



Council for Partnerships on Rice Research in Asia
20th Annual Meeting
Summary Report
October 25-26, 2017

Leaders of the national agriculture research systems of 12 major rice producing and consuming countries in Asia, with IRRI, gathered together for the 20th annual meeting of the Council for Partnerships on Rice Research in Asia (CORRA). The NARS of Taiwan and Singapore also sent participants to observe in the meeting. The meeting was held in Songdo, South Korea on October 25-26, 2016 and hosted by South Korea's National Institute of Crop Science – Rural Development Administration (NICS-RDA).

Opening Session

The meeting was called to order and started with a round of self- introduction by all the participants. RDA Deputy Administrator, Dr. Seung-Yong Ra together with NICS Director General Dr. Young Hee Lee and the Director General of Central Area Crop Science, Dr. Kyu-Seong Lee, welcomed the CORRA members and observers. Dr. Matthew Morell, IRRI Director General, shared in his welcome remarks that the CORRA remains as a useful mechanism to share information, ideas and aspirations of the member countries. Collaboration and information exchange is especially relevant in the face of natural and man-made challenges to agriculture, food security and the environment and the decreasing investment support for rice research. Together with Dr. Kyu Seong Lee, Dr. Matthew Morell chaired the first session.

The first session included the reading for approval of the agenda of this year's meeting and the transcript of the minutes of the 19th CORRA meeting held in Bekasi, Indonesia last year. Both were approved after brief deliberations. The matters that arose from the minutes of last year's meeting were also quickly discussed and approved (see Annex I for the meeting agenda).

Session 2: Key Developments in CORRA Member countries

CORRA representatives presented key updates, developments and challenges in the rice sector of their respective countries. Members from Southeast Asia and South Asia shared similar challenges and priorities including:

- the development of low input and simple but effective management technologies to improve crop productivity,
- improved varieties with resistance against biotic and abiotic stresses,
- improved postharvest technologies, value chain interventions, further capacity building and the like.

East Asian countries – Japan, South Korea and Japan – shared similar concerns for rice by-product development and strategies to cope with declining rice consumption amidst rice self-sufficiency. Use of advanced genetics and biotechnology for improved production, resistance and nutrition in rice is also a concern (see Annex II for a summary of the presentations and the CORRA website, <http://corra.irri.org/documents/country-presentations> for the presentations).

Session 3:

The third session centered on global developments in rice R&D and featured 5 presentations on developments and updates about economic and technological subjects that were identified as important in the CORRA work plan (see 2016 folder in <http://corra.irri.org/documents/irri-updates>). The first presentation, by Ms. Sook-Hee Baek, Managing Director, Department of Socioeconomic Development, focused on Korea International Cooperation Agency (KOICA) priorities which includes agriculture and rural development, particularly in developing countries like Cambodia. This was followed by Dr. Sam Mohanty's (Head, Social Sciences Division, IRRI) update on the trends and the factors affecting global trade in rice. The third presentation, by Dr. Bas Bouman (Director, CGIAR Research Program - RICE) informed member of the latest developments of CGIAR program on rice called, RICE which was also presented during the 19th CORRA meeting when RICE was still in the proposal phase. The discussion this year expounded on the features of the RICE CRP including the involvement of the CORRA member countries in some, if not all of the components of the program. The question of CORRA's role in the phase 2 of GRiSP or RICE was also discussed. The CORRA serves as an advisory council to GRiSP. In its phase 2, GRiSP or RICE, is described as bound by the particularities of the CGIAR requirements. GRiSP on the other hand, is envisioned to evolve to be a global partnership platform of rice research institutions and stakeholders around the world, that is event-driven, open and inclusive and maybe, similar to the now defunct Rice Committee under the FAO. CORRA's functions and roles align more with the envisioned GRiSP network, albeit, it can be decided that, presently, CORRA will remain as an advisory council to RICE.

Engr. Martin Gummert, (Head, Postharvest Unit, IRRI), provided an overview on the Status of Mechanization and advances across Asia which had previously been identified by CORRA members as a priority and included in the work plan developed during the 19th meeting. Mechanization in the context of rice farming relates to the process of introducing machines or equipment to do work. Aspects of the process include the types of technology for mechanization (from simple to sophisticated), related systems that are responsible for the delivery/development of the machines (fabrication and distribution networks), the steps in the production system that can be mechanized, support services and policy. Several kinds of equipment/machines are used in each stage of rice crop production (e.g. laser leveler during land preparation, seed drill during crop establishment, bubble dryers during postharvest). There are various drivers of mechanization such as labor shortage, cropping intensification, quest for food safety, etc as well as benefits including opportunities it opens like mushroom production (to manage rice straw). Countries across Asia can be categorized by whether they are fully, partly or only starting to mechanize. Japan and South Korea for example, are fully mechanized, whereas Thailand and Vietnam are only partly mechanized in farming operations. Engr. Martin Gummert shared the lessons from projects on introducing machines, specifically the combine harvester in Vietnam and Cambodia where adoption has many similarities but also differences. For example, Cambodia's trajectory of adoption took only 7 years compared to Vietnam's 17 years. Countries can learn from each other in this regard and thus avoid the mistakes and pitfalls experienced by countries. This is especially relevant for CORRA member countries as a regional network that can exchange leanings and transfer technologies to each other. Moving on, he shared ongoing initiatives in the region, with bilateral partners, and some country strategies for mechanization (e.g. Philippine DA's farm mechanization program). IRRI's mechanization program in RICE and GRiSP was also mentioned. Looking into the future, the speaker pointed to the use of drones and 3D printing as potentially shaping the direction and impact of mechanization. A proposal to the Asia Pacific Economic Cooperation (APEC) body was also shared.

Dr. Bouman delivered the last presentation on the Sustainable Rice Platform (SRP). Convened by the United Nations Environment Program and IRRI, SRP is a multi-stakeholder global alliance among 54 institutions representing governments, private sector actors, NGOs and the international research community. SRP promotes the use of sustainable practices across the rice value chain from production to marketing. On the production side, technologies that are proven to be sustainable such as the use of alternate wetting and drying (AWD), conservation agriculture (CA), etc. are promoted. On the marketing side, farmers' products are required to pass sustainability tests and branded to command higher prices from partner market institutions like Mars and Kellogg's. The challenge is the creation of a globally valid set of principles and standards that will allow for the specificities of local implementation. The SRP has narrowed the hundreds of requirements posed by the different stakeholders to around 46 in 8 different dimensions. A set of quantitative indicators spanning economic, social and environmental dimensions is being tested. The next steps of the SRP will see the continuation of field testing of the standards developed as well as its roll out. Research is planned to develop field calculators for SRP, a handbook of approved practices and models for passing benefits to farmers through the value chain. He concluded by saying that farmers' uptake of sustainable practices and the transformation of rice value chains are needed to achieve sustainable food systems. This can only be achieved through a broad-based, scaled up responses that do not leave anybody behind.

Session 4: Next Steps and Closing

The business meeting session where plans for the future of CORRA were discussed including IRRI's ASEAN +3 proposal, the venue of the 2017 CORRA meeting, potential topics for discussion in the 2017 meeting, the promotion of the SRP among members, a review of the CORRA Terms of Reference and the CORRA Declaration to support the ASEAN + 3 proposal. Dr. V. Bruce Tolentino (Deputy Director General- Communication and Partnerships, IRRI) and Dr. Matthew Morell, presented IRRI's ASEAN+3 Call to Action and called on the CORRA members to support this initiative. The Call to Action is a proposal to ASEAN to develop a regional collaborative partnership platform on genetics, rice breeding and capacity development. In the words of Dr. Morell, it is a platform that allows "pre-competitive collaboration while respecting national interests, mechanism to increase investment in rice research and capacity building and a way to work together more closely to meet common challenges." As a breeding platform, the vision is for countries to work together with IRRI on a multilateral collaboration on developing core technologies and capacity building while working bilaterally with IRRI on more specific national breeding objectives. The areas for breeding work include any or all of the following: germplasm exchange, multi-environment trials, informatics, genotyping and marker assisted selection, novel traits and stacks, gene bank mining, consumer traits and hybrid rice. The next steps of this proposal will involve consultations with individual country members of ASEAN and relevant CORRA members. Dr. Tolentino presented the ASEAN+3 call to action as a 10-point agenda which ASEAN can promote and support. These include:

1. Accelerate introduction and adoption of higher yielding rice varieties.
2. Strengthen and upgrade rice research and breeding pipelines.
3. Accelerate research on world's thousands of rice varieties to exploit the vast reservoir of untapped knowledge within the rich diversity of rice.
4. Develop a new generation of rice scientists for both public and private sectors.

5. Bring about an agronomic revolution in Asian rice production to reduce gaps between potential and achieved yield.
6. Accelerate the delivery of new postharvest technologies to reduce crop losses.
7. Reform policy to improve the efficiency of input and output marketing systems.
8. Increase public investment in agricultural infrastructure.
9. Strengthen food safety nets for the poor.
10. ASEAN+3 must work together and with IRRI to finance and implement the ASEAN Rice Breeding Initiative (ARBI) and the ASEAN Agricultural Innovations and R&D Fund (AIRDF).

The ASEAN+3 Call to Action was presented to the CORRA as a set of propositions that CORRA can support and promote to members' respective ministries of agriculture and related stakeholders. At the end of the meeting the CORRA Secretariat drafted a Declaration based on the CORRA members expression of support for the Call to Action. After some deliberation, and back and forth from the members and the Secretariat, a formal declaration was completed and circulated to CORRA members. The final version of the Declaration reads as follows:

“COUNCIL FOR PARTNERSHIPS ON RICE RESEARCH IN ASIA
DECLARATION
20th CORRA Annual Meeting
25 October 2016
Songdo Incheon, South Korea

“The Council for Partnerships on Rice Research in Asia,

“A body composed of representatives of national agricultural research and/or extension systems (NARES) from 16 member countries in Asia and IRRI;
Whose main objective is to guide, facilitate, support and strengthen the partnerships among NARES and between IRRI and the NARES;

“Through its 20th Annual Meeting on 25 October 2016 at Songdo, South Korea;

“Appreciates the rice sector status reports presented by each of the countries participating in the CORRA meeting, noting the importance of collaboration and partnership in resolving the issues and challenges identified in the country reports.

“The 20th CORRA meeting declares full support for the 10-point Rice Action Agenda for ASEAN+3 proposed by the International Rice Research Institute as follows:

“1. Accelerate the introduction and adoption of higher-yielding and superior-quality rice varieties;

- “2. Strengthen and upgrade rice research and breeding pipelines to respond to environmental variability due to climate change, and other challenges;
- “3. Accelerate research on thousands of rice varieties in the world to exploit the vast reservoir of untapped knowledge within the rich diversity of rice;
- “4. Develop the new generation of rice scientists (for both public and private sectors) and farmers;
- “5. Bring about an agronomic revolution in Asian rice production to reduce gaps between potential and achieved yield, and increase sustainability of rice farming systems in the face of a changing climate and other challenges;
- “6. Accelerate the delivery of new postharvest and mechanization technologies to reduce crop losses and increase efficiency;
- “7. Reform policy to improve the efficiency of input and output marketing systems through the use of technological innovations (e.g., GIS);
- “8. Increase public and private investment in agricultural infrastructure;
- “9. Strengthen food and nutritional security and safety nets for all consumers with a particular emphasis on the poor;
- “10. ASEAN+3 must work together with IRRI to finance and implement the ASEAN Rice Breeding Initiative (ARBI) and the ASEAN Agricultural Innovations and R&D Fund (AIRDF).

“In support for the 10-point agenda, CORRA members will promote the same in their respective Ministries of Agriculture and relevant national institutions.

“Moreover, CORRA declares continuing support to the research programs and strategies of IRRI, especially the CGIAR Research Program on rice or RICE.

“CORRA will continue to serve as an advisory council to the CGIAR Research Program RICE, providing feedback on the national rice R&D priorities and needs for each member country; identifying common regional concerns and their technological and policy solutions; and, participating actively in the sharing of information and inputs for the successful implementation thereof.

“CORRA will continue to identify opportunities to develop collaborative programs, initiatives, and activities that align national rice R&D activities with RICE programs;

“CORRA will continue to identify topics for and organize special forums to identify issues of common concern, provide updates on technology development, and assist in the development and oversight of joint initiatives.

“CORRA will review the progress of these commitments and update members on the items enumerated above at the 21st Annual Meeting in China in 2017.”

Venue of CORRA 2017

Dr. Cheng Shihua (Director General, China National Rice Research Institute) offered to host the 2017 CORRA Meeting in CNRRI in Hangzhou, China next year. CORRA members applauded the offer in appreciation and approval. The CORRA Secretariat will coordinate directly with CNRRI (through Dr. Luo Ju, Officer, International Cooperation, CNRRI) for the preparations of the 2017 meeting.

Mechanization Event in 2017

A clarification on the possibility of organizing a meeting on Mechanization where CORRA members can attend was also raised. Engr. Gummert mentioned that discussions on these are still ongoing and being finalized and funding is still an issue. There's a targeted event probably in May or April in Bangkok or Germany but discussions are still ongoing. An update will be provided to CORRA members.

Topics for CORRA 2017 Meeting

It was agreed that the Secretariat will communicate with each of the members to request for a set of topics for discussion in the 2017 meeting in the next few months.

Promotion of the Sustainable Rice Platform

CORRA members were invited to be part of the SRP and to share information on SRP among partners in their respective countries. Ms. Michele Weldon (Head, Partnerships and Development Office, IRRI) announced that there's a meeting in Singapore on December for those interested to attend. Dr. Bouman shared the web page of SRP (sustainable.rice.org).

Revisions in the CORRA TOR

With the conclusion of the Global Rice Science Partnership and the commencement of the CRP-RICE, it was proposed that the TOR of the CORRA be changed to reflect the support of CORRA to RICE. Another change in the TOR is in the area of financial support (section VII) where mention of IRRI paying an honorarium and other entitlements to invited resource persons, was deleted. This will allow IRRI through the CORRA Secretariat greater room to either provide or not provide support depending on fund availability.

Vote of Thanks and Closing

Dr. Young Hee Lee thanked everyone who attended the meeting including the chair persons, rapporteurs, and organizers. He appreciated the productive meeting and sharing of experiences and updates on technologies and programs on rice R&D. He expressed hope that this meeting further enhanced international cooperation and the belief that CORRA will continue to play a strong role in facilitating this. Dr. Morell congratulated members for the meaningful and high caliber discussions and exchange of views and found it noteworthy that there are many common issues facing rice R&D across countries. This highlights the shared collective interests of the countries. Furthermore, the sharing of experiences, issues and concerns on rice R&D is particularly valuable for IRRI as IRRI strives to make its programs and research relevant to its country partners and in light of the ongoing effort to craft a 10 year strategic plan for IRRI. He thanked RDA for the extremely well run meeting and looked forward to 20th Annual Meeting Summary Report

equally meaningful discussions informally after the meeting, over dinner. He also looks forward to next year's meeting in China.

The meeting adjourned at 5pm and CORRA members participated in a consultation meeting on IRRI's 10-year strategic plan with Ms. Ann Steel (Head, Strategic Planning Office, IRRI). An update of the strategic plan will be provided to CORRA members during the 21st meeting.

Annex I.

Agenda of the 20th CORRA Annual Meeting

- I. Review and approval of the minutes of the 19th annual meeting in Bekhasi, Indonesia
- II. Update and resolve Matters arising from the minutes of the 19th CORRA meeting
- III. Share key updates on rice sector priorities of each CORRA member country (Session 2)
- IV. Presentations and discussions: Global developments on rice R&D
 - a. KOICA Agriculture and Rural Development Initiatives
 - b. Global situation and outlook on demand and supply of rice
 - c. CGIAR Research Program: RICE (formerly, Global Rice Science Partnership or GRiSP Phase 2)
 - d. Mechanization of Rice Farming across Asia
 - e. Sustainable Rice Platform
- V. **Business Meeting: Next Steps for CORRA**
 - a. ASEAN+3 Call to Action: A Proposal for CORRA Engagement (discuss how CORRA can engage their ministries) and review the declaration of support
 - b. Review of the ToR of CORRA
 - c. Venue of the 2017 CoRRR Annual Meeting
 - f. Mechanization meeting in 2017 (announcement to CORRA)
 - g. SRP promotion of indicators (encourage CORRA to share amongst relevant national agencies)
- VI. **CORRA Consultation: IRRI Strategic Plan**

Annex II.

**2016 CORRA Member Country Reports (13 Countries):
Rice sector priorities, challenges and opportunities**

Reporting countries: Myanmar, Indonesia, Nepal, Korea, China, Laos, Thailand, Japan, Vietnam, Sri Lanka, Philippines, Cambodia, Malaysia

MYANMAR		
Main national rice-sector priorities	Challenges and constraints	Identified opportunities for advantages for Myanmar
<ul style="list-style-type: none"> -Closing gaps on technology, human resources, productivity, and profit -Clear road map -Investment plan -Production of value/quality rice -Upgrading value chain 	<ul style="list-style-type: none"> -Unpredictable effects of climate change -Limited access to improved technologies -Weak extension & education system -Limited access to financial services _ Limited facilities for postharvest and processing -Limited infrastructure, (irrigation, power, transport) -Volatility of paddy price poorly integrated value chain -Hamper policies for investments in rural and rice sector 	<ul style="list-style-type: none"> -Rich natural resources, particularly land areas suitable for rice cultivation -Rich diversity of traditional rice varieties with high branding and marketing potential -Fast-growing private sector actively engaged in the rice value chain -Strong potential for increasing rice yield and producing quality rice -Strong interest and presence of development and funding institutions -Ideal geographic location for serving the Asian and global rice markets

INDONESIA		
Main national rice-sector priorities 2017-2019	Challenges	Priorities for collaboration w IRRI
<ul style="list-style-type: none"> -Improvement of rice productivity and crop management in tidal and freshwater (lebak) swamp areas -New rice varieties for upland high elevation -Improvement of rice-based farming systems production technologies, particularly in unfavorable rice ecosystems, including water management and farm machinery development -Pilot testing of rice agro-advisory service / LKP -Crop monitoring and planning support using remote sensing -Capacity building: develop the next generation of rice scientists through sandwich type post-graduate degree training, short-course training at IRRI, and in-country training -Joint publication at international journal 	<ul style="list-style-type: none"> -Population continues to grow over time with growth rate of 1.38%/year -Land conversion (+110,000 ha of rice land per year) -Climate change (unpredictable rainfall) -Labor shortages particularly on the outer island of Java and close to urban areas -Inadequate number of highly qualified and educated extension workers: number of village 72,143 while number of extension worker 58,123 (80%) 	<ul style="list-style-type: none"> -Develop/introduce new elite inbred breeding lines with higher yields, good quality, high nutritional value and tolerance to biotic and abiotic stresses for various rice ecosystems -Develop hybrid rice with pest and disease tolerance -Development of Golden Rice -Develop and improved crop management technologies to reduce yield gaps and improve yield stability -Farm mechanization research and development and the reduction of post-production losses -Studies and analyses to support policy development in the rice sector -Training MS and Ph.D. students in rice research and development

NEPAL

Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI
<ul style="list-style-type: none"> -Breeding high yielding varieties with resistant biotic stress (BLB, Blast and brown plant hopper), abiotic stress (drought and submergence) -Development of hybrid rice and its seed production to increase productivity -Varietal development for different ecosystems and seasons (terai, hill and high hill, normal, spring and boro seasons) -Breeding for fine and aromatic rice (Basmati types) -Development of high nutritional content rice -Development of water management technologies- alternate wetting and drying -Package of low cost cultivation technologies -Increased use of agricultural machineries (combine harvester, mini harvester, zero seed drill machine, etc.) -Training and academic programs for scientists in collaboration with international institutes (short term research visit, MSc, PhD and Postdoc) 	<ul style="list-style-type: none"> -Diverse environments, need site specific varieties -Low productivity of existing varieties -Higher yield gap between research station and farmer's field -More terraced sloppy land: difficult for mechanization -Increased incidence of biotic and abiotic stresses -Poor inputs management -Limited trained human resources -Poor lab facilities e.g. Agricultural Molecular Laboratory, glasshouse and net-house -Limited irrigation facility -Inadequate storage facility -Low Investment for rice research -Weak coordination among national institutions 	<ul style="list-style-type: none"> -Development of hybrid varieties (presently working with Long Ping High Tech China and IRRI) -Spring season as well as fine and aromatic rice out scaling activities (Rice -Self-sufficient Program running at 35 districts) -Training to scientists in rice research especially biotechnologies -Molecular breeding and biotechnology research for quality rice and major diseases resistance e.g. Blast, blight (one recent activity with Bangore University) -Crop management including diseases, pests and soil -Development of climate resilient rice varieties -Tools for small scale mechanization in sloppy terrains

KOREA		
Main national rice-sector priorities	Challenges and constraints	Opportunities
<p>-“Creating New Value for Agro-Industry” to solve current problems of over-stock rice by promoting consumption of rice</p> <p>-Rice flour industry</p> <p>-Smart Farming using ICT</p> <p>-Pet animal industry</p> <p>-Mechanization in upland</p> <p>-Food and medicine using edible insects</p>	<p>-Overstock of rice</p> <p>-Continuous decrease in rice consumption</p> <p>-2-3x higher rice flouring cost compared to wheat</p> <p>-Rice processing industry is small scale compared to wheat</p>	<p>-Execution of strategy to reinvigorate the rice flour industry and to replace imported products (to take advantage of the growing processing industry)</p> <p>-Develop rice varieties conducive to flouring</p> <p>-Develop machines for flouring</p>

CHINA		
Main national rice-sector priorities	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<p>-Rice Germplasm Resources (RGR) Research and New Important Gene Discovery</p> <p>-Innovation of Key Breeding Techniques and Breakthrough Breeding materials</p> <p>-Breeding of high-yield, superior quality, multi-resistance, wide adaptability, suitable for mechanization transplanting or direct seeding cultivation varieties</p> <p>-Development of sustainable, low-cost, high economic cultivation technology including two-decrease one-increase, full- mechanization, Intelligence & information production, high resource use efficiency etc.</p> <p>-Research of integrated plant protection prevention and control technology including establishment of monitoring, early-warning system and diagnosis platform, new biological pesticide etc.</p> <p>-High value-chain adding and safety control monitoring as improving the added value of rice processing & comprehensive utilization level</p>	<p>-Germplasm Resources: Lack of breakthrough germplasm resources for breeding use since 1990S, Low RGR use rate for breeding</p> <p>-Breeding Technology: Functional genomics research and breeding practice separated, few cloned genes used in rice breeding, Lack of breakthrough varieties</p> <p>-Cultivation Technology: Existing varieties are not well adapted to simple easy operation cultivation system; Disconnection of seed, cultivation, plant protection, soil, fertilizer technology Application difficulty of full-mechanization matching technology</p> <p>-Knowledge Transfer: Farmer aging and low education level, Extensive production management</p>	<p>-Functional genomics of important agronomic traits: Genetic and molecular mechanisms of important agronomic traits of rice, Establish high-efficient rice molecular breeding program</p> <p>-Application of hybrid rice technology out of China</p> <p>-Human resources exchange and training MS and Ph.D. students in rice research and development</p>

LAOS		
Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<p><u>Collect and evaluate the rice germplasm</u></p> <ul style="list-style-type: none"> -Evaluate and use of rice germplasm that collected since 1991-2016 for selecting of variety that can be resisted to drought, flood, pest, disease, could produce good grain quality and high yield; -Growing for conservation, regeneration, -Study on Wild rice <p><u>Research and Develop new Rice Varieties</u></p> <ul style="list-style-type: none"> -Rice production technic and farming system -Blast resistance varieties -Adapted to drought and flood situation -Short maturity < 100 days -Study on Aerobic rice; -Resistance to iron toxicity soil -Good quality for consumption (sticky and non-sticky rice) 	<ul style="list-style-type: none"> -Limited qualified research staff -Lack of facility to conduct biotechnology research -Lack of facility to conduct grain quality test 	<ul style="list-style-type: none"> -Training MS and Ph.D. students in rice research and development -Raising rice farmers incomes through value chain research and development -Biotechnology research for improved yields and rice nutrition

THAILAND		
Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<ul style="list-style-type: none"> -Increasing farmers' incomes through increased efficiency of farmers' input application, low production cost technology and low yield losses -Supporting self-sufficient rice production for food security in specific areas -Increasing yield potential and production efficiency -Reducing yield losses and stabilizing yield -Retaining high grain quality -Rice production technology to cope with climate change -Value adding and creating special rice for niche market -Enhance potential capabilities of farmers and farmer organizations 	<ul style="list-style-type: none"> -High yielding variety with multiple resistance and wide adaptability to cope with climate change -Specific quality rice for various products processing 	<ul style="list-style-type: none"> -Training MS and Ph.D. students in rice research and development -Biotechnology research for improved yields and rice nutrition

JAPAN		
Main national rice-sector priorities	Challenges and constraints	Priorities for collaboration with partners
<ul style="list-style-type: none"> -Income stabilization -Direct payment for key farmers -Supply structure reform -Exploitation of paddy field use -Rice for animal feed, traceability -Technological innovation -Cost reduction, high value products -Rice paddy farming system (Direct seeding, rotational cropping, 40% reduction of production/distribution cost) -Rice for animal feed (High-yielding varieties (10t brown rice/ha), Whole crop silage (WCS) rice) -Functionality, processing and safety (High value products, rice for flour, arsenic/cadmium concentration reduction) -Environment and resource management (Heat tolerant rice, ICT based infrastructure) 	<p><u>Rice sector</u></p> <ul style="list-style-type: none"> • Decreasing rice demand (55kg/person, yearly) <ul style="list-style-type: none"> – Feed rice is to increase 10 times (-> 1.1 million ton in 2024) • Ageing rural society, high production cost <ul style="list-style-type: none"> – Labor/cost saving technologies, accumulation of farm land <p><u>Research system</u></p> <ul style="list-style-type: none"> • Management system and technology transfer <ul style="list-style-type: none"> – Strategy setting with industry and academia – Platform for multi-stakeholders' collaboration • Research environment for diverse knowledge <ul style="list-style-type: none"> – Human resource development – Participation in global research networks 	<p><u>Priorities in JIRCAS</u></p> <ul style="list-style-type: none"> • Development of Stress-tolerant Rice <ul style="list-style-type: none"> – Heat, drought, P deficiency and N/P use efficiency • Climate change issues <ul style="list-style-type: none"> – Mitigation (AWD), adaptation (insurance, ICT utilization) • Establishment of effective food value chains <ul style="list-style-type: none"> – Rediscovery of high value rice products <p><u>Participation in “Rice” CRP (2017-)</u></p> <ul style="list-style-type: none"> • Flagship project 2: Upgrading rice value chains • Flagship project 3: Sustainable farming system • Flagship project 5: New rice varieties

VIETNAM		
Main national rice-sector priorities 2017-2030	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<p>-Certified seed will be used in 75% growing area with the seed rate of 80 kg/ha by 2020 and 100% growing area by 2030 in the Mekong delta.</p> <p>-IPM will be practiced in 75% growing area by 2020 and 90% by 2030; Other practices (AWD, SRI, VietGAP and GlobalGAP...) will applied in 50% growing area by 2020 and 75% growing area by 2030 and the amount of used fertilizers and chemicals will reduced 30% by 2020 compared to the current used in the Mekong delta.</p> <p>-Post-harvest loss will be reduced to below 8% by 2020 and below 6% by 2030.</p> <p>-Greenhouse gases emission will cut down 10% by 2020 and 20% by 2030 compared to the current level.</p> <p>-Contract farming should be 20% of the total rice growing area by 2020 and 50% of the total rice growing area by 2030.</p> <p>-Market-oriented breeding programs for both domestic and exports with the emphasis for aromatic and high cooking quality rice</p> <p>-Sustainable rice cultivation and post-harvest technologies</p> <p>-Better use of resources and climate change resilient technologies.</p> <p>-Application GIS technology for rice cultivation and resources management.</p> <p>-Rice market study and trade</p>	<p>-In-adequate research infrastructure and access to upstream technology, especially in the area of gene/genome technologies for more precise breeding program</p> <p>-Climate change challenges, especially salinity intrusion, drought, flooding, pest and diseases greatly affect rice growing</p>	<p>-Breeding program for high cooking quality and climate change-ready varieties.-</p> <p>-Developing packages of cultivation practices for each of cultivation regions.-</p> <p>-Application of GIS technologies for resources and rice cultivation management</p> <p>-Exchange of rice breeding and germplasm materials</p> <p>-Degree and nondegree training for rice scientists</p>

SRI LANKA		
Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<ul style="list-style-type: none"> -Increase yield potential through Breeding (above 13t/ha) -Improve the quality of rice to cater for consumer demand (Eating, Cooking, Nutrition and Health concern properties of rice for local and export market) -In cooperate Major pests (BPH, GM) and Diseases (BLB/ Blast) resistance -Identification of genetic resources and improve of rice varieties for new emerging pests (sheath mites/ Stem borer) -Technology improvement to overcome climate change influences -Sustainable management of input (Fertilizer, agro chemicals, land and water) 	<p><u>Institutional level</u></p> <ul style="list-style-type: none"> -Lack of research facilities to conduct new innovative research -No or few post graduate level qualified researchers for all the disciplines in rice research and development -Poor collaboration with IRRI or other international institution -Low private sector investments in agricultural research and development <p><u>Farm level</u></p> <ul style="list-style-type: none"> -Stagnation in potential yield about 13t/ha -Small farm size prevents adoption of mechanization -High labor wages and scarcity of labor availability -Production costs are very high -Reduced water holding capacity of major and especially minor irrigation reservoirs -Highly variable inception time of monsoon rainfall -Buildup of salinity conditions in major irrigation schemes -Insufficient drying and storage facilities -The guaranteed paddy prices prevailed up to now is not receiving to farmers 	<p><u>Human Resources Development</u></p> <p>Post graduate level (PHD/ MPhil):</p> <ul style="list-style-type: none"> -Plant Breeding and Biotechnology -post harvest and grain quality -Plant protection -Marketing and value addition -Agronomy and physiology -Socio Economics and Extension <p>Short term:</p> <ul style="list-style-type: none"> - one or 2 months training in all disciplines <p><u>Facilities Development</u></p> <ul style="list-style-type: none"> -Support from experts for laboratory development (Biotechnology, grain quality and microbiology etc.) <p><u>Research</u></p> <ul style="list-style-type: none"> -Germplasm exchange for known biotic (BLB, Blast, BPH, Sheath mites) and abiotic stresses -Gene sequencing and mapping of traditional and improved local accessions) for important traits (Yield/ Grain quality/ biotic and abiotic stresses) -Climate change (influence for Drought/Floods/ High and Low Temperature with high Humidity) modeling -Rice grain quality, nutritional and functional properties -Soil health/Soil microbiology -Productivity improvement <p><u>Extension and Training</u></p> <ul style="list-style-type: none"> -RCM and other ICT based facilities

PHILIPPINES		
Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI and PhilRice
<ul style="list-style-type: none"> -High quality seeds distribution -Use of plant food supplements and elicitors -Efficient water and nutrient management -Improved farm mechanization -Promotion of brown rice -Upscaling use of Improved Resource-use -Efficient Varieties 	<ul style="list-style-type: none"> -High transport costs -High postharvest losses -Dependence of farmers on traders for price information -Access to credit/capital market constraints -Poor quality seeds and limited access to HQS -Low fertilizer use efficiency and high cost of fertilizer -Low water use efficiency and high water loss 	<ul style="list-style-type: none"> -Upscaling use of improved-resource use efficient varieties -Training of rice scientists -Cooperation for rice value chain activities in rice hubs and zones -Establishing mechanism for rice growth using plant food supplement

CAMBODIA		
Main national rice-sector priorities 2017-2021	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<ul style="list-style-type: none"> -Accelerating germplasm conservation and utilization -Rainfed lowland: Improving popular varieties for flood, drought and lodging tolerance; for BLB, RB and BPH resistance; and high yielding -Irrigated rice: Breeding for very early maturity with high yielding and quality, heat tolerance, BPH and RB resistance, and high water use efficiency 	<ul style="list-style-type: none"> -Limited human resources and capacity -Limited research facilities including biotechnology -Unclear international markets and strong competition -Limited budget 	<ul style="list-style-type: none"> -Training MSc, PhD and on the job -Conventional and biotechnology breeding for resistance and nutrition value -Breeding for very early maturity Value chain study

MALAYSIA		
Main national rice-sector priorities 2017-2020	Challenges and constraints	Priorities for collaboration with IRRI and other partners
<ul style="list-style-type: none"> -Hybrid rice seed production system -Climate change ready rice variety with high yield -Management of newly emerged pest and disease -Specialty rice with nutritional value -Development of rice farming apps to assist farmers in making decision -Yield increment -Pest and disease resistance for lowering production cost -Application of 'crop management apps' for farmers -Export potential of specialty rice 	<ul style="list-style-type: none"> -Re-developed of screening or selection protocol for newly emerged of pest and disease -Coping with climate change for hybrid seed production -Lack of graduates in genetics, plant breeding and agronomy sciences 	<ul style="list-style-type: none"> -Transfer of technologies in hybrid seed production -Molecular marker for pest and disease resistance and traits of interest -Attachment of researcher for specific varietal development -MSc and PhD : sandwich program