GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

Croplands Research Group

Alan Franzluebbers

USDA – Agricultural Research Service Raleigh, North Carolina, USA

Alliance Council Meeting 10 Sep 2015, Des Moines







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Leadership

Group Chairs

Brazil – Ladislau Martin-Neto Executive Director of Research EMBRAPA, Brasilia



Brazilian Agricultural Research Corporation

Agricultural Research Service



USA – Alan Franzluebbers Research Ecologist USDA-Agricultural Research Service



Renato Rodrigues EMBRAPA, Rio de Janeiro



USDA



United States Department of Agriculture





Work Plan

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Component 1 – Quantifying net greenhouse gas emissions in cropland management systems

Standardized protocols and methods for determining GHG emissions and carbon sequestration

International database on agricultural management influences on GHG fluxes, carbon sequestration (including long-term experimental sites)

<u>Practices</u> for minimizing GHG emissions and sequestering carbon in different soils, environments, cropping systems

Emission factors for specific countries

Summary documents for decision makers

MAGGnet







MAGGnet Metadata Entry Template

Worksheet Tabs

- Experiment description
- Experiment location
- Experiment duration
- Climate attributes
- Soil and drainage attributes
- Data type
- Treatments
- Key Findings
- Journal citations
- Primary contact



Review

date

Future





Experimental Sites Summarized

Status

- 233 completed
- 82 ongoing

Duration

- 214 short-term (<1-3 yr)
- 54 mid-term (>3-10 yr)
- 47 long-term (>10 yr)

Common Treatments

- Fertilizer rate (68)
- Manure/Amendments (52)
- Tillage type (43)

Soil/GHG/Plant parameter	Projects measuring parameter (%)
Soil carbon	83
N ₂ O flux	82
CO ₂ flux	45
CH ₄ flux	29
Grain	56
Stover	35
Roots	9

Review

Update

Future

Joining MAGGnet

To obtain access to the latest versions of the MAGGnet metadata entry template and sharing agreement, please login to the GRA website and join the Managing Agricultural Greenhouse Gases (MAGGnet) Group. Access to the GRA website is limited to Alliance Member Countries and can be obtained by contacting the GRA Secretariat (secretariat@globalresearchalliance.org).



- Metadata Entry Template: MAGGnet_Site Information_v1.2_BLANK_Dec2014.xlsx
- Sharing Agreement: MAGGnet Metadata Sharing Agreement_Dec2014.pdf

Alternatively, the template and sharing agreement may be obtained from the MAGGnet Coordinator (contact information listed below).

Contact Details

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http://globalresearchalliance.org/ research/croplands/





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Work Plan

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Component 2 – Assessing greenhouse gas emissions in agricultural peatlands and wetlands

Overview reports on topic / state of knowledge

Network of experimental sites

Management practices and their effects on GHG emissions

GHG datasets for models and management testing

<u>Recommendations</u> to restore peatlands to more natural ecosystem functioning

Peatlands product

http://dx.doi.org/10.1080/14693062.2015.1022854

GHG mitigation of agricultural peatlands requires coherent policies

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Peatlands product

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Summary of findings

- Mitigation potential of peatlands could be better \checkmark utilized by renewing agricultural and land-use policies to include soil type and societal costs as criteria in decisions affecting management of croplands
- Climate policies alone are not efficient enough if other policies work in opposition to targets
- Climate policies should be supported by other relevant policies to yield success stories in the mitigation of GHGs by land-use measures





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Next steps

 Developing a workshop in 2016 to exchange knowledge of GHG emissions in peatlands and expand research collaborations





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Component 3 – Modeling nitrous oxide emissions and soil carbon stocks

Inventory of publications using N₂O and soil carbon models

<u>Review articles</u> describing N₂O and soil carbon models

Model evaluation, synthesis of the best models, best conditions for each



Objectives

- Establish collaborations
- Create website
- Encourage interaction
- Synthesize problem areas
- Build capacity







Contents lists available at ScienceDirect

Computers and Electronics in Agriculture

journal homepage: www.elsevier.com/locate/compag

Global Research Alliance Modelling Platform (GRAMP): An open web platform for modelling greenhouse gas emissions from agro-ecosystems



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RESEARCH

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Training

Learn about GRAMP models and ecological modeling in general

Quantitative methods for model evaluation

A GRAMP webinar given by Professor Pete Smith - August 20, 2015



http://gramp.org.uk/ pages/training



2015 annual meeting





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✓ Continue developing collaborative research

• Populate databases; assemble network teams; cross-cutting...

✓ Cultivate effective partnerships

• Existing partnerships with CCAFS, university-government...

\checkmark Improve lines of communication with stakeholders

• Within and among GRA groups; policy makers; farmers and extension specialists; existing and additional partners

\checkmark Identify synergies to mitigate GHGs and adapt to CC

- Conservation agricultural systems
- ✓ Resourcing our ambitions





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Options...

Component 1

Quantifying net greenhouse gas emissions in cropland management systems

Component 2

Assessing greenhouse gas emissions in agricultural peatlands and wetlands

Component 3

Modeling nitrous oxide emissions and soil carbon stocks

<u>Networks</u>

- Key topic areas with available expertise to achieve outcomes
- Regional approaches to facilitate engagement
- Building more effective partnerships with groups of associated interest





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✓ Agroforestry systems







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✓ Conservation agriculture







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✓ Integrated crop-livestock systems







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✓ Integrated nutrient management







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✓ Irrigation efficiency







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Landscape management of agricultural systems







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Modeling of carbon and nitrogen fluxes







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Peatland management







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✓ Small-farm resource management





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Partners

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- ✓ <u>CCAFS</u> workshop on data-lite GHG estimation methods held at end of 2014
- ✓ <u>CABI</u> desire to develop partnership for publishing GHG mitigation summaries
- <u>IFIA</u> exploring potential partnership to collaborate on integrated nutrient management effects on GHG emissions
- Field-to-Market exploring collaboration to expand FieldPrint Calculator use

Committed members





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- Attendance at annual meetings during past 5 years
 - 5 Brazil Canada Denmark Japan Norway Spain UK USA
- 4 Chile France Germany Netherlands Sweden
- 3 Australia China Ireland New Zealand South Korea

Questions?



