water flows in partnership with the CO Secretary of Agriculture; and
 - SEI-Lake Erie and SEI-Pennsylvania are focused on nutrient pollution of waterways.
- In all of the regional programs, the producers come together to discuss what is working and what is not, and make lists of priority recommendations for USDA. SEI has an independent evaluation team that sets goals, creates metrics for measuring success, and debriefs regularly with the SEI team.
- SEI evaluations have revealed that:

- Participation in the program deepens the commitment of farmers and ranchers to constructively engage in policy discussions. When producers drive the discussion and feel heard the result is much more progressive than would be expected. For example, the Greater Sage Grouse may be listed under the ESA in 2015 and participating producers, rather than creating roadblocks, are working proactively to support practices that will facilitate the listing.
- Producers want help from NRCS in implementing management practices, a so-called “boots on the ground” approach to conservation.
- There is a desire to directly measure the environmental impacts of farmers and ranchers’ efforts related to these issues.
- Conservation policies and programs are important to the economic sustainability of farming and ranching operations.
- It is critical to keep voluntary, incentive-based programs flexible and user-friendly.
- As part of its efforts, SEI is bringing 25 producers from all parts of the country to Washington, DC the week of July 15 to share experiences and build conservation trust and hear from local voices.

Q&A

Comment: The SEI approach sounds similar to working groups in Soil Conservation Districts.

Q: How can SEI engage with C-AGG?

A: SEI creates a dialogue among groups with different perspectives, which is consistent with the C-AGG model. A specific dialogue with producers to help identify barriers and identify the right tools that work for them with respect to GHG reduction practices on their lands would seem like an appropriate collaborative opportunity.

A: Debbie also pointed out that there seem to be opportunities to seed conversations within commodity group members so that the commodity groups are hearing from the grassroots members on these issues, which will contribute to engagement. There is a need to include these groups in the conversation about GHG mitigation, ecosystem service markets, as well as sustainable supply chain initiatives in order to explain the opportunities and programs underway, become familiar with the jargon, and get producers engaged early on in these programs and policies.

A: Jonathon responded that there is still work to be done for farmers to understand the real economic value of C markets to their operations.

Q: There may be a chance for comprehensive climate legislation at the federal level in the next 5 years or so. There is a need to bring together the GHG CIGs to create a strong base in the center of country so that these producers feel like they are part of the solution and can benefit from appropriate policies on climate change. Can the C-AGG community start working towards a goal of constructive agricultural engagement in the heartland?

A: Yes, there are opportunities to work in support of appropriate agricultural opportunities within future federal climate change legislation. Engaging commodity groups is important. The young leaders in those groups are progressive and open to science and want to participate and talk about climate change.

A: Retailers such as Wal-Mart are helping drive the change with supply chain initiatives. There is a need for Farm Bureau leadership to acknowledge climate change, however. State Farm Bureau chapters are already signaling that they are open to participating in incentive-based opportunities, but until there is a change in stance at the top it will be hard to make progress, so grassroots organizing now can lead to change over time.

Q: What is the groundwork that needs to happen to set the stage for eventual comprehensive federal climate change?

- A: A scoping exercise to identify key allies in state and federal offices could help build the coalition.
- A: Further, the C-AGG coalition should include more producers from across the country to hear about the issues they face in their operations, similar to the SEI model.
- A: The participation of Jim Byrum with MABA on the previous day was an important contribution and development towards expanding stakeholder engagement in this fashion. C-AGG can reach out to more agribusiness associations that are close to the ground.
- A: Stripping away labels or associations with entities allows stakeholders to speak from their perspective rather than coming with an agenda from their organization. This avoids getting stuck where participants may have preconceived notions about an individual's position.
- Debbie wrapped up the Q&A stating that C-AGG will map out opportunities to work with SEI and share that with the group in the future.

Satellite Imagery and Geospatial Information: Agricultural Uses
Brett P. Thomassie, Director – U.S. Federal Civilian Government Programs
DigitalGlobe Incorporated

Brett provided an overview of DigitalGlobe (DG), and the imagery products and services DG provides. In his role at DG, Brett is responsible for making data available to US federal agencies. DG could provide a variety of satellite imagery and related products to the C-AGG community to assist in the remote sensing of impacts of land-based agricultural management practices. Any data paid for by a federal agency can be licensed to up to 24 additional users, providing free access to that data. Additionally, any organization receiving federal funds for a project can contract directly with DG to access the data at the reduced federal rate, and share the data free of charge through licenses with up to 24 additional users. Both models might appeal to C-AGG stakeholders who can directly access USDA collected data, for instance, free of charge with a license; or by collectively financing specific data needs among up to 25 total users.

- DG provides three levels of services:
 - raw imagery for advanced users who can manipulate and analyze data;
 - information on events through time-series and other imagery products; and
 - insight through in-house imagery analysis.
- The DG timeline is as follows:
 - founded in 1992;
 - granted the first private enterprise license for a civilian satellite by the US Department of Commerce in 1993;
 - IKONOS satellite, with 1m resolution, launched in 1998;
 - QuickBird satellite, with 60 cm resolution, launched in 2003;
 - WorldView-1 satellite, with 50cm maximum resolution for civilian use, launched in 2007;
 - GeoEye-1 satellite, with 41cm resolution available to the US Department of Defense, launched in 2008; and
 - WorldView-2 satellite, with 46cm and 8-band multispectral resolution, launched in 2006.
- DigitalGlobe recently merged with its main competitor, GeoEye, giving DG a robust integrated imagery collection and analysis capacity. The company now controls 5 satellites, each orbiting the earth 15x/day on a North-South orbit.
- Future satellites are planned. WorldView-3, slated for launch in June 2014, will be the most technically advanced of DG's satellites. It will be the first "super spectral" satellite with:
 - 16 bands can be used to delineate land-based events like forest fires;
 - 30cm resolution;

- 1.2m Very Near Infrared can distinguish vegetation health as opposed to human visual range;
- 3.7m Shortwave Infrared provides more information for identifying materials and features;
- Atmospheric sensor (CAVIS):
 - C – Map Clouds
 - A – Measure Aerosols or Particles in atmosphere that affect image quality
 - V – Measure Water Vapor that affects image quality
 - I – Map Ice and differentiate it from clouds and snow
 - S – Map snow and differentiate it from clouds and ice.
- Currently, it takes DG 60 days to capture the entire earth’s land mass using its 5 satellites.
- DG has developed a new product, FirstLook, which gives users real-time access to global crisis events such as fires, floods, and hurricanes as they occur.
- DG’s Advanced Elevation System (AES) can build:
 - DSM - digital surface model with vegetation and buildings; and
 - DTM - digital terrain model – representing just bare earth, without structures.
- Some applications for the imagery products for agriculture that could be of interest to C-AGG are:
 - Crop type maps to differentiate between fields and crops;
 - Presence of water, for example flooded vs. non flooded rice;
 - Soil surveys using site specific zones instead of uniform grids;
 - Moisture deficiencies/excesses detected earlier (sub-visual);
 - Nutrient deficiencies detected earlier (sub-visual);
 - Insect or pest infestations detected and treated while localized;
 - Weeds detected and treated while localized;
 - Diseases detected and treated while localized;
 - Growth regulation to maximize fruit yield;
 - Harvest scheduling based on optimal natural dry down;
 - Yield prediction to inform in-season decisions and to inform markets and trading options; and
 - Potential for on-the-go combine adjustment for yield variance.
- Brett noted that any individual or group within USDA or that received USDA funding can acquire imagery at a 70% discount – or, with a license granted by USDA, access USDA-financed imagery at no cost. DG can also host heavy imagery through its Global Basemap program.

Q&A

Q: What is DG’s pricing philosophy for its products?

- A: \$4-7 /km² for basic imagery;
- A: \$12-15/km² for 8 band resolution imagery; and
- A: value-added analytics are custom priced.

Q: Are nighttime shots available?

A: No, these satellites still all depend on sunlight to illuminate the earth’s surface. Most shots are taken in the morning between 10:30-10:45am local time where there is the lowest incidence of cloud cover (cloud cover is typically greatest in the afternoon) and shadows present in the early morning are not such an issue.

Q: Are NASA and NOAA’s non-optical satellites complimentary?

A: Sometimes, but most DG satellites are in the visible and near-IR spectrums. High resolution DG satellite data can validate coarser resolution NASA data.

- Debbie closed the session by noting that C-AGG will be setting up workshops with federal agencies for data sharing, and access to satellite imagery will be included as a topical issue, and that DigitalGlobe will be invited to participate in these workshops.

Plenary Discussion on Agricultural GHG Offsets in CA Cap-and-Trade Program
Robert Parkhurst, Environmental Defense Fund

As a continuance of an earlier discussion, participants agreed that it is necessary to define project implementers to better understand the roles and requirements of project aggregators for the agricultural sector. Robert kicked off the discussion by asking the question: “Who are project implementers, and what do they look like?”

- Greg Mayeur, ARB, responded that if an individual acts as an OPO and develops a CITTS account, there may not be a requirement to publicly reveal the individual’s name. Greg will have to dig deeper into CITTS requirements to figure out exactly how much personal information is required, and how much of it is publicly released or available to the public.
- Don McCabe provided a response by sketching out land ownership and its relation to farming operations. Farmers might lease land (this tends to be longer term leases, of multiple years), rent land (which tends to be shorter term e.g., annual leases), sharecrop, or own land, or any combination of these. So there is potentially a suite of actors in any single agricultural GHG project. Further, he broadly categorized agricultural protocols into two types:
 - Soil-based i.e., C sequestration projects. For these projects we need to know the owner of the land where a project occurs because there are longer-term commitments and requirements; and
 - Inputs-based e.g., N management. In this case we need to know the operator or farmer on an annual basis, because these requirements are shorter term in nature.
 - The upshot is that depending on the type of protocol, the OPO may vary.
- The ARB rice protocol is based on avoided emissions which means there is no reversal risk. However, ARB has a 3-8 year “invalidation time frame” to protect purchasers of offset credits if fraud or material error is detected. This is problematic because rice is an annual crop so risk should be passed on to the buyer or aggregator of credits, rather than staying with the farmer who already changed practices to avoid emissions.
 - Greg responded that perhaps the aggregator could take out an insurance policy, which might need to be in the \$10-50M range, to make the entity whole that bought the credits should there be a reasons to invalidate the credits.
 - In response, someone asked, Is there a role for government or another entity to play to create a buffer pool of credits?
 - Perhaps agribusiness entities with assets and a stake in their producers operations could take on the liability of an aggregator.
- On the topic of risk, an audience member asked, What about the risk associated with uncertainty in protocols in cases where some aspect of the science is later found to be inaccurate?
 - Greg responded that this situation is not a problem because the protocols, based on sound science at the time of development and approval, are locked in when they are approved.
- Greg provided some closing comments to the session. Science and reason can only take you so far. In the case of AB32, policy decisions were made that may be extremely difficult to retract or change. ARB hopes that AB32 can serve as a model for an eventual US federal program on climate change, and is therefore proceeding conservatively and cautiously. Based on comments in the session, ARB needs to address terminology around OPOs related to agricultural offset projects. Optimally, OPOs should not be renters with a 1-year lease, nor an absentee landowner, but rather someone who has

a long-term commitment to the project. Finally, Greg invited everyone to join an August 19 technical working group call on the ARB rice protocol.

***Data Needs for Agricultural Ecosystem & Carbon Market Opportunities:
Opportunities for Researchers, Project Developers, and Stakeholders to Clarify Data Needs and Facilitate Data Collection***

Facilitator: Chris Chopyak, Alchemy Consulting

Debbie kicked off the last session of the day by asking the group to focus on ongoing data needs for agricultural offset protocols and projects, and brainstorm creative ways to optimize data collection and sharing to inform protocol development in real-time. How can the C-AGG community work with the research community to speed up project or protocol development by ensuring that data collection is targeted and useful to these efforts, maybe even by joining with researchers to collect data as part of pilots or projects?

- Chris Chopyak provided an example of “exploratory research design”. This approach involves continuously and rapidly evolving research efforts as learnings are gleaned from projects. It is used to help establish a baseline when there are complex multiple variables. Currently, the US Department of Health & Human Services is using this approach. Can these same principles be applied to address data needs for GHG projects? Could it be used for the GHG CIGs?
 - Adam Chambers, NRCS, underscored that CIGs do not support research.
 - Phil Robertson, Michigan State University, responded that, unfortunately, funding is sorely lacking for long-term research. There is a need to influence agencies around C sequestration and GHG reduction to make commitments beyond the typical 2- or 3-year funding cycles that USDA and other federal agencies grant.
- The C-AGG community needs to encourage researchers to work with trials and plots that can be sampled over longer time frames e.g., every 5 or 10 years.
- An audience member asked whether a portion of C payments could be earmarked for research.
 - Greg responded that some portion of auction proceeds, which are expected to eventually reach \$500M, may be available for research, but in CA only.
- Debbie commented that the issue of collaboration on data collection may be a fit with private funders or entities such as the Climate and Land Use Alliance (CLUA).
- Pilot projects to link C offset projects to researchers might work. But there is a need for standardization around how GHG scientific assessments are conducted so they’re applicable to protocols.
- There is a need to clearly identify the research gaps before diving in.
- Long term research is important but there is also a role for short term research or short-term funding cycles; failures and challenges provide learnings and properly assessed can help to more quickly evolve programs so that they function smoothly.
- Finally, the group agreed that compiling a list of research gaps is important.
 - An example was given of fertilizer companies that recently pooled resources for a research fund to understand the GHG impacts of N₂O to develop eventual future protocols.
 - Greg underscored that ARB wants a focused accumulation of data to calibrate and validate models for new protocols.