

## Paddy Rice Research Group Meeting

Umali Hall, CESD Conference Room, Los Baños, the Philippines

21 August 2014

# Meeting Report

## OVERVIEW

The 2014 meeting of the Paddy Rice Research Group's Asia sub-Group of the Global Research Alliance on Agricultural Greenhouse Gases ("the Alliance") was held at the International Rice Research Institute (IRRI), Los Baños, Philippines on 21 August 2014 alongside AsiaFlux Workshop 2014. The Alliance meeting was chaired by Japan (Dr Kazuyuki Yagi, NIAES) as Co-Chair 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 22 participants, including representatives from seven Member countries and partners of the Group.

- **Alliance Members attending:** Indonesia, Japan, Republic of Korea, Malaysia, Philippines, Thailand, Viet Nam.
- **Alliance Partners attending:** CIAT, IRRI

The participant from CIAT (Dr. Ngonidzashe Chirinda) also represents the America Sub-group of the Paddy Rice Research Group, on behalf of another Co-Chair of the Group (Dr. Gonzalo Zorilla, INIA). One of the participants from IRRI (Dr. Bjoern Ole Sander) represent Paddy Rice Production Component of Climate and Clean Air Coalition (CCAC) - Agricultural Initiative.

## MEETING OUTCOMES

The meeting achieved the following outcomes:

- Update from the Alliance Secretariat including outcomes from the latest Council meeting.
- Updates on the other Research Groups of the Alliance.
- Outcomes and overview from the first meeting of the Americas sub-Group
- Agreement from the Group tasking the MIRSA2 project to develop the first version of the standardisation guidelines.
- Report of results from the first year of the MIRSA2 project.
- Presentation on the database of experimental sites and a timeline to have members complete this ahead of the 2015 meeting.
- Continuation of the discussion on adaptation and mitigation synergies as they relate to paddy rice.
- Development of a new area of work on low-emitting rice cultivars and first actions for this activity.
- Proposal to consider a work area on developing paddy rice inventories.
- Next steps for the Group and discussion about future meetings.

## SUMMARY OF DISCUSSIONS

### OPENING REMARKS

1. The meeting was opened by the Co-Chair of the Group and included an overview of the Group's meetings and activities to date. The 2013 meeting of this Group was held in Bogor, Indonesia and the America sub-Group met for the first time in Cali, Colombia at the International Centre for Tropical Agriculture (CIAT) in May 2014.

2. Participants were welcomed to the Philippines by Ms Kristine Pascaul from PhilRice, Philippines. PhilRice is working to address the effects of climate change in agricultural systems and the production of rice, for example the recent devastating losses of rice crops in two regions of the Philippines caused by two large typhoons show the need to improve the resilience of paddy rice crops. PhilRice is pleased to be involved in a research community that works collectively to find solutions to these challenges.

### UPDATE FROM THE SECRETARIAT

3. A presentation from the Secretariat included an update on the outcomes from the most recent meeting of the Alliance Council, Membership of the Alliance and updates on activities and meetings of the other Research Groups. The 2014 Alliance Council meeting was hosted by the incoming Council Chair the Netherlands. Outcomes from the Council meeting included five actions proposed to the Council during the Research groups report on:

1. Framework

- Promote practical outcomes to stakeholders
2. Developing Partner relationships
    - Research Groups to develop Partner roadmaps
  3. Communication
    - Develop targeted communications, including promotion of outputs
    - dedicated country contacts for each of the Groups
  4. Adaptation
    - Stocktake of synergies between adaptation and mitigation
  5. Cross-cutting Issues
    - RGs to support Cross-Cutting meetings and activities
    - Integrated Networks: Modelling, Monitoring, Inventories

4. The Group was also provided with an update on the Activities of the Secretariat which included a focus on promoting the Alliance through social media and requesting member countries to update their activities on the Alliance website. The Secretariat will also be working with the Chair and interested members to develop a term of reference for Council representatives including activities such as communicating with country participants in the Research Groups.

5. The discussions during the Council meeting also included consideration of potential Partner organisations. The Climate and Clean Air Coalition (CCAC) an organisation that is developing projects in collaboration with the PRRG and the LRG was invited to present during the Council meeting. Future collaborative activities and partnership will be discussed with this Group. The Council also discussed how the Alliance should develop a relationship with a yet to be launched initiative on Climate Smart Agriculture. As the activities this group will work on have yet to be identified the Secretariat and Co-Chairs will focus on promoting the activities of the Alliance to the Climate Smart Agriculture and its members once formalised to reduce overlap of activities.

## **OVERVIEW OF THE PADDY RICE GROUP**

6. Co-Chair, Dr Kazuyuki Yagi then provided an overview of the Paddy Rice Research Group; its previous meetings and agreed workplan as well as the current activities being undertaken by Group members. There are three new Members participating in activities of the PRRG since the last meeting, Paraguay, Chile and Bolivia

7. The Group has divided into two regional sub-groups, Asia and America as a way to organise group meetings. The two sub Groups will share and agree on the same workplan, with some activities in common across the Group and regional projects focused on the different production systems. The first meeting of the America sub-Group was held in May 2014 in Cali, Colombia.

### **Workplan update**

1. Standardised measurement guidelines
  - Measurement protocols have been provided from a number of member countries.
  - A project to analyse the best time of day for sampling has been completed using automatic measurement chambers and the results published.

## 2. Databases

- At the last meeting a new proposal was agreed, to develop a database on experimental sites.
- The database will compile metadata from experimental sites measuring greenhouse gas emissions from paddy rice systems. The database is based on the MAGGnet database developed by the Croplands Research Group.
- This database will replace the previously agreed to expert and literature databases.

## 3. Increasing participation

- The Group collaborates with partners and other international networks.
- Non-member country experts are invited to attend meetings.
- A collaborative project is underway with the Climate and Clean Air Coalition (CCAC) who are interested in reducing short lived climate pollutants, which includes agricultural methane emissions.

## 4. Multi- country projects

- The MIRSA2 project has completed the first year.
- The America sub-Group has developed a concept proposal for another regional project.

## 5. Network for mitigation and adaptation synergies

- Possible options were identified at the previous meeting, and discussed by the America sub-Group.
- A Network has been created with Vietnam and Indonesia coordinating.

### **Activities of America sub-Group**

1. The eight countries attending developed simple action plans for their countries involvement in the Group.
2. A draft proposal for multi country project was discussed and developed.
3. The next steps for the Group were identified and a proposal for the next meeting to be held February 2015 in Porto Alegre, Brazil alongside the 12<sup>th</sup> International Rice Conference for Latin America and the Caribbean was agreed to.

### **Messages from the PRRG to Council**

8. The co-Chair shared with participants the issues and questions that were presented to Council during the PRRG report during the annual council meeting. The issues presented were:

1. Greater mobilisation of resources, requesting that experts and funds are made available to support meetings and activities.
2. Consistent reference persons to participate in the PRRG attending annual meetings and responding to email and other communications between meetings.
3. Strengthen the two sub-Groups by encouraging participation from America and European experts.
4. Develop capability building activities in Africa, which could contribute to adaptation and mitigation synergies.

9. The Group discussed ways to improve participation in the Group, noting that the wider Fluxnet community may have a number of participants from America who will be interested in the work of the PRRG. In Africa the CGIAR centre responsible for rice research AfricaRice. This centre is organised differently IRRI with Ministers from West African countries setting the research priorities rather than a scientific board, and mitigation is not a focus for countries in this region, meaning the PRRG may need to find other ways to engage with African research communities.

## **ACTION PLAN DISCUSSIONS**

### **Standardisation on measurement techniques**

10. Dr Kazunori Minamikawa from NIAES, Japan who is leading the work on the standardisation guidelines provided an overview of this activity and the next steps required before publishing the first version. The activity was approved by the Group in 2010 and was outlined in a paper published in 2012. The guidelines have since been incorporated under the MIRSA project, a multi-country project which is developing their methodology using the measurement guidelines. The guidelines cover six different chapters: experimental field design, chamber design, gas sampling, gas analysis, data processing, and auxiliary measurements.

11. The guidelines will be circulated to the Group for review in early 2015 with version one to be published by August/September 2015. The guidelines will be updated as required and the Chair hopes that the PRRG community will contribute to this.

12. The final guidelines should be a document that can be used by everyone, no matter what equipment is available to them. The Group recommended that the guidelines outline the minimum requirements and are developed in collaboration with similar publications e.g. SAMPLES project and Vietnam's MRV guidelines supported by USAid.

13. The Group agreed that the MIRSA project participants would develop these guidelines, including the minimum requirements, optimal conditions for sampling and consideration of eventual presentation and promotion of the published version.

### **Experimental sites database**

14. Progress on the database experimental sites was presented by Dr Shigeto Sudo from NIAES, Japan. The database is based on the MAGGnet activity of the Croplands Research Group with changes made to include specific features of paddy rice cultivation. The database includes general information on the research site, experimental metadata, researcher/site manager contact information and links to journal publications. Following discussions about this activity at the last meeting the changes now include the addition of options such as, length/time of the rainy season, irrigated or rainfed conditions, hydraulic connectivity measurements, site specific water management, and sowing or transplanting. The sites included in the database should have links to published experimental results, but information from ongoing long term experiments will also be included.

15. The first version of the database will be sent to the PRRG by the end of September, following a further discussion with the MAGGnet database project leaders. A revised version including comments will be circulated to the Group by December 2014. Members will then be asked to complete the first version of the database that is sent out in March 2015, with the results discussed at the next meeting of the Asia sub-Group.

16. The Group discussed the need to provide clear instructions when asking for information to contributed to the database, the knowledge sharing objectives, purpose, and future use of any data

provided needs to be well explained so that countries see benefit in contributing information. The Group needs to consider how this database will continue to be updated so that the information it holds stays relevant and useful.

### **MIRSA report**

17. Dr Kazunori Minamikawa from NIAES, Japan and Dr Agnes Padre from IRRI jointly presented the MIRSA project and the results from the first experimental season. The greenhouse gas mitigation in irrigated rice paddies in Southeast Asia (MIRSA) project held its second annual meeting prior to the PRRG meeting discussing results from the first season of the three year project. MIRSA is comparing alternate wetting and drying (AWD) techniques to reduce greenhouse gas emissions and develop best practice across Vietnam, Thailand, Indonesia and the Philippines. Standardised protocols for sampling, measurements and analysis are shared across all four sites although different chambers are used.

18. Analysis of the first season results has shown no significant difference between treatments for the experiment sites with the exception of Vietnam. The discussion during the annual meeting considered the methodology that is used at each site. Each site needs to confirm that they are using chambers of the same area and volume as well as comparing the size of the chamber with the area that the rice plants occupy, the number of plants inside each chamber should be counted to prevent over or underestimating the emissions.

19. Other PRRG members who have completed similar studies on AWD could share these with the MIRSA outcomes, combining a wider range of experimental results within the PRRG to gain a better understanding of AWD practices and the effect on mitigating greenhouse gases. This experimental information can also be shared through the experimental database.

### **Varietal differences of irrigated rice**

20. During the 2013 Group meeting in Bogor, Indonesia the Group identified rice cultivar selection as a potential activity under the adaptation and mitigation synergies objective, ideally identifying a cultivar that has high yields with low greenhouse gas emissions and perhaps resilience to drought or heat tolerance.

21. Dr Prihasto Setyanto presented the work completed by IARD, Indonesia in the area of low emitting rice varieties. The four main rice varieties grown by farmers were tested under the same conditions with one variety showing consistently higher fluxes and methane emissions. The experiment concluded that higher dry matter from the plants roots showed a significant relationship to higher methane flux. However, high methane emitting varieties did not always show a high yield.

22. The next step for this activity within the PRRG will be comparing information on similar experiments and knowledge of low methane emitting varieties across members. It may be that the differences in emissions would only be able to be detected using automatic chambers rather than manual chambers. The identified variety may be a cultivar with a shorter time until maturity/harvest, therefore less time in the field.

23. Indonesia will continue to lead this activity and member that have information to contribute should contact Indonesia.

### **Adaptation and mitigation synergies, experience from Indonesia**

24. Dr Prihasto Setyanto then presented to the Group Indonesia's experience in research that has synergies between adaptation and mitigation. Indonesia has a target to reduce agricultural

emissions, with a focus on increasing the productivity and efficiency of agricultural systems first and then identifying those practices which will also reduce greenhouse gas emissions.

25. Indonesia has an integrated rice and livestock system for sustainable agriculture production which aims to meet multiple outcomes (including the reduction of greenhouse gas emissions), but also making use of all parts of the system (e.g. waste products) and considering international carbon schemes. Indonesia has developed a number of programmes to encourage integrated crop management, food diversity, integrated fish and rice crops and reduce emissions from peatlands used to grow oil palm.

## **RESEARCH ACTIVITY REPORTS**

26. Three speakers from IRRI, CIAT and Japan were invited to present on current research on mitigation of greenhouse gas emissions from paddy rice reports.

### **Lessons learnt from IRRI's greenhouse gas measurement experiments and implementation of mitigation strategies in rice systems**

27. Dr Ole Sander provided an overview of research activities at IRRI; the aim behind the research is to develop accurate estimates for GHG emissions from rice, as some countries are currently using values that are likely to be over estimated.

28. Experiments to identify best practice for protocols and sampling procedures have used automated systems to identify the best time of day to take samples (mid-morning) and brought together the common sampling practices from several research institutes. The common practices can then be tested to confirm best practice and identify the data that is required when publishing literature to replicate the experiment. Under the SAMPLES programme with CCAFS the first stage of a measurement protocols harmonisation activity has been completed to identify minimum requirements, guidelines for tradeoffs between greenhouse gases and consideration of factors that influence farmer livelihoods.

29. A study in Vietnam has compared AWD practices across different ecosystems and identified the emission intensity of rice production from each. The research found that the carbon footprint of rice produced in the hilly midlands was smaller than rice produced in the delta regions. Another study in the Philippines has identified regions where it is possible to practice AWD technologies, related to seasonal rainfall and the soil type. The project combined soil maps with rainfall data over a ten year period and identified regions most appropriate for AWD. Ideally similar maps would be completed across South East Asia and Asia.

30. A joint project involving the Climate and Clean Air Coalition (CCAC), IRRI and the GRA lead by Japan and working with farmers in Colombia, Bangladesh and Vietnam has been developed to disseminate AWD practices more widely and identify reasons that farmers are not always willing to take on this technology. The project includes provision of information to stakeholders and policy documentation, farmer trials, GIS mapping, a central website holding all the information and will establish national working groups to provide support on the technology and initiatives.

### **Activities for assessment of greenhouse gas emissions from rice systems in Latin America**

31. Dr Ngonidzashe Chirinda from CIAT in Colombia provided an overview of research activities from the region as were mentioned by participants at the May 2014 America sub-Group meeting.

- Bolivia has not completed measurements as yet, and hopes to send samples to a regional lab at CIAT for analysis.

- Brazil has a large area of land under rice cultivation and a well advanced research programme of measurements. Brazilian researchers are able to provide support and share experiences to the region.
- Chile has recently begun a measurement research project and very interested in improving protocols.
- Colombia has a low carbon strategy with need to understand country emissions for use in a rice NAMA.
- Ecuador has no research on rice emissions as yet and lacks the infrastructure but is interested in learning how they can develop a programme.
- Paraguay is increasing rice production but has no measurements to quantify emissions from rice and is looking to provide support to policy.
- Peru plans to conduct greenhouse gas inventories in 2015, but has no information on emissions yet.
- Uruguay has been conducting measurement experiments with particular focus on finding alternatives to reduce emissions without reducing yields.
- CIAT was asked to be a technical hub for the region and lead efforts to develop multi country project, a proposal "GREENRICE" has already been developed and submitted to the CCAFS fund. The project would use the protocol developed under MIRSA as a way to align the research.

32. Although there are differences between the rice production systems in Latin America and Asia there are opportunities to share experiences and information across the two sub-Groups. The Asia sub-Group has more regional measurement information and research into rice systems available but the America sub-Group has more experience with production for markets and flexibility around the crops grown from year to year.

### **Mitigation trials of greenhouse gas emissions from rice through iron fertiliser application**

33. Dr Kazuyuki Inubushi from Chiba University, Japan presented results of experiments to mitigate methane emissions from paddy rice fields in Vietnam using iron slag. Microbiological studies have shown that the addition of amorphous iron can reduce the production of methane from paddy fields by preventing the reduction step in the chemical processes leading to methane.

34. When additional iron was applied to soils low in iron a reduction in methane emissions was observed, this effect is not seen if the soil already has high iron content. The results of an experiment testing the availability of iron in tropical soils, using sites across Southeast Asia, rather than temperate soils were then presented to the group. The experiment compared methane production and mineralisable N, which indicates a soil high in organic matter and saw methane reduction in 11 out of 17 crops when the amorphous iron fertiliser was applied. Of the 17 crops 14 also showed an increase in yield. It is possible that the increased yield seen was related to the lower silicate (SiO<sub>2</sub>) content in Southeast Asian soils than is seen in Japan and was adding additional trace elements to the soil and reducing methane. Iron toxicity can occur in soils if they already have high iron content, therefore the soil should be tested before amorphous iron can be considered as a mitigation option.



## **FUTURE ACTIVITIES**

### **Adaptation and Mitigation Synergies**

35. During the meeting in Bogor in 2013 the Group discussed activities that show synergies between adaptation and mitigation and the America sub-Group meeting added to the list during the May 2014 meeting in Cali. Vietnam and Indonesia are leading the Group activities on this topic which now covers a long list of ideas. Following the Alliance Council meeting the Co-Chairs agreed that a stocktake of the adaptation and mitigation activities that are occurring already within member countries need to be captured this stocktake will be developed over the coming year, with contributions from all Groups. This topic and the activities that should be considered by the PRRG will be discussed again following the stocktake activity.

### **Inventory Activities**

36. The Group expressed an interest in developing emission factors for rice production, although some activities separate from the GRA exist in this area already. An activity on rice inventory would need a country to lead this activity. As a first step the Co-Chair proposes that members first share information on how emission factors are determined in each country and will send an invitation asking countries to participate in this activity.

### **Meeting Outcomes**

- Measurement guidelines, the Group agrees that the MIRSA project will be asked to complete the first version of these guidelines.
- Experiment database, it was agreed to revise the spreadsheet and collect the first set of data before next PRRG meeting.
- Increased participation, for the Asia sub-Group this will involve encouraging participation from European members and building collaborations with the America sub-Group.
- MIRSA project, the work is ongoing and the groups should develop other collaborations to share research.
- Adaptation and mitigation synergies, the PRRG will continue to discuss these issues and contribute to wider GRA activities

### **2015 Meeting of the Asia sub-Group**

37. The Group has not yet agreed on a location for the 2015 meeting, possible meeting locations could include:

- Alongside the next ESAFS conference to be held in Nanjing, China.
- Meet at the same time as the MIRSA project meeting which is expected to be held in the second half of 2015 in Japan.

38. Any further possibilities for the next meeting location should be provided to the Co-Chair, with the final decision to be communicated at a later date.

# APPENDIX 1: Participants List

Country	Attendees
<b>Alliance Member Countries</b>	
Indonesia	Prihasto Setyanto, Indonesian Agricultural Environment Research Institute ( <a href="mailto:Prihasto_Setyanto@yahoo.com">Prihasto_Setyanto@yahoo.com</a> ) Ali Pramono, Indonesian Agricultural Environment Research Institute ( <a href="mailto:ali_pramono@yahoo.com">ali_pramono@yahoo.com</a> )
Japan	Kazuyuki Yagi, NIAES ( <a href="mailto:kyagi@affrc.go.jp">kyagi@affrc.go.jp</a> ) Kazunori Minamikawa, NIAES ( <a href="mailto:minakazu@affrc.go.jp">minakazu@affrc.go.jp</a> ) Shigeto Sudo, NIAES ( <a href="mailto:ssudo@affrc.go.jp">ssudo@affrc.go.jp</a> ) Kazuyuki Inubushi, Chiba University ( <a href="mailto:inubushi@faculty.chiba-u.jp">inubushi@faculty.chiba-u.jp</a> ) Takayoshi Yamaguchi, NIAES ( <a href="mailto:ladakh2008@affrc.go.jp">ladakh2008@affrc.go.jp</a> )
Korea	Hyuncheol Jeong, ( <a href="mailto:Taiji152@korea.kr">Taiji152@korea.kr</a> )
Malaysia	Mohd Fairuz Md Suptian, MARDI ( <a href="mailto:fairuzsr@mardi.gov.my">fairuzsr@mardi.gov.my</a> )
Philippines	Filomena Grospe, PhilRice ( <a href="mailto:fs.grospe@philrice.gov.ph">fs.grospe@philrice.gov.ph</a> ) Kristine Pascual, PhilRice ( <a href="mailto:kcsamoy@gmail.com">kcsamoy@gmail.com</a> ) Mark Everson Casil, PhilRice ( <a href="mailto:med.casil@philrice.gov.ph">med.casil@philrice.gov.ph</a> )
Thailand	Amnat Chidthaisong, KMUTT ( <a href="mailto:amnat_c@jgsee.kmutt.ac.th">amnat_c@jgsee.kmutt.ac.th</a> )
Viet Nam	Tran Dang Hoa, Hue University of Agriculture and Forestry ( <a href="mailto:trandanghoa@huaf.edu.vn">trandanghoa@huaf.edu.vn</a> ) Hoang Trong Nghia, Hue University of Agriculture and Forestry ( <a href="mailto:nghialv42@gmail.com">nghialv42@gmail.com</a> )
<b>Secretariat:</b> Deborah Knox, New Zealand Ministry for Primary Industries ( <a href="mailto:deborah.knox@mpi.govt.nz">deborah.knox@mpi.govt.nz</a> )	
<b>Invited Participants</b>	
IRRI : Reiner Wassmann ( <a href="mailto:r.wassmann@irri.org">r.wassmann@irri.org</a> ) Bjoern Ole Sander ( <a href="mailto:b.sander@irri.org">b.sander@irri.org</a> ) Agnes Padre ( <a href="mailto:a.padre@irri.org">a.padre@irri.org</a> ) Ryan Romasanta Julie Ann Basconcillo	
CIAT : Ngonidzashe Chirinda ( <a href="mailto:n.chirinda@cgiar.org">n.chirinda@cgiar.org</a> )	