RESEARCH ON GHG EMISSION FROM N FERTILIZER USE

Amrith Gunasekara, Ph.D.
Research Manager
Fertilizing Materials Program
Fertilizer Research and Education Program (FREP)

September 9, 2008
Proactive in our approach to addressing environmental issues related to fertilizer

Plan, fund, and evaluate baseline nitrous oxide levels from agricultural fields with and without fertilizer use

Determine contribution of nitrous oxide from fertilizer use in agriculture

Use FREP as a tool in which to facilitate some of the research
Greenhouse Gas Sectors Portal

The staff of the Air Resources Board (ARB) are currently working on multiple sector specific greenhouse gas (GHG) reduction strategies to better define, organize, and control major sources of GHG emissions. These sources have been identified as agricultural practices, energy use, and industrial processes. The ARB is continuously updating and refining these efforts to develop more effective strategies for reducing GHG emissions. This page will be updated and hyperlinked as new information becomes available.

Agriculture:

- Agriculture Stakeholder Working Group on Scoping Plan Development
- General Manure Management Activities
- Manure Management Strategies
- Manure Management Protocols
- Research on Emissions from Nitrogen Fertilizer
- Agricultural Off-road Equipment
- Electrification of Stationary Agricultural Engines
EXPANDED LIST OF EARLY ACTION MEASURES TO REDUCE GREENHOUSE GAS EMISSIONS IN CALIFORNIA RECOMMENDED FOR BOARD CONSIDERATION

Lyell Glacier, Yosemite National Park, California, USA circa 1903 (upper) and 2003 (lower)

OCTOBER 2007
Staff Analysis of Proposed Early Action for Climate Change Mitigation in California

1. Early Actions Strategy Name and Proponent

   SUMMARY #: C12
   ID NUMBER: N/A
   TITLE: COLLABORATIVE RESEARCH TO UNDERSTAND HOW TO REDUCE GHG EMISSIONS FROM NITROGEN LAND APPLICATION
   PROPOSENT: Stakeholders Suggestions

2. Staff Recommendation

   This measure is recommended for addition to the list of early actions. The Board date for consideration of this item is anticipated in 4th quarter of 2010.

3. Early Action Description

   Staff analysis suggests that nitrogen land application may be a significant source of nitrous oxide, which is a potent greenhouse gas. In order to reduce greenhouse gases while benefiting agricultural systems, landscaping and other uses staff needs to identify methodologies for better characterizing California’s nitrogen cycle.

   An important first step to better characterizing the relationship between nitrogen land application and nitrous oxide formation in California agriculture, landscaping and other uses as well as opportunities for emission reductions is a collaborative research effort with stakeholders. The research is expected to focus on identifying optimal ways to reduce nitrous oxide emissions while increasing soil retention of nitrogen for plant uptake. Factors such as the total acreage of
● Early 2008 - was requested to get involved with this issue by Dr. Asif Maan, Branch Chief of FFLDERS (Branch level).

● Tonnage reporting data was used to predict nitrous oxide emissions from fertilizer use. Some concerns with using this data.
Contacted scientists in ARB about fertilizer tonnage data being used per fertilizer industry concerns - Renee Pinel, WPHA (January 30, 2008)

Decided scientific research needed to be completed to find out what "real" N2O emissions from fertilizer use are since go through microbial cycle

Identified key questions that research needs to answer (baselines)

FREP funding announcement
Nitrogen and Phosphorus efficiency in high production systems with consideration to environmental quality

Identified researchers with instrumentation and capabilities to conduct research and asked them to submit 2 page pre-proposal (February-March, 2008)
Worked with CARB to identify researchers (February 25, 2008)

Three pre-proposals related to N2O submitted for review by TASC (March 3, 2008)

TASC requested full proposal for all three including five others on benefits of fertilizer use in different crops (April 1, 2008)

In collaboration with CARB, determined same work being proposed to by several different research labs. Worked to bring them together so that more funding for more research parameters such as different crops (April 18, 2008)

CARB also put forth RFP to address knowledge gaps in N2O research (May, 2008)
Researchers agree to work together (May, 2008)

Proposal put forth by Cal State University, Fresno to FREP

One proposal put forth by UC, Davis researchers to CARB

Both will collaborate so parameters maximized for dollars invested.

Research is for three years at $150,000 from FREP (if approved).

TASC will review September 17 and result on September 18 after FIAB meeting.
The Fertilizer Research and Education Program promotes agronomically sound and environmentally safe use of fertilizing materials

Half mil ($0.0005) per dollar of sales of fertilizing material

About $800,000 in Research and Education annually

Anywhere from $200,000 to $400,000 in new proposals
FREP

Precision Agriculture 8%
Compost/Cover Crops 3%
Educational 16%
Fertilizer Practices

Pest Interactions 3%
Air Quality 2%
Other 4%

16th Annual Fertilizer Research and Education Conference & Western Plant Health Association Central Valley Regional Nutrient Seminar

Fresh approaches to fertilizing techniques 2008

November 12-13, 2008
Doubletree Hotel Modesto
Modesto, California

Nursery/Horticulture 3%
Fruits 16%
Fruits/Nuts 1%
Multiple 22%
From 1990-2007, FREP has supported over 130 research and education projects

Key Research Areas

- Crop nutrient requirements
- Fertilization practices
- Fertilizer & water interactions
- Site-specific fertilizer technology
- Diagnostic tools for improved fertility fertilizer recommendations
- Education and public information (~16%)

Research Priorities set forth by TASC

Nitrogen and phosphorus efficiency in high production systems with consideration to environmental quality
Technical Advisory Sub-Committee
(created by FIAB)

Reviews and recommends proposal for funding to FIAB

http://www.cdfa.ca.gov/is/fflders/frep.html
FERTILIZER RESEARCH and EDUCATION PROGRAM (FREP)

FUNDING ANNOUNCEMENT
JANUARY

LETTER OF INTENT AND BRIEF OUTLINE
MARCH

TECHNICAL ADVISORY SUB-COMMITTEE (TASC) REVIEW
MARCH

TASC RECOMMENDATIONS
MARCH

LETTER TO RESEARCHER
(NO = FULL PROPOSAL)
APRIL

FULL PROPOSAL FROM RESEARCHER
JUNE

PEER REVIEWER 1
JUNE-JULY

FREP MANAGER
(CAROLEE RILEY)

PEER REVIEWER 2
JUNE-JULY

FREP MANAGER
AUGUST

ORGANIZED TO AID TASC
AUGUST

TASC REVIEWS FULL PROPOSALS
AUGUST-SEPTEMBER

TASC RECOMMENDATIONS
SEPTEMBER

YES

FIAB BOARD REVIEWS TASC RECOMMENDATION
YES/NO
SEPTEMBER

FREP MANAGER
SEPTEMBER

RESEARCH BEGINS
JANUARY

RESEARCH BEGINS
JANUARY

AWARD LETTER
OCTOBER

FREP CONFERENCE
NOVEMBER-DECEMBER

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<td>UC Extension (University)</td>
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<tr>
<td>Mr. Robert Fry</td>
<td>USDA/NRCS (Government)</td>
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<tr>
<td>Mr. Tom Gerecke</td>
<td>Actagro (Industry)</td>
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<tr>
<td>Mr. David McEuen</td>
<td>JG Boswell (Farming)</td>
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<tr>
<td>Dr. Robert Mikkelsen</td>
<td>Int. Plant Nut. Ins. (not-for-profit)</td>
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<td>Dr. Jerome Pier</td>
<td>Western Farm Service (Industry)</td>
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<td>Mr. Al Vargas</td>
<td>CDFA (Government)</td>
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<td>Mr. Jack Wackerman</td>
<td>Haifa Nutritech (Industry)</td>
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