



Technical Working Group on Agricultural Greenhouse Gases (T-AGG)

Lydia Olander

Nicholas Institute, Duke University

July 20-21, 2011 C-AGG Meeting, Chicago



T-AGG Process

- Collaborative and transparent
- Range of advisors (sectors, users, academics)
- Engage a broader network
 - Email list and website
 - Open review process and opportunities to engage at C-AGG and other meetings

Supported by The David and Lucile Packard Foundation

Report on GHG mitigation through livestock management

- Estimate the GHG mitigation potential of management strategies for livestock in the US;
- summarize research gaps;
- Assess models and tools for quantifying GHG impacts of management at project or farm scales;
- review available data and data gaps;
- highlight critical accounting issues for assessing performance with project scale implementation (e.g., baseline determination).

Multiple users

- ...private or voluntary GHG market
- ...sustainability-driven supply chain requirements
- ...federal incentive program to mitigate GHGs
- ...cap & trade legislation w voluntary offsets



Author Team

- Shawn Archibeque
(Colorado State U)
- Kristen Johnson
(Washington State U)
- Ermias Kebreab
(U of CA, Davis)
- Karen Haugen-Kozyra
(KHK Consulting)
- Lydia Olander
(Duke University)

Livestock Advisors

- Garth Boyd (Camco)
- Erin Fitzgerald, Ying Wang, and Juan Tricarico(DMI)
- Marty Matlock (TSC)
- Marlen Eve (USDA)
- Others welcome

Outline (part 1)

Summary of mitigation potential (cattle, goats, sheep, swine)

- a. For each management practice
 - i. mitigation potential per yield of product on average or a range;
 - ii. indication of potential for US (if possible)
 - iii. critical research gaps
 - iv. co-benefits or life cycle concerns
 - v. hierarchy of management activities - from significant mitigation potential to less promising or unknown (provides an indication or priorities for program development and research);
 - vi. indicate potential economic viability issues

Management Practices

Manure management

- Cooling
- Altering pH
- Covering
- Separating solids from slurry
- Spreading manure
- Compost vs stockpiling
- Capturing and flaring CH₄
- Capturing and producing energy from CH₄
- Altering dietary N

Enteric methane management

- Improved diet digestibility
 - Replacing sugars with starches in feed concentrates
 - Improved forage
 - Microbial manipulation (e.g. Defaunation)

Enteric methane management (cont)

- Additives
 - Ionophores
 - Oils/oilseeds (incl Corn DDGS)
 - Halogenated compounds
 - Probiotics /Fumaric or malic acid
 - Vaccination against methanogens
 - performance enhancing pharmaceuticals, (e.g Beta-Agonists)
- Improved genetics of livestock (genetic markers)
- Reduced time from birth to slaughter
- Reduced dry periods for lactating cattle

Outline (part 2)

Quantification methods

- a. Direct measurement options
- b. Modeling - Starting with the IPCC tier 1, 2 and 3 methodologies and including mechanistic models such as MOLLY (UC Davis), COWPOLL (Netherlands/Canada/USA), CoolFarmTool, manure DNDC, and Integrated Farm System Model (IFSM)
 - i. What management activities are covered, useful at what scales (particularly interested in what is viable for projects), known limitations, ability to know uncertainty inherent in models
 - ii. Critical data gaps that impact quantification methods

Outline (part 3)

Implementation considerations

- a. What we know about existing management practices in these sectors (baseline)
- b. How simple or difficult is it to verify management changes and how will this link to quantification method used
- c. Other?

Questions

- (1) *Does this look like a report that would be helpful in moving your efforts forward? If not, how could we change it so it would be more useful in informing your work?*
- (2) What are the significant unanswered questions regarding mitigation potential of various practices or quantification of mitigation from your point of view?
- (3) What are the critical science gaps that could impede quantification and accounting of GHGs from livestock?
- (4) How well do these sectors track management practices (feed, performance, manure mgmt)?
- (5) What practices are beyond business as usual for these sectors?
- (6) What do we know about barriers to implementation in these sectors? Infrastructure, cost?

Management Practices

Manure management

- Cooling
- Altering pH
- Covering
- Separating solids from slurry
- Spreading manure
- Compost vs stockpiling
- Capturing and flaring CH₄
- Capturing and producing energy from CH₄
- Altering dietary N

Enteric methane management

- Improved diet digestibility
 - Replacing sugars with starches in feed concentrates
 - Improved forage
 - Microbial manipulation (e.g. Defaunation)

Enteric methane management (cont)

- Additives
 - Ionophores
 - Oils/oilseeds (incl Corn DDGS)
 - Halogenated compounds
 - Probiotics /Fumaric or malic acid
 - Vaccination against methanogens
 - performance enhancing pharmaceuticals, (e.g Beta-Agonists)
- Improved genetics of livestock (genetic markers)
- Reduced time from birth to slaughter
- Reduced dry periods for lactating cattle

END