GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

Paddy Rice Research Group Meeting

Room C, IPB International Convention Centre, Bogor, Indonesia

25 October 2013

Meeting Report

OVERVIEW

The fifth meeting of the Paddy Rice Research Group of the Global Research Alliance on Agricultural Greenhouse Gases ("the Alliance") was held at the IPB International Convention Centre, Bogor, Indonesia on 25 October 2013 alongside ESAFS11. 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 17 participants, representing 6 Alliance member countries, one Alliance Partner and 2 invited experts from non-member countries.

- **Alliance Members attending:** China, Indonesia, Japan, Thailand, Viet Nam.
- **Alliance Members unable to attend:** Argentina, Colombia, France, Ghana, Malaysia, Mexico, Netherlands, Nicaragua, Peru, Philippines, Republic of Korea, Spain. Uruguay, USA

MEETING OUTCOMES

The meeting achieved the following outcomes:

- Update on research activities in member countries.
- Update from the Alliance Secretariat including outcomes from the latest Council meeting.

- Updates on the other Research Groups of the Alliance.
- Comparison of standardisation protocols used by member countries and agreement on the next steps for combining these.
- Outcomes from the MIRSA 2 project kick-off meeting
- A new proposal to develop a database of experimental sites, based on the MAGGnet activity
- Identification of adaptation and mitigation synergies as they relate to paddy rice
- Further discussion on the work areas identified at the last meeting, and development of the identified activities in the Group workplan.
- Next steps for the Group and discussion about future meetings.

SUMMARY OF DICUSSIONS

OPENING REMARKS

The meeting was opened by Dr Muhrizal Syarwani, Director of the Indonesian Centre for Agriculture Research and Development. Dr Syarwani extended a warm welcome to Indonesia for all participants and hoped that this meeting of the Alliance would provide great opportunities for networking and collaboration.

Indonesia places great important on measuring and reducing greenhouse gas emissions from agriculture, with particular interest in wetlands and peatsoils which cover 15 million hectares of Indonesia and environmental research into sustainable agriculture practices. Funding has been made available to scientists for climate change research including dedicated lab facilities and funding for projects on rice, agricultural soils and sustainable oil palm systems

Indonesia aims to reduce total greenhouse gas emissions 26% by 2020, while improving people's welfare and without reducing economic development. This also includes reductions within the agriculture sector, although this is not as high a source of emissions as other sectors. Indonesia recognises the need to synergise adaptation and mitigation options for agricultural production and as Indonesia aims to be self sufficient in food production there is a need to secure food for Indonesians in the future.

Dr Syarwani would like to note Indonesia's commitment to the Alliance and the aims listed in the Charter. Indonesia is very pleased to host the fifth meeting of the Paddy Rice Research Group.

UPDATE FROM THE SECRETARIAT

The representative for the Alliance Secretariat provided an update on current activities underway in the Alliance including a refresh of Research Group and member country pages on the Alliance website. All participants were encouraged to check that the activities they participate in are included on the Alliance website and promoted on their country webpage outlining support for the Alliance. The Secretariat also noted that it is the responsibility of Research Group participants to communicate opportunities and outcomes resulting from Research Group meetings to Council representatives. The Co-Chair agreed that official reporting from Group meetings , such as the

publicly available meeting summary that the Secretariat produces, should be sent to Council representatives and Ministers so that actions can be followed up at the government level.

There are now 40 member countries in the Alliance; new members that have joined since July 2013 are Belgium, Bolivia, Ecuador, Honduras, Nicaragua, Panama and Sri Lanka. Some of these new member countries have yet to identify participants for each of the Research Groups and the Secretariat asks members with contacts or colleagues in these new Alliance countries to introduce these contacts to the aims of the Alliance and suggest activities they could be interested in joining.

Key Outcomes from the Council Meeting

- Uruguay took on the role of Council Chair.
- The Netherlands was confirmed as Vice-Chair of the Alliance Council.
- A discussion on mobilisation of resources with all members agreeing to:
    - Highlight / promote the Alliance in related activities and events.
    - Integrate the Alliance into national agricultural research programs.
    - Member countries should identify opportunities and activities to include in the Research Group workplans.
    - Research Groups were requested to provide a list of partnerships/collaborations underway.
- The Council agreed that adaptation and mitigation synergies within the Alliance need increased promotion, Research Groups and their representatives are requested to:
    - identify/develop mitigation projects or activities that have synergies with adaptation.
    - Include synergies between mitigation and adaptation in reporting to the Council.
    - Create specific networks to promote synergies between mitigation and adaptation.

OVERVIEW OF THE PADDY RICE GROUP

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. Dr Gonzalo Zorrilla, who was not able to attend the meeting, was introduced as the new Co-Chair from Uruguay for the Group. New member countries Nicaragua and Ecuador, although not able to attend this meeting have expressed an interest in participating in the Group meaning there are now 22 members taking part in the work of the Group.

Workplan update

Stocktake-Inventory:

- It was agreed at the previous meeting that the Group would complete a revision of the Alliance research project stocktake exercise, with a focus on rice production.
- A more efficient way to complete this outcome is proposed in the section on databases under the action plan discussion.

Research Networks and Databases:

- Communication with members and non-members through 'PRRG e-news'.
- Development of a literature and experts database.

Capability development:

- Members from Latin America met at a workshop alongside the Alliance Council meeting in Montevideo, Uruguay during June 2013.
- Representatives from Brazil, Argentina, Chile, Peru, and Uruguay discussed future activities for the region including noting that rice is an important export for the region so reducing carbon footprints is a key concern.
- The Group will now focus on developing two sub-Groups.
    - Latin American sub-Group including CIAT as a partner.
    - Asia sub-Group.
- Both the Asia and Latin America Groups will undertake multi site experiments.
- Next meeting of the Latin American Group will take place early 2014 at CIAT.

Collaborative Research Projects:

- MIRSA project on water management across multiple sites.
- Kicked off meeting was held in Viet Nam 2-3 October.
- planning underway for a similar project for Latin American members.

Technical information and knowledge transfer:

- measurement protocols reviewed for each country.

Policy support and links:

- The Group has a number of collaborative partners and projects underway with international organisations including:
    - International Rice Research Institute (IRRI)
    - International Centre for Tropical Agriculture (CIAT)
    - Africa Rice
    - Climate Change and Food Security (CCAFS)
    - PROCISUR
    - FluxNet

Coordination with other Research Groups

The Soil Carbon and Nitrogen Cycling Cross-cutting Group will host a workshop in Paris, France in March 2014. This workshop will develop the next steps of the Cross-cutting Groups modelling inter-comparison project and will focus on measurement of whole systems and the scaling up of data. A DNDC modelling network has been established by the Croplands Research Group in coordination with the Soil Carbon and Nitrogen Cycling Cross-cutting Group. The network will look at variations of the DNDC model, including DNDC-Rice, and the applicability using these models to explore mitigation options.

The Group discussed the importance of integrated farming systems a cross-cutting issue that combines paddy rice, other crops and livestock, which is the common practice with small holder farmers across the region. Single models do not allow for the whole system to be considered in this way, few participants in the Paddy Rice Research Group use a specific model to identify the best mitigation options for paddy rice management. The Group discussed using a life cycle assessment (LCA) approach to better cover whole systems, although the Alliance does not include LCA at this time. However, if the Group feels this is an important area that should be included in the Alliance, there may be an opportunity to reconsider this in the future.

COUNTRY REPORTS

Each country was given the opportunity to update the Group on research activities that have taken place since the last meeting of the Group (Los Baños, 22-23 January 2013) and new opportunities or funding that can benefit the work of the Alliance.

China

- Draft measurement standard for paddy rice is being internally reviewed
- Updated greenhouse gas emissions data for rice paddies included in China's second national communication
- Training for measurement methodologies
- Funding provided for new projects:
    - Carbon and nitrogen exchange using the rule and control method in valley ecosystems
    - Carbon sequestration and emissions mitigation assessment including demonstration programme
    - Improved technology for monitoring and control
- Rice projects
    - Atmospheric pollution by crops
    - Comparison of CH_4 emissions across:
        - water management systems
        - fertilisers (organic and mineral)
        - increased CO_2 and temperature conditions

Indonesia

Strategies for emissions reduction from rice cultivation:

- Expansion of rice production to marginal land areas eg. peat soils
    - research in peat soils from 2006-2009 comparison of rice cultivars and ameliorant options
- Jakenan trial in 2011
    - transported soils on-site for experiments
    - emissions reductions found across all options, except when including rice straw.

    - increased yield.
- Comparison of cultivars – looking for low emitting varieties
- Comparison of crop management systems
    - conventional, intermittent flooding, continuous flooding.
- Minimising constraints to mitigation technology options
    - comparison of mitigation techniques across ecosystems and management practices
- Future work
    - develop low cost technologies for each ecosystem
    - Develop accurate MRV metrology

Activities to mitigate greenhouse gas emissions from wetlands:

- Effect of biochar from agricultural waste when used in low land and low acid soils
- Comparisons between biochar and compost – lab trials in pots
    - Lower emissions from biochar
    - Reduced yield is using biochar only.

Adaptation and mitigation activities:

- Improved fertiliser application
- Water management, depending soil type and flooding conditions
- Use of low emission varieties
- field management systems
    - dam water flow
    - plant high yielding rice for market alongside lower yield local rice with preferred flavour for local consumption
    - other crops grown in raised beds alongside paddies

Japan

Research priorities:

- Developing feasible mitigation options, particularly through the management of water and straw
- Scaling up of mitigation options to identify the potential at the national level
- Improving national inventories using the model 'DNDC-Rice'
- Promoting international collaborations to apply agricultural clean development mechanisms (CDM) to paddy rice.

Current and planned research projects:

- Research identifying appropriate mitigation options
    - prolonged mid-summer drainage (completed)
    - improving soil drainage
    - rice straw compost (common local practice) and manure compost compared for emissions

    - minimum or shallow tillage
- Modeling
    - further revisions of the DNDC-Rice model
    - Tier 3 calculation of national inventory
- Life Cycle Assessment (LCA) and implementation of carbon trading schemes
- GHG emissions under future atmospheric CO_2 and temperature
    - Increased concentration of CO_2 across the test site
    - Increase in yield if cultivar has a large sink capacity (shown through and increase in spikelets per panicle or grain size).
    - two favoured cultivars have lowered methane emissions as well
    - Further experiments will see if this result is related to root biomass.
- International collaborations
    - MIRSA
    - Other projects underway with: Thailand, China, Philippines, Vietnam, Indonesia, Bangladesh.

Philippines - IRRI

Current research activities:

- rice systems in South-East Asia, adaptation and mitigation
- Measurement of total emissions from paddy fields
- Development of new rice varieties
- Development of CDM methodology (includes AWD)
- Assessing mitigation options in smallholder farms
- MRV guideline development
- Mitigation projects funded through CCAFS
- Adaptation activities include burning of straw, etc.
- Climate –informed Crop management programme, recommends specific management options for farmers
- Alternate wetting and drying – research into mitigation potential and methodologies
- Collaborations with projects and partners across South-East Asia

Eddy Covariance Research:

- CH_4, CO_2 and N_2O fluxes measured from fields
- IRRI is one of 92 sites in the ASIA FLUX network, sits under the worldwide FluxNet
- 2014 Asia Flux meeting to be hosted by IRRI, Paddy Rice Research Group invited to participate and develop relationship between groups.
- Eddy covariance towers were primarily developed for forestry, now moving into rice, other crops and grazed livestock.

Pakistan

- 230,000 hectares of land under rice
- Limited water available for crop production so there is a shift to dry land rice systems
- Cultivation in two main provinces Punjab and Sindh

Current Research:

- Research into hybrid rice production CMS system and manual
    - Identification of CMS lines, crossing local varieties to high yielding cultivars
    - hybrid rice varieties
    - dry rice management systems

Thailand

- 10 million hectares of rice, mostly rainfed with some areas of irrigation
- 23% of total emissions from agriculture with 60% of this attributed to rice emissions

Current research activities:

- Emissions from different cultivar and straw management options compared
- Planting methodologies
- Organic fertiliser management
- Water management
- Evaluating the carbon footprints of major rice production systems – completed in 2013
- Water management and fertiliser application at farmer level (2014-2015)
- Carbon footprint of upland rice and flooded rice terraces
- Seasonal variation of emissions across a range of rice varieties

Adaptation and mitigation research:

- Using crop modelling to predict the effect of increased CO_2 levels on rice, which saw increased yield
- Using weather models to predict rainfall, could see an increase in rain fed rice in Thailand
- Identifying feasible adaptation strategies under climate change
    - trialling different rice varieties
    - fertiliser management options
    - water management options

Vietnam

Research activities underway:

- Climate change impact assessment including economic evaluation
- Environment modelling (DSSAT, DNDC, erosion and pollution transfer)

- Greenhouse gas measurement estimation to identify appropriate mitigation solutions
- Bio fertilisers, biochar
- Agro-climate and CHG database information
- Management of biodiversity and invader species
- Several projects on mitigation and adaptation

International Collaborations:

- New project with Bioforsk (Norway) "Climate change and impacts on rice production in Vietnam: pilot testing of potential adaptation and mitigation measures (2013-2015)"
    - Climate-smart rice farming
    - Focuses on policy options and management practices
    - alternate wetting and drying practices, fertiliser input, rice straw biochar etc.

Latin American rice research

- Findings from the Montevideo workshop
- All countries are measuring Greenhouse gas emissions from rice
- Water management is being looked at as the main mitigation (and adapation) option.

ACTION PLAN DISCUSSION

Standardisation of Measurement Techniques

Each country was asked to present a summary of the measurement techniques and methodologies used in their home countries/institutes so as to form an understanding of common protocols and reasons for any differences. Differences in techniques may occur due to agricultural practices, environmental conditions or resources available; this includes both numbers of researchers and the materials/ equipment that can be sourced for a project.

Presentations from China, India, Indonesia, Japan, Thailand, and Vietnam are available as PDFs on the Alliance Website. The presentations include detailed methods, calculations and technical information that is not captured in this summary report.

Framework for the standardisation protocol

Items to be included in the standardisation protocol

1. Field design
    a. Plot size
    b. replication
2. Chamber
    a. Size of chamber and the number of hills covered
    b. Placement of the chamber, permanent base
    c. Fan, pressure, buffer

3. Gas collection
    a. Sampling intervals
    b. Sample collection bag/bottle
    c. storage
4. Measurement sampling
    a. Time of day
    b. Seasonal intervals
5. Analysis
    a. GC and gas standards
    b. Seasonal emission rate calculation
6. Additional data
    a. Climate
    b. Soil
    c. Rice variety

Additional comments

7. Statistical base is needed
8. Purpose of measurements
9. QA/QC of the data

Next steps and future actions

The framework as outlined above will be included in the meeting report and circulated for further comments to Group participants who were not able to attend the meeting. The first draft of the guidelines will be developed by Japan as the activity coordinator with all members providing country contributions. Indonesia, KIIT University - India and scientists from IRRI are all willing to contribute to the first version.

The framework will be considered a living document that should be added to by new members or considered for revision by the Group periodically.

Multi country experiment - MIRSA

Dr Yagi provided an update on the Greenhouse Gas Mitigation in Irrigated Rice Paddies in Southeast Asia (MIRSA) project to identify water management options across sites in Indonesia, Vietnam, the Philippines and Thailand. The one year pilot project (MIRSA 1) was conducted by IRRI during 2013 with funding provided by the Japanese Ministry of Agriculture Forestry and Fisheries. The five year project (MIRSA 2) has now begun holding a kick off meeting 2-4 October at Hue University of Agriculture and Forestry, Vietnam. MIRSA 2 will be coordinated by the National Institute for Agro-Environmental Sciences (NIAES), Japan and will involve researchers and field measurements from all four participating member countries.

The project aims to improve water management options based on alternate wetting and drying (AWD) practices, with a 30% reduction of combined emissions from N_2O and CH_4. Each participating country will compare convention water management practices alongside two or three variations of

AWD. The experiment will also measure any changes in soil carbon that may occur over the five year period.

Technical backfilling of field observations will be conducted at IRRI, the Philippines with NIAES formulating the measurement, results and verification (MRV) guidelines. The MRV guidelines developed will be based on similar guidelines developed by the Japanese forestry department and will be published once finalised. All results from the MIRSA project will be shared with Alliance members and other Research Groups. The Latin American Sub-Group are interested in undertaking a complementary project based on MIRSA methodologies across the region. This project will be discussed further during the 2014 meeting.

Databases

A new proposal from Japan was put before the Group to develop a database that compiles metadata from experimental sites throughout the world where greenhouse gas fluxes are monitored, based on the Croplands Research Group Managing Agricultural Greenhouse Gases Network (MAGGnet) activity. This database would combine and replace the revision of the Alliance stocktake which the Group had planned to complete for rice research and the literature/expert database that was being developed. The spreadsheet for each experimental site would capture information about the experiment aims and methods, researchers and organisations involved and include specific site information (e.g. soil type, rainfall, rice cultivar).

As an example of how the completed spreadsheet could be filled out, activity data for the MIRSA 2 project was included in the database. The Group was asked to identify further information that should be included. The purpose of the database is to exchange information among Alliance members, but there are opportunities to undertake some analysis on the information listed. The database is initially intended to capture published information, but significant research papers and reviews should be included to form a complete picture for researchers new to the field. There is the possibility to include papers from national publications or government and policy reports

Japan will develop the first version of the database including the Paddy Rice Research Group requirements. If the Croplands Research Group permits the MAGGnet database will be distributed alongside for comparison. All participants should then consider further modifications that would make this database appropriate for paddy rice.

Mitigation and Adaptation Synergies

An outcome from discussions at the 2013 Alliance Council meeting was that Research Groups would identify ways to promote adaptation and mitigation synergies within the work of the Alliance:

1. Research Groups to conduct a review of mitigation and adaptation synergies in their workplans.
2. Create specific Networks in each Research Group to promote synergies between mitigation and adaptation.

The Group was asked to consider how they would respond to these two requests from the Council, and encourage activities on adaptation and mitigation synergies. The Group first looked at the

current work plan to see which activities are already aligned with these requests. The MIRSA project in particular on water management was seen to have very strong links to water management research undertaken for adaptation purposes. The Group developed a list of synergistic research areas:

- Water management
    - saves water
    - flood control through irrigation & drainage systems
- Cultivar selection
    - Identify heat, drought, salt, submergence tolerant varieties
    - shorter cultivation period
    - higher yield under increased CO_2 levels
- Fertilizer management
    - nitrogen management, including slow-release fertilizers
- Integrated rice (crop) -livestock systems
- Cropping pattern or calendar
    - rotation from multi-rice to introduce upland crop
    - changing crop calendar

A discussion on the meaning of adaptation and the aims of the Alliance noted that while adaptation is the main area of research for all countries present the focus of the Group needs to remain on management of rice systems. Wider adaptation aims such as, economics, no waste practices, pest management and local knowledge should be considered only as they relate to rice production. The Group agreed that adaptation activities benefiting mitigation options should be considered within scope.

The Group agreed to consider the discussion of adaptation and mitigation activities and the review of current activities underway in the work plan within the Network created. The points above will be considered a frame work for the network. Following the meeting the frame work will be revised and circulated to all members for comment. Vietnam, with the support of Indonesia and Dr Adhya from India will coordinate the development of this framework, and all members will be asked to contribute country case studies. The network will also coordinate identification of activities with CCAFS who are already undertaking work in this area.

Other Activities

The Co-Chair proposed that cultivar selection as a mitigation option should be considered by the Group as a future activity; this would also be another area where there are great synergies with adaptation. All members of the Group have research underway to identify high yielding rice varieties that will perform well under projected climate change. The database activity as discussed above will be the first step in identifying participants for this activity who are undertaking trials of cultivars already.

FUTURE ACTIVITIES

The final discussion identified options for the next meetings of the Group. The Group will host a scientific symposium "Mitigating greenhouse gas emissions from rice paddy soils" at the 20th World Congress of Soil Science in Jeju, Korea, 8-14 June 2014. Group members were reminded that abstract submission deadline is 30th November 2013. (http://www.20wcss.org/).

The Co-Chair noted that although the Group had discussed next meeting in Korea alongside the World Congress of Soil Science and holding a joint meeting with the Croplands Research Group there are some logistical difficulties with meeting alongside the congress. Members of the Group were also concerned about the cost of attending the congress itself.

A second meeting possibility raised was the opportunity to meet alongside and AsiaFlux workshop to be held at IRRI, Los Baños, the Philippines during August 2014. The Group was in favour of this suggestion over the meeting in Korea. The Co-Chair will be in contact with the Group regarding the next meeting after a discussion with the Croplands Research Group Co-Chairs.

The next meeting of the Latin American Sub-Group will be hosted by CIAT in early 2014 as agreed to by the members during the Paddy Rice Research Group workshop in Montevideo, Uruguay earlier in the year.

As the meeting was brought to a close the Co-Chair and secretariat reminded all participants that bottom up action is required from the Research Groups. All members should be reporting on the outcomes of research group meetings to their Council representatives or Alliance contact persons, and sending a copy of the meeting outcomes. Members should also request outcomes of the annual Council meetings from their representative if they do not already receive this information.

Dr Kazuyuki Yagi then brought the meeting to a close and thanked all participants for their input and attendance. The meeting hosts from the Indonesian Agricultural Environment Research Institute were thanked for their expert hosting and support during the one day meeting.

SUMMARY OF OUTCOMES AND ACTION ITEMS

Measurement Standardisation:

- Standardisation framework slide to be included in the meeting report, and circulated to others for comment.
- The framework will be open for revision and future versions as required.
- Version one will be developed by Japan as coordinator. The draft will be circulated to all members for input.

Greenhouse Gas Mitigation in Irrigated Rice Paddies in Southeast Asia (MIRSA):

- MIRSA 1 a one year pilot study conducted by IRRI in 2013.
- MIRSA 2 will be a 5 year project (2013-2018) coordinated by NIAES
    - The research activities are implemented in member countries: Vietnam, Indonesia, Philippines, and Thailand.

- Results to be distributed through the Alliance.
- Guidelines for MRV will be published once finalised

Databases and Stocktakes:

- Development of a rice database input spreadsheet based on the MAGGnet spreadsheet
- This database will combine literature and expert database information and the project stocktake activities
- Japan to develop first version modified for Paddy Rice
- Group participants should review the database and contribute.
- Japan to get the Croplands Research Group's approval for distributing the MAGGnet database for information.

Mitigation and adaptation synergies

- Revision of the slide and adaptation synergies for circulation to members
- Discussion from the meeting will form the framework for the network, the review of synergies will continue within the network
- Vietnam, Indonesia and India with the support if IRRI will coordinate the initial development of the framework and country case studies.

New Activities:

- Rice cultivars as a mitigation option
- Identify data on cultivation selection, using database project information

Member Country Resourcing:

- Bottom up action is required – members should send reports and summary to Council representative, with request for resourcing to attend next meeting and participate in activities

Next Group Meeting:

- Latin America early 2014 hosted by CIAT
- Asia location to be decided:
    a. Alongside the 20th world congress of soil science at Jeju, Korea. Jointly held with the Croplands Research Group.
    b. Alongside the AsiaFlux workshop in August 2014. Hosted by IRRI, Los Baños, the Philippines.

APPENDIX 1: Participants List

Country	Attendees
Alliance Member Countries	
China	Yunfan Wan, IESDA, CAAS (wanyunfan@ami.ac.cn)
Indonesia	Prihasto Setyanto, Indonesian Agricultural Environment Research Institute (Prihasto_Setyanto@yahoo.com) Dedi Nursyamsi, Indonesian Agricultural Environment Research Institute, (ddnursyamsi@yahoo.com) Miranti Ariani, Indonesian Agricultural Environment Research Institute (miranti.ariani@yahoo.com)
Japan	Kazuyuki Yagi, NIAES (kyagi@affrc.go.jp) Kazunori Minamikawa, NIAES (minakazu@affrc.go.jp) Shigeto Sudo, NIAES (ssudo@affrc.go.jp) Takayoshi Yamaguchi, NIAES (ladakh2008@affrc.go.jp)
Thailand	Kingkaew Kunket, Bureau of Rice Research and Development (kkkunket@yahoo.com; kingkaew@brrd.mail.go.th) Chitnucha Buddhabun, Prachinburi Rice Research Centre (chitnucha@brrd.mail.go.th; chitnuchab@gmail.com)
Viet Nam	Ha Pham Quang, IAE, VAAS (haphamquang@fpt.vn)
Secretariat: Deborah Knox, New Zealand Ministry for Primary Industries (deborah.knox@mpi.govt.nz)	
Invited Participants	
IRRI : Maricar Alberto, International Rice Research Institute (m.alberto@irri.org)	
Tapan K. Adhya, KIIT University, Bhubanswar, Odisha, India (adhyas@yahoo.com)	
Muhammad Anwar, National Agricultural Research Council, Pakistan (muhammadanwar1964@gmail.com)	