GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

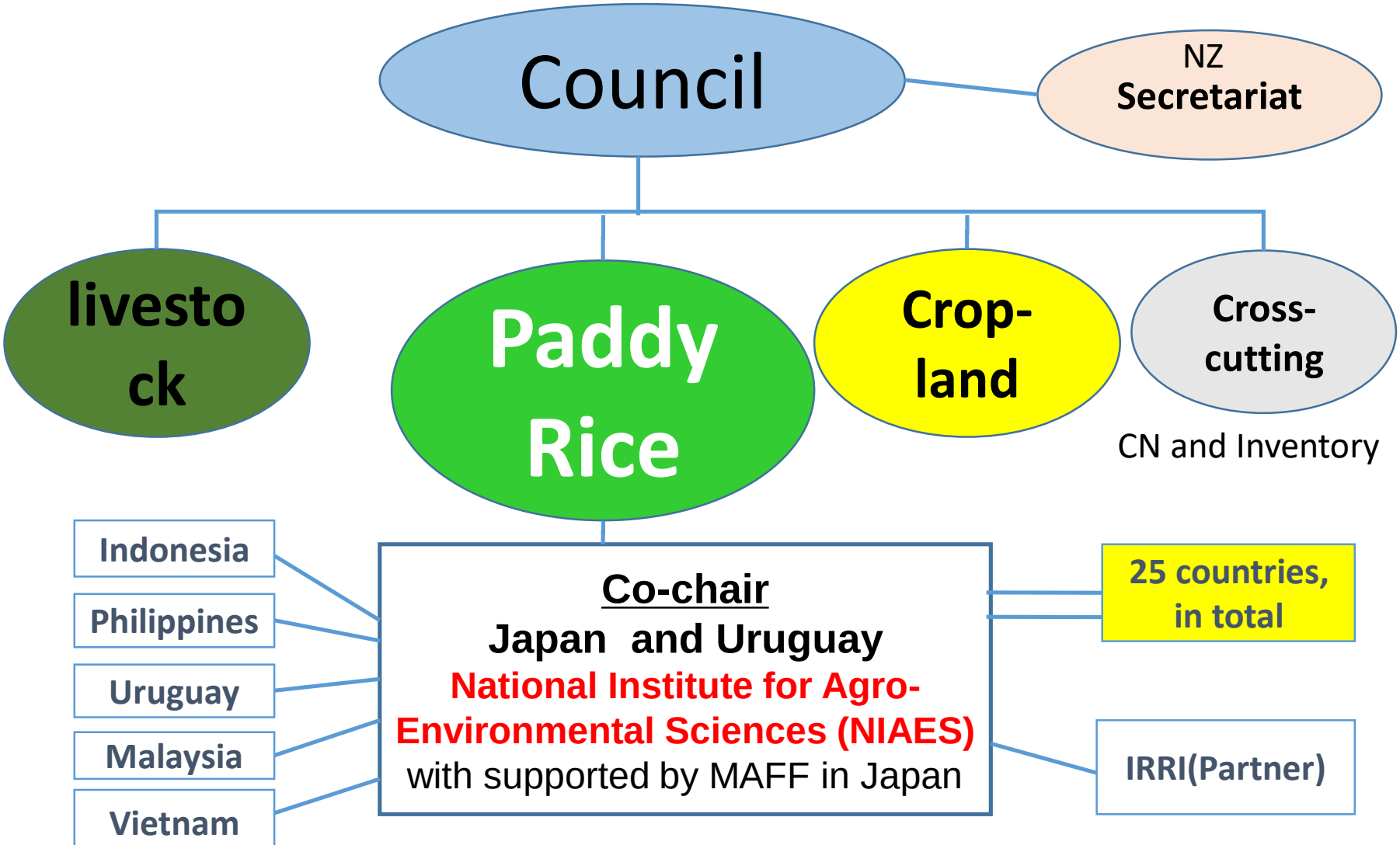
GRA Paddy Rice Research Group Spreadsheet Database for experimental sites

Shigeto Sudo

National Institute for Agro-Environmental Sciences, Japan

Framework of Paddy Rice Research Group on GRA

GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES



GRA Paddy Rice – Work Plan

1. Stock take/Inventories of Research Activities:

2. Research Networks and Databases:

3. Capability Development: GRA Paddy Rice Research Group and PROCISUR International Workshop

4. Collaborative Research Projects: MIRSA

5.Technical Information and Knowledge Transfer

6. Policy Support and Links to International Initiatives

By Cropland Group

Attributes of Successful Networks

- Explicit goals
- Clear protocols and standards
- Shared and integrated database
- Working relationships based on trust

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EOS

EOS, TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

VOLUME 93 NUMBER 23
5 JUNE 2012
PAGES 217–224

The Role of Trace Gas Flux Networks in the Biogeosciences

PAGES 217–218

Vast networks of meteorological sensors ring the globe, providing continuous measurements of an array of atmospheric state variables such as temperature, humidity, rainfall, and the concentration of carbon dioxide [*New et al.*, 1999; *Tans et al.*, 1996]. These measurements provide input to weather and climate models and are key to detecting trends in climate, greenhouse gases, and air pollution. Yet to understand how and why these atmospheric state variables vary in time and space, biogeoscientists need to know where, when, and at what rates important gases are flowing between the land and the atmosphere. Tracking trace gas fluxes provides information on plant or microbial metabolism and climate-ecosystem interactions.

The existence of trace gas flux networks is a relatively new phenomenon, dating back to research in 1984. The first gas flux measurement networks were regional in scope and were designed to track pollutant gases such as sulfur dioxide, ozone, nitric acid, and nitrogen dioxide. Atmospheric observations and model simulations were used to infer the depositional rates of these hazardous chemicals [*Fowler et al.*, 2009; *Meyers et al.*, 1991]. In the late 1990s, two additional trace gas flux measurement networks emerged. One, the United States Trace Gas Network (TRAGNET), was a short-lived effort that measured trace gas emissions from the soil and plants with chambers distributed throughout the country [*Ojima et al.*, 2000]. The other, FLUXNET, was an international endeavor that brought many regional networks together to measure the fluxes of carbon dioxide, water vapor, and sensible heat exchange with the eddy covariance technique [*Baldocchi et al.*, 2001]. FLUXNET, which remains active today, currently includes more than 400 tower sites, dispersed across most of the world's climatic zones and biomes, with sites in North and South America, Europe, Asia, Africa, and Australia. More recently, several specialized networks have emerged, including networks dedicated to urban areas (Urban Fluxnet), nitrogen compounds in Europe (NitroEurope), and methane (MethaneNet).

Technical Aspects of Flux Networks

Eddy covariance flux measurements are the preferred method by which biogeoscientists measures trace gas exchange between ecosystems and the atmosphere [*Baldocchi*, 2003]. In the eddy covariance technique, trace gas fluxes are calculated from the instantaneous changes in the vertical wind velocity and atmospheric gas concentration. A key attribute of the eddy covariance method is its ability to measure fluxes in situ with minimal disturbance to the environment, at a spatial scale of hundreds of meters, and on time scales spanning hours, days, and years.

For the eddy covariance method to work, trace gas sensors must be able to respond to fluctuations in atmospheric gas concentrations over as little as a tenth of a second, maintain a stable calibration, possess a high signal-to-noise ratio, and, in cases where pumps are needed to move air to the sensor, have access to a power line. The current generation of carbon dioxide and water vapor sensors easily meets these criteria, and a revolution in instrument development is producing trace gas sensors capable of measuring a broad suite of compounds at high sampling rates with high sensitivity and precision. Those measuring stable isotopes of carbon, oxygen, and carbonyl sulfide can help partition fluxes between the vegetation and the soil. Those measuring methane and nitrous oxide can assess microbial activity in the soil. And measurements of hydrocarbons, ozone, and nitrogen oxides can assess

The components of a flux network: (top left) An eddy covariance flux tower, which acts as one site in (top right) a global network (FLUXNET, a component of NASA's Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC)) that produces data that are merged and distributed through (bottom right) an integrative database. These data, used in conjunction with models and remote sensing information, produce (bottom left) high-resolution, spatially gridded maps of trace gas fluxes between the land and the atmosphere.

By D. Baldocchi, M. Reichstein, D. Papale, L. Koteen, R. Vargas, D. Agarwal, and R. Cook

GRA Paddy Rice Research Group Greenhouse Gas Network

Database Input Spreadsheet

Welcome to the GRA Paddy Rice Research Group Greenhouse Gas Network data entry spreadsheet. This spreadsheet serves to compile metadata from experimental sites throughout the world, with the underlying purpose of fostering the development of a coordinated, multi-national approach for inventory and analysis of greenhouse gas mitigation research specific to paddy rice production. Please read the brief guidelines below before entering information into the spreadsheet. This database is adapted from the Managing Agricultural Greenhouse Gases Network (MAGGnet), which is an effort organized within Component 1 of the GRA Croplands Research Group.

WORKSHEET COLOR CODES

- Experiment background and site location atttributes are documented in BLUE worksheets
- Key findings associated with the experiment is documented in the GREEN worksheet
- Citations and contact information are documented in RED worksheets

GENERAL INSTRUCTIONS

- Experimental information included in this spreadsheet should be derived from peer-reviewed journal articles.
- Depending on the number of experiments and associated treatments for a given country, it may be necessary to use a separate file for each experiment.
- Many columns have drop down menus. If your option is not included, select 'Other' and add the entry below the appropriate column heading in the 'Drop Down Menu Options' worksheet.
- For missing values, please populate the cell with the word 'null'. Do not fill blank data cells with periods.
- Please scroll over column headings for additional data entry instructions.
- This spreadsheet database is offering the terms and conditions of the guide for providing and using MAGGnet metadata (tentative).

Questions?

Please contact Shigeto Sudo (NIAES, Japan) at ssudo@affrc.go.jp or +81-29-838-8330.

v 0.1 (30 September 2014)

Top Page

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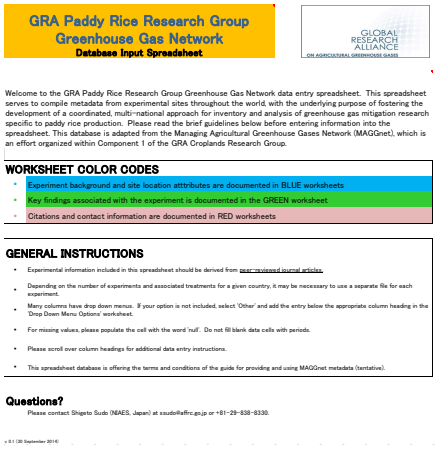
Discussion for today

- Agreement of this spreadsheet database design and its 'terms and conditions' ***as version 1***.
- How can we input experimental data to this spreadsheet?
  - Demonstrative dataset are welcome!
  - Please send to ssudo@affrc.go.jp.
- How can we share this sheet?
  - GRA web site
- Further suggestions and comments are welcome.



GRA Paddy Rice Research Group Greenhouse Gas Network

Database Input Spreadsheet

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Based on the design of "Croplands Research Group",

We would like to share each research site information

1. Experimental Description
2. Experiment Location
3. Experiment Duration
4. Climate
5. Soil and Drainage Classification
6. Experimental Data Type
7. Experimental Treatments
8. Key Experimental Findings (Literatures and others)
9. Journal Citations
10. Primary Contact

1. Check sheet categories

2. Items for each sheet (remove and add for paddy rice group)

3. Check drop down menus

Spreadsheet names

1. Experimental Description
2. Experiment Location
3. Experiment Duration
4. Climate
5. Soil and Drainage Classification
6. Experimental Data Type
7. Experimental Treatments
8. Key Experimental Findings
9. Citation
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Sheet 01
Experimental Description

- Experiment Name
- Experiment ID
- Experiment keywords
- Brief Description

- MIRSA
- MIRSA01
- AWD
- Study designed to evaluate how AWD water management reduces CH4 from irrigated rice paddy field in Southeast Asia

Experimental Description

- Experiment Name
- Experiment ID
- Experiment keywords
- Brief Description

1. Experimental Description
2. Experiment Location
3. Experiment Duration
4. Climate
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Experiment Name	Experiment ID	Experiment keywords	Brief Description
AWD in Hue for GHG mitigation	Vietnam001	AWD water management, GHG, paddy rice	Study designed to evaluate how AWD water management reduces CH4 from irrigated rice paddy
AWD in Prachinburi for GHG mitigation	Thailand001	AWD water management, GHG, paddy rice	Study designed to evaluate how AWD water management reduces CH4 from irrigated rice paddy
AWD in Pati for GHG mitigation	Indonesia001	AWD water management, GHG, paddy rice	Study designed to evaluate how AWD water management reduces CH4 from irrigated rice paddy
AWD in Philrice for GHG mitigation	Philippines004	AWD water management, GHG, paddy rice	Study designed to evaluate how AWD water management reduces CH4 from irrigated rice paddy
Mitigation of methane emissions from paddy fields by prolonging midseason drainage	Japan001	midseason drainage, prolonging, paddy rice	Over 2 years, different water-management strategies such as prolonged midseason drainage (MD) in 9 Japanese paddy rice sites were tested. The CH4 emission rates at each site varied considerably; the rates were dependent on the ratio of reductive
Mitigation of methane emissions from paddy fields by prolonging midseason drainage	Japan002	midseason drainage, prolonging, paddy rice	Over 2 years, different water-management strategies such as prolonged midseason drainage (MD) in 9 Japanese paddy rice sites were tested. The CH4 emission rates at each site varied considerably; the rates were dependent on the ratio of reductive

Sheet 02
Experimental Location

- Experiment Name
- Experiment ID
- Country
- Province/State
- Nearest city
- Latitude (decimal)
- Longitude (decimal)

- MIRSA
- Vietnam001
- Vietnam
- Hue
- Hue
- 16.5
- 107.5

Examples of Experimental sites information (PRRG)

- Experiment ID
- Country
- Province/State
- Nearest City
- Latitude
- Longitude

1. Experimental Description
2. Experiment Location
3. Experiment Duration
4. Climate
5. Soil and Drainage Classification
6. Experimental Data Type
7. Experimental Treatments
8. Key Experimental Findings
9. Citation
10. Primary Contact

Experiment ID	Country	Province/State	Nearest city	Latitude (decimal)	Longitude (decimal)
Vietnam001	Vietnam	Hue	Hue	16.5	107.5
Thailand001	Thailand	Prachinburi	Bansang	14.0	101.2
Indonesia001	Indonesia	Central Java	Pati	−6.8	111.2
Philippines004	Phillippines	Batang	Ligao City	13.3	123.6
Japan001	Japan	Yamagata	Tsuruoka	38.8	139.9
Japan002	Japan	Yamagata	Yamagata	38.3	140.2
Japan003	Japan	Fukushima	Koriyama	37.5	140.4
Japan004	Japan	Niigata	Nagaoka	37.4	138.9
Japan005	Japan	Aichi	Nagakute	35.2	137.1
Japan006	Japan	Gifu	Gifu	35.4	136.7
Japan007	Japan	Tokushima	Ishii	34.1	134.4
Japan008	Japan	Kumamoto	Koshi	32.9	130.8
Japan009	Japan	Kagoshima	Minamisatsuma	31.5	130.3

Sheet 03
Experiment Duration

- Experiment ID
- Year Experiment Began
- Year Experiment Ended

- Indonesa001
- 2013
- 2016

Experimental Duration

- Experiment ID
- Year Experiment Began
- Year Experiment Ended

1. Experimental Description
2. Experiment Location
3. Experiment Duration
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Experiment ID	Year Experiment Began	Year Experiment Ended
Vietnam001	2013	Ongoing
Thailand001	2013	Ongoing
Indonesia001	2013	Ongoing
Philippines004	2013	Ongoing
Japan001	2008	Ongoing
Japan002	2008	Ongoing
Japan003	2008	Ongoing
Japan004	2008	Ongoing
Japan005	2008	Ongoing
Japan006	2008	Ongoing
Japan007	2008	Ongoing
Japan008	2008	Ongoing
Japan009	2008	Ongoing

Sheet 04
Climate Attribute

- Experiment ID
- Mean annual precipitation (mm)
- Mean annual temperature (° C)
- rainy season(Month-Month)
- dry season (Month-Month)

- Vietnum001
- 1000
- 25
- December - April
- May - November

Climate

- Experiment ID
- Mean annual Precipitation
- Mean annual temperature
- Wet season
- Dry season

1. Experimental Description
2. Experiment Location
3. Experiment Duration
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Experiment ID	Mean annual precipitation (mm)	Mean annual temperature (°C)	season(Month-Month)	dry season (Month-Month)
Vietnam001				
Thailand001				
Indonesia001				
Philippines004				
Japan001		12.8	June-July	
Japan002		11.9	June-July	
Japan003		12.3	June-July	
Japan004		13.3	June-July	
Japan005		16.2	June-July	
Japan006		16.2	June-July	
Japan007		16.9	June-July	
Japan008		15.9	June-July	
Japan009		17.9	June-July	

Sheet 05
Soil and Drai…s

- Experiment ID
- Soil Taxonomic Descri… (gray lowland
- Soil Taxonomy System…
- …xture
- …er Table…
- irrigated or rain-fed
- hydraulic conductivity (or percola…

Soil Taxonomy System
- FAO
- WRB
- USDA
- Australia
- Brazil
- Canada
- France
- Germany
- Norway
- Russia
- South Africa
- Switzerland
- United Kingdom
- Other

- irrigated
- Rainfed
- deep water
- upland

Soil Taxonomy Texture
- Sand
- Loamy sand
- Sandy loam
- Loam
- Sandy clay loam
- Sandy clay
- Clay Loam
- Clay

Minimum Water Table Depth
- None
- 0-0.5 m
- >0.5 m

Soil and Drainage Classification

- Experiment ID
- Soil Taxonomic Description
- Soil Taxonomy system
- Surface soil texture
- Minimum water tables depth
- Field types
- Percolation rate

1. Experimental Description
2. Experiment Location
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Experiment ID	Soil Taxonomic Description	Soil Taxonomy System	Surface Soil Texture	Minimum Water Table Depth (m)	Field Type	Percolation rate (hydraulic conductivity)
Vietnam001	ıvisols (Gray lowland soil)			>0.5 m	irrigated	0-10
Thailand001	ıvisols (Gray lowland soil)			0-0.5 m	rain-fed	10-20
Indonesia001				0-0.5 m	irrigated	>20
Philippines004				None	irrigated	
Japan001	Eutric Gleysols	FAO			irrigated	10-20
Japan002	alcaric, Eutric, Fluvisol	FAO			irrigated	10-20
Japan003	alcaric, Eutric, Fluvisol	FAO			irrigated	0-10
Japan004	alcaric, Eutric, Fluvisol	FAO			irrigated	0-10
Japan005	Dystric Gleysols	FAO			irrigated	10-20
Japan006	Eutric, Fluvisols	FAO			irrigated	0-10
Japan007	Eutric, Fluvisols	FAO			irrigated	10-20
Japan008	Mollic, Umbric Fluvisols	FAO			irrigated	>20
Japan009	Eutric, Fluvisols	FAO			irrigated	10-20

Sheet 06
Experimental Data Type

- Experiment ID
- Soil Carbon
- Soil Properties
- N2O flux
- CH4 flux
- CO2 flux
- Grain
- Straw (or Stover)
- Roots
- Other

- Vietnum001
- Yes/no
- Yes/no
- Yes/no
- Yes/no
- Yes/no
- Yes/no
- Yes/no
- Yes/no
- Soil temperature, water depth

Experimental data type

- Experiment ID
- Soil parameters
- Gas flux parameters
- Plant parameters
- Others

1. Experimental Description
2. Experiment Location
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4. Climate
5. Soil and Drainage Classification
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	Soil Parameters		Gas flux parameters			Plant parameters			
Experiment ID	Soil Carbon	Soil Properties	N_2O flux	CH_4 flux	CO_2 flux	Grain	Straw	Roots	Other
Vietnam001	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water depth
Thailand001	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water depth
Indonesia001	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Philippines004	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan001	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan002	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan003	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan004	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan005	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan006	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan007	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan008	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water
Japan009	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Soil temperature, water

Sheet 07
Experimental treatments

- Experiment ID
- Treatment description
- Tillage type
- fertilizer type
- Manure/Amendment Type
- Crop Rotation
- Cover crop
- Residue removal
- Burning
- Irrigation
- water management
- Sowing and transplanting

Manure/Amendment Type
- Swine_Manure
- Cattle_Manure
- Chicken_Manure
- Other_Manure
- AnimalBased_Compost
- PlantBased_Compost
- Plant&AnimalMixed_Compost
- Other
- None

Experimental treatments

- Experiment ID
- Treatment description
- Tillage types
- Fertilizer treatment as variable?
- Nitrogen rate(kg N ha-1 yr-1)
- Synthetic N fertilizer type
- Manure/Amendment Type
- Crop Rotation
- Cover crop
- Residue removalBurning
- Irrigation
- Water Management
- Sowing and Transplanting
- Field Type

1. Experimental Description
2. Experiment Location
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Experiment ID	Treatment description	Tillage type	Fertilizer treatment as variable?	Nitrogen rate(kg N ha^{-1} yr^{-1})	Synthetic N fertilizer type	Manure/ Amendment Type	Crop Rotation	Cover crop	Residue removal	Burning	Irrigation	Water Management	Sowing and Transplanting	Field Type
Vietnam001	continuous flooding	Conventional_Till								Yes	Yes		direct seedling	irrigated
Vietnam001	Safe AWD	Conventional_Till								Yes	Yes		direct seedling	rain-fed
Vietnam001	Site specific AWD	Conventional_Till								Yes	Yes		direct seedling	irrigated
Thailand001	continuous flooding	Conservation_Till									Yes		pre-germinated	irrigated
Thailand001	Safe AWD	Conservation_Till									Yes		pre-germinated	irrigated
Thailand001	Site specific AWD	Conventional_Till									Yes		pre-germinated	irrigated
Indonesia001	continuous flooding	Conventional_Till									Yes		direct seedling	irrigated

Key Experimental Findings

- Experiment ID
- Key findings

1. Experimental Description
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Experiment ID	Key Findings
Vietnam001	
Thailand001	Study in now on going until 2017…
Indonesia001	
Philippines004	
Japan001	The CH4 emission rates at each site varied considerably; the rates were dependent on the ratio of reductive and oxidative capacities ofthe fields. Seasonal CH4 emission was effectively reduced at most sites by prolonging MD beyond its conventional duration, especially at sites where organic matter was added to the soil before the cultivation.
Japan002	The CH4 emission rates at each site varied considerably; the rates were dependent on the ratio of reductive and oxidative capacities ofthe fields. Seasonal CH4 emission was effectively reduced at most sites by prolonging MD beyond its conventional duration, especially at sites where organic matter was added to the soil before the cultivation.

Journal Citations

- Experiment ID
- Corresponding author
- Citation

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Experiment ID	Corresponding author last name	Corresponding author first name	Citation
Vietnam001			
Thailand001			
Indonesia001			
Philippines004			
Japan001	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan002	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan003	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan004	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan005	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan006	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan007	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan008	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.
Japan009	Itoh	Masayuki	Agriculture, Ecosystems and Environment, 141 (2011) 359–372.

Primary contact

- Experiment ID
- Name
- Email
- Contact types

1. Experimental Description
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4. Climate
5. Soil and Drainage Classification
6. Experimental Data Type
7. Experimental Treatments
8. Key Experimental Findings
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Experiment ID	Last name	First name	Email	Contact Type
Vietnam001	Kazuyuki	Yagi	kyagi@affrc.go.jp	GRA
Vietnam001	Hoa	Hoang Thi Thai	hoangthithaihoa@huaf.edu.vn	Research site
Thailand001	Kazuyuki	Yagi	kyagi@affrc.go.jp	GRA
Thailand001	Chidthaisong	Amnat	amnat_c@jgsee.kmutt.ac.th	Research site
Indonesia001	Kazuyuki	Yagi	kyagi@affrc.go.jp	GRA
Indonesia001	Setyanto	Prihasto	prihasto_setyanto@yahoo.com	Research site
Philippines004	Kazuyuki	Yagi	kyagi@affrc.go.jp	GRA
Philippines004	Sibayan	Evangeline B.	vangiebs@yahoo.com	Research site
Japan001	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan002	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan003	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan004	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan005	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan006	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan007	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan008	Sudo	Shigeto	ssudo@affrc.go.jp	GRA
Japan009	Sudo	Shigeto	ssudo@affrc.go.jp	GRA

Managing Agricultural Greenhouse Gases Network (MAGGnet)

GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

MAGGnet is an international greenhouse gas network of experimental sites and research expertise within the Global Research Alliance Croplands Research Group.

METADATA SHARING AGREEMENT

Introduction

The Managing Agricultural Greenhouse Gases Network (MAGGnet) was established to foster the development of coordinated, multi-national approaches for inventory and analysis of greenhouse gas mitigation research specific to croplands. Since 2012, MAGGnet has served to compile metadata from over 200 experimental sites throughout the world. Metadata contributors include scientists from countries actively engaged in the Global Research Alliance Croplands Research Group.

The following terms and conditions are offered as a guide for providing and using MAGGnet metadata. Terms and conditions have been adapted from those proposed by the *N_2O Network (Australia)* and the *IC-FAR Crop-M Data Sharing and Publishing Agreement (Italy)*. This agreement must be made available to all providers and users of MAGGnet metadata.

Metadata Providers

A Metadata Provider is an individual or entity that provides metadata.

MAGGnet metadata is compiled in a Microsoft Excel® data entry spreadsheet. A spreadsheet template is available for Metadata Providers from the MAGGnet Coordinator (contact information below).

Metadata Providers agree to adhere to the 'General Instructions' for entering metadata outlined in the MAGGnet data entry spreadsheet.

Metadata Providers agree to work with the MAGGnet Coordinator to resolve questions related to content and formatting of provided metadata.

Metadata Providers agree to update metadata in a timely manner resulting from the availability of new or revised metadata and/or following revisions to the spreadsheet template by the MAGGnet Coordinator.

Metadata Providers agree to have their metadata made freely available for research purposes by Metadata Users.

Metadata Users

MAGGnet metadata are offered for use by Metadata Users. A Metadata User is an individual or entity that collects, retains, or processes metadata.

Metadata Users will not redistribute MAGGnet metadata beyond the immediate collaboration sphere.

MAGGnet metadata is made freely available in the spirit of open scientific collaboration. Accordingly, Metadata Users are encouraged to consult and collaborate with Metadata Providers.

Metadata Users agree to properly acknowledge Metadata Providers in any publications or data products derived from MAGGnet metadata. Acknowledgements should identify the Metadata Provider, support received by the Metadata Provider, and related applicable information (e.g., grant numbers).

Metadata Users are encouraged to offer authorship credit to Metadata Providers who contribute significantly to publications or derived data products. Justification for authorship credit includes, but is not limited to, contributions to the conception and design of research projects, acquisition of experimental site data, data analyses and interpretation, and report writing.

Metadata Users agree to notify the Metadata Providers and MAGGnet Coordinator when any publications or data products derived from MAGGnet metadata are distributed.

Metadata Users agree to notify the MAGGnet Coordinator when contacting Metadata Providers for experimental site data.

All efforts are made to ensure the accuracy of compiled metadata, however complete accuracy cannot be guaranteed. Accordingly, Metadata Users hold all parties involved in the production and distribution of MAGGnet metadata harmless for damages resulting from its use or interpretation.

By accepting MAGGnet metadata, Metadata Users agree to abide by the terms and conditions of this agreement. Metadata Providers or the MAGGnet Coordinator have the right to terminate this agreement at any time by written notice upon the Metadata User's violation of any of its terms.

Contact information

Questions and comments pertaining to this agreement may be directed to the MAGGnet Coordinator, Mark A. Liebig, mark.liebig@ars.usda.gov, +1-701-667-3079, PO Box 459, Mandan, ND 58554 USA.

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Discussions

- Agreement of this spreadsheet database design and its 'terms and conditions' ***as version 1***.
- How can we input experimental data to this spreadsheet?
  - Demonstrative dataset are welcome!
  - Please send to ssudo@affrc.go.jp.
- How can we share this sheet?
  - GRA web site
- Further suggestions and comments are welcome.

Top Page

Welcome to the GRA Paddy Rice Research Group Greenhouse Gas Network data entry spreadsheet.
This spreadsheet serves to compile metadata from experimental sites throughout the world, with the underlying purpose of fostering the development of a coordinated, multi-national approach for inventory and analysis of greenhouse gas mitigation research specific to paddy rice production. Please read the brief guidelines below before entering information into the spreadsheet. This database is adapted from the Managing Agricultural Greenhouse Gases Network (MAGGnet), which is an effort organized within Component 1 of the GRA Croplands Research Group.

General Instructions

- Experimental information included in this spreadsheet should be derived from peer-reviewed journal articles.
- Depending on the number of experiments and associated treatments for a given country, it may be necessary to use a separate file for each experiment.
- Many columns have drop down menus. If your option is not included, select 'Other' and add the entry below the appropriate column heading in the 'Drop Down Menu Options' worksheet.
- For missing values, please populate the cell with the word 'null'. Do not fill blank data cells with periods.
- Please scroll over column headings for additional data entry instructions.
- This spreadsheet database is offering the terms and conditions of the guide for providing and using MAGGnet metadata .

METADATA SHARING AGREEMENT

Introduction

Cropland's case

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Based on the design of "Croplands Research Group",

We would like to share each research site information

1. Experimental Description
2. Experiment Location
3. Experiment Duration
4. Climate
5. Soil and Drainage Classification
6. Experimental Data Type
7. Experimental Treatments
8. Key Experimental Findings (Literatures and others)
9. Journal Citations
10. Primary Contact

1. Check sheet categories

2. Items for each sheet (remove and add for paddy rice group)

3. Check drop down menus

GRA Paddy Rice Research Group
Greenhouse Gas Network
Database Input Spreadsheet

GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

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3. Many columns have drop down menus. If your option is not included, select 'Other' and add the entry below the appropriate column heading in the 'Drop Down Menu Options' worksheet.

4. For missing values, please populate the cell with the word 'null'. Do not fill blank data cells with periods.

5. Please scroll over column headings for additional data entry instructions.

- Please scroll over column headings for additional data entry instructions.

Questions?

Please contact Shigeto Sudo (NIAES, Japan) at ssudo@affrc.go.jp or +81-29-838-8330.

Sheet 08
Key Experimental Findings

- Experiment ID
- Key Findings

- Indonesia001
- Safe AWD can reduce CH4 30% compared with CF,….

Sheet 09
Journal Citations

- Experiment ID
- Corresponding author last name
- Corresponding author first name
- Citation

Sheet 10
Primary Contact

- Experiment ID
- Last name
- First name
- Email
- Contact Type

- Indonesia001
- Setyanto
- Prihasto
- prihasto_setyanto@yahoo.com
- Email

Drop down menus 1

Minimum Water Table Depth	Tillage Type	Fertilizer Type	Manure/Amendment Type
None	Conventional_Till	Synthetic_Normal	Swine_Manure
0–0.5 m	Conservation_Till	Synthetic_SlowRelease	Cattle_Manure
>0.5 m	No_Till	Other	Chicken_Manure
	Strip_Till	None	Other_Manure
	Sub_Till	Synthetic_nitrification i	AnimalBased_Compost
	Other	Lime-nitrogen (CaCN2)	PlantBased_Compost
	None		Plant&AnimalMixed_Compost
			Sewage_Sludge_Compost
			City_Refuse_Compost
			Other_Compost
			Pelleted_Material
			Waste_Food
			Other
			None

Drop down menus 2

Crop Rotation
Alfalfa
Alfalfa_Wheat_Barley
Barley_Continuous
Barley_Corn_Soybean
Barley_Fallow
Barley_Pea
Barley_Potato
Cash_Grain
Corn_Barley
Corn_Continuous
Corn_Cotton
Corn_Dry_Bean
Corn_Soybean
Corn_Soybean_Wheat
Corn_Wheat_Soybean
Corn_Soybean_Wheat_Soybean
Corn_Sunflower_Barley
Corn_Wheat_Barley
Cotton_Continuous
Cotton_Sorghum
Fallow
Ginsing
Greenhouse_Production
Fababean
Fababean_Wheat_Barley
Other
WinterWheat (green manure)/Corn/Sorgham(green maure) rotation
WinterWheat/Soybean rotation
Vegetable_Fallow
Spring wheat/potato/soybean/sugar beet for NI)Potato/Winter wheat/Sugar beet/Soybear
corn/Winter wheat/Oats (green manure)/Sugar
Soybean/Barley rotation
Vegetable/Winter_wheat
PaddyRice_UplandCrop
PaddyRice_MultipleCrop (same year)
VegetableProduction_Continuous
VegetableProduction_TraditionalGrainCrop
Orchard
Vineyard
PLANTATIONS
Rubber
Oil Palm
Cocoa
Coconut
Banana
Tea/Coffee
Cinsing

Drop down menus 3

Residue Removal	Burning	Irrigation	Data Type	Soil Taxonomy
Yes	Yes	Yes	Yes	FAO
No	No	No	No	WRB
Partial				USDA
				Australia
				Brazil
				Canada
				France
				Germany
				Norway
				Russia
				South Africa
				Switzerland
				United Kingdom
				Other

Drop down menus 4

Surface Soil Texture	water management	Sowing and transplanting
Sand	continuous flloding	Sowing
Loamy sand	single aeration	transplanting
Sandy loam	multiple aeration	
Loam		
Sandy clay loam		
Sandy clay		
Clay Loam		
Clay		
Loam to Clay Loam		
Silty clay		
Silty clay loam		
Silt loam		
Silt		

Discussions

- 10 sheets categories (common design with “cropland” should be desired, but …..
- Items for each sheet (remove and add for paddy rice group)
- Drop down menus

Time schedule

- Delivery of 0 version until end of September
- Revision procedure of today’s proposal version
  => December, 2014
- January, Delivery of version 0.5 (feedback version)
- Delivery of First version of spreadsheet DB Design

=> March, 2015

- Proposal of DB (data inclusive)

=> ? (next GRA Paddy Rice meeting….)

Examples of Experimental sites information (cropland group)

Experimental Description
Experiment Location
Experiment Duration
Climate
Soil and Drainage Classification
Experimental Data Type
Experimental Treatments
Key Experimental Findings
Primary Contact

Experiment Location

Experiment ID	Country	Province/State	Nearest city	Latitude (decimal)	Longitude (decimal)
CAN001	Canada	Ontario	Woodslee	42.1999	−82.7167
CAN002	Canada	Ontario	Ottawa	45.3670	−75.7167
CAN004	Canada	Alberta	Lethbridge	49.7006	−112.7690
CAN005	Canada	New Brunswick	Fredericton	45.9167	−66.6000
CAN006	Canada	Manitoba	Winnipeg	49.917	−97.217
CAN007	Canada	Manitoba	Brandon	49.917	−99.950

Climate

Experiment ID	Mean annual precipitation (mm)	Mean annual temperature (°C)
CAN001	831	9.4
CAN002	914	6.3
CAN004	401	6.2
CAN005	987	5.7
CAN006	514	2.6
CAN007	472	1.6

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Experimental Data Type

Please indicate 'Yes' or 'No' for each data type entry.

	Soil Parameters		Gas flux parameters			Plant parameters			
Experiment ID	Soil Carbon	Soil Properties	N_2O flux	CH_4 flux	CO_2 flux	Grain	Stover	Roots	Other
CAN001	No	No	Yes	No	Yes	No	No	No	Soil water content, soil nitrate, and soil ammonium
CAN002	No	No	Yes	No	No	No	No	No	Soil temperature and water content
CAN004	No	Yes	Yes	Yes	Yes	No	No	No	Soil nitrate/nitrite, soil ammonium
CAN005	Yes	Yes	Yes	No	No	No	No	Yes	Plant nitrogen accumulation, Tuber Yield
CAN006	No	No	Yes	No	No	No	No	No	Soil ammonium and nitrate, nitrate intensity, microbial biomass carbon, extractable organic carbon, soil water content
CAN007	No	No	Yes	No	No	No	No	No	Soil ammonium and nitrate, nitrate intensity, microbial biomass carbon, extractable organic carbon, soil water content

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Experimental Treatments

Experiment ID	Treatment description	Tillage type	Fertilizer treatment as variable?	Nitrogen rate (kg N ha^{-1} yr^{-1})	Synthetic N fertilizer type	Manure/ Amendment Type	Crop Rotation	Cover crop	Residue removal	Burning	Irrigation	Other
CAN001	Corn	Conservation_Till	No	170	Synthetic_Normal	None	Corn_Continuous	None	No	No	No	
CAN001	Soybean	Conservation_Till	No	0	Synthetic_Normal	None	Soybean_Continuous	None	No	No	No	
CAN001	Winter_Wheat	Conservation_Till	No	83	Synthetic_Normal	None	Winter_Wheat_Continous	None	No	No	No	
CAN001	Corn followed Soybean (2 yr)	Conservation_Till	No	85	Synthetic_Normal	None	Corn_Soybean	None	No	No	No	
CAN001	Soybean follow Corn (2yr)	Conservation_Till	No	85	Synthetic_Normal	None	Corn_Soybean	None	No	No	No	
CAN001	Corn followed Winter_Wheat (3yr)	Conservation_Till	No	84	Synthetic_Normal	None	Corn_Soybean_Wheat	None	No	No	No	
CAN001	Soybean followed Corn (3yr)	Conservation_Till	No	84	Synthetic_Normal	None	Corn_Soybean_Wheat	None	No	No	No	
CAN001	Winter_Wheat followed Soybean (3yr)	Conservation_Till	No	84	Synthetic_Normal	None	Corn_Soybean_Wheat	None	No	No	No	

Examples of Experimental sites information (cropland group)

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Journal Citations

Experiment ID	Corresponding author last name	Corresponding author first name	Citation
CAN001	Drury	C	Drury, C. F., Yang, X. M., Reynolds, E. D., and McLaughlin,N. B. 2008 Nitrous oxide and CO2 emissions from monoculture and rotational cropping of corn, soybean and winter wheat. Can. J. Soil Sci. 88: 163–174.
CAN002	Gregorich	E.G.	Gregorich. E. G., Rochette, P., St–Georges, P., McKim, U. F., and Chan, C. 2008. Tillage effects on N_2O emissions from soils under corn and soybeans in Eastern Canada. Can. J. Soil. Sci. 88: 153–161
CAN004	Ellert	B.H.	Ellert, B. H. and Janzen, H. H. 2008. Nitrous oxide, carbon dioxide and methane emissions from irrigated cropping systems as influenced by legumes, manure and fertilizer. Can. J. Soil Sci. 88: 207–217.
CAN005	Burton	D.L.	Burton, D. L., Zebarth, B. J., Gillam, K. M. and MacLeod, J. A. 2008. Effect of split application of fertilizer nitrogen on N2O emissions from potatoes. Can. J. Soil Sci. 88: 229–239.
CAN006	Burton	D.L.	Burton, D. L., Li, X. and Grant, C. A. 2008. Influence of fertilizer nitrogen source and management practice on N2O emissions from two Black Chernozemic soils. Can J. Soil Sci. 88: 219–227.
CAN007	Burton	D.L.	Burton, D. L., Li, X. and Grant, C. A. 2008. Influence of fertilizer nitrogen source and management practice on N2O emissions from two Black Chernozemic soils. Can J. Soil Sci. 88: 219–227.

Examples of Experimental sites information (cropland group)

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Experiment Duration
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Primary Contact

Experiment ID	Last name	First name	Email
CAN001	Drury	C.	DruryC@agr.gc.ca
CAN002	Gregorich	E.G.	gregoriche@agr.gc.ca
CAN004	Ellert	B.H.	Ellert@agr.gc.ca
CAN005	Burton	D.L.	dburton@nsac.ca
CAN006	Burton	D.L.	dburton@nsac.ca
CAN007	Burton	D.L.	dburton@nsac.ca

Paddy Rice Research Group

Example:

MIRSA-2 Project

- Experimental Description = mitigation of CH4 by AWD
- Experiment Location = Philippines, Vietnam, Thailand, Indonesia, IRRI, NIAES
- Experiment Duration = 2013 - 2017
- Climate = monsoon and tropical
- Soil and Drainage Classification = Irrigated
- Experimental Data Type = CH4, water level, Eh, SC, temp. etc.
- Experimental Treatments = conventional, AWD (two types)
- Key Experimental Findings = AWD’s CH4 reduction effects
- Primary Contact = Kazuyuki Yagi

Desired information specialized for paddy rice research group?

- Water Management
- Rice – upland multiple cropping system?
- Rice harvest yield
- Residue treatment
- Others?
- Information on standardization of measurement…

Modified design of DB for “Paddy Rice Research Group”

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9. Primary Contact
10. Water Management
11. Rice – upland multiple cropping system?
12. Others – standardization of measurement