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# AGRICULTURAL GREENHOUSE GASES PROGRAM (AGGP)

## GLOBAL RESEARCH ALLIANCE (GRA)

December 10, 2012

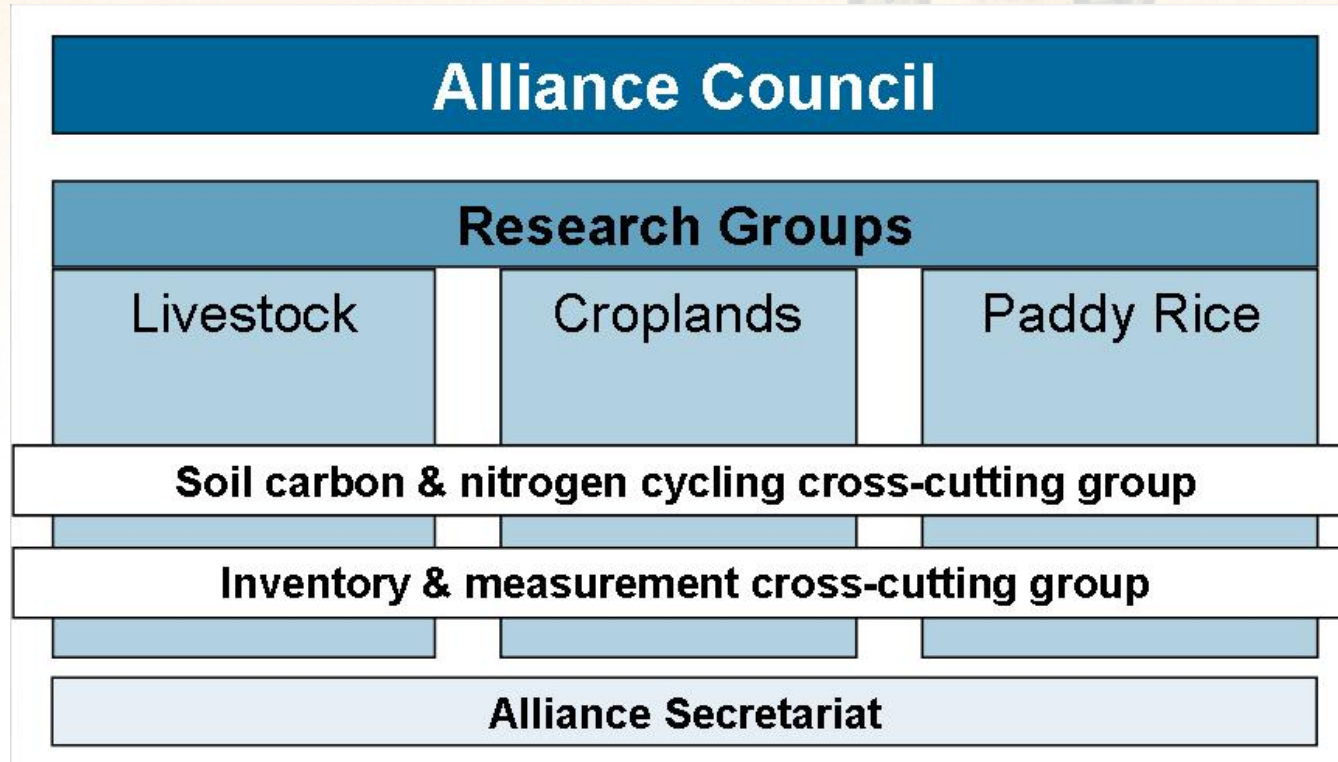
L. Tollefson

Canada 

# GLOBAL RESEARCH ALLIANCE (GRA)

- Originated at Copenhagen summit and launched 2009
- Vision was to ensure agricultural emissions are understood and that greenhouse gas emissions decline for every unit of food produced
- Agriculture produces 14% of the world's annual greenhouse gas emissions
- Canada was one of the founding members. Today 32 members.
- "The alliance promotes an active exchange of data, people and research to help improve the ways that agricultural greenhouse gas research is conducted and to enhance participating countries' scientific capability. Alliance members will work with farmer's and farmer organizations, the private sector, international and regional institutions, foundations and non-governmental organizations to improve the sharing of research results, technologies and best management practices."

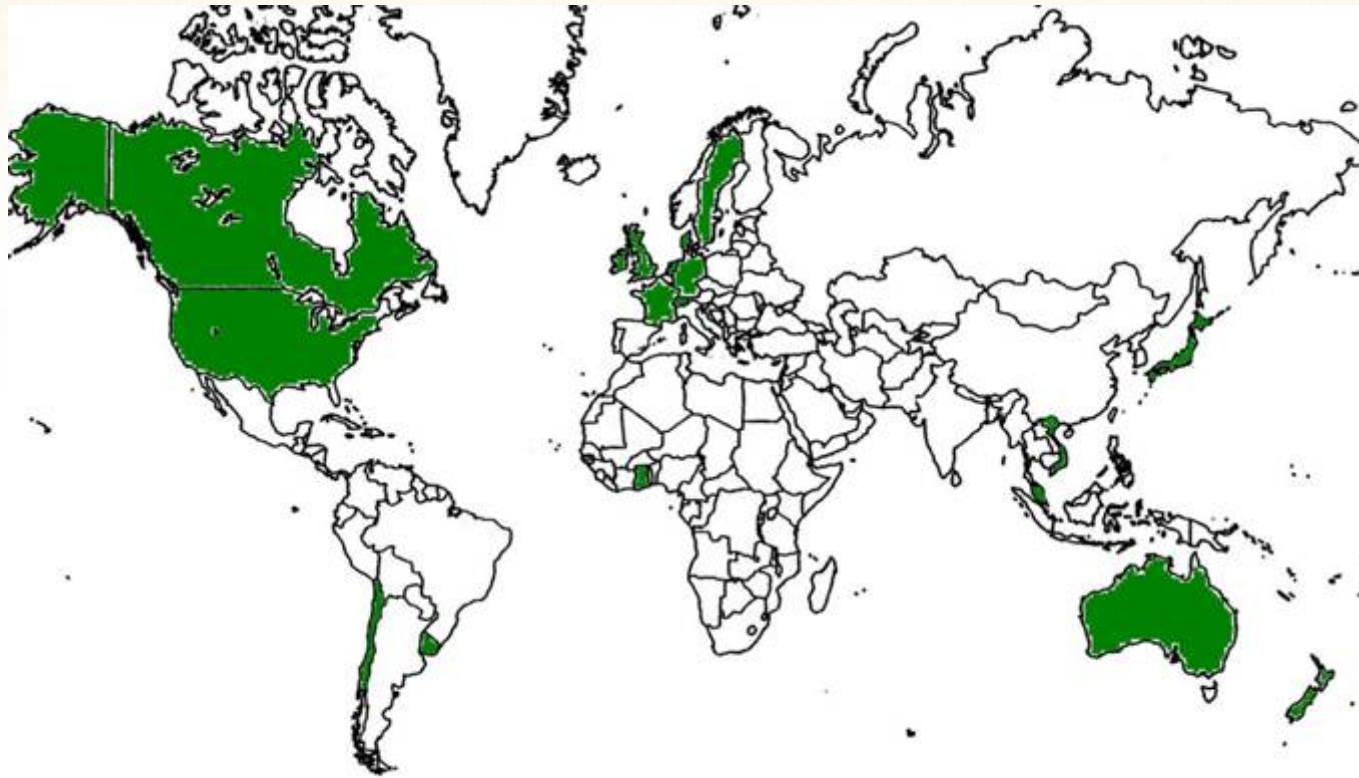
# Global Research Alliance on Agricultural Greenhouse Gases



- GRA was founded on the voluntary, collaborative efforts of countries. Member countries work in livestock, croplands and paddy rice. Cross cutting themes of soil C and N cycling and inventory and measurement have been developed.

- Canada is currently chair of the Global Research Alliance.

# Global Research Alliance on Agricultural Greenhouse Gases



Argentina, Australia, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, Finland, France, Germany, Ghana, Indonesia, Italy, Ireland, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Peru, the Philippines, Republic of Korea, Spain, Sweden, Switzerland, Thailand, United Kingdom, United States, Uruguay, and Vietnam

# AGGP Program



- AGGP Program – Delivered by AAFC and is Canada's contribution to the Global Research Alliance
- 27 Million proposal based program
- Agriculture and Agri-Food Canada participates in four research areas:
  - 1) Mitigation of livestock emissions
  - 2) Carbon sequestration
  - 3) Agroforestry
  - 4) **Intensively irrigated cropping systems**



# Program Vision

- The vision for the AGGP is to develop and transfer knowledge to help Canadian farmers mitigate GHGs. Focus will be on both science and knowledge creation and on implementing knowledge and technology transfer.



# Program Objectives

- The objective of the AGGP is to enhance the understanding and accessibility of agricultural technologies, BMPs and processes that can be adopted by farmers to mitigate GHG emissions in Canada.



# Program Outcomes

The outcomes of the AGGP will improve the understanding of GHG mitigation BMPs and improve access to and adoption by **farmers** of mitigation technologies.

The outcomes are:

- GHG mitigation information and technologies are made available to **farmers**;
- New GHG mitigation information and technologies are developed, verified and validated; and
- Technology transfer methodologies and approaches developed for targeting **farmers** about GHG mitigation.




# Current AGGP Work

## Agricultural Water Use Efficiency:

Call for proposals: → 2010

- AGGP projects to focus on quantifying GHG emissions and enhancing carbon sequestration through improved irrigation and drainage:
  - Quantifying GHG emissions ( $N_2O$ ,  $CH_4$  and  $CO_2$ ) and carbon sequestration under standard irrigated production practice in Canada
  - Assessing and quantifying the impact of irrigation and drainage management on GHG emissions across Canada

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- Developing strategies, technologies and BMP's for minimizing GHG emissions in water managed production systems while maintaining economic returns to producers:
    - Nutrient management and fertilizer application with particular reference to nitrogen (reduced N<sub>2</sub>O emission)
    - Irrigation methods, scheduling and water management for increased energy and water use efficiency
    - Cropping and agronomic practice
    - Precision agriculture
    - Alternate energy sources (solar and wind)

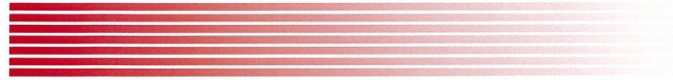
- How do we maximize biological and economic productivity per unit of land while enhancing environment performance?





# Projects Approved

- 5 projects were approved. These include studies to quantify and mitigate GHG emission under irrigated conditions in the Prairies and B.C. and with drained and water managed conditions in Eastern and Atlantic Canada.



## **AGGP | Agricultural Greenhouse Gases Program**

Effects of Agricultural Water Management Systems on  
Greenhouse Gas Emissions in Eastern Canada.

Dr. Chandra Madramootoo  
Faculty of Agricultural and Environmental Sciences  
McGill University, Macdonald Campus

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This project will develop greenhouse gas (GHG) mitigation strategies jointly with producers, producer organizations and federal and provincial stakeholders to improve water use efficiency; reduce GHG emissions; and enhance the profitability of Canadian farmers. Currently there is limited information on irrigation and drainage practices on horticulture crops in Eastern Canada and particularly their impact on GHG emissions.

# Water Use Efficiency Projects

## Improved water and nutrient use efficiency to maximize the net greenhouse gas balance in irrigated production systems

Warren Helgason - Dept. of Chemical and Biological Engineering  
Rich Farrell - Dept. of Soil Science



This project will quantify greenhouse gas (GHG) emissions under irrigated conditions typical of the Prairie region, and will identify how increased level of soil moisture and fertility associated with irrigated production systems influence GHG emissions. Studies will be used to evaluate the processes governing GHG emissions, and to examine the effect of nitrogen (N) fertilization practices and irrigated crop rotation sequence upon GHG emissions.



SOUTH NATION  
CONSERVATION  
DE LA NATION SUD

## Managing the Impact of Agricultural Drainage Management on GHG Emissions

J. Brizard



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The project will document the effect Controlled Tile Drainage (CTD) has on the carbon and nitrogen processes in the air-plant-soil-surface-groundwater continuum. This will help to identify how CTD used on manured and non-manured corn, soy bean and forage fields can be managed to reduce GHG emissions while optimizing crop yield and water quality benefits.



## Water conservation practices for production of woody perennial horticultural crops

Beneficial management practices for mitigating greenhouse gas emissions

**Melanie Jones**

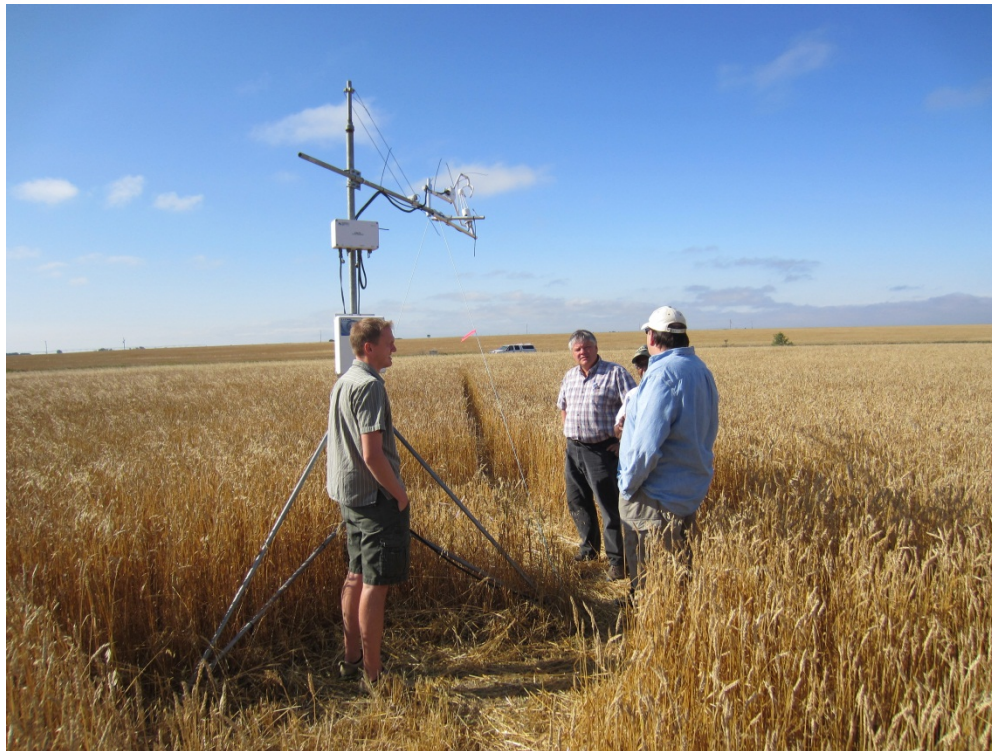


This project will examine several major processes involved in soil organic matter turnover and greenhouse gases (GHGs) in irrigated production systems under the semi-arid and Mediterranean climates found in southern British Columbia. The project will also identify beneficial management practices (BMPs) for mitigating GHGs in irrigated production of woody perennial crops and transfer this knowledge to farmers, as well as greatly improve our understanding of the processes underlying the interactions between water conserving practices and GHGs.



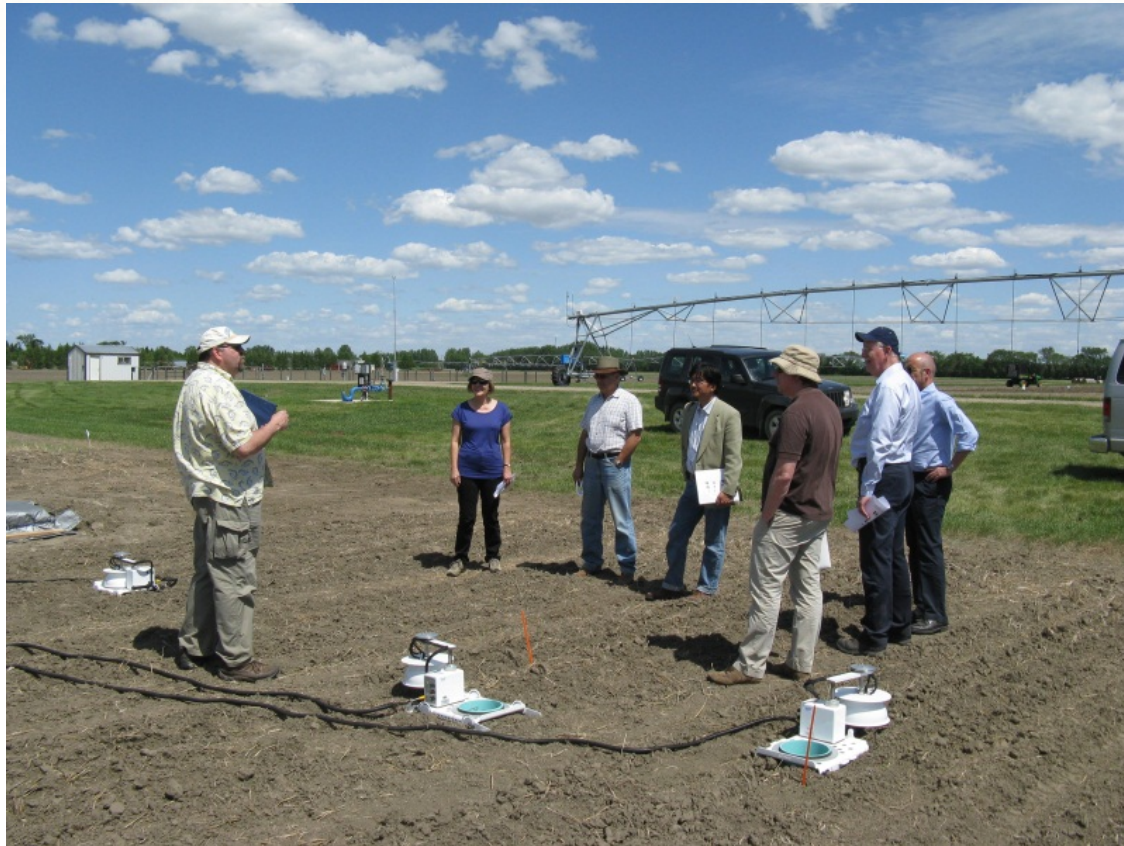
# Opportunities

- Improve the understanding and measurement of GHG emissions under water managed production systems
- Develop strategies and BMP's that maximize biological and economic productivity per drop while improving environmental performance.



# Opportunities

- Broaden and develop networks both domestically and Internationally.



# Opportunities



– Co-operate and integrate activity under AGGP

– Water use efficiency knowledge and expertise resides in many countries and Canada's access to it will enhance sector competitiveness.



# ICID Iran 2011



- Utilize CANCID and ICID as knowledge networks to strengthen our contacts and exchange information





ICID-CIID

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE



29 September - 1 October 2013, Mardin, Turkey. Website: <http://www.worldirrigationforum.org>

29 September to 1 October 2013  
Mardin, Turkey

## Call for Papers

**Theme: Irrigation and drainage in a changing world: Challenges and opportunities for global food security**

**Workshop – 3: ‘Management of Water, Crops and Soils under Climate Change’**

Quantifying GHG emissions ( $N_2O$ ,  $CH_4$  and  $CO_2$ ) and carbon sequestration under current irrigation practices; Developing strategies and technologies for minimizing GHG emissions in water-managed production systems; Use of improved crop varieties to cope with extreme events (floods and droughts); Soil management and tillage practices to adapt to the impacts of a changing climate.



Canada 