WFO-GRA Study Tour – bringing scientists and farmers together to grow more food without growing greenhouse gas emissions

Presentation to WFO Workshop
Helsinki, 12 June 2017
Agriculture currently contributes 14% of global greenhouse gas emissions. This is expected to grow in total and in percentage as global demand for food grows and as decarbonization takes place in other sectors of the economy.

Increasing food production is central to food security.

Agriculture is essential for many economies and is a key contributor to growth and development.

Solutions can be difficult to implement and need buy-in from millions of farmers.

While agriculture is not necessarily the largest emitter for many countries – in time it will become so.

Difficult to reduce emissions in the sector.

The challenges

Global baseline emissions

Global agriculture emissions under the 2°C scenario

van Vuuren et al. 2011
THE CHALLENGES

• Agriculture directly contributes 10-12% of global greenhouse gas emissions, plus indirect emissions

• Projected increases in emissions as global demand for food and high-quality nutrition grows

• Agriculture is essential for many economies and is a key contributor to growth and development

• Increasing food production is central to food security

• Solutions can be difficult to implement and need buy-in from millions of individuals (farmers)
In many cases there is a direct correlation between increases in agricultural productivity, efficiency and resilience and reducing emissions intensity.

Many countries are already investing in agricultural production and climate change research—the GRA leverages these efforts to make the best use of collective resources.

Opens up a wide field for research and education which then enables better connections with policy-makers.

Paris COP21 outcome creates a fertile environment for increased focus and collaboration in this field (119 NDCs contain actions on agricultural GHGs).

Opportunities in livestock sector

Low productivity – high intensity

High productivity – low intensity
Objectives of the GRA

• Brings countries together to find ways to grow more food without growing greenhouse gas emissions (i.e. emissions intensity goal):
  • Improve understanding, measurement & estimation of agricultural emissions.
  • Find ways to reduce emissions intensity of agricultural production systems and increase potential for soil carbon sequestration, while enhancing food security.
  • Improve farmer access to agricultural mitigation technologies & best practices.

• Enable activities that would not have happened without the GRA.
What is the GRA?

- Inter-Governmental Organisation
- Launched in December 2009
- Operationalised in June 2011 at Ministerial Summit
- Governed by a Council of Members
- Guided by a Charter
- Activities undertaken by four Research Groups
- Supported by a Secretariat and Special Representative
47 Member countries

- Argentina
- Australia
- Belgium
- Bolivia
- Brazil
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Denmark
- Dominican Republic
- Ecuador
- Egypt
- Finland
- France
- Germany
- Ghana
- Honduras
- Indonesia
- Italy
- Ireland
- Japan
- Korea
- Lithuania
- Malaysia
- Mexico
- Nicaragua
- Netherlands
- New Zealand
- Norway
- Panama
- Paraguay
- Peru
- Philippines
- Poland
- South Africa
- Spain
- Sri Lanka
- Sweden
- Switzerland
- Thailand
- Tunisia
- United Kingdom
- United States
- Uruguay
- Vietnam
Partners of the GRA

BANQUE AFRICAINE DE DEVELOPPEMENT
African Development Bank

cabi.org

CGIAR

CLIMATE & CLEAN AIR COALITION
To reduce short-lived climate pollutants

Inter-American Development Bank

IICA

world Agricultural forum

The World Bank

WORLD FARMERS’ ORGANISATION

FONTAGRO

FAO

GODAN
Global Open Data
for Agriculture & Nutrition

FACCEJPI

CATIE
Solutions for environment and development
Soluciones para el ambiente y desarrollo
LIVESTOCK RESEARCH GROUP NETWORKS

- Animal Genetics & Genomics
- Feed and Nutrition
- Manure Management
- Grasslands
- Rumen Microbial Genomics
- Animal Health
Emissions intensity and absolute emissions

- Climate benefits of improved productivity
- Additional options to reduce absolute emissions
LRG ACHIEVEMENTS TO DATE

- Rumen Microbial Census – shows there is potential for solutions to work everywhere
- Vaccines a viable option for reducing methane emissions from animals
- Identification of compounds that can reduce methane emissions
- Breeding and feed/diet can also contribute to reductions
15. AS AN EXAMPLE…
Countries want to take action in agriculture

Demand for mitigation in agriculture:
- 119 countries have agriculture in their mitigation INDC.
- 64% are developing countries

Agriculture in the INDCs
- Mitigation target includes agriculture
- Mitigation target does not include agriculture
- No INDC

Capability development

LEARN, BORLAUG, GRASS awards
- Technician
- PhD
- Post doctoral
- Senior scientist exchanges

Technical training courses
- N$_2$O measurement, Chile
- CH$_4$ measurement, S. Africa, New Zealand, S. America

Improved agricultural GHG inventories
- S. America
- S.E. Asia
Livestock development and climate change: The benefits of advanced greenhouse gas inventories

About this booklet

Livestock development and climate change outcomes can support each other. More productive and efficient farm systems generally produce food at much lower greenhouse gas (GHG) emissions per unit of product. However, many countries use simple (Tier 1) methods for estimating livestock emissions in their GHG inventories. Tier 1 methods are unable to capture the reductions in emissions intensity that result from improvements to livestock farming.

This booklet shows how advanced (Tier 2) inventory methods can support climate change and productivity goals and help broaden countries’ policy options.

Inside, you will find information on:
- Why are livestock GHG inventories important?
- The benefits of advanced GHG inventories for livestock development
- The difference between Tier 1 and Tier 2 methods
- How to set up an advanced inventory
- An example of a Tier 2 approach for beef production
- A case study of Uruguay’s Tier 2 inventory
- Where to find more information

An example of a Tier 2 approach for beef production

A similar approach can be used in Tier 1 and Tier 2 inventories to estimate climate change impacts of beef production.

Benefits of improved inventories

Tier 1 inventories are simpler and less detailed than Tier 2 inventories. Tier 1 inventories are based on a national beef herd and a database of emissions factors. Tier 2 inventories are based on a national beef herd and include a range of options for emissions factors.

In this example, the Tier 1 inventory estimates carbon dioxide emissions from feeds and the Tier 2 inventory estimates methane emissions from manure management systems. Tier 2 inventories include a wider range of factors, such as the greenhouse gas emissions from feed, feed digestion, and manure management.

In this way, Tier 2 inventories give countries a choice to:
- a. reduce absolute GHG emissions without compromising food security,
  OR
- b. use productivity gains to increase food production but with a lower GHG footprint.
Reducing emissions intensity (of current NZ farm systems)

- Baseline
- + improve baseline productivity/efficiency
- + productivity/efficiency accelerated further
- + Low-N diet
- + N fertilizer constraint

Efficiency/productivity

New mitigation options
Information  Collaboration  Capability

Scientific Reports

Rumen microbial community composition varies with diet and host, but a core microbiome is found across a wide geographical range.

Gemma Henderson, Faith Cox, Shiv Ganesh, Ajar Jonker, Global Rumen Census Collaborators & Peter H. Janssen

Reducing the Emissions Intensity of Livestock Production: Case Studies of Success

Indonesia

Dietary changes to improve beef productivity in Banjul, Indonesia

Workshop: improving GHG inventories from livestock in south & south-east Asia

Purpose:
The workshop seeks to demonstrate the benefits of higher-tier GHG inventories for livestock systems, and to identify the steps needed for participating countries to improve their inventories consistent with their national circumstances, priorities and capacities.

Date/location:
23-25 September 2015, Bangkok, Thailand.
**WFO-GRA Partnership**

“A partnership to bring scientists and farmers together to grow more food without growing greenhouse gas emissions.”

- Annual GRA-WFO Study Tour into its fourth year
  - New Zealand 2014
  - Argentina 2015
  - New Zealand 2016
  - Italy 2017 (proposed October)
Launch of GRA-WFO Fellowship Programme

• Two streams:
  ➢ Farming systems and environmental practices for young farmers
  ➢ Agricultural greenhouse gas inventories for graduate scientists

• Objectives:
  ➢ to build better understanding of the on-farm problems and drivers and the available and developing technologies and practices
  ➢ to increase the engagement between farmers, science and policy on the challenges of climate change for agriculture
  ➢ to establish an alumni that could provide expert and consistent comment on measures farmers are taking in response to climate change
FOR MORE INFORMATION

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