The Irrigated Rice Research Consortium (IRRC)

Phase 4 (2009-2012)

External Review

August 29 through September 10, 2011

Jonathan Banks
Frits Penning de Vries
Urs Scheidegger
Karin Zbinden

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Executive summary

The Irrigated Rice Research Consortium (IRRC) is a multi-stakeholder platform made up by partners from 12 rice-growing countries in Asia and IRRI (International Rice Research Institute). It develops and disseminates innovative technologies for irrigated rice. Initiated in 1997, it is now in Phase 4 (2009 to 2012) of funding by the Swiss agency for Development and Cooperation (SDC). Four experts conducted an external review. It included visits to five countries and IRRI between August 28 and September 10, 2011.

The External Review Team (ERT) concluded that IRRC during its Phase 4 has successfully reached out to farmers. It has further broadened its network, now consisting of 158 relevant partners from public and private sector organizations as well as NGOs. Key partners are National Agricultural Research and Extension Systems (NARES). IRRC went a long way to strengthen partners' capacities.

IRRC has probably already achieved the impact at household and community level that was planned for this phase. Based on many impact studies, it appears that IRRC technologies are presently used by 500,000 to one million farmers, with yield and income improvements of 10 to 20%. Social impact is evident especially where collective action is part of the technology implementation. However, little information on gender and social disaggregation of utilization, costs and benefits was provided.

IRRC has reached over 7,000 persons with its training events, besides on-the-job training of direct partners. Information about the impact of this training on capacity of NARES was not provided. IRRC produced over 50 peer-reviewed publications during Phase 4 and has a good network to link with the scientific community worldwide. IRRC contents are used in several university curricula. IRRC has had remarkable impact at policy level, getting technologies adopted by governments. This is a cumulative effect of the contacts, explanations and demonstrations in the past and continuous engagement in policy dialogue by IRRI together with national staff, with national "champions" playing often a key role.

The organizational principle of IRRC is thematic Workgroups. They are effective platforms for technology development and dissemination. The 'older' Workgroups (productivity and sustainability, water saving, labor productivity and community ecology, past-production) reached important and sound achievements during the Phase. The interaction between the "older" Workgroups has improved, both at site and country level as well as at IRRI. Pilot activities with private sector and NGOs constitute an approach for technology adaptation and out-scaling that merits further optimization. The In-Country Outreach Programs (ICOPs) in Vietnam, the Philippines and Indonesia have become successful platforms for out-scaling and up-scaling of technologies and for integration between the Workgroups, with IRRC playing a crucial role as convener and honest broker at the outset.

IRRC is well integrated within IRRI, allowing for wide and responsive interaction with NARES. Steering Committee members are instrumental for up-scaling of technologies in several countries. Encouraging cross-country learning has occurred during Phase 4 and IRRC has helped to leverage substantial funds from donors other than SDC and to mobilize contributions from its members. Thailand and China participate in the Consortium on their own funds, but this special relationship needs to be more clearly communicated to other partners. Sustainable links with selected NGOs and private sector actors are built pragmatically. Access to IRRC outputs is good and diverse in form, ranging from a newsletter to the computer-based decision support tool Nutrient Manager and extension material produced with substantial farmer involvement (e.g. 'digital green' videos). The Consortium has improved its sustainability, although still dependent on funding by SDC.

Several national partners have enhanced their capacity and are willing to take more responsibility in cross-country learning. The gradual re-orientation of IRRC to South-East Asia during Phase 4 sharpened the focus of the Consortium. Yet, even within SE Asia national priorities vary and this should be better reflected in IRRC's objective system and impact assessment.

The ERT summarized the conclusions as follows: IRRC is an important part of IRRI and GRiSP (Global Rice Science Partnership). It is well on track to achieve many of its ambitious goals. Adoption and impact at farmers' level is evident. NARES see IRRC as a mechanism to integrate technologies, to massively scale them out to farming communities, and to prepare for further up-scaling of interventions. IRRI scientists see in IRRC a platform to get technologies to farmers.

The ERT recommends to continue with IRRC and to prepare for a Phase 5. It agreed on ten main recommendations for Phase 5, which are presented here in the order corresponding to the structure of the Terms of Reference:

1: Fine-tune contents and interaction of Workgroups: Quantify also environmental impact of IRRC technologies; adapt post harvest work to changes in production as promoted by other Workgroups; define the interaction of the crop health Workgroup with others; address also secondary effects of climate change (e.g. shifts in pest problems, salinity).

2: Further strengthen the ICOPs: Clarify their role and modus operandi; foster further integration of Workgroups and technologies.

3: Improve impact assessments to make strong cases: Re-visit studies critically and jointly between natural and social scientists; undertake a meta study on assessments done so far in view of more focusing; broaden triangulation, include national statistical data.

4: Integrate social and natural sciences along the entire research-dissemination continuum to achieve higher impact.

5: Re-construct the aims of IRRC to reflect the individual national priorities and to serve as a framework for impact assessment.

6: Maintain the existing workgroups of IRRC while improving integration of objectives.

7: Re-visit the contents addressed by the workgroups: Establish a lean mechanism to get feedback from users into priority setting of IRRC; make climate change a full workgroup on mitigation and adaptation; include "varieties" in IRRC work wherever there is potential for added value.

8: Transfer leadership of specific tasks from IRRI staff to specific national partners.

9: Maintain the present geographical scope: Continue to focus on SE-Asia; seek stronger collaboration with (and input from) Thailand and China; be prepared to provide consultancy and expertise on Consortium set-up and management.

10: Continue with IRRC, prepare Phase 5, while promoting more adaptive research in-country and scientific follow-up of pilot activities and developing a mechanism to provide guidance to GRiSP on new research issues.

Content

Acronyms

1M5R	One Must-do, 5 Reductions program (Vietnam)
ACIAR	Australian Centre for International Agricultural Research
AWD	Alternate Wet-and-Dry irrigation
CURE	Consortium for Unfavorable Rice Environments
DARD	Department of Agriculture and Rural Development, Vietnam
EBRM	Ecologically-Based Rodent Management
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FSSSP	Food Staple Self Sufficiency Program, the Philippines
GAP	Good Agricultural Practices
GRiSP	Global Rice Research Program
ICM	Integrated Crop Management
ICOP	In-Country Outreach Program of IRRC
IPM	Integrated Pest Management
IRRC	Irrigated Rice Research Consortium
IRRI	International Rice Research Institute
IMOP	IRRC Myanmar Outreach Program
NARES	National Agricultural Research And Extension System(s)
PhilRice	Philippine Rice Research Institute
PRSSP	Philippine Rice Self Sufficiency Program
SDC	Swiss Agency for Development and Cooperation
SSNM	Site-Specific Nutrient Management

1. Introduction

The Irrigated Rice Research Consortium (IRRC) began in 1997 with funding from SDC. It is a consortium focused on lowland irrigated rice-based systems in Asia. The IRRC provides a dynamic international platform for the development and dissemination of innovative production technologies for irrigated rice.

IRRC is facilitated by the International Rice Research Institute (IRRI) and implemented in 12 rice-growing countries in South and Southeast Asia: Bangladesh, Cambodia, China, India, Indonesia, Lao PDR, Myanmar, Sri Lanka, Vietnam, Malaysia, the Philippines and Thailand. This consortium has helped to identify and address problems of each country's irrigated rice production by developing and testing rice-growing technologies and crop-management approaches in farmers' fields. The focus is on more efficient use of resources such as land, labor, water and fertilizer, leading to sustained, environmental-friendly increases in production and increased profitability of rice farming.

Rice is the staple food for 2.7 billion people in Asia, providing 40% of their daily calorie intake. Ensuring sufficient supplies of rice that are affordable for the poor has been a challenge for the past 50 years. The current best estimate is that an extra 60 million tons of rice will be required by 2020 to meet the demand of a growing world population. This represents an annual increase in production of 1.5–2.0% compared with current annual increases of about 1%. The 79 million hectares of irrigated lowlands in Asia represent 45% of the global rice area and produce 75% of the world's rice. Lowland irrigated cropping systems offer the best potential to meet this targeted increase in production, with the IRRC providing an important platform to facilitate multi-stakeholder partnerships and technologies to achieve these increases.

Phase 4 of IRRC comprises the years 2009 through 2012 (IRRI 2008). The IRRC Steering Committee, together with IRRI and SDC commissioned an external review in August/September 2011. The main objective of the review was to assess the progress of the Consortium, the relevance and quality of its research and extension, its set-up as well as the effectiveness of the collaboration it facilitates between NARES, IRRI, civil society organizations and the private sector for sustaining research and extension partnerships in the member countries. In addition, the review was expected to identify areas to strengthen, modify and re-focus.

IRRC is a multi-faceted undertaking drawing on varied sources of funding and expertise. The ERT was often overwhelmed by the complexity and the richness of its activities and approaches. Whenever we asked a critical question, the IRRC team would come forward with still new activities and results. Therefore, suggestions of the ERT may in some cases just reflect the ERT's failure to understand the full scope of IRRC's activities in the short time allocated to the review.

Nevertheless, the ERT considers that these suggestions point out a need of IRRC to consolidate its activities, approaches and findings and to present them more clearly. Such an effort will increase IRRC's effectiveness and impact, as it helps different stakeholders to make even better use of IRRC's outputs. A better and more comprehensive understanding of IRRC will especially benefit the NARES (who need to understand the full scope of IRRC for enhanced cross-country learning), other networks (who may want to learn from IRRC's experiences), donor representatives (who need to inform their agencies), and maybe even IRRI scientists (who will better understand how their contributions feed into an integrated approach).

2. Methodology

The external review included field visits by the team between August 28 and September 10, 2011, while some analysis and most of the writing took place afterwards. The External Review Team (ERT) included:

Urs Scheidegger, Switzerland, head of the ERT, agronomist, seed production, farming systems research, extension networks

Frits Penning de Vries, Netherlands, agronomist, sustainable land and water management, production ecology, crop simulation, climate change impacts

Jonathan Banks, Australia, post-harvest specialist, pest management

Karin Zbinden, Switzerland, social and applied anthropology; social networks, household and development strategies

From the Terms of Reference (Annex 1), the team derived a methodology and a set of questions to be discussed with interview partners (Annex 2). This preparatory work allowed for dealing with the challenges related to the special schedule for in-country visits (Figure 1). IRRI staff involved in IRRC accompanied each of the sub-teams during the country visits. The details of the schedule can be found in Annex 2. The choice of these countries rather than the others from the IRRC was made by the IRRC Coordination Unit to present the ERT with a broad range of cases.

Figure 1: Schedule of the IRRC external review mission 2011

	Reviewer			
Date	Karin Zbinden	Frits Penning de Vries	Jonathan Banks	Urs Scheidegger
29.8.-1.9.	**Vietnam**		**Cambodia**	
3.9. – 6.9.	**The Philippines**			
7.9.-10.9.	**Philippines**	**Bangladesh**	**Indonesia**	

The IRRC Workgroup leaders elaborated a "critical self assessment" of their Workgroups. During preparation of the review, the review team asked for several tables to be completed (Annex 2). All these documents (Annex 8) were useful ingredients to the review process. Reports from the country visits are included in Annexes 3 through 7.

The activities of the review team consisted in:

- Studying the documentation of the Project (IRRC 2010; IRRC 2011; Palis et al. 2010)
- Participating in presentations and discussions with the IRRC team in Los Baños
- Interviews with different stakeholders in the countries mentioned in Figure 1
- Field visits in these countries, including interactions with:
  - Farmers and farmer groups
  - National research and extension staff involved in the activities visited
  - Other partners (including potential ones)
- Preliminary analysis of the findings and development of recommendations face-to-face in the Philippines
- Workshop for verification of preliminary results in Los Baños
- Analysis of the findings via electronic media after completion of all country visits
- Presentation of the results to the IRRC Steering Committee on October 5, 2011 (distance presentation and discussion)

The ERT thanks all interviewees for the time they dedicated to the interviews, their openness, the ideas they put forward and their hospitality. We thank especially the IRRC staff and the Coordination Unit for the excellent organization of the review missions and their continuous support during the review.

3. Achievements and effectiveness

a) Partnerships

Partnerships have evolved considerably in quantitative terms during Phase 4. To the 122 partners at the end of Phase 3, 36 new ones were added (Annex 8). The partner mix is diverse, with public and private sector organizations as well as NGOs present. There are considerably more partners who are predominantly active in extension than there are research partners. This reflects the challenge that in outreach activities a broader range of partners is necessary (and exists in the different countries), some often active only in a few provinces. The institutional landscape for outreach is considerably more complex than for research. The fact that IRRC faced this challenge is evidence for their taking outreach activities serious.

The partners we met during the visits all bring additional capacity and expertise to the joint activities or in other words, it always became plausible why they were on board, even though in some cases they are rather weak. The ERT concluded that IRRC now has an extensive network of relevant partners.

b) Capacity of partners

Over 8,000 NARES partners, farmers and other partners have been trained by IRRC Workgroups from January 2009 to July 2011. Many more people were probably trained, but their attendance of meetings was not reported. More than 170 in-country trainings took place and more than 40 at IRRI in Los Baños. Training of post-graduates was not reported, but some Workgroups mention them in their reports (e.g. 4 PhD students). For more details, see Annex 8.

In addition to training events, IRRC puts a lot of emphasis on on-the-job training, both during country visits and in longer term joint projects at IRRI or in-country. The ERT concluded that IRRC went a long way to strengthen partners' capacity.

c) Development and dissemination of technologies and strategies

Development and dissemination of technologies is primarily done at the level of the different Workgroups. Even though Workgroups made a conscious effort to integrate at the level of the field sites and in country outreach programs, main achievements are reported here by Workgroup.

i. Productivity and sustainability

The plan of this Workgroup for Phase 4 has been "to increase profitability of rice farming by developing and disseminating sustainable nutrient and crop management practices". Under the assumptions that ample scientific knowledge on fertilization and management has accumulated but that most rice farmers have made little use of this knowledge, this Workgroup wants to formulate better targeted applications and make them accessible. In several coherent national programs, better targeted applications of fertilizers and management practices at district level are produced in collaboration with NARES and introduced to farmers. Field-specific advice can even be given with internet based technologies. Better application allows profitability targets to be reached without extra fertilizer or even with less.

The Workgroup has further strengthened and broadened research and extension partnerships, albeit that the research was of an applied nature. This refers among others to

Bangladesh, where a new partnership was created to evaluate Nutrient Manager, and to the Philippines where the Nutrient Manager was promoted among government organizations.

The capacity of several NARES was strengthened, in particular to connect scientific knowledge with practical applications. For instance, in Indonesia, a technical team was established to adapt web- and mobile phone decision tools, and in India, collaboration was established to do the same for that country. Yet, it was observed in all countries that senior experts are retiring in the coming years and too few junior experts are succeeding them, so that (a new phase of) training may be needed.

In addition to encouraging NARES to revise their national fertilizer recommendations to new situations and to bring these into training courses, the new approach (i.e. to give fertilizer recommendations directly to the farmer himself) was actively further developed. This approach allows efficient and effective site and situation specific farming. For this approach, a web-platform has been established for several countries (China, Indonesia, Philippines). The decision tool 'Nutrient Manager for Rice' was placed on a website of China, Indonesia and the Philippines. Furthermore, mobile applications of the Nutrient Manager were developed for the Philippines (mobile phone, smart phone). Finally, a conceptual frame of a web-based program 'Rice crop manager' was developed. While these products are under active development and only the first prototypes are field-tested, they hold much promise for the future.

To disseminate principles and technologies to farmers, videos were developed and released on fertilizer application for the Philippines, and provincial quick guides on the same topic were produced and distributed for 75 provinces. An additional 400,000 copies of the Leaf Color Chart were printed and distributed in many countries. Also the use of the nutrient management information in the Rice Knowledge Bank was promoted in all countries. Finally, an e-learning course for NARES on submerged soils was made accessible through internet to anyone.

It may be considered how the Nutrient Manager can also be used to quantify and communicate environmental impact. It is necessary to investigate whether the intellectual ownership of the computer programs and applications developed under IRRC needs to be claimed, and if so, how.

ii. Water saving

The plan for Phase 4 of this Workgroup is "to reach a million farmers with IRRC-technologies, and provide e-learning materials to NARES", and to continue its lead role to facilitate the Philippines ICOP. Emphasis in the activities was on out-scaling (i.e. reaching more farmers) rather than on up-scaling (i.e. further integration with other technologies).

Research and extension partnerships related to this Workgroup have been strengthened in most countries. This was most noticeable in Bangladesh, Laos and the Philippines. This is reflected in the way they adapted and adopted IRRC technologies.

The Workgroup gave much attention to increasing the expertise of NARES. In the Philippines, for instance, 27 organizations became new partners in the aerobic rice initiative. In addition, 2,230 farmers and 185 staff members were trained in aerobic rice. In Vietnam, the Alternative Wetting and Drying (AWD) system for efficient water use has been incorporated into the 1M5R (‘One Must do, 5 Reductions’) program and training proceeds well. However, feedback from farmers (about problems due to large untimely rains) was not used to formulate new research questions.

Adaptive research by NARES on AWD and aerobic rice was carried out in Indonesia, Laos, Myanmar and the Philippines. This occurs with guidance from the Workgroup and uses much extension material supplied by the IRRC.

The task of this Workgroup to facilitate the Philippine ICOP has lead to a large network of NARES, universities and NGOs and many interactions among all partners.

Even though laser leveling (now under the post-harvest Workgroup) has a major impact on water saving technologies, the interaction with such activities was not observed and should be developed. Also, increased variability in water supply, including rain, could be a theme for further action.

iii. Labor productivity and community ecology

The labor productivity and community ecology Workgroup works on two quite different issues:

- Crop establishment in a labor saving way (e.g. using direct wet seeding with drum seeders) and related changes necessary in weed management (weed community ecology)
- Rodent control through community level Ecologically Based Rodent Management (EBRM)

Labor productivity

Over the past 8 years, the Workgroup has done a lot of strategic and adaptive research on direct seeding and related weed management changes, especially in South Asia. An impressive number of joint publications with national scientists resulted from this work. At the same time, the Workgroup engaged in out-scaling activities, i.e. training of extension staff and farmers, demonstrations and trials.

A series of comparative trials in India showed that direct seeding under farmer management might lead to yield reduction. This is, in many cases, offset by a reduction of labor costs (about US$ 100 per ha) and a yield increase in the subsequent wheat crop. But in many researcher-managed experiments, similar yields were obtained with transplanting and direct seeding. Thus, there seems to be scope for improvement in direct seeding. Farmers first need to learn to manage direct seeding and weeds, together with extension and research.

The largest success of the Workgroup was achieved in the North-West of Bangladesh. There, direct seeding of rice allowed farmers to plant the following *rabi* upland crops earlier, so that crops can be harvested a month earlier, thereby avoiding much hunger and unemployment in a traditionally very difficult period. The ERT visit learned that already some 120,000 farmers made these adjustments and effectively eliminated hunger in their family (Annex 7). The economic benefit to farmers is estimated to be over 400 US$/ha on some 70,000 ha, adding up to an impressive of 28 million US$ per year. The project attracts much attention nationally.

More recently, the Workgroup focused gradually on South-East-Asia. Even though it can build on the experience and lessons learned in South-Asia, new trials and demonstrations, new adaptive research and new problem solving jointly with new national stakeholders will be needed.

In Indonesia, Myanmar and Cambodia, dry and wet seeding options were widely tested and demonstrated. As a result, in Myanmar, 1,200 drum seeders were introduced. In Cambodia, so far only a few dozen seeders were introduced for testing, but there is interest by some NGOs and private sector actors to import them in large numbers.

Solutions for managing weedy rices, which are triggered to some extent by the shift to direct seeding, were developed in Sri Lanka, Philippines, Vietnam and Malaysia, mainly through better information and respective extension material. Yet, this is an issue where further efforts will be needed.

Rodents

The Workgroup managed to study rodent ecology in a number of countries in SE-Asia. This allowed for bundling a series of measures, usually at community level, to control rats. The trap-and barrier system developed earlier is now just used in contexts where severe rat damage is expected and other community-level EBRM (Ecologically-based Rodent Management) measures are not effective enough.

Since the entire village needs to collaborate for rodent control, the Workgroup looked into different ways of reaching out to the population. In the Philippines, a concerted campaign including a media (radio and TV) as well as follow-up by extension was studied. It showed that the media can help to raise the awareness of farmers that rats in the rice field can indeed be controlled (many farmers just gave up and agreed that they had to “share their rice with rats”) and that working together is essential. But only together with support from local leaders and extension staff a change in practices can be achieved, leading to economic benefits for farmers.

Rodent work and EBRM of IRRC has received much attention worldwide and may have the potential to spill-over to Europe, where rodenticide-based control is becoming increasingly difficult.

iv. Post-production

The post-production Workgroup in IRRC Phase 4 works on several different issues:

- Mechanical harvesting, as a means to reduce harvesting quality and quantity losses.
- Seed storage, to give high quality seed for individual farmers.
- Mechanical drying, to improve quality of dry rice and to cope with increased harvesting during wet season.
- Laser leveling, as a means to improve irrigation efficiency and crop evenness to facilitate mechanical harvesting.

While emphasis is on post-harvest issues, the term "post-production" was chosen to accommodate also mechanical harvesting. Overall, the Workgroup focuses on improving in the rice value chain from rice maturity to end use and decreasing losses, with development and understanding of business models associated with the value chain. There is an emphasis on improvements resulting from mechanical engineering, reflecting the inheritance of this Workgroup from previous IRRC Phases. Thus, laser leveling does not actually come within post-production (although it may enhance product quality), but was pragmatically included in this Workgroup as the same staff (from mechanical engineering) is working on the issue.

Changes in the production and harvesting practices will affect post-harvest grain flow. The ERT therefore recommends analyzing the effect of changed production practices such as promoted by other Workgroups on the entire postharvest system (value chain, harvest to end use) and adjusting the work program accordingly.

Mechanical harvesting

The Workgroup and IRRC partners have successfully catalyzed the large scale introduction of mechanical (combine) harvesting in Cambodia. Subsequent to local workshops, demonstrations and other extension activities now typical of the IRRC approach, there has

been rapid adoption of mechanical harvesting in Cambodia, with estimated 2000 harvesters in use or imported for sale (e.g. the Kubota small combine) in the last two years.

These small harvesters enable rapid on-time harvesting, particularly critical in wet season harvesting, with reduced labor costs. It is estimated that harvesting costs have been reduced by 30-40% in Cambodia.

Lao now has 2 mechanical harvesters under demonstration and there are requests from IRRC partners and collaboration in both Myanmar and Indonesia for assistance in introducing combine harvesting there.

The success of introduction of combine harvesting will bring several problems that may need IRRC attention. These include:

- Potential for weedy rice to spread via combine harvested seed
- Sudden and large supply of freshly harvested high moisture paddy
- Soil compaction and disturbance
- Changes in supply of rice straw for farm use and management of crop residues for best soil improvement and minimized emissions
- Optimizing selection of varieties and their management (e.g. planting time, wet season weed management, straw length and strength).

There is now a need to reassess the small scale stripper harvesters introduced some years ago in parts of Indonesia for best performance. Lodging continues to be an issue for mechanical harvesting compared with hand harvesting.

Seed storage

Good quality rice seed is essential for good productivity and profitability. Both germination capacity and vigor are important. Lower planting rates are possible to achieve the same initial crop density. The quantity of crop required to be set aside for seed, not sale or consumption, is reduced. A good storage system allows a producer to retain and use locally harvested seed, avoiding high prices typically prevailing at planting time for purchased seed. A hermetic storage system, the ‘Superbag’, is being promoted by IRRC as a farm level seed storage system. Demonstration and pilot village trials in Cambodia, Indonesia and elsewhere have shown that it is practical and successful in retaining high seed quality from harvest to planting, without losses from insect and rodent pests. Yet, in some cases in pilot use, the benefits of using a Superbag are not immediately clear to farmers and practices are yet to change to realize its potential (e.g. better crop establishment with less seed).

Uptake of the ‘Superbag’ has been limited. Supply of new bags is a problem in some regions, even in cases where the benefits of the Superbag are well accepted. There is continuing debate over an acceptable price for the bag, with prices for a new bag at around $US 2 (possibly more) compared with a woven polypropylene bag at less than $US 0.5.

IRRC work continues on the introduction of the Superbag in the region. Similar technology, but on a larger scale, is well established in the Philippines, where PhilRice used ‘cocoons’ for seed storage. There is concern over the emergence of cheap copies of the 'Superbags' that may not perform as well as the Superbag.

Flat bed dryers

IRRC work previous to Phase 4 established flat bed drying of wet, freshly harvest paddy as a viable alternative to sun drying, with reduced losses (2-5%) and much improved head rice yield (10-15% improvement). The process has been widely adopted in Vietnam, with a particular design of flat bed dryer now known as the Vietnamese type dryer. It incorporates a rice hull fired heating unit, pioneered by IRRC.

The Vietnamese type flat bed dryer is being introduced by IRRC into Cambodia, Lao, Myanmar and Indonesia, with the reversible air flow modification under trial in the Philippines. Much of the dissemination and uptake of the flat bed dryer system is now occurring outside the IRRC project – an indication of success of the original work.

As an example, in Myanmar, a private group is now commercializing the system, with 135 Vietnamese type dryers and over 200 of modified design now installed.

In Cambodia, the original IRRC business model was to introduce flat bed dryers at village or farmer cooperative level, but there has been limited adoption. However, millers are installing flat bed dryers (or higher capacity falling column dryers) themselves as they get better control over quality of the dried commodity. There is an increase in contract drying.

There is now concern in the region that technical support for the new dryers has lagged behind the uptake of the technology and some installations or designs may not perform satisfactorily. IRRC may have scope to provide technical assessment and improvement of the new systems.

Laser leveling

Laser leveling is a well established technology in some rice growing regions. For instance, as a result of IRRI collaboration, it is estimated that there are now 10,000+ contractors in India for laser leveling.

After successful initial IRRI work in SE Asia in the mid 1990s, laser leveling work slowed, but was revived in 2004 with IRRC collaboration with NLU in Vietnam. Manufacturing of equipment was established in Vietnam and the technique was accepted by the agriculture ministry. But it is not yet applied, and the 1M5R program does not make use of it.

Work on this technology has revived in Phase 4, with ongoing demonstrations and collaboration on design and manufacture of laser leveling equipment in Cambodia. The ERT visited some of the respective trial sites; the positive effects are not yet visible.

Proper field leveling can lead to a broad range of improvements for the rice farmer, from making fertilization, weeding and water management more efficient to higher yield and better rice quality due to a more uniform maturity of the crop (and hence interfering with the subjects of several Workgroups). On the other hand, leveling constitutes a major investment, including in some cases yield penalties in the first season after leveling. The ERT proposes that IRRC develop a concept on laser leveling, which explains the relations with the different Workgroups and why this work has been (pragmatically) allocated to the post-production Workgroup.

v. Crop health

The crop health Workgroup was initiated in Phase 4. Its activities were predominantly diagnostic, looking at disease, pest and weed problems in different SE Asian rice environments. The rationale for such a situation analysis is that the context has changed substantially over the past two decades (intensified crop rotations, more intensive fertilization, direct seeding, shifts in the varietal portfolio – especially hybrids, water shortages etc.), implying changes in crop health. Diagnostic activities are done together with partners in the different countries with the aim to strengthen their capacity for rural advisory services in crop protection. An aim is to develop decision support tools for crop health.

The ERT could not interact with the Workgroup leader. From the written documents, we question, whether this Workgroup is integrated with the other activities of IRRC. Yet, maybe

as a new Workgroup, if first needs to find its identity and tangible outputs targeted to farmers' needs before it can fruitfully interact with the other Workgroups.

Even though IPM has been promoted in thousands of Farmer Field Schools and other activities in Asia, the ERT noticed that (at least in one case in Indonesia) farmers were keen to learn IPM principles. This observation should alert the IRRC and ICOPs that the design of new programs to out-scale technologies, knowledge of 'old' techniques (and of varieties, as in the Bangladesh Monga project) should not be taken for granted. IPM is crucial for profitable and sustainable rice farming and IRRC should ensure that other technologies can build on sound IPM strategies of farmers. To what extent this should come within the crop health Workgroup or rather constitute a strategy cutting across all Workgroups should be carefully assessed.

We recommend that the IRRC Management Committee assesses carefully, how the crop health Workgroup should interact with the others and jointly develops respective workplans for optimal integration.

vi. Climate change

The Climate Change Workgroup was initiated in 2011. In October 2011 it will have its launching workshop, where together with partners stocktaking of activities and information on adaptation to climate change will be done and researchable issues will be identified as a step towards joint priority setting. The Workgroup is cutting across IRRC and CURE (Consortium for Unfavorable Rice Environments), which makes sense as adaptation to climate change is especially challenging in unfavorable environments. . Moreover, some favorable environments may become unfavorable due to climate change (and vice versa).

The idea is to work mainly on adaptation, but also on mitigation (e.g. to quantify the effects of water saving technologies on methane and other greenhouse gas emissions in view of searching funding from Clean Development Mechanisms for further out-scaling of these technologies – a endeavor that seems to have many obstacles).

The ERT endorses this strategy. It recommends that the Workgroup also addresses the concerns of many rice farmers who suffer from increasing unpredictability of rainy seasons.

Climate change is a large and well known driver of change of rice crops, particularly recognized in changes in temperature and precipitation. But there are also other environmental changes relevant for irrigated rice, such as in biodiversity (the specter of weeds, pests and diseases), sea level rise, and pollution (soil, water, air). IRRC should be perceptive of these changes and carefully pick those subjects that are most relevant in irrigated rice. They may be addressed either in the context of the climate change Workgroup or in collaboration with other initiatives (e.g. the Earth System Science Partnership, ESSP).

Recommendation 1: Fine-tune contents and interaction of Workgroups
- Quantify environmental impact of IRRC technologies
- Adapt post harvest work to changes in production as promoted by other Workgroups
- Define the interaction of the crop health Workgroup with others
- Address secondary effects of climate change (e.g. shifts in pest problems, salinity)

d) In-Country Outreach Programs (ICOPs)

i. Achievements in ICOPs

In Vietnam, the Philippines, Myanmar, Thailand and Indonesia In-Country Outreach Programs (ICOPs) have been established or strengthened during Phase 4. ICOPs in

Vietnam, the Philippines and Myanmar are very active in planning and implementing country-specific actions.

An important achievement of the ICOP in Vietnam is the program of "One must do – five reductions" (1M5R) launched via the ICOP in An Giang in 2009. This seems to be a real success story as all the Workgroups of ICOP are included as well as DARD (Department of Agriculture and Rural Development), extension workers and famers' groups. When launching the program local government officials were and still are present and supportive (scaling-up as supportive policy of local government). Only the private sector is not yet very well addressed with the ICOP.

The dissemination of 1M/5R was realized with trainings for farmers' groups and extension workers, using a good qualitative handbook, leaflets and posters. More than 4'000 farmers have been trained. First preliminary analysis of the impact study conducted in 2011 estimate that more than 15'000 farmers producing on 24'000 ha apply 1M5R as a whole package (representing 8% of farmers and 12% of the area). Farmers report that thy disseminate 1M/5R directly to their neighbors who then adopt the whole package or – mostly – some of its components. Another achievement is the strong ownership showed for 1M5R by all local ICOP partners.

The ICOP in the Philippines is integrated in PhilRice. IRRC technologies (SSNM, EBRM, and AWD) were integrated in the PalayCheck[1] of PhilRice, tested, adapted and promoted broadly throughout the country after 2006. In 2009 an administrative order stipulated AWD as the main water saving technology of the Philippines. The ICOP is now introducing additional IRRC / IRRI technologies (drum seeder, new varieties, aerobic rice) in the different ICOP sites already established as well as out-scaling to new sites. Many private and public partners, farmer and farmers' groups are involved in different sites. The ICOP is as well partner of PhilRice in the Philippine Rice Self Sufficiency Program (PRSSP), now Food Staple Self Sufficiency Program (FSSSP), where it contributes to the sub-project "Unified Capability Building Support". FSSSP being a national program, IRRC technologies will be disseminated on a national level.

The post-harvest Workgroup has an active learning alliance meeting at national level. There are workshops that focus on dissemination, capacity building, as well as on cross-country exchanges with Cambodia (training on stripper harvester) and Vietnam (adopting reversible dryer from Nong Lam University). The learning alliance under ICOP in Bohol is very active and integrates NARES-partners as well as National Irrigation Administration (NIA) and private sector (e.g. First Consolidate Bank). The ICOP facilitated decision making in a water distribution scheme. As this scheme makes water available only on some days during the week, it imposes AWD to more than 300 smallholder households.

In the Philippines the ICOP has facilitated the research-extension interface by integrating in the national PhilRice programs. In Vietnam the ICOP brought different partners together and made the testing and dissemination of 1M5R a real success; the ICOP partners are looking out for further technologies, up-scaling and out-scaling of 1M5R. The ICOP activities in Vietnam and the Philippines produced the expected results and are moving on to out-scaling and up-scaling of more technologies.

[1] The PalayCheck is a dynamic rice integrated crop management system established by PhilRice, which integrates IRRC technologies. The idea is to compare farmer's practices with best practices in farmer fields (test fields) . Farmers compare, discuss and improve their practices in farmer groups. The eight checks of PalayCheck: (1) Use high quality seeds of a recommended variety, (2) No high and low soil spots after final leveling, (3) Practiced synchronous planting after a fallow period, (4) Sufficient number of healthy seedlings, (5) Sufficient nutrients from tillering to early panicle initiation and flowering stages, (6) Avoided excessive water or drought stress that could affect the growth and yield of the crop, (7) No significant yield loss due to pests, (8) Cut and threshed the crop at the right time

In Indonesia the 2020 Vision for Rice Production program (Peningkatan Produksi Padi Menuju 2020) rolls out in the current Phase of IRRC the Integrated Crop Management Farmer Field Schools to assist farmers to increase rice production, aiming at covering 2 million ha. Other actual projects are the Sulawesi Project funded by the Australian Centre for International Agricultural Research (March 2008–May 2001) and the Nutrient Manager for Indonesia which began in June 2011 (funded by private sector).

The Myanmar Outreach Program (IMOP) was founded in 2005 and works closely together with the extension division of Myanmar Agriculture Service (MAS). The IRRC Workgroups for Productivity and Sustainability, Water-Saving, Labor Productivity and Post-Harvest have activities in the IMOP, working on six different sites. The IMOP also organizes and realizes trainings for trainers. The ICOPs in both countries, Myanmar and Indonesia, are reported to be success stories. In Thailand there seems not to happen much between the ICOP meetings, so that the ICOP does not really take off.

ii. Overall assessment of ICOPs

The ICOPs are explicitly mentioned in the log frame for Phase 4 only for the Water saving Workgroup (“take active leadership in ICOP activities in the Philippines”) and for the Crop Health Management Workgroup (“recommendations adopted by NARES partners as part of ICOP in two countries”). Apparently a lot more has been done and quite successfully, with the Coordination Unit playing an important and very much appreciated role.

The ICOPs allows for working across usual boundaries - national, academic and societal. They are a good way of creating ownership for projects. In countries with a large and active ICOP, the activities as well as the technologies are so diverse that an annual meeting is possibly not enough to keep all informed. A newsletter could be useful to foster common ownership. The ICOPs seem to be a good model for facilitating the scaling-out and scaling-up, with the best examples in Vietnam (DARD and local government, possibly national government) and the Philippines (FSSSP).

As for the lessons learned, the ICOPs of Vietnam, Myanmar and the Philippines are sustainable and provide a good platform for concerted action. The ICOPs benefit from peer contributions (IRRI, NARES and other specialists) and from the possibilities to work across boundaries – academic, institutional and national. Strengths are the established personal relationships, the involvement of 'champions', the perception of IRRC as honest broker and IRRI researchers as outstanding specialists, and the continuity of activities (needs assessment, adaptation, and dissemination) in the ICOPs. Weaknesses are the dependence on key persons, the long distances to get to meetings and hence too few meetings scheduled and (for the Philippines) the difficulty of members to get an overview of the many different activities going on.

The ERT proposes to further strengthen the ICOPs. A conscious effort to clarify and document how the ICOPs are structured and how they integrate champions, how they link theory (what they intend) to reality (what they can do), and how they can show their effectiveness will provide guidelines to less developed ICOPs and ground for mutual learning. Further integration of the Workgroups can be achieved by taking more Workgroups and further technologies on board for the Philippines, Thailand and Indonesia, and integrating the Workgroups in new programs in all the countries. The ERT endorses the idea of IRRC of trying to expand the "Nutrient Manager" into a "Rice Crop Manager" as a platform for integrating technologies of IRRC.

Recommendation 2: Further strengthen the ICOPs
- Clarify their role and modus operandi
- Foster further integration of Workgroups and technologies

4. Impact

One should bear in mind that the review of IRRC Phase 4 was carried out more than one year before the end of that Phase. Therefore, many impacts are not yet firm, not yet complete, not yet documented, and even not yet obtained. Impacts of Phase 4, no doubt, will be larger than what is reported below. The social scientists of the Coordination Unit carry out household surveys to assess the changes in social, economic and environmental aspects of farmers' livelihoods.

a) Impact at farmer and community level

Impacts are measured with different methods according to the techniques and approaches of the Workgroups. In Phase 4 the Coordination Unit is in charge of assessing impacts with a team of social scientists doing surveys. The social scientists make baseline and post-baseline studies (interviews, focus group discussions) and ask the participants of programs and trainings about changes in their practices and impacts of changes. Table 1 shows an overview over impact studies and estimated impacts for Phase 4 done or planned by the social scientist team of the Coordination Unit.

Table 1: Assessment of impact implemented or planned in Phase 4
Source: Palis (2011)

	Technology	Country	Adopters	Plans to get numbers	Economic impact
a)	AWD	Philippines, Bangladesh	70,000	By October 2012	yes
b)	SSNM	Bangladesh, Vietnam	400,000 – 600,000	done	Preliminary results
c)	Monga	Bangladesh	> 50,000	September 2012	September 2012
d)	Combined	Philippines	> 10,000 (mainly AWD)		
e)	Combined	Vietnam (An Giang)	> 4,500	Expected high no, December 2012	Under analysis
f)	Flat-bed dryers	Myanmar	48,700	one	Preliminary: 3% in dry season, 42% in wet season
g)	EBRM	Vietnam,	60% farmers using EBRM (Vietnam) > 50,000 Indonesia		Under analysis
h)	Combined	Indonesia	200 (pilot study)	December 2012	Under analysis

Table 1 has heterogeneous entries. The number of farmers participating in training is shown at the same level as the number of adopters determined in random sample surveys. The economic impact is often not yet quantified. In other documents, the ERT found higher numbers for adoption, including for countries not mentioned in Table 1 (see for instance figures for rodent control below). The ERT recommends that a comprehensive overview of the impact be elaborated by the entire IRRC team, where the certainty of adoption and impact data is qualified and shown along with the numbers. This overview should be very carefully scrutinized and presented. This is not only important for those in the project, but also for the wider community interested in a critical assessment of impact of research for irrigated rice.

From all the discussions and critical reviewing the documents, the ERT concludes that IRRC made substantial progress in moving out its technologies to farmers massively. During Phase 4 between half and one million farmers have probably adopted technologies increasing their net income by at least 100 US$ per ha or per household. Yet, this is a rough estimate and the ERT encourages IRRC to make a strong case – with sound data and conservative assumptions - out of this obviously big success.

In Phase 4, social scientists of IRRC made a tremendous effort to obtain baseline data and – especially during 2011 – collect data on adoption and effects of IRRC technologies. It was courageous of IRRC to present preliminary findings of these studies to the ERT, which

triggered interesting discussions. The ERT recommends that IRRC re-visit these impact studies, making sure those natural scientists that developed on the technologies work closely together with social scientists who quantified impact. Gender and social issues should be discussed in relation to impact. The ERT further recommends undertaking a meta study comparing all the impact assessments so far undertaken in the context of IRRC (including the study done in Bangladesh by Humboldt University, Berlin, Germany, Kürschner et al. 2010) in order to extract lessons learned. This should help in the future to focus on few cases and go more in depth in these. Finally, the ERT suggest doing a broader triangulation of findings. If impact studies find yield increases of 1 t/ha for individual technologies, this seems to suggest that farmers combining several IRRC technologies arrive at average yields of 8 to 10 t/ha. Is this realistic? Such issues need to be discussed in the impact studies. Further, high productivity gains and widespread adoption should eventually be reflected in national statistics. Even though statistical production data are somewhat slow in reacting to changes at farm level, the effects of technologies that have been in use for several years by tens of thousands of farmers should make a difference in these data.

Recommendation 3: Improve impact assessments to make strong cases
- Re-visit studies critically and jointly between natural and social scientists
- Undertake a meta study on assessments done so far in view of more focusing
- Broaden triangulation, include national statistical data

Below we try to qualify the most impressive impacts by workgroup (obviously missing out on some of the synergies of combined technologies).

Productivity and sustainability workgroup

The Leaf Color Chart is widely used to reduce urea applications, in particularly in Bangladesh. Increased profitability of Vietnamese farmers using the 1M5R teachings was observed. Farmers tell as well that they have more time for the family and the community when using the 1M5R technologies. Saving time and money is more important to them than increasing yield. Environmental pollution is probably reduced (as there is less nutrient waste) but not directly observed.

Water saving workgroup

Very significant savings in water use have been documented. It is no surprise therefore that AWD and aerobic rice are generally well received. However, their uptake is still modest (in comparison to the planning) but expanding rapidly. In Bangladesh AWD is promoted by several government bodies and NGOs and more than 50,000 farmers adopted AWD; adoption of aerobic rice is still in an early stage. In the Philippines 65,000 farmers adopted AWD; 3,700 farmers adopted aerobic rice. In Vietnam, AWD was part of the training to 4300 farmers and most of them practice what they learned. In Indonesia and China was AWD well received by farmers but it needs validation and adaptation.

In addition to water savings, social benefits can be derived from AWD. For instance in the Philippines, lower water consumption in irrigation areas has eliminated water shortage downstream. Not only did this improve food security of the downstream farmers but it also eliminated conflicts among neighbors over water.

Labor Productivity workgroup

Impact on farmers' livelihoods is yet studied only in a few cases, such as in the "suppress Monga" project in Bangladesh. Here, a series of changes in the cropping system were made possible by an earlier establishment and thus harvest of the rice crop. Offering farmers new options is the essence of sustainable development. The impact was phenomenal. In 3 years a new cropping system was adopted by 120.000 farmers who then had work and did not go hungry in the customary hunger-month.

In addition to economic and social impact (higher net returns and more confidence regarding food security) the technologies were adopted by the Bangladeshi government into an expanding Monga mitigation program (policy impact).

For rodent control, 100'000 and 70'000 farmers in the Mekong delta and in Indonesia respectively adopted EBRM principles. Yield increases due to proper rat control are estimated at 10 to 15% in the areas where rats are a problem. Saving of pesticides and social cohesion in the villages that joined forces to control the rats are other beneficial outcomes.

Post-production workgroup

The post harvest workgroup is full of promise, but there are no impacts identifiable for capacity building. The Superbag is interesting, promoted by NARES, but adoption is still weak. The notice boards with price information that would help the smallholders in Cambodia to bargain good prices for their crops are not easy to keep up-dated and have mostly been abandoned after a while. Mechanical harvesting is under rapid adoption in Cambodia, but no data are available to what extent smallholders benefitted so far. Mechanical drying – a quite widespread and mature technology in Vietnam - looks as though it would be adopted in various forms in several other IRRC partner countries. The adoption in Cambodia is aimed at farmer cooperatives or farmer 'tigers', but actually will probably be adopted rather by millers. Laser leveling is either already adopted (as in India) or under research / adoption (e.g. Cambodia, Vietnam).

Linking natural and social sciences

IRRC made a conscious effort to integrate social sciences in its work. Today, social science topics and methods clearly have their role in the Consortium. However, the IRRC questions whether social scientists sufficiently interact with natural scientists. We missed a common understanding of issues and a common language when reporting about technology development and out-scaling. We suggest that natural researchers are more involved in impact assessment (as outlined above) and social scientists participate more in technology development and dissemination. Most important, that both groups work together – in the field and in data analysis and interpretation.

The ERT identified opportunities, where strong social science involvement might have enhanced technology adaptation and up-take: The 'Superbag' in Cambodia is yet little used. Hypotheses for this are several: Farmers do not trust that the technology works; in order to make the Superbag profitable, seed rates would need to be reduced, which could have other implications for the cropping system; the technology does not fit into the storage and cash management system (seed and food). A team of a social scientist and a post-harvest specialist could together probably find out quicker, which obstacle to adoption is highest and together design a strategy to overcome it (or otherwise decide together to stop promotion of the Superbag, as it does no fit into the specific farming system).

Recommendation 4: Integrate social and natural sciences
- Along the entire research-dissemination continuum
- To achieve higher impact

b) Innovation and business models

The Postharvest workgroup introduced the method of Participatory Impact Pathway Analysis (PIPA) in order to integrate all stakeholders from the very beginning.[2]

[2] With PIPA, participants define together impacts to be realized and the pathways by which the impacts can be realized. PIPA combines two types of analysis: the causal analysis (problem tree) and the stakeholder analysis (network mapping). The logic behind PIPA is (i) to define the actors and different actors' groups, (ii) to discuss

After the PIPA process the next step is to launch learning alliances with all actor groups involved, who will then continue the process without facilitation from outside. [3]

The Postharvest workgroup facilitated several PIPA workshops in Cambodia, Vietnam and the Philippines (funded by Asian Development Bank) in order to foster the dissemination process for improved rice postharvest technologies. The workshops last in general for five days and involve some 30 persons from different stakeholder groups within a country.

The learning alliances, which were launched after the PIPA workshops, are active and organize themselves. Some are now independent from IRRC funding and facilitation (e.g. in the Philippines).

In Bangladesh, we noticed that the involvement of the private sector in the work of the IRRC brings new thinking about what may work and what not in introduction of new techniques. Suppliers of water, for instance, may not benefit from introduction of AWD (e.g. when water is not measured by volume but by period of delivery). Adjustment of incentives for water delivery should then be encouraged. While this may well exceed the scope of IRRC itself, reaching out to knowledgeable partners can be crucial for the success of the rice production improvement program. Thinking in terms of business models, indeed, is in itself an important innovation in IRRC.

The ERT concludes that with its participatory impact pathway analysis and the learning alliances resulting thereof, the post-production Workgroup has an innovation model that merits close follow-up for eventual replication in other Workgroups. Also pilot activities with private sector and NGOs constitute an approach for technology adaptation and out-scaling that merits further optimization.

c) Impact on capacity building of NARES

In this chapter we report the capacity building impacts from those sites where we visited NARES partners and end-users. This may have lead to some bias.

In Vietnam, the DARD staff appeared well trained and has the skills and capacities to do research and extension. Nevertheless they would like to have more trainings and demonstrations to out-scale the 1M5R to larger areas and other provinces. They are highly motivated to adapt and disseminate the technologies. But they were not very active to upscale the extension further, e.g. towards a GAP program. The training material for extension officers (handbook on 1M5R) provides good information and visualization of the technology.

In the Philippines the partners in the ICOP are well trained and seem to be dynamic and motivated to collaborate and disseminate IRRC technologies to farmers and other partners. We don't know who has been trained with what means, so that it is difficult to assess whether the impact of capacity building can be accounted to IRRC. The NARES partners are manifold. With the partners in PhilRice the IRRC and IRRI researchers have peers with whom to mutually build up skills, capabilities and knowledge. The extension workers we met felt well prepared and trained for their tasks. They are motivated to work because they can see that what they promote makes sense for the farmers.

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what each group should change in their practice, knowledge, attitudes, skills and aspiration so that change described in the vision can happen, (iii) to project impact pathways by describing the changes the project can help to achieve, who will change and project strategies to bring changes about.

[3] The Learning Alliances are expected to (i) increase diversity of options (through prototyping and experimentation), (ii) increase interaction among stakeholders (through regular group reflection), and (iii) improve stakeholders' ability to identify and choose what works (through research).They follow the logic of planning – acting – reflecting and capturing – planning (2) – acting (2) (and so on).

NARES in Bangladesh in this Phase have trained many farmers in AWD and even more in improved rice based cropping systems (Monga project). NARES are stronger in this field than before, though it is not clear how much the IRRC-project contributed to this. Their strength in research-extension collaboration could not be judged.

d) Scientific impact

An impressive number of scientific publications were produced out of the work of IRRC. From 2009 to 2011, 53 peer-reviewed articles, 70 other scientific publications and 55 presentations in scientific fora are listed in IRRC's list of publications. About 30% of the authorship is made up by NARES staff. Scientists, both national and IRRI, are embedded in respective scientific networks and are well linked to the world outside SE-Asia see for instance Palis et al. 2010, Singleton et al 2011).

IRRC contents are widely used in universities in South and South-East Asia. It is basically the long-standing workgroups that made material available to national universities on topic such as nutrient management and submerged soils, water management, weed management and post-harvest. Courses on rodent management are also used in Australia and the UK. A tutorial for students and teachers on nutrient management is available on the IRRI Web-site and we were informed that it is extensively used.

e) Impact at policy level

IRRC has been remarkably successful in getting technologies adopted by governments and higher decision makers. This is clearly a cumulative effect of the contacts, explanations and demonstrations in the previous phases, but also shows the efficacy with which scientists have presented their cases. National scientists (and often IRRC-colleagues from NARES) played also a very important role, if not more important, but IRRI's credibility always provides a solid foundation. IRRC has skillfully involved national 'champions' of the technology in achieving policy impacts.

The relevant cases include already:

- Bangladesh, 2009. Adoption by the Ministry of Agriculture of the AWD-program for national dissemination.
- China, 2010. The 3 Controls Technology (or 'two 100 increases') was adopted by the Ministry of Agriculture of the Guangdong Provincial Government.
- Myanmar. The DG of the Dept. of Agricultural Planning and the Minister of Agriculture and Irrigation have been briefed about IRRI technologies.
- Philippines, 2010. The government endorses AWD for nationwide adoption (through Administrative Order 25).
- Thailand. IRRC-Thailand was invited by the United Nations Environment Program to be the lead collaborator on 'Sustainable rice with reduced environmental footprint'.
- Vietnam. Laser leveling was certified by the Ministry of Agriculture and Rural Development.
- World Bank. Contracts are made with Vietnam to increase rice production in five provinces based on IRRC-work in An Giang.

In addition, IRRC members from IRRI and from the national partners informed key persons from various ministries and many other organizations about new technologies and options for their implementation. This occurred ad-hoc, such as during workshops, and planned moments, such as in briefings and demonstrations. The frequent encounters between policy makers and IRRC-members, and the repetition of the message over several years, contribute to the adoption.

Members of the IRRC Steering Committee have often a high position in their governments. This allows them to steer IRRC activities and anticipate national policies such that they reinforce each other.

When IRRC-scientists are involved in the preparation of a national policy, it is essential to review the issue and potential solutions with several national scientists and laboratories. Only is this way can there be a common view and common base line data. An example would be on new approaches to fertilizers. Typically involved are officials from different organizations that all have a mandate on that subject. It was mentioned to us on several occasions that it requires often much effort and time before all agree on one (set of) conclusions and basic data. Yet, such investments are indispensable in the run up to policy impacts. Senior scientists retired from NARES management positions, particularly if IRRI alumni, were found to be effective as facilitators.

In the case of the Rice Nutrient Manager, regular contacts and information to policy makers about nutrient management has increases the acceptance of IRRC-recommended fertilizer application strategies. In often long negotiation processes, nationally adapted versions of the Nutrient Manager were developed and are now part of national programs in Indonesia, Philippines and Vietnam.

The degree to which IRRC engaged with NGOs and the private sector varied by country and opportunity. There was much effort to engage them for specific subjects (equipments, tools) and tasks (designing and implementing business plans). NGOs and private sector partners encountered during the review missions are complementary to IRRI and NARES, and (have the potential to) help significantly with bringing technologies to farming communities. This is already a good achievement since these are not 'traditional partners'. In a next Phase, cooperation with such partners should be brought to its full potential to the benefit of farmers and IRRC-partners.

f) Concept note

The concept note elaborated by the Coordination Unit provides a useful starting point for discussion of the best shape for a Phase 5 for the IRRC. It builds on the well-proven organizational structure of the current IRRC, with the principle aim of more widespread adaptation and adoption of state of the art irrigated rice production systems. Recommendations made by the ERT can be incorporated to enrich the Concept Note.

However, ultimately the drive to improve rice production comes from national partners. The need to involve them in the design of Phase 5 and its implementation requires much more attention and should be reflected in the Concept Note. The ERT suggests exploring and pioneering ways to do this to a larger extent, in at least of few countries. This will first increase national ownership and later impact of IRRC-initiated national production programs. A training program for NARES on how to introduce technical options (to improve rice production) in regional and national planning for rural development may be one way in helping partners to be even more effective.

There are statements in the concept note relating to introduction of new technologies for Phase 5. However, the bulk of the discussed technologies are already under introduction in some form in Phase 4. Phase 5 takes these technologies from pilot stage and model villages to a more widespread and sustainable use. The main ‘new’ technology relates to further regional and local adaptation and improvement, with introduction of new varieties, productive under adverse environmental conditions, and their optimal management.

The vision statement in the Concept Note suggests that IRRC's leadership will lead to food security in the region. This raises exaggerated expectations and is a gross underestimation

of the roles of other factors such as markets, national policies and other actors in rural development. In this form, the statement may not be useful.

We miss a clear definition of the self-understanding of IRRC. In the concept note, IRRC is sometimes described as (or implied to be) a small number of IRRI scientists that work with partners, at other occasions as the sum of national partners, private sector actors and IRRI staff. This is confusing.

It is apparent at the partner country level that the objectives within the IRRC context are different. As examples,

- Cambodia – to increase rice production to generate a large exportable surplus of milled rice
- Bangladesh – to improve food security and livelihood of small scale rice producers
- Philippines – to achieve rice self sufficiency

The differing objectives will require different prioritization of effort and process in the different countries. The ERT therefore recommends reconstructing and reformulating the objective system of IRRC, so that it is consistent with the individual goals and priorities of the different countries. Impact assessment should then take into account also the individual national aims, rather than just focusing on yield and income.

In considering the rice value chain, the concept note is focused mainly in achieving higher per hectare productivity. There is a need to extend the analysis throughout the value chain to include whether systems are in place to cope with the postharvest aspects resulting from increased production or shifts in harvest time, volumes and conditions. Research, technology transfer and development should address changes required in postharvest downstream of product drying and conditioning for storage or processing.

An important part of efforts to achieve local and regional food security in the face of increased climate instability and risk is to provide systems for storage. These systems need to store the harvested rice with minimal quality and physical losses.

It would be prudent to include assessment of carbon balance and greenhouse emissions in overall analyses of benefits of new technologies.

Recommendation 5: Re-construct the aims of IRRC
- To reflect the individual national priorities
- To serve as a framework for impact assessment

5. Consortium set-up

a) Structure and organization

The workgroups are the primary organizational principle of IRRC. Their structure and composition has been changed several times in previous phases. The ERT concluded that the present workgroup structure works is appropriate. Considerable progress has been made to work together between several workgroups, both at country and site level (often with the ICOPS as convening platform) and among IRRI scientists.

The ERT recommends that the present workgroups be maintained and collaboration between them be strengthened further (especially the new workgroups, crop health and climate change, be better integrated).

IRRC is well integrated within IRRI and GRiSP (IRRI et al. 2010). It is a complementary structure to other IRRI activities and provides researchers with a dynamic platform to react to national needs and developments.

The ERT could witness in several cases (e.g. Indonesia, Vietnam) that the strategy of having rice experts and actors in the national policy dialogue on the Steering Committee worked out very well. Steering Committee members play an important role in facilitating and making good use of IRRC activities in their respective countries.

The ERT had not more than anecdotal information about the functioning of the Steering Committee. We do not know how its meeting agenda is developed, how decisions are followed through, and whether it really steers IRRC or largely approves proposals. Neither do we know (nor did we ask) how members are selected. The fact that this issue hardly came up during the ERT-visits could suggest that the guiding role of the Steering Committee, vis-à-vis the Coordination Unit, is still limited.

We ask IRRC to reflect on this point, and, if correct, to lay out a realistic path to more significant contributions from the Steering Committee. Developing plans for Phase 5 could be a starting point.

b) Platform for adaptive research

IRRC is an effective platform for adaptive research. At national level, it brings together diverse stakeholders in the research-extension continuum and thus provides a framework for priority setting, planning, implementation and especially debate on conclusions of research and outreach activities, with IRRI scientists often playing the role of honest broker. At IRRI level, it creates room for multi-disciplinary discussion of research.

The ERT could witness examples of learning across countries: In Cambodia, flatbed dryers, drum seeders and combines are brought from Vietnam. In some cases, cross-country learning has been facilitated by IRRC staff. In others, private sector actors and NGOs just need first contacts to be established by IRRC and then carry on by themselves.

IRRC was very successful in leveraging funds from other donors, who appreciate the platform that can host projects aiming at adaptive research, research for development and scaling-out. The Coordination Unit manages these different projects skillfully. The ERT did not get the impression that specific donors or projects would unduly bias the IRRC portfolio towards a specific country or province or topic. On the positive side there are considerable synergies that can be (and in fact are) exploited between the different project implemented by IRRC.

The ERT observed that national support to IRRC has been important in Phase 4, although the national contributions to the Consortium have not been quantified in economic terms. In many cases, contributions are in kind: countries pay the cost of the participation of their researchers and extensionists in joint IRRC activities.

c) Evolvement of partnerships

Partnership was broadened during Phase 4 (see 3a). The ERT could witness that IRRI staff was keen to facilitate partnerships in the different countries between public research and extension organizations on the one hand and private sector actors and NGOs at the other.

Thailand and China participate in IRRC on their own funds, i.e. they cover all their costs in-country, but often are supported with international air fairs. IRRC's strategy is to embark on joint projects in these two countries. While the IRRC Management Committee clearly pointed out added value of having Thailand and China on board (e.g. a joint study tour between Thailand, Vietnam and Laos on GAP following on a workshop on this topic in Thailand), some partners were rather skeptical about the value added for the Consortium. The ERT recommends communicating more clearly, how Thailand and China participate in IRRC.

IRRC's partnerships depend to some extent on the external funding made available through the project. Yet, many of today's partnerships go back to IRRI's training activities in the past and are proof of long standing relationships which have survived periods of limited funding. These alumni relationships are sustainable. It is hoped that new partners brought on board over the past few years are likely to engage in similar long-standing links with IRRI and among each other. There is concern about a high turn-over of personnel. However, IRRI alumni often do not disappear entirely from the country and thus opportunities for still different alliances may emerge.

Partnerships with the private sector and NGOs are often less dependent on external funding. IRRC is pragmatically seeking and fostering such partnerships.

d) Sharing results

Well over 200 scientific publications and contributions to meetings and books were produced by IRRC during Phase 4 (see also 4d). The publication list made available to ERT probably even underestimates the number of scientific publications, as it does not contain material from the productivity and sustainability Workgroup. All of this material is well accessible to the target groups by usual means. Publications are also distributed effectively to (potential) partners during meetings.

In addition, national partners of IRRC produced handbooks for training, leaflets to support technologies, posters and brief articles in national media. Their impact on target audiences is probably large but could not be quantified.

While the number of contributors from IRRI and NARES partners is large (their actual number, beyond IRRI, is not well defined) and the period considered is only 2.5 years, the summary of publications indicates a good rate of production by scientific standards. The publications are generally well accessible through regular media. We did not attempt to judge the scientific impact of the scientific publications.

The IRRC newsletter RIPPLE appears 3-4 times a year, and presents the partners interesting news on results, impacts and persons. It is well appreciated by the partners.

Furthermore, the IRRC produces high value videos. The one about eliminating Monga (seasonal hunger in Bangladesh; IRRC contributed to the project) has been shown on TV (UK) and is considered for TV-presentation in Bangladesh.

A new type of publication of insights and data, using internet and mobile phones, is being developed by the Productivity and Sustainability Working Group and IRRI staff. This technology aims to give to individual farmers recommendations regarding fertilizer applications that are specific to their own fields and objectives. The advice is generated by scientific computer programs fed with inputs by the farmer. This modern approach, called the 'Nutrient Manager' may be seen as 'publication' as it communicates results and insights in writing (or by voice) to the public. Even though the approach is still in early stages, with limited field testing completed, the perspectives are that it is a breakthrough with respect to reaching individual farmers on a large scale with individualized yet state of the art advice. IRRI and IRRC are pioneering this approach with NARES partners. We want to encourage them strongly to continue its development, field testing, and roll out in Phase 5. Needless to say that IRRC-partners in several countries as well as private industry are enthusiastic.

e) Sustainability

While the research, extension and partnership activities of IRRC are proceeding in a sustainable manner, the Consortium is dependent on external funding. The volume of the own contribution of all partners in the IRRC is high, judged by the number of person-days that must be spent for it, but it is not quantified. But external funds are still indispensable to make the IRRC work, i.e. for the Coordination Unit, its operations and support of workgroup-initiatives. Especially the funding by SDC is crucial for IRRC fulfilling its role of a platform for developing and disseminating innovations, because it covers the structure of IRRC. Moreover, the SDC-budget provides more flexibility than that of special projects, and continuity in management, as also the previous 4 phases were paid by SDC. A situation where national partners provide together the funds for the Coordination Unit and its operations is out of the question. So, when the ERT recommends a Phase 5, it implicitly recommends finding external support.

How many more phases of the successful project of IRRC should be anticipated? The ERT observed that IRRC is evolving: national programs get stronger and partnerships evolve into new platforms. This may open up new avenues for IRRC after Phase 5, at least in its relation to some of the present partner countries. However, experience with China and Thailand shows that while they cover their in-country IRRC-activities fully, spending money abroad is difficult. So it may be expected that further 'IRRC-phases' can still be very effective, but with an evolving program, increasingly shared responsibilities with partners, but with some external funding.

The ERT recommends that IRRC, particularly its Steering Committee reflects on Phase 5 and beyond, respective needs and sources for its external funding. The proposal for Phase 5 should outline a pathway for medium-term development of IRRC, beyond the end of Phase 5.

6. The future

a) Working group structure

As outlined above, the ERT concludes that the present workgroup structure is efficient. An encouraging development could be observed during Phase 4 of more intensive interactions across workgroups, both at ICOP and IRRI level. The workgroups added during Phase 4 provided a useful dynamic, yet they need to pay attention to interact and integrate more with the other work groups.

Recommendation 6: Maintain the existing workgroups of IRRC while improving integration of objectives

On the other hand, the contents and topics the workgroups are working on should be re-visited. In view of Phase 5 planning, the ERT recommends to update the needs analysis. Inputs from farmers should be sought in this process through appropriate, innovative methodologies (for instance by doing priority setting exercises with farmers on different research and outreach topics).

In particular, the following questions should be addressed regarding contents of the workgroups:

- The need and the potential of including the issue of seed: farmer saved seed *versus* certified seed; what is the promise of improving seed quality; what are cost-efficient strategies to do so?
- IRRC assisting countries in the formulation of national GAP (related to rice production): Can IRRI staff, with its technical expertise and its weight, contribute to make the GAP regulations realistic and farmer-friendly?
- Laser leveling: What are the benefits in different contexts? What concept should IRRC follow on this issue?

The ERT recommends that the Climate Change Workgroup be made fully operational as soon as possible, addressing both mitigation and adaptation (including how farmers can deal with the increasing unpredictability of rainfall and climate extremes). The ERT also considers that in several cases, work of IRRC could be made more effective by teaming up with national (or IRRI) breeders and looking at varieties, where there exists potential for added value by considering a variety change. We do explicitly not propose to create a workgroup on varieties. We rather endorse IRRC's present strategy to focus on all other aspects than varieties. However, this should not lead to miss chances on impacting with a combination of management practices and a new variety.

Recommendation 7: Re-visit the contents addressed by the workgroups:

- Establish a lean mechanism to get feedback from users into priority setting of IRRC
- Address both, adaptation and mitigation in the climate change Workgroup
- Include “varieties” in IRRC work wherever there is potential for added value

b) IRRC's role in sustainably delivering technologies

In IRRC, IRRI has teamed up with partners to deliver technologies to rice producers. In its approach, NARES partners are not just passing information on to farmers, but assimilate it, package it in training programs, and, increasingly, scrutinize results and impact for options for further improvement with new knowledge/technologies. This approach of the IRRC has been well appreciated, works well and is expected to work well in the future.

Even better: as NARES grow in capacity, they can have, and should have, a stronger role in the IRRC. We judge that, on specific topics (e.g. farmer training programs; linking research and extension) they can have a lead role in a next Phase. When asked, several NARES indicated that they are ready to take up a lead role, even though they may not be able to provide the operating expenses for activities beyond their mandate area and will need continued backstopping from IRRI staff. (Asked about this point, IRRI staff underline that prior attempts to transfer responsibilities to NARES have failed. Hence new attempts should learn from these failures). We therefore provide the following recommendation:

Recommendation 8: Transfer leadership of specific tasks from IRRI staff to specific partners

Successful transfer of the leadership of specific tasks or roles will lead gradually to more equal participation of partners in the IRRC, and a larger ownership will be a result. Guidance-on-request and backup by IRRI staff should remain available.

The roles of IRRC in fostering innovation are diverse. In Table 2, the ERT differentiated the different roles and assessed – in consultation with IRRC staff – which partners put how much effort in these roles in the past and present Phase and where development should go for the next.

Table 2: Different roles of IRRC in fostering innovation and their importance as assessed (Phases 3 and 4) and recommended (Phase 5) by the external review team

Role	Phase	Importance*	
		IRRI	NARES
Develop technologies	3	■■	■
	4	■	■
	5	■■	■■
Adapt technologies to national/local contexts (trials, pilots and demonstrations, including follow-up)	3	■■	■■
	4	■■■	■■
	5	■■	■■■
Facilitate cross country technology transfer and learning	3	■■	
	4	■■	■
	5	■■■	■■
Train national stakeholders on technologies (including basics)	3	■■	■■
	4	■■	■■
	5	■	■■■
Organize stakeholders for outreach activities (ICOPs, convener and honest broker role etc.)	3	■■	■■
	4	■■	■■
	5	■■	■■■
Inform and support policy formulation (including consensus building among national scientist)	3	■■	■■
	4	■■	■■
	5	■■	■■
Get feedback from users and infuse it into the process	3	■	■
	4	■	■
	5	■■	■■
Strengthen NARES (including on-the-job and degree training)	3	■■	■
	4	■■	■
	5	■■	■■

* ■ = low, ■■■ = high importance; ■ = for part of the countries

For the next Phase, the ERT recommends that IRRC puts again more emphasis on technology development, after jointly setting priorities for selecting problems to address. It should be possible that NARES play a more important role in technology adaptation to local contexts, thus freeing some capacity of IRRI staff. Cross country learning picked up momentum during the present Phase and should be enhanced in the next. So far, both IRRI

staff and NARES made a big effort to train national stakeholders about the technologies and often had to start with basic knowledge on which the technology are built and basics about working and communicating with farmers; the ERT sees for the future a shift of this activity to NARES. In terms of ICOP management, still considerable effort is needed, but IRRI staff should be able to focus more on its role of convener and honest broker, leaving day-to-day management to NARES. How fast this shift can happen depends, however, on the maturity of the different ICOPs. Participation in policy dialogue should continue in the same way as in the past. But more effort is needed to get feedback on the technologies to out-scale and on newly emerging problems and opportunities from users. Finally, in strengthening NARES, there is big concern that national scientists trained in the past (20 years ago and more) have been retired or are soon going for retirement and that therefore an important "brain gap" becomes more and more evident. It will be crucial for the national research and extension systems to launch initiatives to fill the upcoming gaps. The ERT sees IRRC contributing selectively to such initiatives rather than taking the lead.

c) Geographic focus and challenges

During its Phase 4, IRRC increasingly concentrated on SE-Asia. The ERT concludes that this approach worked well and was implemented with the necessary pragmatism (some work still being concluded in South Asia). IRRC started new, interesting initiatives in the poorer countries Cambodia and Myanmar, finding a dynamic context and committed new partners. We heard little about Lao DPR, suggesting that IRRC is less active there. IRRC played an important role in Bangladesh, achieving impressive success; the ERT suggests that activities there be continued, in coordination with CURE.

As for Thailand and China, the concept of their participation in IRRC should be defined. It will be crucial for the commitment of the other partners to better understand this concept of collaboration and to see, what China and Thailand contribute to IRRC.

With the new thrust of rice research in Africa, the question comes up, how African countries could participate in IRRC. The ERT concludes that it does not make sense to include e.g. East-African countries as full members in IRRC. They are too far away and the ecological and cultural differences are too big for effective cross-country learning.

On the other hand, IRRC could become a model for similar platforms in other rice growing regions. Yet, the IRRC set-up should not be taken as a blueprint. IRRI's history in SE-Asia, its prestige and its network of "alumni" in the region are crucial factors of success for IRRC and a similar model might not work elsewhere.

Recommendation 9: Maintain the present geographical scope:

- Continue to focus on SE-Asia
- Seek stronger collaboration with (and input from) Thailand and China
- Be prepared to provide consultancy and expertise on Consortium set-up and management

The ERT sees the following challenges for irrigated rice production and post-production that are not yet addressed by IRRC.

Salinity: With increasing water scarcity, sea level rise and larger storm surges, more and more irrigated rice land will get exposed to shorter or longer periods.

Fragmented land holdings: Small plots are a constraint to mechanization. In addition, fragmented land makes irrigation management, concurrent planting for pest and disease management and other technologies applied at village level more difficult. In Cambodia, presently a lively debate on land consolidation exists related to combine

harvesting and laser leveling. Out-scaling of 1M5R into the northern Vietnam is expected to be limited by small holdings. Even if this issue is common to several countries, it is highly sensitive and IRRC will have to carefully assess if it should play a role in the respective debate.

Knock-on effects of changes: Changes in rice production practices may have substantial know-on effects on the entire value chain. For instance changes to modern varieties in Cambodia entails harvest during the rainy season, with respective need of huge capacities for mechanical drying, which in turn alters the business relationships between farmers and millers. Combine harvesting to cope with the workload may lead to substantial soil compaction. IRRC could contribute to anticipate the effect of changes (whether IRRC induced or not) on the entire value chain.

d) IRRC and GRiSP

IRRC is important for GRiSP because it accelerates significantly achieving impacts of rice research on the actual production of irrigated rice. IRRC can be a role model for increasing the impact in other rice ecologies and regions (e.g. southern Africa). The IRRC is, in theory, also important as a channel for feedback from the farmer communities to the GRiSP on new issues and new technologies. In practice, the feedback is still weak and needs nurturing.

Activities of the IRRC are under GRiSP Theme 6 'Supporting the growth of the Global Rice Sector'. Its financing strategy states that, initially, the existing mechanisms and sources of funding will continue. It states also that IRRI's expert technical group will actively seek links to be a subcontractor for the rice component in large scale development projects.

For new projects in Theme 6 of GRiSP (IRRI et al. 2010), funds will be sought for partnerships, innovative communication and extension approaches. New funding is also required to build up a strong professional extension support team at IRRI to link science with development efforts on the ground. Further financial support is needed for development of internet based communication approaches and information systems.

e) Achieving sustainability

The objectives of the project 'IRRC Phase 4' are:

- Increase production of rice by 10% and income by 15% for smallholder families, leading to improved livelihoods for 500,000 people,
- Scale out successful technology options in partnership with NARES and other stakeholders,
- Strengthen capacity of NARES partners,
- Foster innovative research on irrigated rice-based cropping systems.

This document shows that the project is well under way to achieve these objectives. Indeed, it may be argued that these objectives are reached already. And the remaining year of the project will undoubtedly increase its impact even further.

This achievement is a compliment to IRRI and to all partners, as well as to the donors for supporting an innovative, and hence risky, approach. However, risks have been dealt with constructively (many partners, backstopping, regular feedback of operations, extensive communication, and learning from mistakes) and failures were few.

The NARES-partners, without exception, experience the IRRC as an effective mechanism to enhance their capacity to integrate mono-disciplinary interventions and respond to their national challenges (i.e. up-scaling), to attract and involve new partners (including other

government bodies, NGOs and private sector actors), and to jointly prepare for out scaling to many in the farming communities.

At the same time, while there is good progress in the capacity of the NARES, the process is not over. In none of the partner countries are the NARES ready to take over more than specific tasks, and remains IRRC needed for the broader framework. This does not reflect negatively on the IRRC, as multi-institutional capacity building is an inherently slow process. On the contrary: there is good progress and sustaining the course is rewarding. We therefore strongly recommend to continue with IRRC, i.e. to embark on planning a further Phase.

In some cases, we got the impression that sound agronomic and socio-economic information is lacking, as Workgroups in some countries focused entirely on outreach activities. Critical distance and curiosity were sometimes put on the back burner. The ERT recommends to put again slightly more emphasis on research, especially adaptive research in-country (like in Sulawesi) and critical (scientific) follow-up of pilot activities. Further, IRRC, thanks to its closeness to farmers, is in a good position to provide guidance to GRiSP towards new research issues.

Recommendation 10: Continue with IRRC, prepare Phase 5
- Promote more adaptive research in-country and scientific follow-up of pilot activities
- Develop a mechanism to provide guidance to GRiSP on new research issues

Phase 5 could see the further evolution of the Consortium to reach millions of farmers in SE Asia, to foster even stronger national NARES and NARES-NGO-private sector partnerships, to find ways to use an even larger part of the Rice Knowledge Base to make farming more profitable for households and more environmental friendly, and to increase the feedback of new research issues to GRiSP.

As international trade in rice develops, new demands for production and processing emerge. Introduction of the practical and formal parts of the Good Agricultural Practices (GAP) requires new partners and activities beyond IRRI's mandate (e.g. regarding food safety). We see IRRC as an appropriate vehicle to engage with other partners to develop national GAP (Good Agricultural Practices: a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economical, social and environmental sustainability). GAP is developed and promoted by FAO. Governments can produce and promote national and commodity specific versions of GAP.

7. Conclusions and summary of recommendations

IRRC has become an important part of IRRC and GRiSP. It is on its way to achieving many of its ambitious goals. There is ample evidence for widespread adoption and impact at household level (and beyond). NARES see IRRC as a mechanism to integrate and prepare for up-scaling of interventions. IRRI scientists see it as a platform and opportunity to get technologies to farmers.

The Coordination Unit does excellent work. It promotes an inclusive management of the Consortium. It created a high ownership among both, IRRI and national partners, and high esteem in the countries for IRRC's work. It guided, with the Steering Committee, the IRRC to establish a broad and relevant network of partners. IRRC's media team is particularly strong. The ERT recommends that IRRC establish the impact of key products of this team on farmers and extension.

NARES and other partners (from the private sector, NGOs and other government agencies) are on board in the IRRC largely because they see win-win situations in collaboration in order to reach their own goals. Funds from the IRRC core budget facilitate meetings and stimulate the interaction. This is a very efficient arrangement. Obviously, the extent to which this applies differs among workgroups and among countries.

Recommendations

The recommendations outlined above are presented here as a summary:

1: Fine-tune contents and interaction of Workgroups

- Quantify also environmental impact of IRRC technologies
- Adapt post harvest work to changes in production as promoted by other workgroups
- Define the interaction of the crop health workgroup with others
- Address also secondary effects of climate change (e.g. shifts in pest problems, salinity)

2: Further strengthen the ICOPs:

- Clarify their role and modus operandi
- Foster further integration of workgroups and technologies

3: Improve impact assessments to make strong cases

- Re-visit studies critically and jointly between natural and social scientists
- Undertake a meta study on assessments done so far in view of more focusing
- Broaden triangulation (to include national statistical data)

4: Integrate social and natural sciences

- Along the entire research-dissemination continuum
- To achieve higher impact

5: Re-construct the aims of IRRC

- To reflect the individual national priorities
- To serve as a framework for impact assessment

6: Maintain the existing workgroups of IRRC while improving integration of objectives

7: Re-visit the contents addressed by the workgroups

- Establish a lean mechanism to get feedback from users into priority setting of IRRC
- Address both, adaptation and mitigation in the climate change Workgroup
- Include “varieties” in IRRC work wherever there is potential for added value

8: Transfer leadership of specific tasks from IRRI staff to specific partners

9: Maintain the present geographical scope:

- Continue to focus on SE-Asia
- Seek stronger collaboration with (and input from) Thailand and China
- Be prepared to provide consultancy and expertise on Consortium set-up and management

10: Continue with IRRC, prepare Phase 5

- Promote more adaptive research in-country and scientific follow-up of pilot activities
- Develop a mechanism to provide guidance to GRiSP on new research issues

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Annex 1: Terms of Reference

External Review of the Irrigated Rice Research Consortium (IRRC)

Background and Terms of Reference

Background

Established in 1997 with support from the Swiss Agency for Development and Cooperation (SDC), the IRRC strives to ensure that rice farmers benefit from technologies arising through research. The SDC continued its strong support of the IRRC through funding a fourth Phase of the consortium through until December 2012. Our target is to assist farmers in irrigated rice-based systems to achieve increased profitability, food security, and environmental sustainability. The consortium has developed partnerships between national agricultural research and extension systems (NARES) and the International Rice Research Institute (IRRI) in eleven countries. The focus in Phase IV is on Southeast Asia and China. However, there are key activities in Bangladesh which focus on the diffusion of direct seeded rice, and alternate wetting and drying.

The IRRC has helped identify and address regional research needs in irrigated rice. Technologies have been developed and verified in farmers' fields, and pathways explored for their diffusion to end users (farmers, NGOs, private sector, policy makers). With a strong multi-stakeholder partnership, IRRC is contributing to Millennium Development Goals 1 (Eradicate extreme poverty and hunger) and 7 (ensure environmental sustainability) through increased efficiency of resource use (such as land, labor, water, fertilizer, and other inputs) and promotion of ecologically based management of pests and diseases (principally weeds and rodents in this phase), leading to sustained production in an ecologically and environmentally friendly context.

The external review of the IRRC Phase III recognized that the IRRC has helped IRRI pioneer the evolution and transfer of applied research to the research-extension interface. They believed we should "stay the course" and build on the extension delivery to rural communities. The review team also commented that the IRRC needs to strengthen the extension work of the partnerships in more systematic and strategic ways in future activities. In Phase IV we took up this challenge through developing a series of "innovation platforms" linked to national priorities, which will facilitate the diffusion of technologies at a district, provincial and national level. The innovation platforms were structured around action research facilitated through fostering stakeholder partnerships (e.g. learning alliances). Our main stakeholders are policy advisers, agricultural practitioners, farmers and farmer groups, and teaching institutions. The agricultural practitioners include government research and extension specialists (NARES partners), NGOs, and the private sector.

There continues to be a strong emphasis on innovative research directed at developing and testing technologies aimed at increasing productivity and production. This is achieved through five problem-solving Work Groups (WGs):

(i) **Productivity and sustainability WG**: with a focus on improved nutrient and crop management practices at the field and farm level for increased profitability in rice farming

(ii) **Water savings WG**: with a focus on increased productivity under water-scarce conditions

(iii) **Labor productivity and Community ecology WG**: with a focus on improving labor productivity, including effective community action for managing weeds and rodents

(iv) **Post production WG:** with a focus on improving post production techniques and access of farmers to market information on rice

(v) **Crop Health WG**: with a focus on crop production management (e.g. crop rotation and fallow management) and host plant resistance for managing insect pests and diseases.

The WGs are complemented by the IRRC Coordination Unit which facilitates the integration of activities of WGs, cross country learning, the research-extension interface, impact assessment, and the management of IRRC County Outreach Programs (ICOPs).

In April 2011, a sixth work group was formed – the **Climate Change WG**: with a focus on developing approaches and assisting farmers in mitigation of greenhouse gas emissions and adaptation to climate change and more severe climate extremes.

Development Goal of Phase IV
To improve the livelihoods of poor smallholder farmers in Southeast Asia by increasing their sustainable production of rice through the application of technologies from research on natural resource management.

Outcomes and activities
The expected outcomes of the IRRC Phase IV (IRRI 2008) are:

- Increased production for 500,000 small holder families in Asia; and for this increase to be sustained.
- Clear documentation of the processes that facilitated successful innovation and subsequent widespread diffusion of technologies.
- Within Asia, IRRC is the preferred source of information for new natural resource management technologies, and these technologies are integrated as key elements of best management practice for rice production in at least 4 countries.
- IRRC technologies adopted at a national policy level.
- Private sector and NGOs incorporated and disseminated IRRC technologies for the benefit of small holder farmers.
- Adopted technologies provide environmental benefits and are gender positive through reducing the drudgery of women and providing better opportunity for education of girls.

The key activities are summarized in the IRRC Phase IV logframe.

An effective Consortium requires effective management structures and communication

Management Structure

Each Work Group has an international scientist from IRRI as leader and they have NARES counterparts in their respective countries where they have activities. The spread of Work Groups in the Asian region is summarized in Table 1. The consortium is managed by a coordination unit that consists of a coordinating scientist, a social anthropologist (scientist), an agronomist (post doc), 1.5 specialist communicators, an agricultural economist (assistant scientist), and a social scientist (assistant scientist). The coordinator chairs a management team consisting of the WG leaders. In IRRI's new Global Rice Science Partnership (GRiSP), the IRRC is prominent in delivering outputs to Programs 3, 4, 5, and 6, and is clearly recognized as an important platform for facilitating multi-disciplinary research, conducting adaptive research for impact in the intensive rice-based systems and for scaling out research findings.

The IRRC has a steering committee composed of leading representatives of NARES and NGOs from five major Asian rice-growing countries. The steering committee meets face-to-face yearly and they are provided with regular email updates (at least 3 a year) by the IRRC coordinator.

Communication

The main avenues for communication are:

1. Regular email contact and visits to countries by individual WG leaders and the IRRC coordinator.
2. RIPPLE newsletter that is published three times a year and is designed to improve communication between NARES and IRRI and raise the profile of IRRC in the wider agricultural community in Asia (and elsewhere).
3. IRRC web site – this is updated at least every two months. And the development and cross-linking to web sites of the IRRC Work Groups
4. Contribution to the IRRI Rice Knowledge Bank
5. Regular contributions to the IRRI weekly bulletin, and the quarterly Rice Today magazine.
6. Press releases, videos, displays at conferences, brochures, flip charts, etc.
7. Sponsored cross-country learning of NARES partners through attending international conferences, training courses and the annual IRRC Steering Committee meeting.

Terms of Reference

The main objectives of the review with be the following:
1) To assess progress (key outputs, outcomes and impacts) and future direction of the Consortium

2) To identify areas to strengthen, modify, and refocus to enhance the Consortium's mechanism and activities

3) To assess relevance and quality of research and extension undertaken to meet farmers needs and identify the gaps

4) To assess the current Consortium setup and develop recommendations to sustain Consortium activities, if required

5) To review the effectiveness of IRRI-NARES collaboration, and IRRC-civil society and IRRC-private sector partnerships for sustaining research and extension partnerships in member countries

The Terms of Reference are structured as follows:

TOR 1. Achievement of project objectives (against the logframe for IRRC phase 4)

Assess the efficiency of the IRRC in achieving each of the following objectives and the extent to which they have been reached. The assessment should concentrate on the key outcomes (direct and indirect), and implications that arose from the activities.

1(a). Strengthen research and research-extension partnerships in the respective countries
(How have partnerships evolved and been strengthened in this phase? What is the strength of the partnerships from a research perspective? Has the IRRC developed appropriate partnerships in research-extension which will enable sustainable adoption of technologies? During the previous phase of the IRRC, there were few activities in Laos, and Cambodia, and new linkages in Myanmar. How effectively have these three poorer countries been integrated into the IRRC in this phase?)

1(b). Strengthen capacity of NARES partners
(*In-country training; attendance at Workshops, Conferences or Training Courses; Post-graduate training; short term on-the-job training at IRRI; etc*)

1(c). Develop improved approaches and technologies for more productive and sustainable production
(How have the respective WGs performed against their logframes? Assess the quality of science and applications of sound approaches in the development of best practice and technology options within the different IRRC Workgroups)

1(d). Disseminate promising production principles and technologies through IRRC Country Outreach Programs (ICOPs). (*How has the ICOP structure facilitated the research-extension interface in-country? Did the main ICOP activities in each country produce the expected results? How successful is the Innovation platform (ICOP) model in achieving its goal of coverage (10,000 ha) and linkage to national priorities? How successful is this model in facilitating the scaling out (increased diffusion to end users) and scaling up (policy impact) of IRRC technologies? What is the quality of extension materials, newsletter, web site? Have these strengthened the networking at a multi-country consortium level? How well did the "innovation platform" engage key actors in both the public and private sector in the different countries? What are the lessons learned, the pros and cons of this model? Which adaptations are required for the future?)*

TOR 2. Project Outcomes and Impacts

Assess actual and/or potential impacts, drawing upon evidence of uptake of project outputs by user groups (e.g. NARES partners, farmer groups, policy makers, training institutes/ Universities, private sector, other researchers). Assess the performance of the IRRC as compared to expected outputs of the different components as set in the logframes. Comment on strengths and weaknesses.

2(a) *Farmer Community level impacts (social (including gender), economic, environmental etc.*): Indicate how the outputs of phase 4 have been taken up and assess the probability of

potential take up by users at micro, meso and macro levels and how these already have and may be translated into impact on the community (positive or negative) within the next five years. Community impact includes impact on farmers and consumers (micro), training institutions and extension agencies (meso: inclusion of IRRC outputs in national programs, propagation) and policy-makers (macro; policy decisions, decrees) and should address environmental impact. Research on gender & equity aspects: what are the findings across promoted technologies, WGs and countries?

How well have the impacts been quantified? Suggest what could be done to facilitate and better document community impact(s) in the last 15 months of the project.

Is the IRRC likely to reach its target by December 2012 of increased production for 500,000 small holder families in Asia; and for this increase to be sustained. Has there been appropriate documentation of the processes that facilitated successful innovation and subsequent widespread diffusion of technologies? What were the successes, what the drawbacks?

2(b) *Innovation/ business model development* (production economics + innovation process): How successful was this aspect in the different WGs and countries?

2(c) *Capacity building impacts:* Evaluate the extent to which the project has increased capability, knowledge and skills of partners and end-users, through their participation in the project and its training elements. Did the Consortium meet its goal of strengthening the capacity of 1,000 NARES, farmers, and other actors? Evaluate the impact on the capacity strengthening of collaborating research institutes to continue related research and extension activities (assess the direct and indirect effect of training).

2(d) *Scientific impacts:* Assess the scientific outputs in terms of their potential contribution to other scientific projects or activities through their publications, presentations at scientific meetings and workshops, initiatives in arranging workshops and training courses, post-graduate supervision. In particular, review how IRRC technologies have been integrated into University curricula in different IRRC countries etc.

2(e) *Policy impacts:* Assess the extent to which IRRC technologies have been adopted at a national policy level. Also assess how effectively the IRRC has engaged with NGOs and the private sector?

TOR 3. Execution of the Consortium

3(a) Assess the effectiveness of the IRRC structure and organization in optimizing the implementation of the Consortium's research and extension agenda
- Comment on the level of cooperation and synergy between the coordination unit and WGs, and between the WGs? How well does the Consortium integrate with other scientists and Consortia at IRRI (provide added value)?
- How well has the IRRC been integrated within the new IRRI program and product structure of GRiSP?
- How well has the IRRC engaged with the Steering Committee? Has the IRRC taken advantage of the expertise available to them?

3(b) Assess the efficiency of the IRRC phase 4 as a platform for adaptive research compared to phase 3 in:
- developing collaboration and cooperation during the project between countries, institutions and individuals;
- leveraging resource from Consortium members, and other donors; and assisting partners to raise the profile of their work nationally and internationally;
- strengthening multi-institutional and interdisciplinary research;
- providing a framework for effective disciplinary and regional networks

3(c) How have the partnerships evolved (between the different NARES, between NARES and IRRI, the private Sector, CSOs, Universities)? What was the evolution of financing IRRC

activities through national funds throughout Phase 4 e.g. Thailand, and China. Has the counterpart contribution/ ownership of Indonesia, Vietnam, Philippines increased? What are the lessons learned for IRRI/ IRRC/ national counterparts (research and extension)?

Is the IRRC creating partnerships that will be sustained once funding from the IRRC comes to an end? Has further funding been attracted based on these IRRC partnerships?

3(d) Consider the formal documentation including reports and publications resulting from the project and its accessibility to potential users, including development / extension agencies from both the public and private sector (including NGOs).

3(e) Assess mechanism put in place for Consortium sustainability in terms of funding, collaboration structure, future demands.

TOR 4. Future directions of the Consortium

4(a) Assess the current Consortium setup and develop recommendations on the need to sustain Consortium activities based on perceived needs/ opportunities/ challenges (e.g. WG setup; agro-ecosystem focus; etc.). While new WGs have begun this phase, are there any long term WGs that can be discontinued or reduced? Have certain WGs reached 'climax' stage?

4(b) Comment on the role of the IRRC in sustainably delivering technologies for natural resource management in lowland intensive rice production and its benefits for the rice farmers in Asia . How has the role of the national partners and IRRI evolved over time in the different WGs? Is there still a need for a mechanism such as the IRRC?

4(c) If the IRRC is to continue, what is its scope beyond Asia? What are pros & cons to stay focused on Asia 'only'? What are the future challenges in intensive irrigated rice production and how does this impact the WG portfolio? Could the IRRC be interesting for other financing sources?

4(d) How does GRiSP (program & funding) influence the functioning of the IRRC in the short and longer term? Is there room for a new scope for the IRRC? How relevant is the current IRRC within GRISP? What are possible interesting links to other initiatives?

4(e) Advise IRRI and donors on what, if any, follow-up activities and support would be desirable to ensure long-term benefits from the project (including spillovers to other countries).

Table 1. The involvement of the respective Work Groups and the IRRC country outreach programs by country in Phase IV (January 2009 to present).
□□□ = high level of activity; □□ = moderate level; □ = low level

Workgroup	Bang-ladesh	Cam-bodia	China	Indo-nesia	India	Laos	Myan-mar	Philip-pines	Sri Lanka	Thail-and	Viet-nam
Productivity & Sustainability	□□□		□	□□□	□□		□	□□□			□
Labor productivity& community ecology	□	□□□		□□	□□		□□	□	□□	□	□□
Water saving	□□		□	□□		□□□	□□	□□□		□	□□
Postharvest		□□□		□□		□	□□	□□□		□	□□□
Crop Health				□			□	□□□		□□□	□□□
IRRC Country Outreach Programs	□□		□	□□□		□	□□□	□□□		□□	□□□

Annex 2: Methodology for the external review

The review was complicated by the fact that reviewers did not meet at the beginning. We therefore agreed on a common methodology before the field visits:

1. The team used a common set of questions that were addressed during the interviews (marked "Interviews" in Table A). These questions were arranged in the Interview Guide (Table B). We did not intend to address all these questions in each interview. An intelligent selection was made depending on the interview partner.
2. The team asked IRRC to compile several tables and lists (marked "Table" in Table A). These allowed the ERT to have an overview and probe on some elements of the tables in the different countries we visited. A format for each table was proposed.
3. Some questions stipulated in the TORs could only be answered once the ERT met (marked "panel" in Table 1), as they required a high degree of aggregation and overview. Of course, all the other questions were also discussed jointly, but they were formulated in a way that allowed for getting partial answers in each interview.
4. For the country visits that took place after we all met at IRRI (Philippines, Bangladesh and Indonesia), a report per country was written. This was the basis for verifying and modifying the preliminary findings elaborated while meeting face-to-face at IRRI.

Table A: Proposal on how to address the questions in the TORs

TOR	Question	Addressed
1	**Achievements as compared to the logframe**	
1a	**Strengthening research and research extension partnerships**	
	List of partners 2008-2011	Table
	Why did partners join, why did other partners stop collaborating with IRRC?	Interviews
	What did IRRC do to strengthen certain partners, evidence of success?	Interviews
	Which special efforts did IRRC make in Laos, Cambodia, Myanmar, success?	Interviews
1b	**Strengthening capacity of NARES partners**	
	List of training and other capacity development events/activities 2008-2011	Table
	What evidence exists that the event/activity had an effect	Interviews
1c	**Developing approaches and technologies for more productive and sustainable production**	
	Self-evaluation of WGs against their log-frames, provide evidence that indicators therein were reached or explanation why they were not fully reached	Report WGs
	What can be learned about approach/technology development	
1d	**Disseminating promising results through ICOPS**	

	What will we see during the mission regarding each ICOP?:
	• What are the main activities of the ICOP? How is it organized?
	• What are the main achievements of the ICOP? → Choose 1-3 cases of successful dissemination
	  ○ How did dissemination take place (meetings, face-to-face, Internet etc.)?
	  ○ Who participated, how?
	  ○ What were the expected results, to what degree are they achieved?
	  ○ How is further scaling up and scaling out organized
	  ○ What is the area coverage at present? Projections?
	• What are the strengths and weaknesses of the ICOP?
	• Ideas for improvements of the functioning of the ICOP?
		Mission Interviews

	What is the quality of extension material? How can it be used across countries?	Interviews
	What is the bottom line regarding ICOPs: Impact, lessons learned, adaptations for the future?	Analysis
2	**Outcomes and impacts**	
2a	**Impact at household and community level**	
	Which are the 10 most successful technologies developed in phase 4?	Table
	For each: • Are there several target groups? • Take-up by users (present and next 5 years)? • Present and potential (next 5 years) impact? • At what level (micro, meso, macro)? • Are there data on use and impact of technology segregated by gender and social strata? • What were the factors of success for technology development and spread?	Mission, Interviews
	What research was done on equity and gender aspects? What were the findings?	Interviews

	Were there any adoption and impact studies done or planned? Findings?	Interviews
	How could community impact be better documented in the coming 15 months?	Panel
	What were the 5 most important flops in technology development or spread?	Table
	What were the reasons for failures of these innovations?	Interviews
	What are the lessons learned on innovation development?	Panel
2b	Which innovation and business model was employed? How successful was it?	Reports Interviews
2c	**What was the effect of on-the-job and event training on NARES strengths?**	Interviews
	Is there evidence that NARES partners do a better job due to training?	Interviews
2d	**How was the work of IRRC publicized? List of publications**	Table
	Have IRRC technologies been integrated in university curriculae?	Interviews
2e	**Have IRRC technologies and findings impacted on national policies?**	Table
	What was the outcome of this involvement in policy dialogue	Interviews
	How has IRRC engaged with NGOs and the private sector	Interviews
3	**Execution of the Consortium**	
3a	**Effectiveness of IRRC structure**	
	Is cooperation between the coordination unit and WGs and among WGs appropriate?	Interviews
	Does IRRC collaborate with other IRRI scientists and other Consortia? Is there value added?	Interviews
	What is the relationship between IRRC and GRiSP?	Interviews
	Is IRRC taking advantage of the expertise and contacts of its Steering Committee?	Interviews
3b	Was IRRC more efficient in stimulating/coordinating adaptive research in phase 4? • Developing collaboration between countries, institutions and individuals? • Leveraging resources (e.g. by raising the profile of partners)? • Strengthening multi-institutional and multi-disciplinary research? • Providing a framework for effective networks?	Interviews
3c	What is new in phase 4 regarding partnerships (NARES, IRRI, private sector, CSOs, universities)?	Interviews
	How and what for has national funding been attracted? What were the effects?	Table Interviews
+3e	Are IRRC partnerships and its structure sustainable (beyond project life)?	Panel
3d	Is IRRC reporting useful for target users (result versus activity reporting)?	Docs
4	**Future of IRRC (still needed? to do what and where? relation to GRiSP?)**	
4a	How should the consortium set-up evolve (WG portfolio, ag-ecosystem focus)?	Panel
4b	What was/will be the relevance of IRRC for the rice sector (will GRiSP take over)?	Panel
4c	What should be the future orientation of IRRC (beyond Asia, portfolio, financing)?	Panel
4d	What is and should be the relation between IRRC and GRiSP?	IRRI
4e	What should be the future of IRRC after completion of phase 4 (in 2012)?	Panel

Methodology for pre-analysis of findings during country visits

During country visits, each evening the two members of the ERT got together and agreed on the bottom line of the day. The basic question was: "What have we learned about IRRC and irrigated rice from each interview or visit?" The main purpose of this exercise was to have a continuous exchange between the two members. It was meant to help broadening the perspective, identifying the main findings, uniformizing criteria and identifying questions to be further addressed during the next days.

This was done with pin-board cards and markers, which had the advantage of limitation in space (you can fit only a certain amount of text on these cards). Further, the two members could easily work together using these cards. Finally, the cards were later re-arranged for further analysis and comparison between the countries. We used them also for mutual exchange during the meetings at IRRI.

From each interview or visit a maximum of ten cards (2 to 10 cards) were written. Each card was identified (labeled) on the back with the interview it came from. If it referred to a specific issue from the TORs, the number (e.g. 2c) was added.

The different categories of findings and the color code used were:

Yellow	General findings (on the country, its opportunities and challenges)
White	Innovation development (achievements, strengths and weaknesses, impact)
Blue	Approach, set-up and orientation of IRRC and related activities
Green	Future of IRRC and general conclusions

Table B: Interview guide

TOR	Question	Refer to
1	**Achievements as compared to the logframe**	
1a	**Strengthening research and research extension partnerships**	
	Why did partners join, why did other partners stop collaborating with IRRC?	Table
	What did IRRC do to strengthen certain partners, evidence of success?	
1b	**Strengthening capacity of NARES partners**	Table
	What evidence exists that the training events/activities had an effect	
1c	**What developing approaches and technologies were developed by WGs**	
	What can be learned about approach/technology development?	
1d	**Disseminating promising results through ICOPS**	
	• What are the main activities of the ICOP? How is it organized?	
	• What are the main achievements of the ICOP?	
	→ Choose 1-3 cases of successful dissemination	
	o How did dissemination take place (meetings, face-to-face, Internet etc.)?	
	o Who participated, how?	
	o What were the expected results, to what degree are they achieved?	
	o How is further scaling up and scaling out organized	
	o What is the area coverage at present? Projections?	
	• What are the strengths and weaknesses of the ICOP?	
	• Ideas for improvements of the functioning of the ICOP?	
	What is the quality of extension material? How can it be used across countries?	
2	**Outcomes and impacts**	
2a	**Impact at household and community level**	
	For the 10 most successful technologies developed in phase 4:	Table
	• Are there several target groups?	
	• Take-up by users (present and next 5 years)?	
	• Present and potential (next 5 years) impact?	
	• At what level (micro, meso, macro)?	
	• Are there data on use and impact of technology segregated by gender and social strata?	
	• What were the factors of success for technology development and spread?	
	What research was done on equity and gender aspects? What were the findings?	
	Were there any adoption and impact studies done or planned? Findings?	
	What were the reasons for 5 most important flops in technology development or spread?	Table
2b	Which innovation and business model was employed? How successful was it?	
2c	**What was the effect of on-the-job and event training on NARES strengths?**	
	Is there evidence that NARES partners do a better job due to training?	
2d	**How was the work of IRRC publicized?**	
	Have IRRC technologies been integrated in university curriculae?	
2e	**Have IRRC technologies and findings impacted on national policies?**	Table
	What was the outcome of this involvement in policy dialogue	
	How has IRRC engaged with NGOs and the private sector	
3	**Execution of the Consortium**	
3a	**Effectiveness of IRRC structure**	
	Is cooperation between the coordination unit and WGs and among WGs appropriate?	
	Does IRRC collaborate with other IRRI scientists and other Consortia? Is there value added?	
	What is the relationship between IRRC and GRiSP?	
	Is IRRC taking advantage of the expertise and contacts of its Steering Committee?	
3b	Was IRRC more efficient in stimulating/coordinating adaptive research in phase 4?	
	• Developing collaboration between countries, institutions and individuals?	
	• Leveraging resources (e.g. by raising the profile of partners)?	
	• Strengthening multi-institutional and multi-disciplinary research?	
	• Providing a framework for effective networks?	
3c	What is new in phase 4 regarding partnerships (NARES, IRRI, private sector, CSOs, universities)?	
	How and what for has national funding been attracted? What were the effects?	
3d	Is IRRC reporting useful for target users (result versus activity reporting)?	
4	**Future of IRRC (still needed? to do what and where? relation to GRiSP?)**	
4a	How should the consortium set-up evolve (WG portfolio, ag-ecosystem focus)?	
4b	What was/will be the relevance of IRRC for the rice sector (will GRiSP take over)?	
4c	What should be the future orientation of IRRC (beyond Asia, portfolio, financing)?	
4d	What is and should be the relation between IRRC and GRiSP?	
4e	What should be the future of IRRC after completion of phase 4 (in 2012)?	

Annex 3: Report from visit to Vietnam

Visit of Frits Penning de Vries and Karin Zbinden Gysin to IRRC-partners in Ho Chi Minh City and An Giang from 29 August to 2 September 2011, accompanied by Dr. Florencia Palis, IRRC social scientist, and Dr. Grant Singleton, leader of Coordination Unit, IRRC.

a) Rice and rice production in the Mekong Delta, Vietnam

The Mekong Delta provides 50% of Vietnam's rice and is inhabited by only 20% of the population. The other major irrigated rice area is in the Red River Delta in northern Vietnam. Many farmers in the South produce three crops per year, those with flood-prone fields two. Major areas are already diked, allowing growing the third crop. The average paddy rice yields in the two main seasons, spring and autumn, are now 7.3 and 5.4 t ha^{-1} respectively in the province An Giang, with 235.000 ha of rice fields. Measured over the last 7 years, the average increase in the spring yield has been a respectable 100 kg ha^{-1} yr^{-1} but that of the autumn paddy remained stable (An Giang Statistical Office). Farmers we visited reported yields of 6, 7 and 6.5 t ha^{-1} depending on the season, and are apparently 'average' for the Province. The national average rice yield is 5.2 t ha^{-1} and it has risen about 110 kg ha^{-1} yr^{-1} in the last decade, making Vietnam the 5th largest rice producer in the world (source: FAO).

It was reported by several of our interview partners and resource persons that things go so fast that new features or techniques are sometimes already proposed before the impact of the 'old' ones is evaluated.

b) Approaches and results of IRRC

In the Mekong Delta, An Giang Province, all IRRC workgroups work together within the ICOP and launched in 2009 the program "one must do – five reductions" (1M5R, 'must do' refers to certified seed, '5 reductions' refer to water, fertilizer, labor, pesticides and post harvest losses). The program builds on former experiences with IPM and "three reductions – three gains", introduced in previous phases. A handbook was produced, already 4300 farmers trained, information given out via TV and radio. The approach is very much appreciated by the partners as being more integrative than they experienced so far with single-focus donors. It shows that the transfer of the IRRC technologies to NARES was successful.

Although some farmers report had to convince their wives for adopting 1M5R, there is no training addressed to women so far. All partners, the University DARD, IRRI staff and the farmers have an understanding of the importance of integrating gender and environmental issues, but no research or dissemination is done to follow this up. There seem to be clear implications about gender issues in the program(s), but there are no projects about implementation of gender sensitive activities.

It is remarkable that the 1M5R program aims at improving income by reducing cost and not by increasing yield. The farmers we met appeared to accept this fully. However, this approach might not work as well in provinces where yields are lower.

The process of disseminating 1M5R is fostered by relatively few very motivated persons. At the level of local research more could be done, as people have enough expertise but are still waiting for more inputs and activities coming from other ICOP members, especially IRRC ("consumer attitude"). Some mentioned that there are actually too few staff to carry out desirable IRRC-activities in Vietnam and that those who retire may not be replaced in these functions. We noticed a strong demand for short (courses) and long training (MSc, PhD).

In the Post Harvest workgroup a business model was developed where technologies are provided to rich farmers and other actors who then provide the service to others. The workgroup post-harvest deals with few but big stakeholders (often millers, traders and

contractors) who can afford buying machines and hence the model can rely on individual coaching and advisory. On the other hand, on crop production topics many extension workers and farmers have to be trained properly. This is usually done in training courses (Training of Trainers of farmers groups).

One of the SC-members is from Vietnam. He is an IRRI alumnus and Deputy Director General of the Crop Department of the Ministry of Agriculture. He takes an active role in promoting 1M5R and related programs and is an effective link to the government. He would support a relatively stronger role of Vietnam in a continued IRRC.

c) Results of IRRC

As for the measuring impact, there is a baseline and a post-baseline study. Results are not yet fully analyzed as the study was finalized recently. First results show that farmers implementing 1M5R go in a first instance for profit, not yield, as they were told in the trainings. Some add that they are concerned about family health and safe food and an environment that is not too much polluted, or that they have more time for the family (because of the grain drier). Farmers told us they still exchange experiences with other members of the training group. They also disseminate actively 1M5R amongst their neighbors and are willing and feel confident to train other farmers. The farmers in the second village we visited report that they neighbors adopted 1M5R mostly partially: 80% reduced the seed rate, 100% the water (AWD), 50% spraying, 100% post harvest losses. About 50% of the fields are planted with certified seeds. The post-baseline survey estimates that 15.450 (8%) of the farmers in An Giang have adopted 1M5R and that it is practiced on 23.800 ha (12% of the rice growing area). More extensive data will be available by end of 2011.

d) The future

The ICOP in An Giang is already working on a proposal for elaborating Good Agricultural Practices (GAP) for rice in Vietnam (VietRice GAP). Until 2015 the objective is to have more than 90% of the production certified under GAP and 50% produced with 1M5R technologies. This project will need get further private sector companies on board. A real learning alliance is not operational, but it is still on the agenda as it shines up in presentations. Channels for questions and answers ‘up and down’ through institutions seem not to work as well as they should.

Annex 4: Report from visit to Cambodia

Visit of Jonathan Banks and Urs Scheidegger to IRRC-partners in Phnom Penh and August 28 to September 1, 2011, accompanied by Dr. Martin Gummert and Dr. David Johnson, IRRC and Dr. Meas Pyseth, Ministry of Agriculture, Forestry and Fisheries.

a) Rice and rice development

Cambodia, with a population of 15 million people, has about 2.7 million hectares planted to rice for an annual production in 2010 of 8.25 million t paddy. Official statistics show rapidly rising production since 2008, with exports of about 800,000 t paddy equivalent in 2009-10. It is estimated that a further 3 million t is purchased informally by traders from neighboring countries and taken out of Cambodia. Some widely grown local varieties of rice are favored by markets/consumers and export purchasers (as milled rice). It is Cambodian government policy to increase exports >1 million t by 2015, with exports as milled rice, not paddy. Per capita rice consumption in Cambodia at 140 kg per year is one of the highest in the world.

Cambodia has a shortage of agricultural labor in some rice-growing areas. About one quarter of the population has household incomes of less than $2 a day.

There is a good and developing network of agricultural extension workers and agricultural research institutions. Many international and NGO aid and development organizations are active in Cambodia, with activities that may include work in the rice value chain.

Purchasing of rice from producers is solely in the hands of private sector traders and millers.

b) Approaches and structure of IRRC

The IRRC works closely with several local organizations involved with rice production, development and improvement. The ERT had the opportunity to interact with representatives of:

- Ministry of Agriculture, Forestry, and Fisheries (MAFF) and its extension organization, Department of Agricultural Extension
- Cambodian Agricultural Research and Development Institute (CARDI)
- Cambodian Agricultural Value Chain Project (CAVCP)
- International Development Enterprises-Cambodia (IDE)

c) Results of IRRC

Rice production methods in the larger farming units in Cambodia are rapidly changing, particularly in relation to mechanization of harvesting and some postharvest handling. There are a large number of mechanical harvesters now in use (2011), with more in stock for sale. Millers are installing flat bed and falling column dryers, capable of handling and drying wet season crop with good quality outturn including head rice yield on milling.

At this time, the building blocks for improvement of rice productivity are available and in demonstration or pilot village use, but there is not yet widespread adoption amongst small scale farmers. These include designs for improved granaries, understanding of seed and processing quality of rice and improved drying systems (flat bed dryers).

There is no good and recent adoption data available for IRRC-based projects and IRRC-inspired adoption. The situation today with regard to attribution is confused with introduction of rice production and postharvest systems by private sector participants and various

agencies outside the IRRC. However, it can be said that adoption of many of the improvements was catalyzed by IRRC initiatives and designs.

The introduction of rapid mechanical harvesting systems as much increased the potential for multiple cropping of rice in rain fed and irrigated areas. A move away from growing traditional long season, photoperiod sensitive varieties will be needed to move the potential of multiple cropping into reality.

Flat bed driers, such as pioneered under IRRC, are now being installed for contract drying by the private sector.

Attempts to improve the prices that farmers receive from traders/millers for their rice have been only limited in success. Notice boards were introduced for some key villages on which prices were posted for rice on various markets to assist farmers to negotiate a fair price. While these boards are no longer updated, it was said that the process has made some producers more aware of what a reasonable price is for their rice. At village level, there may only be a single purchaser, restricting negotiation power.

The Superbag project, a system for improved storage of rice seed, is still being pursued, but adoption has not been as fast as elsewhere. It is likely that objections to its use will be overcome in the near term, giving farmers the ability to store their rice seed in good condition until planting, with improved retention of germination and vigor, also avoiding the need for purchase of seed at high prices at planting time.

d) The future

The rapid introduction of various technologies for rice production and postharvest use by private sector and various agencies pose a substantial challenge to orderly IRRC and NARES-led introduction and improvements in the rice value chain. While many of these activities are most welcome (e.g. further introduction of flat bed dryers), others may be in a form that change the environment in which the IRRC seeks to introduce other improvements.

As examples, there may be unintended consequences to IPM systems for crop establishment and pest management. Ground preparation prior to seeding becomes increasingly important, with a need to establish very even crop growth and maturity for efficient mechanical harvesting. Mechanical harvesters may increase soil compaction and unevenness, but with increased potential for laser leveling to correct this. Removal of bunds for land consolidation may decrease predator refuges for IPM.

Increased production and an emphasis on export of high quality milled product are likely to bring need for increased and better storage and transport. Double cropping will alter harvest flows and bring an urgent need for capacity to dry large quantities of wet harvested paddy. Some work may be required to ensure losses postharvest are minimized and rice quality is maintained in transport and storage.

Overall, there will need to be enhanced coordination between the various work groups to ensure continued rational integration of their outputs in the changing Cambodian rice value chain.

Successes in introduction of IRRC-led and other improvements in the rice supply chain have already led to some similar products being offered into the Cambodian system. These include various flat bed dryers and, it is said, look-alike versions of the Superbag. There is concern that some of these products may have inferior performance to the equivalent IRRC product. The IRRC, as an independent entity, is in a position to observe performance of these products and advise on specifications.

Annex 5: Report from visit to The Philippines

Visit of Karin Zbinden Gysin to IRRC-partners in Bohol / Philippines on 7 and 8 Sept 2011, accompanied by Ms. Rica Flor, assistant scientist, IRRC.

a) Rice and rice production in Bohol, the Philippines

Bohol has a population of some 2 Mio, of which 70-80% of the households work at least partially in agriculture and rice production. The Island of Bohol contributes only 1.2% to the total rice production in the Philippines. The share of irrigated rice to rain fed rice production is about 55 to 45%, with a potential to nearly double the irrigated area in the future. With 2.55 t/ha in two crops the yields in Bohol are amongst the lowest in Central Visayas and even in the Philippines (irrigated rice 3t/ha, rain fed 2t/ha). This covers the needs of households but there is not much to be sold. The sufficiency level for Bohol is thus only around 70%, but with the new schemes the yield for the first crop rose by 14% compared with last year.

b) Approaches and structures of IRRC

In the Philippines IRRC facilitated the establishment of ICOPs and learning alliances (PIPA Workshops). The ICOP is integrated in PhilRice where it teams up for the dissemination of new technologies (PalayCheck).

The ICOP and its learning alliances in Bohol are very active. It translated guidelines for SSNM and AWD, verified the AWD in demonstration fields and did a technical verification of the DS. The ICOP organizes several trainings for extension workers, farmers and institutional development officers.

The farmers in both Barangay visited (including the extension workers / institutional development officers) were trained for AWD. They form water user associations in order to get the training and technical support.

In the case of Valladolid this is in form of three water pumping stations providing water to 150 farmer households in a public-private partnership with the local government and Syngenta (trial with local adapted hybrids). IRRC facilitated via the ICOP the introduction of AWD and SSNM.

In Pilar the farmers get the water from the National Irrigation Administration (NIA) and support for the reinstallation of the milling equipment and a flatbed dryer. In Valladolid AWD is implemented in order to have a better share of water for all farmers. Reducing the water for irrigation means as well reducing the salinity, as the water in the river gets mixed with salt water from the sea during high tide. In Pilar the irrigation channel run by NIA imposes a forced AWD, as NIA developed together with the farmers upstream and downstream an irrigation scheme that allows to have water for all, but only on certain days. IRRC facilitated the elaboration of the new water scheme that allows the farmers upstream and downstream a secure yield every year.

In 2009, IRRC launched a Learning Alliance (LA) including farmers, extension workers and other stakeholders. The LA met several times every year, defined the topics (hermetic storage and business model) and did a baseline survey. The newest project deals with methods for volumetric prizing for irrigation water, working closely together with NIA who runs the main irrigation channels.

c) Results of IRRC

The **ICOP** has several projects accomplished since 2009, including tests with AWD (result: same yield with less water, best yield with low to medium water level), the translation of guidelines into local languages, distribution of 5'000 guidelines, 100 trainings, 33 on-farm

trials on AWD and SSNM. In new projects the ICOP does tests with the post-harvest workgroup and the Crop Health workgroup. The ICOP is well established, involving different partners, and quite independent from IRRC. But the members of the ICOP feel comfortable to be still linked to IRRC.

In **Valladolid,** 33 farmers of the Water User Association have been trained in AWD and SSNM. Some 20 have adopted both technologies. The increase in yields of nearly 1t/ha is attributed mostly to the SSNM and the new varieties. It allows all the 150 families to have enough rice (even those who own only ¼ ha) and to sell some. AWD allowed them achieving the same yields with lesser water. Up to now they don't know yet how much costs they can save as they didn't get the bill yet. Normally they irrigated 10 to 12 times per year, now only 7 to 10 times. The impact could be improved if all the farmers adopt the PalayCheck. The members of the Valladolid Water User Association would like to have more training in new IRRC technologies and require advise of how to deal with problems they have (e.g. salinity, snails).

In **Pilar,** the impact of the AWD can be measured through the number of farmers who can pay the fees for the water. Those farmers who yield less than 1600 kg are excused from paying fees. In 2009 only 14% paid the fees, in 2010 some 45%. The new scheme of water distribution (forced AWD) allowed all farmers to have a good yield on their fields. Some farmers in the downstream area planted rice even in places they did no longer use in the last years as they hardly ever received enough water. The farmers in the downstream area are happy with the irrigation scheme while the upstream farmers feel deprived, although they did not suffer from lower yields because of the forced AWD. Pilar has 130 households, the neighboring Water User Association 200. Altogether some 1700 persons in the downstream zone profit from the new water scheme allowing a secure yield for all. (But we don't know how many of them had enough yield without the AWD before the new scheme was implemented). With AWD, farmers observe more stem borers. They attribute it to AWD rather than to non-synchronous planting (as the researchers do). The latter is not possible as many farmers don't have the money for paying the transplanting early enough while others plant as early as possible to ensure a good yield. The problem for many farmers in the Pilar Water User Association is that they know how they should fertilize (PalayCheck), but don't have enough money to buy the fertilizer. IRRC or the ICOP could probably act again as facilitators.

The **Learning Alliance** found other funding sources and thus became independent from IRRC.

Annex 6: Report from visit to Indonesia

Visit of Jonathan Banks and Urs Scheidegger to IRRC-partners in Bogor and Southeast Sulawesi on Sept 8 to 10, 2011, accompanied by Dr. Madonna Casimero, project scientist, IRRC.

a) Rice and rice development

Indonesia has 240 million people and 12.9 million hectares of land is planted to rice annually, of which 75% is irrigated rice. In 2010, Indonesia produced 66 million t of rice; the aim in 2011 is to produce 70 million t to reach full self-sufficiency. The president has further set a target of 10 million t of surplus for 2015. This means about 20 million t of production increase from 2010 to 2015.

The government has an impressive number of 29'000 extension workers and would like to increase this number so that each of the 40'000 villages would have an extensionist. Subsidies are provided for fertilizer and seed. Presently, for 2.8 million ha of rice (basically the farmers participating in a Farmer Field School) subsidized fertilizer is provided. Either, 75% of the recommended dose is provided free or fertilizers for these farmers are provided at a subsidized price (at about 40-50% of the market price). The ERT could not find out, which of both versions applies. Yet, farmers in the village visited by the ERT in Southeast Sulawesi complained that in the present season, subsidized fertilizer has not yet arrived (6 weeks into the cropping season).

b) Approaches and structure of IRRC

Several government agencies are involved in rice development and are working with IRRC. They are all committed to the government's target of boosting rice production, which means increasing yields, as the rice cropping area can hardly be further expanded. The ERT had the opportunity to interact at central level with representatives of:

- ICFORD (Indonesian Center for Food Crops Research and Development)
- ICRR (Indonesian Center for Rice Research)
- AIAT (Indonesian Center for Agricultural Technology Assessment and Development), who is the central authority overlooking extension work in the country (from the provincial level extension agencies right to the village level extension workers)

The ERT found among these bodies a high appreciation of IRRC's work. The management of these bodies is determined to expand and replicate the work of IRRC to entire provinces and the whole country: Indonesia's "Mega Project" on rice improvement works with ten technologies formulated in 2007, and most of them are national adaptations of IRRC technologies. The IRRC Steering Committee member especially appreciates, besides the technical work of IRRC, its approach to technology development, adaptation and dissemination.

IRRC implemented over the past three years an ICIAR funded project in South and Southeast Sulawesi. Other activities were implemented in other parts of the country and a new study covering all of the important rice growing environments is planned between Indonesia and IRRC: The "Digital system for precision farming", which will validate the rice Nutrient Manager and further develop it towards and Integrated Crop Manager.

c) Results of IRRC

At national level, the set-up of the extension and research services for top-down diffusion of technologies is well developed. The question is, if these services are strong enough at the bottom.

Here lies the importance of IRRC's project in Sulawesi. This is an excellent example of participatory technology adaptation: Farmers jointly decided what to experiment on (e.g. reducing insecticide use (IPM), fine-tuning herbicide application, AWD, community rodent control), participated in benchmarking (diagnostic) trials and in solution development and testing (adaptive trials) and were involved in evaluating the outcomes and in disseminating the results. In a later phase of the project, farmers chose which technologies they wanted to combine and measured the effect, which ranged from 10 to over 100% yield increase.

Yield and net income in these combination trials were compared to a baseline at the beginning of the project; hence it was a comparison in time. Yield and income of non-cooperating farmers showed a somewhat parallel development, indicating that either the context became more favorable for rice production or these non-collaborators had quickly learned from collaborating farmers. The ERT suggested looking into the evolution of these parameters over time in control villages that that are far enough apart to exclude learning, yet close enough to experience similar climatic conditions.

The local extension service was fully integrated in the project, conducting most of the field activities with the farmers (Singleton and Casimero 2011). The project has a comprehensive dissemination strategy, relying on farmers as teachers, but also including the production of extension material with farmers, such as posters and movies ("Digital Green").

The visit of the ERT in the pilot village of Bendewuta (near Kendari) showed a very positive picture (although the village may be somewhat a-typical, as holdings are larger than on average): Farmers experiment, for instance they compare their own local seeders with IRRI drum seeders and improve them. There is evidence that farmers look over the fence, learn from each other. There seems to be a strong demand for 'Superbags'; farmers stated that they would buy them if they were on sale. It was surprising that farmers often referred to IPM as something new; obviously the IPM-FFS initiative in Indonesia of the 1990s has not fully reached farmers in Sulawesi.

d) The future

Indonesia has set a very ambitious target (a 30% rice production increase within 6 years). It will certainly take a concerted action by all stakeholders involved to reach this goal. But at the same time it provides a dynamic context for IRRC to work in.

The Indonesian Centre for Rice Research (ICRR) is putting considerable emphasis on rice breeding (about 30% of their resources). Extension (AIAT) on the other hand is placing much hope in new varieties, probably too much. Since in the Sulawesi project IRRC was able to show the potential that lies in non-genetic improvements at farm level, IRRC (together with IRRI breeders) would be well placed for assisting Indonesian actors in finding the right balance between varietal development and non-varietal technologies.

The Sulawesi project is a beautiful case on what can be achieved with truly participatory approaches. Some follow-up activities are still needed to show the full potential of this approach (e.g. looking more carefully at improvements the farmers achieved, accompanying scaling-out activities, test sales of 'Superbags'). Then it will make a strong case of adaptation and scaling-out of IRRC technologies.

Annex 7: Report from visit to Bangladesh

Visit of Frits Penning de Vries to IRRC-partners on 8 and 9 Sept 2011. He was accompanied by Dr. Ruben Lampayan, leader of the IRRC workgroup Water Savings.

a) Approaches and structure of IRRC

On Thursday morning. Dr Hamid Miah (IRRI liaison scientist and ex-director of the Bangladesh Rice Research Institute, BRRI) introduced some of the highlights of introduction of AWD in Bangladesh since 2003, work with extension and IRRC since 2008: recognition by the government, field testing by BRRI, and significant water savings. He feels a strong ownership to this program and made several contributions to convince government officials. Later, we met in a mini-workshop also with six senior researchers from BRRI, a private sector organization, and two persons from the NGO IDE (more below). Staff from the extension department had important visitors and could not come.

b) Results of IRRC

Participants presented results of adaptive AWD-research work (at several locations across the country, always with 10 farmers following AWD and 10 in a control group) that showed consistently water savings of 25-30%, yield increases per crop of 400-500 kg ha^{-1}, and an increases in labor (2x instead of 3x weeding). Yields are usually moderately high: 4-6 t ha^{-1}. Prepaid cards were introduced for 5000 pumps (with 60 farmers each) to pay for pumping-time. AWD is now recommended by the Ministry and training programs to farmers are underway. There was little attention to new varieties that might fit better in the AWD-schemes. One scientist gave also a good presentation of the nutrient management work with IRRI ('operational next year'). The promotion of the Leaf Color Chart (LCC) was briefly discussed: the concept is well appreciated by farmers who use urea significantly less as a result. Yet, the view is that farmers are not willing to pay a little for the LCC as they are used to get technology free from the government (and indeed, a proposal by Dr. Miah to the government is out to promote the LCC at a large scale). A response curve of frequency of irrigation vs. yield was shown: it showed an optimum yield of 5.9 t ha^{-1} the AWD recommendation. It is worrisome that there is no yield gap left, as farmers are already achieving this level.

All are satisfied with the interaction with IRRI (i.e. the workgroups Water Saving and Productivity and Sustainability) in the IRRC framework. Collaboration with NGOs and the private sector was mentioned but is still minimal.

We also met briefly with Dr. Zainul Abedin (IRRI representative in Bangladesh. He was well informed and supportive about IRRC. To him, the collaboration with IRRI should continue but expressed no preference for IRRC or another network. He did state that climate change should be an important topic for any future collaboration with Bangladesh: we 'need to prepare to be ready' for climate change.

The Monga-project was briefly explained. A significant success bringing income and rice to 120.000 farmers in the northwest of Bangladesh in a 3-year project. The seasonal hunger (monga) has been suppressed on 100.000 ha in 2008-2010 after a long series of unsuccessful trials and interventions. Stakeholder meetings and PRA, with workgroup labor productivity (in IRRC Phase 3) lead to the successful insertion of short duration varieties and the widespread adoption of the system. It has now taken of in a spectacular manner, and the government wants to continue it. Interestingly, this was achieved with short duration varieties that already existed at BRRI (indeed, it was commented that BRRI uses too little of its varieties in extension). It was also striking how much this presentation, in words and with data, agreed with the Communication-team video on Monga that we saw during the IRRI staff presentations (which reflects well on the authors of the video).

In the afternoon, we met with IDE (NGO International Development Enterprise, Bangladesh branch) in their office. Present were the director (Mr. Radjiv Pradhan, native from Nepal) and 5 senior members. IDE has 75 members in Bangladesh, 25 in Dacca and 50 out in the field. IDE was recently approached by IRRI (Bouman) to explore how IDE and IRRI can work together to bring modern technologies to farmers. IDE-Bangladesh is enthusiast about this, and focuses on AWD. IDE has strength in designing business models for implements for poor people and applies this since 2009 to AWD. They focus on situations where AWD is practiced by farmers that receive pumped groundwater for irrigation. A problem was recognized (in the discussion) that incentives for water saving are not always clear or proper: pump owners earn more if they pump more, and farmers (1) get more money from a yield increase and savings on water, but (2) spend more on weeding. Some farmer-water provider contracts specify the period in which water can be obtained disregarding the volume so that no savings accrue. It looks as if adding 'fertilizer' and 'improved varieties' to AWD can give farmers that additional incentive of high yield-high income, and IDE will explore this further. In addition, IDE will develop (with its own funds) a business model for AWD based on surface water irrigation. All participants concluded that this meeting was very informative and stimulating, and that IDE will go ahead full steam developing further projects on AWD with IRRI.

Meetings on Friday were limited, because of a holiday in Bangladesh. We met first again with Dr. Miah. He mentioned that across Bangladesh the word 'IRRI' has become equivalent to 'good': an 'IRRI-crop' of sugarcane for instance. He also spoke about mixed cropping of rice with sugarcane and mulberry to increase the cropping intensity, about higher yield varieties and monga (seasonal hunger). Later, four colleagues from BRRI joined.

The maximum yield level of rice crops was discussed. Dr Miah agreed that the maximum of the AWD system (6 t ha^{-1}) is too low, but stated he showed the Minister already how today 9.9 t ha^{-1} can be attained, upon which the Minister released 250 million Taka for a gap-minimization program.

c) The future

Support is requested from IRRI through CURE or IRRC for:

- integrative approaches to interventions; although Bangladesh has become better informed the capacity to do this is still lacking;
- further research and extension to adapt the 'suppress monga' cropping system to another 100.000 ha where hunger has not yet been eliminated.
- the gap-minimization program; the program entails all measures needed to improve the top yields by farmers;
- a higher yield short duration variety (to replace 'fazeera');
- upscale the rice-mustard intercropping system;
- adaptive research on other intercropping, such as with sugar cane and mulberry; Dr Miah experimented already with these systems and offers his personal support;
- management of pre-monsoon drought stress;
- a drier for the aus-crop (harvested in the wet season).

Annex 8: Partnership and capacity development

A: Partnerships of IRRC for research and extension

Partner	Country (ies)	Year[4]		Active in[5]		Comments
		Joined	Stop-ped	Res-earch	Exten-sion	
Bangladesh Rice Research Institute	Bangladesh	2000		XXX	X	Field evaluation of Nutrient Manager for Rice; Labor Productivity WG (LPWG); Water-Saving WG (WSWG)
Bangladesh Agriculture Research Institute	Bangladesh	2005		XXX	X	Developments of Nutrient Manager for Maize
Bangladesh Rural Advancement Committee	Bangladesh	2005		0	XXX	Distribution of LCC anticipated partnership in NM Rice use and promotion
Soil Resource Development Institute	Bangladesh					
Department of Agricultural Extension	Bangladesh	2003		0	XXX	LPWG; WSWG
Barind Multipurpose Development Authority	Bangladesh	2007		0	XXX	WSWG
Bangladesh Agricultural Development Cooperation	Bangladesh	2007			XX	WSWG
Rural Development Authority	Bangladesh	2005			X	WSWG; LPWG
Concern Bangladesh	Bangladesh	2007		0	XXX	LPWG
Inter-cooperation	Bangladesh	2006		0	XXX	LPWG
International Development Enterprises-Bangladesh	Bangladesh	2010		X	XXX	WSWG
Practical Action	Bangladesh	2006		0	XXX	WSWG, LPWG
Syngenta	Bangladesh	2007		X	XXX	WSWG
Humboldt-Universitat zu Berlin	Germany	2010		XX	0	WSWG
Hohenheim University	Germany	2011		XXX		New collaboration IRRI-Hohenheim-GrainPro on drying
Cambodian Agricultural Research and Development Institute	Cambodia	2006		XXX	0	LPWG, PPWG
Department of International Cooperation, Ministry of Agriculture, Forestry, and Fisheries (MAFF)	Cambodia	2005			X	POLICY (Development); Serves as coordinating unit for PPWG initiatives in Cambodia; LPWG
Department of Agricultural Extension, MAFF		2008		0	XXX	Extension for PPWG
Provincial Departments of Agriculture (Kampong Thom, Kampot, Pursat, and Takeo)	Cambodia	2004		X	XXX	Baselines for PPWG; LPWG
Rice Department, General Directorate of Agriculture	Cambodia	2009		XX	XX	LPWG
International Development Enterprises-Cambodia	Cambodia	2011		X	XX	Planned supply chain for hermetic storage
Samaritans Purse	Cambodia	2011				Proposal on postharvest activities rejected today by UIS Embassy
Cambodian Agricultural Value Chain Project	Cambodia	2006		X	X	
SME Cambodia	Cambodia	2009		X		Some scoping research on gasification
Cambodian Rice Millers Association	Cambodia	2007			X	Partner in Training and Extension of dryers in Cambodia
Chea Sim Kamchaymea University	Cambodia	2009		X	X	
Royal University of Agriculture	Cambodia	2011		XXX	X	LPWG
China Agricultural University	China	2002		XXX	0	WSWG
The Rice Research Institute, Guangdong Academy of Agricultural Sciences	China	2001		XXX	XXX	Promotion of 3 Controls Technology; use and promotion of NM Rice; WSWG
Hunan Agricultural University	China	2005		XXX	0	
Chinese Center for Agricultural Policy, Chinese Academy of Sciences	China	2004				POLICY
Guangdong Academy of Agricultural Sciences	China	2005		XXX	0	ALSO POLICY
The College of Water Resources and Hydroelectric	China	2003		XXX	0	

[4] Year when partnership with IRRC was established or when it was ended

[5] Focus of partner's activity: XXX = strong; XX = medium; X = some; 0 = no research or no extension activites

Engineering, Wuhan University						
Ramakrishna Mission Narendrapur, West Bengal	India	2008		XX	XX	LPWG
Tamil Nadu Agricultural University	India	1996		X	XX	Field evaluation and promotion of NM Rice
NEFORD	India	2008		XX	XX	LPWG
PRADAN	India	2008		XX		LPWG
Narendra Deva University of Agriculture and Technology, Uttar Pradesh	India	2005	2010			LPWG
GB Pant University of Agriculture and Technology	India	2005				LPWG
Indonesian Agency for Agricultural Research and Development	Indonesia	1996		XXX	XXX	Field evaluation of NM Rice; development and promotion of web and phone apps of NMRice;
Indonesian Center for Rice Research	Indonesia	1996		XXX	X	SSNM development; field evaluation of NMRice; Research to develop decision tools; LPWG; WSWG
Assessment Institutes for Agricultural Technologies, Southeast and South Sulawesi	Indonesia	2007		XX	XX	LPWG; WSWG ; PPWG
Assessment Institutes for Agricultural Technologies, South Sumatra	Indonesia	2007		XX	XXX	
Indonesian Center for Food Crop Research and Development	Indonesia	2004		X	X	POLICY; Development and promotion of NMRice; Fertilizer and WG leader in the past
Indonesian Center for Agricultural Land Resources Research and Development	Indonesia	2004		XXX		Fertilizer WG; compilation of results for NMRice
Indonesian Center for Agricultural Technology Assessment and Development	Indonesia	2001			X	POLICY; Early work on ICM when the Institute had another name
Agri Business Club Jakarta	Indonesia	2005	2007		XX	Distributor of local hermetic storage bag, quality problems
Sriwijaya University, South Sumatra	Indonesia	2011		XXX	X	
National Agriculture and Forestry Research Institute (NAFRI)	Lao PDR	2005		XXX	X	WSWG
National Agriculture and Forestry Extension Service	Lao PDR			0	XXX	
National Rice Research Program (NRRP) of NAFRI	Lao PDR	2008		XX	X	POLICY; WSWG
Phone Ngam Rice Research Station, Champassak	Lao PDR	2009		XXX	X	WSWG
Provincial and District Agriculture and Forestry Office (PAFO and DAFO) in Savannakhet and Champassak provinces	Lao PDR	2009		XX	XXX	WSWG
Horticultural Research Center (national IPM program)	Lao PDR			XX	XX	
Thasano Rice Research Center, Savannahket	Lao PDR	2006		XXX	X	
World Vision				0	XXX	
Helvetas	Lao PDR		2007	X	XX	Organic Rice Value Chain
Outhai Taimany, Manufacturer of dryers and agricultural equipment, Vientiane	Lao PDR	2005		0	X	Private sector
Malaysian Agricultural Research and Development Institute	Malaysia	2005		XXX	0	LPWG
Universiti Kebangsaan Malaysia	Malaysia	2005		X		LPWG
Agriculture Extension Division, Myanma Agriculture Service (MAS)	Myanmar	2006		X	XXX	
Land Use Division, MAS	Myanmar	2002		X	XXX	SSNM
Myanma Agriculture Service	Myanmar	2006				POLICY, Water-Saving WG
Plant Protection Division, MAS	Myanmar	2005		XXX	XX	LPWG
Projects Planning, Management and Evaluation Division, MAS	Myanmar	2006		XX	XX	POLICY
Department of Agricultural Planning, Ministry of Agriculture and Irrigation	Myanmar	2006				POLICY
GRET	Myanmar	2010		0	XXX	CU
Mercy Corp	Myanmar	2011		0	XXX	CU
Welthungerhilfe	Myanmar	2011		0	XXX	CU
Pioneer Postharvest Development Group	Myanmar	2005		X	XXX	NGO, members are former members of Myanmar Rice and Paddy Traders Association (MRPTA)

Yezin Agricultural University	Myanmar	2006		XX	X	WSWG
Myanmar Rice and Paddy Traders Association	Myanmar	2005	2011	0	XXX	POLICY; Dissolved by government in 2011
Department of Agricultural Research, Ministry of Agriculture and Irrigation	Myanmar	2009		XXX	XX	WSWG
Philippine Rice Research Institute	Philippines	1996		XXX	XXX	SSNM development; NM Rice evaluation; all WGs involved
Agricultural Training Institute (ATI) Central Visayas	Philippines	2007		0	XXX	TRAINING; Development and promotion of mobile phone apps
Bohol Agricultural Promotion Center	Philippines	2007		XXX	XX	SSNM promotion; WSWG
University of Southeastern Philippines	Philippines	2008		XX	X	
Bulacan Agricultural State College	Philippines	2008		XXX	XX	WSWG
Central Luzon State University	Philippines	2008		XXX	X	WSWG
Bureau for Postharvest Research and Development	Philippines	1999		X	XX	POLICY; Provided postharvest analytical services; member of Philippine Rice Postproduction Consortium
Bureau of Soils & Water Management	Philippines	2000		XX	XX	POLICY; WSWG
Department of Agriculture (provincial and regional offices)	Philippines	2000		0	XXX	NM Rice evaluation; quick guides
National Irrigation Administration	Philippines	2000		0	XXX	POLICY; NMRice promotion
National Food Authority	Philippines	1999		X	XX	Member of Philippine Rice Postproduction Consortium
National Agriculture and Fisheries Council	Philippines	1999		X	XX	Member of Philippine Rice Postproduction Consortium
Philippine Council for Agriculture, Forestry and Natural Resources Research and Development	Philippines	2000		X	X	POLICY; CD distribution of Ryza SSNM videos; WSWG
Local government units in Agusan del Norte, Bohol, Camarines Sur through the Postharvest Learning Alliance	Philippines	2010		0	XXX	PPWG
Local government units across country	Philippines	2009			XX	SSNM and NMRice dissemination
Catholic Relief Services	Philippines	2008		0	XX	Field evaluation and promotion of NM Rice; WSWG; PPWG
Mercy Corps	Philippines	2011			XX	Microfinance interface with NMRice
Philippine Rice Postproduction Consortium	Philippines	1999		X	X	POLICY
Atlas Fertilizer Corporation	Philippines	2004		0	XXX	Private sector; SSNM and NMRice promotion
GrainPro, Inc.	Philippines	2005		0	XX	Private sector; manufacturer of hermetic storage systems
Syngenta (through the Scientific Knowledge Exchange Program)	Philippines	2009		X	X	Private sector
University of the Philippines Los Baños	Philippines	1999		XX	XX	NMRice development and promotion; evaluation of e-learning module for SSNM; Member of the Philippine Rice Postproduction Consortium
Central Luzon State University	Philippines	2004		XX	X	
Don Mariano Marcos State University	Philippines	2009		X	X	
Isabela State University	Philippines	2006				
Bulacan State Agricultural College	Philippines	2000		XX	X	
West Visayas State University	Philippines	2006		X	XXX	SSNM field testing and development; NMRice promotion
University of Reading	United Kingdom	2006		XXX	0	
Northern Arizona University	USA	2009		XXX	0	
Rice Research and Development Institute	Sri Lanka	2005		XXX		LPWG
University of Peradeniya	Sri Lanka	2006		X		LPWG
Bureau of Rice Research and Development, Rice Department	Thailand	2009		XX	0	
Department of Agriculture	Thailand	2010		X	X	
Department of Agricultural Extension	Thailand	2009		X	XXX	
United Nations Environment Program	Thailand	2010		XX	XX	POLICY
International Institute for Environment and Development Aid Environment	Europe	2010		0	XX	
Syngenta	Thailand	2010		0	XX	

Kellogg	International	2010	0	XX	
Nestle	International	2010	0	XX	
Louis Dreyfus Commodities	Singapore	2010	0	XX	
Asian Institute of Technology	Thailand	2010	XX	0	
Kasetsart University	Thailand	2008	XX	0	
Thailand Rice Department	Thailand	2009	XX	XX	LPWG
Nong-Lam University (NLU)	Vietnam	2005	XXX	X	Partner in cross country PH technology transfer
Bac Lieu Department of Agriculture and Rural Development	Vietnam	2005	X	XX	
Hue University of Agriculture and Forestry	Vietnam	2005	XX	0	
National Institute for Soil and Fertilizer	Vietnam	1997	XXX	X	SSNM
Vietnamese Academy of Agricultural Sciences	Vietnam	2006	XX	X	POLICY; SSNM; LPWG
Plant Protection Department	Vietnam	2006	X	XXX	
Plant Protection Research Institute, Ministry of Agriculture and Rural Development	Vietnam	2007	XX	0	LPWG
Field Crops Research Institute	Vietnam	2008	XXX	0	
An Giang Department of Agriculture and Rural Development	Vietnam	2008	X	XXX	
Cuu Long Delta Rice Research Institute	Vietnam	1996	XXX	X	SSNM
Northern Mountainous Agriculture and Forestry Science Institute	Vietnam	2009	XXX	0	
Department of Crop Production	Vietnam	2009	X	X	POLICY
Food Crops Research Institute	Vietnam	2008	X		WSWG
Institute of Agricultural Engineering & Post Harvest Technology, Hanoi	Vietnam	2009	XX	XX	
Southern Institute for Agricultural Engineering and Postharvest Technology, HCMC	Vietnam	2009	XX	X	
Institute for Agricultural Sciences in southern Vietnam	Vietnam	2009	XXX	X	SSNM development; NMRice
Institute for Agricultural Sciences in northern Vietnam	Vietnam				
North Regional Plant Protection Center, Plant Protection Department	Vietnam				
Southern Regional Plant Protection Center, Plant Protection Department	Vietnam	2005	X	XXX	
Southern Institute for Water Resource Planning	Vietnam				
World Vision	Vietnam	2006	0	XXX	
An Giang Plant Protection Joint Stock Company	Vietnam	2011	0	XX	Private sector
Can Tho University	Vietnam	2004	XX	X	SSNM
Nong Lam University, HCMC	Vietnam	2005	XXX	X	
Hanoi Agriculture University	Vietnam	2007	XXX	0	
Spectra	Australia	1999		X	Manufacturer of laser leveling equipment

B: IRRC capacity development of NARES partners 2009- 2011

Event or activity	Date and Venue	Target group	Partici-pants
	2009		
Coordination Unit			
Training course on baseline and impact survey: interviewing techniques	March 2009, Phnom Penh, Cambodia	partners and enumerators in Phnom Penh, Cambodia	15
Training course on household survey implementation for the conduct of a postbaseline survey in Vietnam	March and April 2009, north and south Vietnam	extension staff from north and south Vietnam	30
Presentation on needs assessments and baseline surveys	October 2009, Laguna, Philippines	postharvest training course	24
Rice Production Training Course for farmer-leaders and scientific and extension staff in Laos	9-13 November 2009, Vientiane and Savannakhet, Laos	farmer-leaders and scientific and extension staff	45
Season-long training: established 2 farmer field schools for integrated crop management in Awolagading and Ujung Tanah, South Sulawesi	Awolagading and Ujung Tanah, South Sulawesi, Indonesia	farmers	50
Season-long training: established 2 farmer field schools for integrated crop management in Bandewuta and Karandu, South Sulawesi	Bandewuta and Karandu, South Sulawesi, Indonesia	farmers	50
Farmer field day in Ujung Tanah, South Sulawesi, Indonesia, with demonstrations of IRRC technologies	13 Aug 2009, Ujung Tanah, South Sulawesi, Indonesia	farmers	200
Water-Saving Work Group			
Refresher course on controlled irrigation	14 January 2009, in Cabanatuan City, Nueva Ecija	National Irrigation Administration-Upper Pampanga River Integrated Irrigation Systems	30
Training and workshop for the adoption of controlled irrigation for rice	24-25 March 2009 in Ilocos Norte, Philippines	staff from the National Irrigation Administration and local government units in Ilocos Norte	54
Water-saving technologies in rice production training course	24 March 2009, Zamboanga Sibugay, Philippines	staff of local government units from Zamboanga Sibugay province	40
Water-saving technologies in rice production training course in Barotac Viejo River Irrigation System	7-8 May 2009, Iloilo, Philippines	staff from the National Irrigation Administration, local government units, and farmer-leaders in Iloilo, Philippines	40
Water-saving technologies in rice production training course	16 July 2009, Muñoz, Nueva Ecija, Philippines	Rice Sufficiency Officers from Central Luzon, Philippines	40
Water-saving technologies in rice production training course	2-3 August 2009, North Cotabato, Philippines	Rice Sufficiency Officers from North Cotabato, Philippines	40
Controlled irrigation water-saving technology training of trainers course and S&T updates	18 August 2009, Muñoz, Nueva Ecija, Philippines	Staff from National Irrigation Admi of Magat River Integrated Irrigation System and the Agno River Integrated Irrigation Projects	43
e-Water Training Course	1 September 2009, Muñoz, Nueva Ecija, Philippines	Rice Sufficiency Officers from Central Luzon (2nd batch)	40
Water-saving technologies in rice production training course	23 September 2009, Los Baños, Laguna	staff from local government units from Region IV-A	40
TOT training courses on water-saving technologies in rice production in Bangladesh	18-25 October 2009, Bangladesh	Department of Agricultural Extension leaders/officers	200
Aerobic Rice Technology Training Course	3-4 December 2009, Baler, Aurora, Philippines	local government units, farmer-leaders, and students in Baler, Aurora, Phils.	50
Water-saving technologies in rice production training course	11 December 2009, Los Baños, Laguna	local government units of Region IV-B	40
Other WSWG involvements			
Irrigated Rice Research and Extension workshop	8-9 January 2009, Bangkok, Thailand	IRRC Management Team and Thailand Rice Department	
Farmers' field school	7-9 January 2009, La Union, Philippines	farmers from Amburayan and Masalip River Irrigation System	40
ICOP-Philippines review and planning meeting	17 February 2009, Los Baños, Laguna	IRRI, PhilRice, Bohol Agricultural Promotion Center, National Irrigation Administration, and nongovernment organizations	42
Stakeholders' workshop on irrigated rice production	23-24 Feb 2009, An Giang, Vietnam	IRRC management team and various stakeholders	
Meeting/discussion for the e-Water learning module development.	23-26 Feb 2009, Davao City, Philippines	Staff from the University of Southeastern Philippines	
Technical Working Group (TWG) to finalize the plan for the island-wide consultation of the proposed administrative order of the implementation of AWD in all irrigation systems in the Philippines	4 March 2009; 27 March 2009; 22 June 2009, in Quezon City, Philippines	IRRI, Bureau of Soils and Water Management, National Irrigation Administration (NIA)	
Field visit and demonstrations on AWD during	17 March 2009, Tarlac, Philippines	farmers	

Annual Harvest Festival "NIAnihan Festival in Tarlac 2009"			
Island-wide stakeholders' consultation meetings on the proposed AO conducted by the Technical Working Group	13-15 July 2009 in Baguio City; 22 July 2009 in Tagaytay City; 28-29 July 2009 in Iloilo City; 4-6 Aug. 2009 in Davao City	Farmers, irrigation cooperatives, local government units, policy makers, Department of Agriculture representatives	
Bohol Irrigation Forum	26 Feb 2009 in Tagbilaran, Bohol	Farmer-leaders, NIA, and local government units in Bohol	1,000
IRRC Steering Committee Meeting	12-15 Oct 2009, Myanmar	IRRC Steering Committee, coordination unit head and staff, work group leaders	
Labor Productivity and Community Ecology Work Group			
Ecological management of rodents, weeds, and rice diseases—biological and social dimensions	16-27 March 2009, IRRI, Los Baños, Laguna, Philippines	extension staff, rice scientists	16
International Conference: Impacts of rodent outbreaks on food security in Asia	26-28 October 2009, IRRI, Los Baños, Laguna, Philippines	rice scientists, researchers	32
Thailand Rice Department/IRRC Workshop	8-9 January 2009, Bangkok, Thailand		
IRRC Country Outreach Program: progress and future plans meeting	17 February 2009, IRRI, Los Baños, Laguna, Philippines	IRRI, PhilRice, Bohol Agricultural Promotion Center, National Irrigation Administration, and nongovernment organizations	42
40th Pest Management Council of the Philippines	5-8 May 2009 in Baguio City, Phils.	Agricultural scientists, students,	
Needs assessment	10-14 August 2009 in Champassak Plain, Laos		
Farmers' meeting for first crop result evaluation and planning for next season and pretesting of extension materials	12-20 September 2009, Ujung Pandang, Indonesia		
IRRC Steering Committee Meeting	12-15 Oct 2009, Myanmar	IRRC Steering Committee, coordination unit head and staff, work group leaders	
Postproduction Work Group			
Postharvest training course	19-30 October 2009, IRRI, Los Baños, Laguna	National agricultural and extension systems (NARES) partners	24
Rice Postharvest Technology workshop for farmer intermediaries	27-30 June 2009 in Cambodia	University lecturers, millers, and officers of the Ministry of Agriculture, Forestry, and Fisheries (MAFF)	36
Safe grain storage training course for PDAs	1-3 August 2009 in Cambodia	Farmer-intermediaries	23
Agricultural extension methodologies training course	10-11 August 2009 in Cambodia	Farmer-intermediaries	48
PH module training course for extension workers	15-21 October 2009, South Sulawesi and Southeast Sulawesi, Indonesia	Extension workers	
Postharvest training and setting up of Super Bag trials	7-15 December 2009, South and Southeast Sulawesi, Indonesia	Farmers and extension workers	40
Dryer machine training workshop	28-29 September 2009, Palembang Indonesia	Manufacturers, extension workers, and government decision-makers	
PPWG training module in IRRC training	7-16 November 2009, Vientiane and Savannakhet, Laos		
Dryer machine training workshop	Myanmar		
Rice postharvest technology workshop	4-6 July 2009, MAFF, Cambodia	farmers	43
Rice postharvest technology workshop	18-20 July 2009, MAFF, Cambodia	Farmers	38
Safe grain storage training course	8-9 August 2009, MAFF, Cambodia	Farmers	48
Training course on hermetic storage using Super Bags 1-6 October , Takeo, Cambodia; 5-10 December, Prey Veng, Cambodia; 11-16 December 2009, Kampot, Cambodia; 16-21 December 2009, Battambang, Cambodia; 24-29 December 2009, Pursat, Cambodia		farmers	
Training course on how to reduce grain losses after harvest 20 August-5 September, Pursat, Cambodia; 27 August-11 September, Battambang, Cambodia; 10 August-10 September, Kampong Tom, Cambodia; 17-28 August , Takeo, Cambodia; 21 August-13 September, Kampot, Cambodia; 13 August-16 September, Prey Veng, Cambodia.		farmers	
Training course on safe grain storage 27 November-6 December, Pursat, Cambodia; 5-13 December, Battambang, Cambodia; 1-20 December, Kampong Tom, Cambodia; 3-8 December, Takeo, Cambodia; 21-29 November, Kampot, Cambodia; 23 November-19 December, Prey Veng, Cambodia		Farmers	
Participatory impact pathway analysis workshops 15-19 December 2008, Cambodia; 26-29 April 2009, Philippines; 21-24 April 2009, Vietnam; 30-31 July 2009, Hanoi, Vietnam; 27-28 July 2009, Hue, Vietnam; 24-25 July 2009, Nha Trang, Vietnam; 21-22 July 2009, My Tho, Vietnam; 3-4 August 2009, Can Tho, Vietnam.			
Crop Health Work Group			
Assessment of Rice Health for Better	July 2009, Nakhon Nayok, Thailand	Farmers, Rice scientists, extension	24

Management of Rice Pests workshop		workers	
Assessment of Rice Health for Better Management of Rice Pests workshop	4-7 August 2009, Muñoz, Nueva Ecija, Philippines	Farmers, Rice scientists, extension workers	25
In-field training on management of rice pests	Nueva Ecija, Negros Occidental, and North Cotabato, Philippines		
Productivity and Sustainability Work Group			
Technical briefing on *Nutrient Manager for Rice* and how to use and evaluate provincial *Quick guide* in the Philippines	20 February 2009, Muñoz, Nueva Ecija, Philippines	Extension workers, rice scientists	
Training of rice coordinators in Camarines Sur on the use of the *Nutrient Manager* decision tool for rice	3 March 2009, Pili, Camarines Sur, Philippines	Rice coordinators	53
Hybrid rice: fertilizer management	25 March 2009, IRRI, Los Baños, Laguna, Philippines	Hybrid Rice Development Consortium participants	
Technical briefing on *Nutrient Manager for Rice* and provincial *Quick guide*	5 May 2009, Talipan, Pagbilao, Quezon, Philippines	Provincial and Municipal Agricultural Officers of Quezon Province	60
Introduction on different innovative tools on nutrient management in the Philippines and the preparation of a provincial *Quick guide*	13-15 May 2009, Butuan City, Philippines	Participants of the National GMA Rice Meeting	130
Introduction to different innovative tools on nutrient management for rice	22 May 2009, Siliman University, Dumaguete City, Philippines	provincial agriculturists of Negros Oriental	17
Presentation on tools for accelerating the dissemination of improved nutrient management for rice	26 May 2009, Gazipur, Bangladesh	Participants of the Cereal Systems Initiative for South Asia Planning Meeting	
Presentation on implementing field-specific nutrient management in rice-based cropping systems	27 May 2009, Dhaka, Bangladesh	Participants of the Rice-Maize Project Planning Meeting	
Dialogue with national partners in Bangladesh on field-specific nutrient management for rice	27 May 2009, IRRI-Bangledesh office, Dhaka, Bangladesh	Bangladesh national partners	
Training on *Nutrient Manager for Rice*	23 July 2009, Muñoz, Nueva Ecija, Philippines	Extension workers, rice scientists, rice farmers	40
Training on *Nutrient Manager for Rice*	11-12 August 2009, Batac, Ilocos Norte, Philippines	Extension workers, rice scientists, rice farmers	22
Introduction to provincial *Quick guide* for 75 provinces in the Philippines and its planned reproduction, printing, dissemination, and field evaluation at the provincial level			
Presentation and discussion at Third Quarterly National GMA Rice Meeting	12-14 August 2009, Davao City, Philippines	Participants of the National GMA Rice Meeting	135
Rice fertilization and introduction to *Nutrient Manager for Rice* and the provincial quick fertilizer guides	19 August 2009, Tanza, Cavite, Philippines	Farmers' field school participants	42
Nutrient Manager for Rice and how to use and evaluate provincial *Quick guides*	2-4 September 2009, Lucena City, Philippines	Seed growers, rice farmers	32
Introduction to *Pemupukan Padi Sawah Spesifik Lokasi* (PuPS 1.0)	7 September 2009, Jakarta, Indonesia	Agronomists	38
Dialogue with Indonesia Fertilizer Work Group on accelerating the dissemination of improved nutrient management for rice	8 September 2009, Bogor, Indonesia	Indonesia Fertilizer Work Group	
Presentation on how to use provincial *Quick guides*	10 September 2009, University of the Philippines Los Baños (UPLB), Laguna	Faculty and staff of the College of Agriculture, UPLB	23
Nutrient Manager for Rice and how to use and evaluate provincial *Quick guides*	14 September 2009, Trece Martires, Cavite, Philippines	Provincial and municipal agricultural officers, rice seed growers in Cavite province	15
Training on how to use provincial *Quick guides*	23 September 2009, Bay, Laguna, Philippines	Members of the Puypuy Rice Farmers Association	28
How to use provincial *Quick guides*, how to evaluate them, and introduction to *Nutrient Manager for Rice*	24 September 2009, Los Baños, Laguna, Philipines	Extensión workers, rice scientists, farmers	29
Nutrient management for rice and how to use provincial *Quick guides*	24 September 2009, Rizal, Philippines	Federation of farmers meeting	90
Technical briefing on *Nutrient Manager for Rice* and how to use provincial *Quick guides*	29 September 2009, Nueva Vizcaya, Philipines	Municipal agricultural officers	31
Technical briefing on nutrient management and provincial *Quick guide*	5 October 2009, IRRI, Los Baños, Laguna, Philippines	Farmer-cooperators of Department of Agriculture-Food Aid Organization Project	60
How to use and evaluate provincial *Quick guide*	6-7 October 2009, Tarlac, Philippines	Technical briefers and techno-demo coordinators	27
How to use and evaluate provincial *Quick guides*	8 October 2009, Tanay, Rizal, Philippines	Rice seed growers regular meeting	25
Nutrient management and provincial *Quick guide*	9 October 2009, IRRI, Los Baños, Laguna, Philippines	Trainers from the Agricultural Training Institute in Pangasinan Province	35
Presentation on site-specific nutrient	10 October 2009, Karnal, Haryana,	meeting of Cereal Systems	

management	India	Initiative for South Asia	
How to use and evaluate provincial *Quick guides*	13 October, 2009, IRRI, Los Baños, Laguna, Philippines	participants of Participatory Adaptive Research course	28
Nutrient management for rice and how to use and evaluate provincial *Quick guides*	15 October 2009, Sta. Cruz, Laguna, Philippines	participants of Laguna Technology Updates on Rice Production (1st)	301
Nutrient management and provincial *Quick guide* for farmers and agricultural extension workers	20 October 2009, IRRI, Los Baños, Laguna, Philippines	Participants of farmers field school at Bagac, Bataan	31
Advances in SSNM and *Nutrient Manager* decision tools: status, challenges, and opportunities	26 October 2009, Gazipur, Bangladesh	Rice-Maize Project Planning Meeting	
Dialogue with national partners in Bangladesh on an update for *Nutrient Manager for Rice*	27 October 2009, Dhaka, Bangladesh	Bangladeshi national partners	
Nutrient management for rice and how to use and evaluate provincial *Quick guides*	28 October 2009, Sta. Cruz, Laguna, Philippines	participants of Laguna Technology Updates on Rice Production (2nd)	202
Nutrient management for rice and how to use and evaluate provincial Q*uick guides*	30 October 2009, Barcenaga, Naujan, Oriental Mindoro	Local government units of Oriental Mindoro	43
Nutrient management for rice and how to use and evaluate provincial *Quick guides*	5 November 2009, Cabuyao, Laguna, Philippines	participants of Laguna Technology Updates on Rice Production (3rd)	202
Nutrient management for rice and how to use and evaluate provincial *Quick guides*	12 November 2009, Mabitac, Laguna, Philippines	participants of Laguna Technology Updates on Rice Production (4th)	202
Introduction of nutrient management for rice and the provincial quick fertilizer guide	18 November 2009, Lopez, Quezon, Philippines	Cooperators and stakeholders of Department of Agriculture project on rice self sufficiency in Quezon Province	20
Introduction of nutrient management for rice and the provincial quick fertilizer guide	19 November 2009, Libon, Albay, Philippines	Cooperators and stakeholders of Department of Agriculture project on rice self sufficiency in Albay province	15
Introduction of nutrient management for rice and the provincial quick fertilizer guide	20 November 2009, Nabua, Camarines Sur, Philippines	Cooperators and stakeholders of Department of Agriculture project on rice self sufficiency in Camarines Sur province	15
Updates on nutrient management for rice in the Philippines: from research to dissemination	24-26 November 2009, Zamboanga City, Philippines	Participants of the National GMA Rice Meeting (4th Quarter)	150
Nutrient Manager for Rice and provincial *Quick guide*	30 November 2009, Padre Burgos, Quezon, Philippines	Farmer-cooperators and technical assistants in Padre Burgos	20
Nutrient Manager for Rice and provincial *Quick guide*	4 December 2009, Lopez, Quezon, Philippines	Farmer-cooperators and technical assistants in Lopez	19
training workshop on nutrient management for rice	9 December 2009, Romblon, Philippines	Faculty and staff of Romblon State University, farmers, extension workers	77
Nutrient Manager for Rice and provincial *Quick guide*	10 December 2009, Libon, Albay, Philippines	Farmer-cooperators and technical assistants in Libon	31
How to use provincial *Quick guides*, how to evaluate them, and introduction to *Nutrient Manager for Rice*	11 December 2009, Los Baños, Laguna, Philippines	Trainees of the Agricultural Training Institute, Region 4A office	20
Introduction of nutrient management for rice: Nutrient Manager software, video, how to use provincial *Quick guide* and its field evaluation.	15 December 2009, San Mateo, Isabela, Philippines	Agricultural technicians of the GMA Rice Program	35
	2010		
Coordination Unit			
Training course on "New Developments in the Management of Rodents" at SEARCA guesthouse	16-17 March 2010, Los Baños, Laguna	Crop Protection Division of the Bureau of Plant Industry-Department of Agriculture	20
Training course on rodent management	27-28 May 2010, Sadanga, Mountain Province, Philippines	Rice farmers from Belwang Village, Sadanga and provincial and municipal agriculturists	115
International workshop on "Sustainable rice production through improved NRM & extension of 'Three Controls' Technology in Guangdong."	9-10 June 2010, Guangzhou, China	scientists	
Workshop on "Resource Efficiency and Ecosystem Resilience in Thai Rice Production"	6-7 October 2010, Bangkok, Thailand	Scientists, extension workers, representatives from Thai rice value chain	3
Workshop on "Rice Production Extension and Technology Transfer System Development and Networking for NRM of Irrigated Rice"	6-8 October 2010, Bangkok, Thailand	Scientists, extension workers, representatives from Thai rice value chain	
Water-Saving Work Group			
Lecture on "Integrated Field Water Management in Rice" as part of the Season-Long Training of Trainers (TOT) on PalayCheck System	8-10 February 2010, South Cotabato, Philippines	Agricultural extension workers in South Cotabato	48
Lecture on "Integrated Field Water Management in Rice Production," as part of the Training of Trainers on PalayCheck System	13-15 January 2010, San Mateo, Isabela, Philippines	Agricultural extension workers in San Mateo	30
Water Savings in Rice Production Training Course	21-23 January 2010, Ilagan, Isabela, Philippines	Agricultural extension workers, farmers, irrigation cooperative	50
Lecture on "Integrated Field Water Management	26-27 January 2010, Naujan,	Agricultural extension workers in	23

in Rice Production," as part of the Training of Trainers on PalayCheck System	Oriental Mindoro, Philippines	Naujan	
Lecture on "Integrated Field Water Management in Rice Production," as part of the Training of Trainers on PalayCheck System	16 February 2010, Los Baños, Laguna, Philippines	Agricultural extension workers in Laguna	26
Lecture on "Integrated Field Water Management in Rice Production," as part of the Season-Long Training of Trainers (TOT) on PalayCheck System	10-12 February 2010, Panabo City, Philippines	Agricultural technicians (regional and provincial trainers)	69
National Aerobic rice workshop	23-25 February 2010, Puerto Princesa, Philippines	Local government units, state colleges and universities, private sector	175
4th Annual Review and Planning Meeting of the ICOP-Philippines	26 February 2010, Los Baños, Laguna, Philippines	IRRI, PhilRice, Bohol Agricultural Promotion Center, National Irrigation Administration, and nongovernment organizations	32
Lecture on "Aerobic Rice Production Systems"	27-28 April 2010, Nueva Ecija, Philippines	Farmers, extension staff	43
Training of Trainers (TOT) course on Controlled Irrigation and Technology and Updates on Rice Production	20-21 April 2010, La Trinidad, Benguet, Philippines	Agricultural technicians	28
Lecture on "Sound Field Water Management" during the RSSP Island-Wide Rice Technology Update Seminar for Rice Technologists and Farmers in Luzon	21-25 June 2010, Baguio City, Philippines	Rice agricultural technologists in Luzon	36
Lecture on "Sound Field Water Management" during the RSSP Island-Wide Rice Technology Update Seminar for Rice Technologists and Farmers in Visayas	5-9 July 2010, Bohol, Philippines	Rice agricultural technologists in Visayas	30
Lecture on "Integrated Field Water Management in Rice" on 26-27 July 2010 as part of the season-long Training of Trainers (TOT) on PalayCheck System for Rice Agricultural Technologists of LGU	26-27 July 2010, Cabagan, Isabela, Philippines	Rice agricultural technologists	29
Briefings on "alternate wetting and drying" water-saving technology as part of the PalayCheck System Training course	15-16 July 2010, Muñoz, Nueva Ecija, Philippines	Rice agricultural technologists	19
Lecture on "Sound Field Water Management" during the RSSP Island-Wide Rice Technology Update Seminar for Rice Technologists and Farmers in Mindanao	19-23 July 2010, Cagayan de Oro City, Philippines	Rice agricultural technologists	41
Aerobic rice production mid-season field days in Rosario	12 August 2010, Rosario, La Union, Philippines	Farmers in Rosario	100
Aerobic Rice Scientific Forum and Workshop	26 October 2010, IRRI, Los Baños, Laguna Philippines	Rice scientists	26
Labor Productivity and Community Ecology Work Group			
Workshop on the "Assessment of Rice Health for Better Management of Rice Pests for the SKEP"	29-31 March 2010, IRRI, Los Baños, Laguna, Philippines	Rice scientists	
Rice Technology Update for Agricultural Extension Workers (Visayas)	5-9 July 2010, Tagbilaran City, Bohol, Philippines	Agricultural extension staff of Department of Agriculture	30
Rice Technology Update for Agricultural Extension Workers (Mindanao)	19-23 July 2010, Tagbilaran City, Bohol, Philippines	Agricultural extension staff of Department of Agriculture	41
Training course on direct seeding for summer rice and drum seeder	6 December 2010, West Bengal, India	Farmers from Kakdwip block	40
Training course on direct seeding for summer rice and drum seeder	13 December, West Bengal, India	Farmers from Patharpratima block	51
Postproduction Work Group			
Cross-country Learning: stripper harvester training	Kandal Province, Cambodia	Farmers	14
Combine Harvester and Reversible Dryer training course (1st batch)	22-24 March 2010, Nueva Ecija, Philippines	Extension and technical staff of the Department of Agriculture	28
Combine Harvester and Reversible Dryer training course (2nd batch)	25-27 March 2010, Nueva Ecija, Philippines	Extension and technical staff of the Department of Agriculture	31
Operation and Maintenance of Flat-Bed Dryer training course	6 April 2010, Bohol, Philippines	Extension and technical staff, farmers	35
Hermetic Storage training course	7 April 2010, Bohol, Philippines	Extension and technical staff, farmers	35
Operation and Maintenance of Flat-Bed Dryer training course	15 April 2010, Agusan del Norte, Philippines	Extension and technical staff , farmers	30
Hermetic Storage training course	15-16 April 2010, Agusan del Norte, Philippines	Extension and technical staff , farmers	30
Hermetic Storage training course	28-29 April 2010, Camarines Sur, Philippines	Extension and technical staff , farmers	30

Interregional-level postharvest training course	5-9 May 2010, Hue City, Vietnam	Extension and technical staff, farmers	27
3rd Learning Alliance Workshop: Capacity Building on Business Model Development	1-2 June 2010, Leyte, Philippines	Extension and technical staff, Learning Alliance members	25
Interregional-level postharvest training course	8-11 June 2010, Ho Chi Minh City, Vietnam	Extension and technical staff, farmers	25
Stakeholder workshop for "Improved Resource Efficiency and Ecosystem Services in the Rice Value Chain"	16-18 June 2010, Bangkok, Thailand	Thai rice value chain stakeholders	29
Message Design Workshop on Unifying Messages on Hermetic Storage	13-14 July 2010, IRRI, Los Baños, Laguna Philippines	national agricultural research and extension systems partners	20
Review and Inception Workshop of the ADB-Postharvest Project	8 November 2010, Hanoi, Vietnam	national agricultural research and extension systems partners	40
Round Table Discussion on Laser Leveling	11 November 2010, Hanoi, Vietnam	Agricultural engineers, technologists, scientists	15
Crop Health Work Group			
Workshop on Prioritization for Rice Health Problems and Management	6-8 January 2010, Hanoi, Vietnam	Scientists from Thailand, Vietnam, and the Philippines	25
Workshop on Assessment of Rice Health for Better Management of Rice Pests	29-31 March 2010, IRRI, Los Baños, Laguna, Philippines	Provincial and municipal agriculturists	15
Productivity and Sustainability Work Group			
Season-long Training of Trainers (TOT) on PalayCheck System	21 January 2010, Tarlac, Philippines	Agricultural technicians, extension workers	23
Season-long Training of Trainers (TOT) on PalayCheck System	12 January-14 May 2010, Los Baños, Laguna	Agricultural technicians, extension workers	26
Season-long Training of Trainers (TOT) on PalayCheck System	20-29 January 2010, Naujan, Oriental Mindoro, Philippines	Agricultural technicians, extension workers	24
Building up rice knowledge: a two-day workshop on Pinoy RKB	28-29 January 2010, Nueva Ecija, Philippines	Agricultural technicians, extension workers	60
Regional and provincial Training of Trainers (TOT) on PalayCheck System, Panabo City, Davao del Norte, Philippines	8-13 February 2010, Panabo City, Davao del Norte	Agricultural technicians, extension workers	40
Introduction to *Nutrient Manager for Rice* in the Philippines; organic fertilizers and rice; quick guides for fertilizing rice; *Ryza the Rice Plant* videos.	22 March 2010, IRRI, Laguna, Philippines	Local government units of Balayan, Batangas	27
Seminar on Recent Technology and Post-Season Review on Rice Techno-Demo Production	24-25 March 2010, Cagayan de Oro City, Philippines	Farmers, agricultural technicians, extension workers	122
Workshop on implementing site-specific nutrient management (SSNM) for cereal crops	22-26 March 2010, Los Baños, Laguna, Philippines	extension workers, agricultural officers, scientists	18
Workshop on implementing site-specific nutrient management (SSNM) for rice in the Philippines	29-30 March 2010, IRRI, Los Baños, Laguna Philippines	Public and private sector organizations	28
Syngenta Rice Expo: Paving the way to rice self-sufficiency.	27-30 April 2010, Cabanatuan City, Nueva Ecija, Philipines	Farmers, agricultural extension workers, public and private sector organizations	500
Interagency Technical Working Team Workshop for Rice Self-Sufficiency Plan	24-26 May 2010, IRRI, Laguna, Philippines	Agricultural extension staff, scientists, farmers	41
GMA Rice Program 2nd Quarter Assessment and Planning Workshop,.	26-28 May 2010, Naga City, Camarines Sur, Philippines	Participants of the national GMA Rice Program meeting	100
Introduction to quick guide for fertilizing rice; field evaluation of NM rice; ABC videos..	8 June 2010, IRRI, Los Baños, Laguna	Local government units officials and staff of Pangasinan province	110
Training of Trainers (TOT) on PalayCheck System, Romblon, Philippines	21-24 June 2010, Romblon, Philippines	Agricultural extension and technical staff	25
Workshop on electronic extension services on proper nutrient management for rice	14-15 July 2010, IRRI, Los Baños, Laguna, Philippines	Technical and extension workers, municipal agriculture officers,	26
Training of Trainers (TOT) on PalayCheck System	16 July 2010, Los Baños, Laguna, Philippines	Agricultural extension staff of Region IV-A	22
Introduction to quick guide for fertilizing rice; principles and practice of site-specific nutrient management; organic fertilizers and rice; field evaluation of NM rice; ABC videos; quick guides for fertilizing rice.	5-9 July 2010, Baguio City, Philippines	Agricultural extension staff in Luzon	36
Introduction to quick guide for fertilizing rice; principles and practice of site-specific nutrient management; organic fertilizers and rice; field evaluation of NM rice; ABC videos; quick guides for fertilizing rice.	12-16 July 2010, Tagbilaran City, Philippines	Agricultural extension staff in Visayas	30
Introduction to quick guide for fertilizing rice; principles and practice of site-specific nutrient management; organic fertilizers and rice; field evaluation of NM rice; ABC videos; quick guides	19-23 July 2010, Cagayan de Oro City, Philippines	Agricultural extension staff in Mindanao	41

for fertilizing rice.			
Season-long Training of Trainers (TOT) on PalayCheck System	23 July 2010, Cabagan, Isabela, Philippines	Agricultural extension staff of Region 2	35
Season-long Training of Trainers (TOT) on PalayCheck System	26 July 2010, Aklan, Philippines	Agricultural extension staff of Region 6	35
Planning workshop for a consortium on ecological intensification of current and future rice-based systems	17-18 August 2010, IRRI, Laguna, Philippines	Rice scientists	20
DA Rice Program 3rd Quarter Assessment and Planning Workshop	26-27 August 2010, Quezon City, Philippines	Agricultural extension staff, scientists, farmers	160
Training on *Nutrient Manager for Rice,* Padre Burgos and Lopez municipalities in Quezon Province, Philippines, 7-8 September 2010.	7-8 September 2010, Quezon province, Philippines	Farmers and extension workers of Padre Burgos and Lopez, Quezon	
Seminar on Rice Production Technology on Other Ecosystems for Agricultural Extension	14-16 September 2010, Pangasinan, Philippines	Rice scientists, agricultural extension workers of Pangasinan	35
Seminar on Rice Production Technology on Other Ecosystems for Agricultural Extension	15-17 September 2010, Batac City, Ilocos Norte, Philippines	Rice scientists, agricultural extension workers of Ilocos Norte	35
Technology Updates on Rice and Rice-based Farming Systems	27-30 September 2010, Los Baños, Laguna, Philippines	Agricultural extension staff	28
Seminar on Rice Production Technology on Other Ecosystems	30 September 2010, Puerto Princesa City, Philippines	Agricultural extension staff	90
Rice Specialist Training Course on PalayCheck and Palayamanan System	3-5 October 2010, IRRI, Laguna, Philippines	Agricultural extension staff, key farmers	54
Introduction to *Nutrient Manager for Rice* in the Philippines; organic fertilizers and rice; quick guides for fertilizing rice; *Ryza the Rice Plant* videos.	6 October 2010, Banna, Ilocos Norte, Philippines	Farmers, agricultural extension staff	45
Introduction to *Nutrient Manager for Rice* in the Philippines; organic fertilizers and rice; quick guides for fertilizing rice; *Ryza the Rice Plant* videos.	15 & 18 October 2010, IRRI, Laguna, Philippines	Farmers in Laguna	60
Season-long Training of Trainers (TOT) on PalayCheck System.	28 October 2010, IRRI, Laguna, Philippines	Staff from the Agricultural Training Institute-Davao del Norte	35
Season-long Training of Trainers (TOT) on PalayCheck System for ATI staff from Pangasinan, La Union, Ilocos Sur	3 November 2010, IRRI, Laguna, Philippines	Staff from the Agricultural Training Institute of Pangasinan, La Union, and Ilocos Sur	35
NM Rice updates and technical briefing of farmers and technicians of SL Agritech farm input beneficiary, Mabitac, Laguna, Philippines, 6-7 November 2010; *60 people attended.*	6-7 November 2010, Mabitac, Laguna, Philippines	Farmers and agricultural technicians	60
Season-long Training of Trainers (TOT) on PalayCheck System for Region VII	8 November 2010, IRRI, Laguna, Philippines	Extension workers of Region VII	35
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Nueva Ecija	9 November 2010, Nueva Ecija, Philippines	Scientists, extension staff	5
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Tarlac	9 November 2010, La Paz, Tarlac, Philippines	Scientist, extension staff	3
Location-specific Technology Development Planning Workshop for Area Development Coordinator	10-11 November 2010, Nueva Ecija, Philippines	Extension staff	20
Technical briefing on NM Rice on Web and NM Rice mobile for ATI-TOT trainers and farmer-cooperators	11 November 2010, Urdaneta, Pangasinan, Philippines	Extension staff, farmer-cooperators	90
Technical briefing on NM Rice on Web and NM Rice mobile for Bataan Provincial Agricultural Office staff	12 November 2010, Balanga City, Bataan, Philippines	Provincial agricultural staff	15
Season-long Training of Trainers (TOT) on PalayCheck System	23 November 2010, IRRI, Laguna, Philippines	Staff from the Agricultural Training Institute-Region V	43
Technical briefing on NM Rice on Web and NM Rice mobile for PhilRice-Midsayap	23 November 2010, Midsayap, Philippines	Extension staff of PhilRice-Midsayap	16
Technical briefing on NM Rice on Web and NM Rice mobile for Lopez municipality rice farmers, Lopez, Quezon, 24 November 2010; *40 people attended.*	24 November 2010, Lopez, Quezon	Rice farmers of Lopez	40
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Camarines Norte	24 November 2010, Daet, Camarines Norte, Philippines	Extension staff, scientists	6
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Naga City and Ocampo, Camarines Sur	25 November 2010, Camarines Sur, Philippines	Extension staff, scientists	8
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Albay in the town of Libon, Philippines, 25 November 2010; *4 people attended.*	25 November 2010, Albay, Philippines	Scientists, extension staff	4
Exploratory talk and planning meeting for the use	26 November 2010, Albay,	Scientists, extension staff	5

of NM Rice on Web and NM Rice mobile for Legazpi City	Philippines		
Exploratory talk and planning meeting for the use of NM Rice on Web and NM Rice mobile for Ligao City	26 November 2010, Albay, Philippines	Scientists, extension staff	4
Technical briefing on NM Rice on Web and NM Rice mobile for Office of the Provincial Agriculturist staff in Palayan City	30 November 2010, Palayan City, Nueva Ecija, Philippines	Staff of the Provincial Agriculturist Office in Nueva Ecija	10
Techno-Demo Coordinators' Meeting in Region 3	7 December 2010, San Fernando City, Pampanga, Philippines	Extension staff of Region III	36
Farmers' meeting in relation to NM Rice use in Cabiao and Jaen, Nueva Ecija	8 December 2010, Cabiao and Jaen, Nueva Ecija, Philippines	Farmers of Cabiao and Jaen	50
Planning meeting and workshop on the use of NM Rice on Web and NM Rice mobile for PhilRice-Negros	9-10 December 2010, Negros, Philippines	Scientists, extension staff	24
Planning meeting and workshop on the use of NM Rice on Web and NM Rice mobile for PhilRice-Agusan	14-15 December 2010, Agusan, Philippines	Scientists, extension staff	14
Training on *Nutrient Manager* decision tools at Catholic Relief Services Partners Forum	15 December 2010, Davao City, Philippines	Catholic groups, NARES partners, and farmers in Mindanao	150
Planning meeting and workshop on the use of NM Rice on Web and NM Rice mobile for PhilRice-Los Baños and Bicol.	20 December 2010, Los Baños, Laguna, Philippines	Scientists, extension staff	27
Farmers' meeting in relation to NM Rice use	27-28 December 2010, Laguna, Philippines	Farmers of Lumban and Sta. Cruz, Laguna	60
	2011		
Coordination Unit			
Training on household survey for impact assessment studies	7-11 March 2011, Iloilo, Philippines	Enumerators in Iloilo	
Training on household survey for impact assessment studies	14-19 March 2011, Isabela, Philippines	Enumerators in Isabela	
Water-Saving Work Group			
Workshop on "Integrated Field Crop and Water Management, and Development of Good Agricultural Practices for Southern Laos"	10-11 January 2011, Savannakhet, Laos	Extension workers and researchers	17
Workshop on "Integrated Field Crop and Water Management, and Development of Good Agricultural Practices for Southern Laos"	13-14 January 2011, Champassak, Laos	Extension workers and researchers	20
Lecture on aerobic rice technology	4 March 2011, Lanao del Sur, Philippines	Farmer leaders, faculty of Mindanao State University, and officers of the Philippine Army	50
Annual Philippine IRRC Country Outreach Program (ICOP) meeting	9-10 March 2011, Muñoz, Nueva Ecija, Philippines	IRRI, PhilRice, Bohol Agricultural Promotion Center, National Irrigation Administration, and nongovernment organizations	
Workshop on establishing roadmap on aerobic rice program for Region II	28-29 March 2011, Cagayan Valley, Philippines	Local government units of Isabela and Cagayan Valley provinces, extension staff of Agricultural Training Institute-Region II	
Lecture on water-saving technologies in Banaoang Pump Irrigation Project	18 April 2011, Ilocos Sur, Philippines	Farmers	45
Lecture on water management in rice production for training of trainers on sustainable rice production	17 May 2011, Los Baños, Laguna, Philippines	Agricultural extension staff	23
Lecture on alternate wetting and drying water-saving technology	3 June 2011, Urdaneta City, Pangasinan, Philippines	Farmers	48
Seminar on aerobic rice technology	18-19 June 2011, Lanao del Sur, Philippines	Farmers in Masiu and Lumbayanague towns	50
Lecture on water-saving technologies	22 June 2011, Apayao, Philippines	Farmers	30
Training-workshop on water management	23-24 June 2011, Colombo, Sri Lanka	Participants of the International Water Management Institute	2
Training on integrated crop management with the alternate wetting and drying technology as one of the component technologies	January to May 2011	Agricultural extension workers and rice self-sufficiency officers	113
Labor Productivity and Community Ecology Work Group			
Workshop on "Integrated Field Crop and Water Management, and Development of Good Agricultural Practices for Southern Laos"	10-11 January 2011, Savannakhet, Laos	Extension workers and researchers	17
Workshop on "Integrated Field Crop and Water Management, and Development of Good Agricultural Practices for Southern Laos"	13-14 January 2011, Champassak, Laos	Extension workers and researchers	20
Training course on rice production in low altitude areas of Bhutan	8-12 March 2011, Research and Development Center, Bhur, Bhutan	Extension workers and researchers	18
Training on weed management and safe application of herbicide	30-31 May 2011, Cambodian Agricultural Research and Development Institute, Phnom Penh,	Extension workers and researchers	23

	Cambodia		
Postproduction Work Group			
Seminar on the principles of drying and storage	30 June-1 July 2011, Can Tho, Vietnam	Scientists, researchers, extension staff	37
Training on hermetic storage	6 July 2011, Imapsugong, Bukidnon, Philippines	Nongovernment organizations	9
Training on hermetic storage	7 July 2011, Malaybalay, Bukidnon, Philippines	Nongovernment organizations	9
Training on hermetic storage	13-15 July 2011, Davao City, Philippines	Nongovernment organizations	24
Communication Strategies Workshop on PH Technologies in Agusan, 19-20 July 2011. *20 participants*	19-20 July 2011, Agusan del Sur, Philippines	Information Officers of the Department of Agriculture, engineers, national agricultural research and extension systems partners	20
Crop Health Work Group			
Workshop on Assessment, Modeling, and Gains from Sustainable Management of Crop Health	8-11 February 2011, Nakhon Nayok, Thailand	Scientists, researchers	60