

## **Paddy Rice Research Group Meeting**

**Room 405, Tsukuba International Congress Center, Tsukuba, Japan**

18 November 2011

# **Meeting Report**

## **OVERVIEW**

The third meeting of the Paddy Rice Research Group of the Global Research Alliance on Agricultural Greenhouse Gases (“the Alliance”) was held at the Tsukuba International Congress Center, Tsukuba, Japan 18 November 2011, following the Monsoon Asia Agro-Environmental Research Consortium (MARCO) Workshop on Technology Development for Mitigating Greenhouse Gas Emissions from Agriculture.

The Alliance meeting was chaired by Japan (Dr Kazuyuki Yagi, NIAES) and Uruguay (Dr Alvaro Roel, INIA) as Co-Chairs of the Paddy Rice Research Group.

This report is a summary of the key discussions and outcomes of the meeting. PDF’s of the presentations are provided separately on the member’s area of the Global Research Alliance website.

## **PARTICIPANTS**

The meeting was attended by 19 delegates, representing 10 Alliance member countries, 2 observer countries, two Paddy Rice Research Group Partner organisations and participants from the MARCO network.

- **Alliance Members attending:** China, Indonesia, Japan, Malaysia, Mexico, Philippines, Republic of Korea, USA, Uruguay, Viet Nam.
- **Alliance Members unable to attend:** Argentina, Colombia, France, Ghana, Netherlands, Peru, Spain.
- **Observer countries attending:** Pakistan, Thailand.
- **Partner organisations attending:** International Rice Research Institute (IRRI), International Centre for Tropical Research (CIAT).

## MEETING OUTCOMES

The meeting achieved the following outcomes:

- Review of activities of the Group since it last met (Versailles, March 2011).
- Review of the ongoing activities in each member country that relate to greenhouse gas mitigation efforts from paddy rice production.
- Discussion of the draft template for the Paddy Rice Research Group database of literature and experts and possible linkages with similar databases under development by the Croplands and Livestock Research Groups.
- Presentation of the experimental work completed for the measurement standardisation guidelines and a suggestion for similar experimental results from other members to be collated for the initial draft of the guidelines which is to be reviewed at the next meeting of the group.
- Agreement to increase the linkages between the Paddy Rice Research Group and the other Alliance Research and Cross-Cutting Groups to adequately collaborate and share information on overlapping research issues.
- Agreement to increase the linkages between the Paddy Rice Research Group and international organisations, regional institutes and expert scientists to engage with and support the work of these partners.
- Review of the rice research projects listed in the Alliance stocktake and a decision for the group to update the information annually.
- Proposal for a 5 year multi-country project on management options in paddy rice systems to mitigate greenhouse gas emissions, with a possible start date in 2012.

The Group Co-Chairs will present an update on progress of these actions at the next Alliance Council meeting in May 2012 Ottawa, Canada. The Group will meet again in late 2012 with the location still to be decided.

## SUMMARY OF DISCUSSIONS

### OPENING REMARKS

1 The opening address was given by Mr Akihiko Uchikawa from the Japanese Ministry of Agriculture Forestry and Fisheries. He noted that since the official signing of the Alliance Charter in June 2011 the Global Research Alliance has been gaining interest from the international community. Mr Uchikawa acknowledged the work of Dr Yagi in invigorating the Rice Group as well as the relentless coordinating efforts made by the New Zealand secretariat, and welcomed all delegates and observers to Japan hoping that more and more countries will participate in this group in the future.

2 The Co-Chairs presented an overview of the Paddy Rice Group and its activities since the March 2011 meeting in Versailles, France. This included an overview of the rice component of the Alliance stocktake and the measurement techniques and methods survey already completed by the Group.

## UPDATE FROM THE SECRETARIAT

3 The Secretariat gave a presentation of the activities of the Alliance since the last meeting of the Group (refer separate PDF presentation). This included the Ministerial Summit, Charter signing and first meeting of the Alliance Council that took place June 2011 in Rome.

4 As a part of this update, the draft Communication Policy and how the Alliance is linking with partner organisations was discussed. The Alliance Council will discuss a third draft of the Communication Policy at its next meeting (Canada, mid-2012), and until this is in place member countries are asked to follow the style guide and use disclaimers when externally communicating their efforts to support the work of the Alliance. Anything presented as being “on behalf of the Alliance” should have Council approval first. The Alliance Council has also developed an initial list of partner organisations who they hope will work with the Alliance to achieve our goals. However, each Group should also consider the partner organisations or individual experts they could invite to work with the Group either in general or on specific projects.

5 The Secretariat gave an update of the activities of the other two Research Groups and the Cross-Cutting Groups. More detail on the work of these Groups may be found on the Alliance website ([www.globalresearchalliance.org](http://www.globalresearchalliance.org)).

### Stocktake Discussion

6 The Secretariat provided an overview of the stocktake data analysis and possible options for how the Alliance may update and use this information in the future. The Secretariat noted that the stocktake was initially developed to inform the work plans of the Research Groups and is due to be updated in January 2012. The Secretariat asked that the Paddy Rice Research Group consider three options for how the stocktake could be updated and improved.

- **Option 1.** Continue with annual updates – but the Group should consider ways to improve the collection of the data and its quality.
- **Option 2.** Change the format of the stocktake – simplify the template to collect scientists’ names and research topics for network building purposes or, alternatively, use surveys and questionnaires to collect information on specific topics instead of the stocktake.
- **Option 3.** Consider the stocktake as an information-gathering exercise that each country completes when they first join the Alliance.

7 The Secretariat noted that the other Research Groups were being asked the same questions. The Cropland Group, which met on 20 October, had decided it did not want to continue with an annual stocktake. Only new member countries should be asked to complete it on joining. The livestock Group drew a similar conclusion at its meeting on 4-5 November.

8 Discussion amongst the Group found that participants would prefer a different format that would make the stocktake easier to update. However at this time the Group agree to revise the stocktake annually to collect more information on paddy rice projects. The Group should contact the Secretariat if they have any ideas for improving the template or format of the Alliance Stocktake.

## LINKS TO OTHER ALLIANCE GROUPS

9 A brief overview of other Alliance Research and Cross-cutting Groups was provided to the Group by participants who had also attended the recently held meetings.

### Croplands Research Group

10 The work of the Croplands Group was summarised by Dr Charles Rice (Kansas State University, USA), covering both the work plan and the literature database developed by the Croplands Group. Dr Rice suggests the literature database under development by the Paddy Rice Group could be based on the Croplands database to provide a consistent look and function.

11 The Croplands Group has divided its work plan into three components.

1. Quantifying net GHG emissions: providing consistent and compatible protocols for measuring GHGs. Some of the technologies and methodologies will be similar to those used by the Paddy Rice Group and linkages could be developed.
2. Agricultural peatlands and wetlands: this component is developing a network of researchers to identify the best way to manage these lands. This work could also link to the paddy rice grown on these land types.
3. Modelling N<sub>2</sub>O emissions and soil carbon stocks: this component aims to provide a comparison of models and links to the Soil Carbon and Nitrogen Cycling Cross-cutting Group.

### Livestock Research Group

12 Dr Tomoyuki Kawashima (JIRCAS, Japan) who attended the Livestock Research Group meeting on 4-5 November 2011, mentioned four issues that were raised in the meeting that were relevant to the Paddy Rice Group.

1. Importance of GHGs cattle/rice mixed systems, the full system needs to be considered including ways to increase food production.
2. Mixed farming practices, for example the breeding of highly digestible rice feed for livestock which could decrease methane emissions.
3. A comparison of rumen microbiology with paddy field methanogenic bacteria microbiology, Microbiologists from each field could collaborate.
4. A collaboration of livestock and paddy rice life cycle analysis.

13 The Group discussed the need to decide for clear boundaries for maintaining linkages between the Research and Cross-Cutting Groups to ensure that there were no gaps in research involving mixed farming systems.

### Soil Carbon and Nitrogen Cycling Cross-Cutting Group

14 Dr Yasuhito Shirato (NIAES, Japan) attended the second workshop of the Soil Carbon and Nitrogen Cycling Cross-Cutting Group on 13-14 July 2011 in Belgium. He noted that the workshop had few participants from Asia and did not include data collected from paddy rice.

15 The three main areas of work discussed by the group were:

- Inter-comparison of models.
- Sensitivity to mitigation options.
- A requirement for long term datasets to test soil organic carbon datasets and high temporal resolution to compare N<sub>2</sub>O flux.

### Inventories and Measurement Cross-Cutting Group

16 The first meeting of this Group was held 8-10 November 2011 in Canada and attended by Dr Kazuyuki Yagi who presented a summary of the discussions. The initial actions were provided to the Group as a summary page.

17 13 areas of work had been identified. Of the most interest to the Paddy Rice Group will be the work on developing emission factors and measurement techniques. The work on uncertainty analysis may involve other Alliance Groups, and the Chairs will keep in contact with the progress of this Cross-Cutting Group to identify possible collaborations.

## **LINKS TO RICE RESEARCH GROUP PARTNERS**

18 The aim of the Alliance is to connect scientists and partner with international organisations that have similar interest and goals. The Co-Chairs of the Paddy Rice Research Group invited speakers from the International Rice Research Institute (IRRI) and the International Centre for Tropical Research (CIAT) to present their current work and the opportunities they see in partnering with the Paddy Rice Group. PDF versions of both presentations are available on the member's area of the website.

### IRRI

19 Dr Reiner Wassmann from IRRI presented on new approaches for quantification of emissions. IRRI's current research aims to understand mitigation options within the whole system such as carbon cycling and flux measurements using eddy covariance and ICON (impact on carbon, nitrogen and water cycles) to develop water management regimes in rice. IRRI has projects underway in Vietnam, the Philippines (collaborating with PhilRice) and Indonesia (partnering with Bayer Crop Science).

20 IRRI works with local partners and institutions to transfer knowledge of mitigation options out to farmers in the most efficient way. However, where possible, measurement and research is undertaken in the farmers' fields to make sure management practices of the farmer and on farm field conditions are taken into account.

21 The Alliance could help coordinate regional research efforts (such as research farms) as a way to get a coherent message out to real world farmers.

### CIAT

22 CIAT's work on efficiency of nitrogen use in paddy rice production was presented by Dr Manabu Ishitani. The organisation has bred high nitrogen efficiency rice cultivars that can minimise the amount of nitrogen fertiliser a farmer needs to apply.

23 CIAT are involved in the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and work mainly in East and West Africa, India, and Pakistan. CIAT works with a variety of other collaborative projects and donors.

24 With its links to the CGIAR climate change programmes, CIAT feels that the Alliance has a unique grouping of member countries and a variety of backgrounds that could publish its findings to reach a wide audience.

25 The Secretariat notes that CGIAR is one of the organisations that has been approached to partner with the Global Research Alliance.

## MEMBER COUNTRY UPDATES

26 Member countries were asked to present a brief update on the mitigation research activities they were involved in and their research priorities. An overview of relevant research projects is provided in Appendix 2 and PDFs of the presentations are available on the member's area of the Alliance website.

## ACTION PLAN DISCUSSION

### Standardisation of Measurement Techniques

27 One of the first collaborative projects for the Group which was identified during the March 2011 meeting, was developing guidelines of measurement techniques and methodologies that could establish "good practice" when designing experiments and that could allow for comparison of results between researchers and sites.

28 Dr Kuzunori Minamikawa (NIAES, Japan) presented results from the initial experiments already completed in Japan, (see PDF of presentation available on the website) identifying the best time of the day to measure for representative values of methane emissions. Also considered was the frequency of measurements required during flooded and drainage periods of paddy rice growth.

29 There was some discussion regarding the findings that the best time to measure was mid-morning to average out the methane flux, and also to avoid measurement on atypical bad weather days. It was agreed that the Group should collect more datasets, statistical analysis and site specific information for the manual, especially from tropical countries. The group agreed to contribute further datasets and send them through to Dr Kuzunori Minamikawa to compile.

30 The next step for the Group is to write the standardisation guidelines. It was suggested that existing manuals such as IAEA and GRACEnet (USDA) be used as a starting point and modified for paddy rice. Japan will coordinate the processes to complete a first draft for review at the next meeting of the Group.

### Database of Literature and Experts

31 Dr Shigeto Sudo (NIAES, Japan) presented an option for the proposed database for the Paddy Rice Research Group to which published and domestic/grey literature as well as experts could be uploaded. The proposed system would use freely accessible software and include the ability to search the database by keyword topics such as by country and management technique.

32 All participants were asked to provide their thoughts about the layout of the database and who should manage and access the information. A questionnaire will be sent to participants and other contact points of the group with some options by the end of December 2011. This should be returned to by **the end of January 2012**.

### Multi county project

33 A longer-term action for the Group that was identified at previous meetings was multi-site/country experiment looking at mitigation of methane emissions through water management. Japan has developed a proposal for a five year multi-site experiment that would work with CGIAR. It is hoped that other countries could similarly put forward proposals to fund this collaborative project.

## NEXT MEETING

34 Before the close of the meeting the Group were asked for their views on the date and location of the next meeting. It was agreed to hold the fourth meeting in late 2012 as the Group feels at this stage an annual meeting is acceptable.

35 Possible meeting locations mentioned were CIAT in Colombia, a soil carbon workshop in China, or a possible South East Asian GHG Inventory meeting. The Co-Chairs will consider the options put forward and make a decision that ensures that the maximum number of participants can attend.

36 For consideration of future meetings, there is an East and South East Asia Federation of Soil Science Societies (ESAFS) regional soil science meeting which will be held in Indonesia, 2013 and in 2014 the International Union of Soil Sciences (IUSS) World Congress of Soil Science will be held in Korea (<http://www.iuss.org/>).

37 The meeting closed with the Co-Chairs thanking participants for their attendance and ongoing support for the Paddy Rice Research group.

# APPENDIX 1: Participants List

Country	Attendees
<b>Alliance Member Countries</b>	
Argentina	Unable to attend
China	Xiaobo Qin: Chinese Academy of Agricultural Sciences ( <a href="mailto:chinayrh@gmail.com">chinayrh@gmail.com</a> )
Colombia	Unable to attend
France	Unable to attend
Ghana	Unable to attend
Indonesia	Nursyamsi Affandi Dedi: Indonesian Agency for Agricultural Research and Development ( <a href="mailto:ddnursyamsi@yahoo.com">ddnursyamsi@yahoo.com</a> )
Japan	Yoshiro Nishimura: MAFF ( <a href="mailto:Yoshiro_nishimura@nm.maff.go.jp">Yoshiro_nishimura@nm.maff.go.jp</a> ) Akihiko Uchikawa: MAFF ( <a href="mailto:akihiko_uchikawa@nm.maff.go.jp">akihiko_uchikawa@nm.maff.go.jp</a> ) Kazuyuki Yagi: NIAES ( <a href="mailto:kyagi@affrc.go.jp">kyagi@affrc.go.jp</a> )
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Netherlands	Unable to attend
Peru	Unable to attend
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Republic of Korea	Hyun-Cheol Jeong: National Academy of Agricultural Science (NAAS) ( <a href="mailto:taiji152@korea.kr">taiji152@korea.kr</a> )
Spain	Unable to attend
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Viet Nam	Ha Quang Pham: IAE/VAAS/Hanoi ( <a href="mailto:haphamquang@fpt.vn">haphamquang@fpt.vn</a> )
<b>Observer Countries</b>	
Pakistan	Muhammad Anwar: Pakistan Agricultural Research Council ( <a href="mailto:muhammadanwar1964@gmail.com">muhammadanwar1964@gmail.com</a> )
Russia	Unable to attend
Thailand	Chitnucha Buddhagoon: Prachin Buri Rice Research Center ( <a href="mailto:chitnuchab@gmail.com">chitnuchab@gmail.com</a> , <a href="mailto:chitnucha@brrd.mail.go.th">chitnucha@brrd.mail.go.th</a> )
<b>Invited Participants</b>	
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<b>Other Participants (MARCO)</b>	
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Tomoyuki Kawashima, JIRCAS, Japan ( <a href="mailto:tkawa@affrc.go.jp">tkawa@affrc.go.jp</a> )	
<b>Secretariat:</b> Deborah Knox, New Zealand Ministry of Agriculture and Forestry ( <a href="mailto:deborah.knox@maf.govt.nz">deborah.knox@maf.govt.nz</a> )	



# APPENDIX 2: Summary of key points from country presentations

## China

Stocktake of recent research:

- Effect of long-term fertiliser use.
- Mitigation from double rice in Hunan.
- Automatic measurement from double rice in Hubei.
- Monitor and control from double rice in Guangdong.

Priorities of research needs:

- Practical GHG abatements technologies.
- Financial support focus only on rice paddy research.
- Profits of peasant and environmental effects.
- Reduce the uncertainties in measurement.

## Indonesia

Mitigation options:

- Increasing water use efficiency in irrigated, rain fed and deepwater management systems.
- Introduction of new rice varieties with less methane emissions.
- Efficient use of nitrogen fertilisers.

## Japan

Recent research:

- Automatic flux sampling system
- Experiment to prolong mid season drainage and reduce methane emissions. Collaboration with local researchers and institutes to find best water practice for the local farmers.
- Intermittent irrigation, gives a high yield, reduces number of secondary tillars and enhances root growth.

Priorities of research needs:

- Develop feasible mitigation options, such as water management, straw removal
- Evaluate mitigation potential at national scale using Emission Factors or DNDC models
- International collaboration

## Korea

Main mitigation options:

- Different rice plant varieties.
- Improved water management.
- Promoting the no tillage method.
- Removal of rice straw.

Future research:

- Monitor emissions using automatic chambers.
- Study GHG emissions using modelling.
- How to apply identified mitigation options on farm.

## Malaysia

Current practices:

- Mainly flooded irrigation using 8 production schemes.
- Most harvesting is mechanical.

- Rice straw residue is usually burnt in the field (for double cropping).
- Direct seeding (about 5% transplanting).

Recent research:

- Local emission factors research using closed chambers and on farm practice field studies.
- Various mitigation options (straw and urea) on farm field studies.
- Water management mitigation options, MARDI research stations field study.

Priorities of research needs:

- develop local emission factors and improve inventory,
- develop mitigation options for paddy rice,
- capacity building and training and collaboration and support.

### Mexico

Recent research:

- Methane emission monitoring in rice fields.
- Measurement of methane fluxes from rice cultivation under lab and greenhouse conditions.

Priorities of research needs:

- Need capacity building in both types of management systems.
- Working to create Mexican research network.
- Collaboration with international institutions.

### Pakistan

Recent research:

- Developing local indigenous hybrids - rice to grow in less water, and aerobic rice.
- Alternate wetting and drying research.
- Improving harvesting and threshing – Agricultural Research Council has developed a rice thresher.

Future work:

- Measurement of GHG emissions.
- Breeding of high yield varieties, local hybrids and high nutrition varieties.
- Training farmers

Priorities of research needs:

- Lack the capacity to focus on mitigation research.
- Technical assistance and training.

### Philippines

Recent research:

- Component studies – soil types, varieties and lines of rice, mitigation options for methane, inventory GHG emissions.
- Varieties and lines of rice with reduced methane emissions.
- Comparison of soil types and methane emissions in greenhouse conditions.
- Water management effects, alternate wetting and drying and mid season drainage.
- Management of rice straw and carbonised rice hull (biochar).

Priorities of research needs:

- Verify mitigation options under field conditions.
- Develop simulation models.
- Capacity enhancement.

### Thailand

#### Recent research:

- Collaborative UNDP-IRRI project to calculate methane emissions.
- Development of Management techniques and mitigation options.
- Carbon footprint in 5 production systems (GAP – Good Agricultural Practice).

#### Priorities of research needs:

- N<sub>2</sub>O quantification.

### Viet Nam

#### Recent research:

- Farmer survey.
- Develop farm scale sampling methods.
- Develop modelling methods.
- Effect of soil type and time in rice growth period on emissions.
- Management of residues – rice straw.
- Efficient use of fertiliser.
- Biochar.
- Water management options (drip irrigation, AWD, plastic cover).
- Minimised tillage.

#### Priorities of research needs:

- Farmer participation.
- Collaboration with policy makers.

### Uruguay

#### Recent research:

- Rotate rice with 3-4 years of pastures.
- Measure methane and N<sub>2</sub>O emissions under conventional and deficient water management.
- Closed chamber to measure emissions.

#### Priorities of research needs:

- Mitigation of emissions without decreasing yield.
- Automated measurement system for more frequent measurements.