



# Methane to Markets

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Methane Emissions from  
Enteric Fermentation and Rice Cultivation  
Options for inclusion in the M2M Partnership

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# Background

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- At the 2007 Steering Committee meeting the ASG was requested to develop a white paper that would provide an overview of mitigation opportunities in the Agriculture Sector along with a list of organizations that work in these sectors.
- This information was discussed at the Steering Committee meeting in Monterrey in January 2009, and the Partnership decided that more information was needed to make a decision.

## Background (continued)

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- The ASG further investigated these sources:
  - The ASG attended the UNFCCC AWG-LCA in-session workshop during the fifth session of the AWG-LCA in March 2009
  - The ASG contacted the major international organizations working with these sources
- The information in this presentation and the companion white papers is intended to provide Steering Committee members with more information to determine whether the M2M Partnership should engage further in these areas.

# Enteric Fermentation Overview

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- Enteric fermentation is the largest source of agricultural methane, accounting for almost 60% of the global total.
- Methane is a byproduct of the digestive process of ruminant animals.
- Options for reducing emissions focus on improving animal efficiency through better nutrition, feed additives and/or improved genetics
  - REDUCTION in methane emitted per unit product
  - INCREASE in methane emitted per animal



# Enteric Fermentation Challenges

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- Enteric fermentation differs from the current focus of the M2M work in the agriculture sector because:
  - *There is no opportunity for methane recovery and use*
  - *The methodologies for determining baseline and calculating project-level methane emissions reductions are site-specific, complex and may contain many uncertainties*
  - *Proven mitigation options may not be appropriate for implementation in many Partner countries.*
  - *The organizations and countries involved in mitigation research and deployment are not currently well engaged in the Partnership.*

# Organization Currently Working with Enteric Fermentation

- Livestock Emissions and Abatement Research Network (LEARN)
  - Created as a result of discussions at a May 2007 UNFCCC meeting
  - Funded by the government of New Zealand
  - An international forum for researchers to collaborate on:
    - Improvements to measurements of GHG emissions from livestock
    - Development of cost effective and practical mitigation options
  - Focuses on research but also works to develop industry and policy partnerships
  - Conducted a workshop in Uruguay in 2008, *Measurement and mitigation of GHGs in grazing livestock systems* and is planning two more workshops for the future

## Possible M2M Activities to Address Enteric Fermentation

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- M2M could disseminate information and research
  - Create an information clearinghouse and discussion board on the M2M Web site for enteric fermentation mitigation strategies and research
  - Conduct workshops and training courses
    - M2M could work partner with LEARN to co-host workshops similar to the *Measurement and mitigation of GHGs in grazing livestock systems* workshop

## Possible M2M Activities to Address Enteric Fermentation

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- M2M could conduct assessments and prepare action plans
  - Support the performance of country-specific assessments to evaluate the current practices and conditions in the country
  - Develop action plans to list recommended best available mitigation options
  - In the 1990s, the U.S. EPA's Ruminant Livestock Efficiency Program (RLEP) conducted studies in multiple countries to determine the most effective methods to decrease methane emissions from enteric fermentation
    - Countries studies included Brazil, China, Ukraine, Nepal, and Tanzania
    - Improved pasture management was one of the most commonly recommended methods to decrease methane emissions

## Possible M2M Activities to Address Enteric Fermentation

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- M2M could support the development of national GHG inventories
  - Conduct capacity building to help partner countries develop more accurate GHG inventories for enteric fermentation emissions
  - LEARN works to improve emission estimate methodologies, but M2M could help countries to better understand existing emission estimation methodologies
  - More accurate data will
    - Provide a better understanding of the emissions
    - Identify practices to reduce emissions
    - Develop priorities for research, and
    - Help to create policies to address emissions from this source

# Rice Cultivation Overview

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- Rice cultivation is the second largest source of agricultural methane, almost 20% of the worldwide total.
- The flooding of fields during rice cultivation leads to anaerobic conditions where degradation of organic matter by methanogenic bacteria produces methane.
- Emission mitigation options include:
  - Direct seeding
  - Use of chemical fertilizers
  - Use of different rice cultivars
  - Improved tillage and crop residue management practices
  - Changes to water management practices



# Rice Cultivation Challenges

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- Rice cultivation differs from the current focus of the M2M work in the agriculture sector because:
  - *There is no opportunity for methane recovery and use*
  - *The methodologies for determining baseline and calculating project-level methane emissions reductions are site-specific, complex and may contain many uncertainties*
  - *Many mitigation options may not be suitable for replication in all Partner countries*
  - *Methane mitigation options may increase nitrous oxide emissions.*
  - *Mitigation options can be highly site-specific.*
  - *The organizations involved in mitigation research and deployment are not currently well engaged in the Partnership.*

# Organization Currently Working with Rice Cultivation

- International Rice Research Institute (IRRI) is a part of Consultative Group on International Agricultural Research (CGIAR)
- IRRI has developed a rice cultivating practice called Alternate-Wetting and Drying (AWD)
  - AWD has been shown to increase rice yield and decrease methane emissions by 50 percent
  - AWD has been demonstrated in the Philippines on pilot farms, and training courses were conducted to encourage farmers to use the practice



# Possible M2M Activities to Address Rice Cultivation

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- M2M could disseminate information and build capacity
  - Create an information clearinghouse and discussion board on the M2M Web site for rice cultivation mitigation strategies and research
  - Provide publicity for other organizations on the M2M Web site, at M2M events, or by co-hosting trainings or workshops
    - M2M could partner with IRRI to help promote AWD
  - Identify partner countries that are taking steps to reduce emissions and encourage them to share lessons and success stories and support the replication or expansion of successful practices.
    - Japan has implemented mitigation activities and done some international outreach

# Possible M2M Activities to Address Rice Cultivation

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- M2M could conduct assessments and prepare action plans
  - Support the performance of country-specific assessments to evaluate the current practices and conditions in the country
  - Develop action plans to list recommended best available mitigation options

# Possible M2M Activities to Address Rice Cultivation

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- M2M could support the development of national GHG inventories
  - Conduct capacity building to help partner countries develop more accurate GHG inventories for enteric fermentation emissions
  - More accurate data will
    - Provide a better understanding of the emissions
    - Identify practices to reduce emissions
    - Develop priorities for research, and
    - Help to create policies to address emissions from this source

## Subcommittee Structure

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- If the Steering Committee decides that M2M should engage on enteric fermentation or rice cultivation, the sources could be included in structure of the M2M Partnership in a variety of ways, including:
  - Incorporation into the existing Agriculture Subcommittee.
  - Creation of a working groups within the Agriculture Subcommittee
  - Creation of a new Subcommittees

# Subcommittee Structure (Continued)

Option	Pro	Con
Incorporation into existing Agriculture Subcommittee	<p>Low incremental administrative cost</p> <p>Delegates responsible for both manure and rice cultivation will have lower travel costs</p>	<p>Scope of delegate expertise may make a meeting useful to all participants difficult</p> <p>Limited options for co-locating meeting with meetings useful to all delegates</p> <p>Size of committee may become unwieldy</p> <p>Countries and PN members engaged in AD and rice cultivation are often different</p>
Working Group inside Agriculture Subcommittee	<p>Moderate incremental increase in administrative costs</p> <p>Allows time for both separate targeted work and conversations amongst entire Ag sector</p>	<p>May get limited engagement at Subcommittee meetings of countries only interested in rice cultivation</p>
Separate Subcommittee	<p>Allows discussion of targeted approach to rice cultivation</p> <p>Easy to co-locate with appropriate meetings</p> <p>Allows countries or delegates only interested in one source to attend only relevant meetings</p>	<p>High incremental increase in administrative cost</p> <p>Limited development of M2M-wide consistency across Agriculture sector.</p> <p>Higher staff/travel investment for countries interested in both manure and rice cultivation</p>

# Reaching Out to New Partners

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- If enteric fermentation and rice cultivation are included in the work of M2M, the countries and organizations most involved with working to reduce emissions from those sources should be encouraged to engage in the Partnership.
- For enteric fermentation:
  - **Partner countries:** New Zealand, Uruguay, and Ireland are active in researching mitigation options
  - **Organizations:** LEARN is the primary organization addressing this source
- For rice cultivation:
  - **Partner countries:** India and China alone are the 2 largest rice producing countries in the world, accounting for more than 60% of world production. Thailand, Vietnam, and the Philippines are also large producers. Japan has taken some actions to reduce emissions and although Japan is a Partner country, Japan does not currently participate in the Agriculture sector.
  - **Organizations:** IRRI and the FAO have been active in researching mitigation options.

# Input from Agriculture Subcommittee

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- Agriculture Subcommittee met on 3-4 September 2009 in Guangzhou, China.
- It is premature to commit to activities with either source at the current time
- There are significant concerns about expansion of the scope, resource constraints, and the state of mitigation options.
- It may be worthwhile to continue to explore possible collaboration with international organizations and Partner governments, especially in the case of rice cultivation.
- A session Expo may be a forum for exploring these issues further with relevant experts from the sectors.

# Agriculture Subcommittee Input to the Steering Committee

- Should M2M move forward with enteric fermentation and/or rice cultivation?
- If so, what are the best activities to pursue?
- How should the new sources be included in the Subcommittee structure of M2M?

