IRRI

INTERNATIONAL RICE RESEARCH INSTITUTE

ADB/JFPR 9036: Improving Poor Farmers Livelihoods through Improved Rice Post-Harvest Management Project

SDC: Irrigated Rice Research Consortium (IRRC), Postproduction Workgroup

Workshop report

Research to Impact in Postharvest: Lessons Learned

Victory Hotel, Ho Chi Minh City, Vietnam, 6-8 May 2008

prepared by

Rica Joy Flor and Carlito Balingbing

edited by

Martin Gummert

May 2008

With support from

ADB

Asian Development Bank

Contact:
Postproduction Unit, GQNPC
Telephone: +63 (2) 580-5600 ext. 2772;
Fax: +63 (2) 812-7689 or 580-5699
E-mail address: m.gummert@cgiar.org
Mailing address: DAPO 7777, Metro Manila, Philippines

With support from

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Table of Contents

Table of Appendices

List of Abbreviations

ADB	Asian Development Bank
AIAT	Assessment Institute for Agricultural Technology, Indonesia
APB	Agriculture Promotion Bank, Lao
BPTP	Technology Assessment Center, in the provinces but under central government, Indonesia
Bupati	District head in Indonesia
CD	Compact Disk
Cocoon	Commercial hermetic storage system, also called hermetic cube.
DANIDA	Danish International Development Agency
DVD	Digital VideoDisc or Digital Versatile Disc
EU	European Union
FBD	Flat Bed Dryer
GQNPC	Grain Quality Nutrition and Postharvest Center
HCMC	Ho Chi Minh City
ICAM	Indonesian Center for Agricultural Mechanization, Serpong
ICRR	Indonesian Center for Rice Research, Sukamandi
IMOP	IRRC Myanmar Outreach Program
IRRC	Irrigated Rice Research Consortium
IRRI	International Rice Research Institute
JFPR	Japanese Fund for Poverty Reduction
MAS	Myanmar Agricultural Service
MC	Moisture Content
MG	MGummert
MOAI	Ministry of Agriculture and Irrigation, Myanmar
MOU	Memorandum of Understanding
MRPTA	Myanmar Rice and Paddy Traders Association
M&E	Monitoring and Evaluation
NAFRI	National Agricultural Forestry and Research Institute
NARES	National Agricultural Research and Extension Systems
NGO	Non Government Organization
NLU	Nong Lam University, HCMC
NTB	West Nusa Tenggara
O_2	Oxygen
PC	Provincial counterparts
PDR	Peoples Democratic Republic (Lao)
PH	Postharvest
PHT	Postharvest Technology
PPWG	Post Production Workgroup
ProRice	Swiss funded project to support organic rice value chains in Lao PDR
PTAC	Postharvest Technology Application Center
RH	Relative humidity
RHF	Rice Husk Furnace
RKB	Rice Knowledge Bank
RMU	Rice milling unit
SDC	Swiss Agency for Development and Cooperation
SIAEP	Southern Institute of Agricultural Engineering and Postharvest Technology
SME	Small and medium enterprises
SSFFMP	South Sumatra Forest Fire Management Project
Sumsel	South Sumatra (Sumatra Selatan)
T	Temperature
TOT	Training of Trainers
TV	Television
USD	US$

VIAEP Vietnam Institute of Agricultural Engineering and Postharvest Technology

Workshop Session Documentation

Prepared by: Rica Joy Flor and Carlito Balingbing

Introductory Sessions

The workshop opened (May 6) with welcome remarks from Dr. Phanh Tanh Tinh, Director General of Vietnam Institute for Agricultural Engineering and Postharvest Technology (VIAEP). He appreciated the effort of IRRI, with funding from ADB and SDC in facilitating the workshop to consolidate learning in the rice postharvest chain and for providing the avenue for sharing among different countries toward the ultimate goal of increasing farmers income and promote food security in the region.

Martin Gummert (MG), Postharvest Development Specialist of IRRI presented an overview of the different postharvest (PH) projects of IRRI being implemented in NARES countries (Appendix 5) namely:

a. The SDC funded Postproduction workgroup of the Irrigated Rice Research Consortium (IRRC-PPWG) with activities in Cambodia, Indonesia, Lao PDR, Myanmar, Vietnam and Philippines
   - the project was recommended a fourth phase (2009-2012) with a greater emphasis on strengthening the national extension networks where the delivery of IRRC technologies is most promising
b. ADB/JFPR Project on Improving Poor Farmers Livelihoods through Improved Rice Post Harvest Technology in Cambodia and in Vietnam
   - now on the 2nd year extension with no additional fund involved
   ADB earmarked funding to initiate programs support to IRRI's postharvest work and for out scaling of postharvest technologies

Activities in these two projects are linked together under two similar objectives: enabling farmers to increase income from their rice harvest (through improved PH technologies and greater understanding of the rice markets) and establishing a regional partnership of trained NARES PH practitioners who will develop and exchange PH information and technology.

MG also stressed the timeliness of the workshop in the light of the prevailing "rice crisis" in Asia especially in the Philippines, and presented the response options identified by IRRI, which include a strong postharvest component. These options were recently addressed in the Philippines with the signing of a Memorandum of Understanding (MOU) with IRRI last May 2, 2008 for the Intensification of Rice Production in the Philippines.

The objective and expected outputs of the two-day workshop are:

Objectives:
1) To discuss and document the status of technology validation and dissemination for each country;
2) To serve as a baseline for cross country learning; and
3) To set the scene for the planning of Phase IV of the IRRC Postproduction workgroup and others postharvest initiatives.

Expected outputs:
- A document on the progress of learning, technology adaptation and dissemination in the rice postharvest projects, supportive and inhibitive factors, key stakeholders/partnerships and successful methodologies;
- Update postharvest country profiles (Myanmar, Lao and Cambodia) and new ones for the other countries for which no profile was compiled yet;
- Priority areas and recommendations for a Phase IV of the IRRC and for other follow-up project proposals; and
- Assessment of the current status of adoption of post-production technologies

Country Presentations, Case Studies and Future Plans

At least one participant of each country presented the status of implementation of postharvest activities. IRRI had sent questions to the presenters in advance (Appendix 4) to make sure that information about where we are on the research to extension pathway in the different countries. Most of the presenters did stick to the structure given by the questions or tried to address the questions using own structures.

For each of the countries represented, some highlights from what was presented by partners or discussed after the presentations are outlined below under the header "*Issues and Concerns*". Some pointers on the status of adoption and the progress along the research to impact pathways were compiled by Rica Flor during the presentations and are included in the country sections below under the header "*Status of Adoption*". Results from the group work form the sessions focusing on capturing the learning, which was facilitated by David Shires, Training Expert are summarized below in tables for each country under the header "*Suggested Case Studies*". The fourth part of each country section is the outline of plans for activities in response to the group work sessions "*Looking ahead*" towards a fourth phase for the IRRC and the earmarked ADB support to postharvest. The goals are overlapping and complementary such that IRRC is recommended to look at strengthening national extension systems and delivery of PHTs to a large number of farmers while the new ADB project is aimed at food security by reducing postharvest losses and both have a livelihood component and increasing farmers' income through adding quality.

Cambodia

Dr. Meas Pyseth presented for Cambodia.
See Appendix 6 and Power Point Presentation on the CD.

<u>Issues and Concerns</u>

- Cambodia's surplus in production is being targeted for export to other countries in the form of milled rice and not as paddy. The Government is aiming at forming a policy towards this; hence, strong need for support and assistance to the rice millers association;
- The problem on labor out migration is prevalent which is affecting availability of labor in the field during land preparation up to post-production activities;
- The next step for the hermetic storage (e.g. super bag, cocoon), instead of just giving them for free to the farmers, is to disseminate more information on the benefit (economic and technical) of hermetic storage especially super bag thru more demonstrations and showing to the farmers and end-users the economic and financial benefit of the super bag (for other technologies as well);
- Relative to the social acceptance of some technologies (as related by Sutrisno regarding their experience in Indonesia) there is the problem of lack of dedicated people who will push or extend (out-scale) the technology to the farmers and it is not yet clear how the government will adopt such technology into the program (up-scale). Martin Gummert clarified that training of trainers alone (TOT) is not sufficient since after the training the farmer intermediaries first need to develop ownership and then after receiving training themselves the farmers need to try the technology themselves to be convinced


Participants from Cambodia sharing ideas during the workshop.

of the advantages. This process needs time. Scaling up still needs further discussion in the country.

- Not all farmers buy in to the mini-combine technology due to the proliferation of combine harvesters with wider cutter bar (3m) from China and Thailand and chain wheel adaptable to soil conditions in the field. The mini-combine provides no option for a chain wheel except star wheel which is not yet adapted to Cambodian field conditions. Field demonstrations have been effective in letting the farmers know the technology and motivating them to adopt. Showing the farmers and intermediaries the comparative technical and economic benefits between combines from China and Thailand and the mini-combine by evaluating the level of loss will give the farmers better tool and understanding of the mini-combine harvester as an option.
- For market information dissemination strategy, mobile phones were provided to key farmers for them to communicate with private millers and buyers and get information on rice prices. Each handler of a project phone has USD10 allowance per month for the necessary activities. It is recognized that there is still much to do in the rice information market - to identify the right kind of rice information and the challenge of how to institutionalize it and to make it sustainable.

Status of Adoption

Needs/ Background

Country has surplus of 1.64Tons
Problems:

- Labor shortage
- Drought/Flood
- Soil fertility
- Poor farm management
- Seed purity & quality
- Lack of irrigation (about 22% only)
- Pests
- High PH losses & Low quality…
- Poor extension

Policies favorable to introducing PH technologies

Technologies introduced

- Flat-bed dryer (1)
- Mini combine harvester (1)
- Improved granaries
- Storage
  - Improved granaries
  - Super bags &
  - Cocoons
- Quality testing kits:
- MC, O2, wind, T, RH, Scale…

How were they introduced

- Trainings
  - Seed & Grain Quality
  - Rice PH
  - Safe Grain Storage
  - Village Mills
  - Flat-bed Dryer
  - Mini Combine Harvester
  - Production & Handling High Quality Grain
  - Farmers' Group Establishment
  - Agr Extension Methods.
- Demos, Field days, Congresses, Meetings, Workshops, Study tours
- Mill benchmarking
- Posters, Fact sheets, banderoles, E-learning CDs, Training materials, Technical reports
- Info boards.

Validation status

- About 30 now for contracts

Super bags & Cocoons:

- No significant different after 5- to 6-month but 9-month storage

Testing kits: MC, O_2, wind, T, RH, Weight

- Most not seen before but feel need
- Aware that MC is very important
- Discovered 7-10% weight variation

Improved granaries

Outcomes of technology introduction

Scale of outreach

Adoption status

Impacts

Weaknesses

Suggestions

- Better cleaning process.

Safe storage:

- Sealed storage, apparent widespread interest
- Accepted as gift, so far

- More grain stocked ð Increased selling choice, food security & marketable
- More time for demos & trials (effects of diff materials, equipments & methods, & overall benefits)

Milling:

- Still many Engleberg-type - yield 50-60% & high broken
- Many have no idea of input/output weights
- Some put pressure to improve mill-out
- Millers face grain quality issues, esp. moisture & trash
- Incentives to improve mill-out needed
- More training, discussions & demos required.

Quality testing kits:

- Many more
- More reliable & affordable
- No restricted availability.

Plan for the future

Suggested Case Studies

This group documented the benefits that can be derived by the farmer from 4 project technologies, the support needed to fully implement the technology, what are the important points to consider for the success of the technology and identifying the risks and difficulties that can be encountered in implementing the new technology.

Technology	Benefits	Actors	Key to Success	Risks-Difficulties
Combine Harvester	✓ Less labor/timer ✓ Low cost ✓ Provides job/income ✓ Crop residues	▪ Project Team ▪ Local Authorities ▪ Private ▪ Farmers ▪ NGOs ▪ NARES	• Identify • Validate • Guide/demo • Train/practice • Actors capacity and motivation	▪ Works for some condition ▪ After sales service ▪ Operators problem ▪ Benefit oriented ▪ Expensive/complicated
Dryer	✓ Weather ✓ Less labor/time ✓ Good Quality of paddy/rice	▪ Project Team ▪ Local Authorities ▪ Private ▪ Farmers ▪ NGOs ▪ NARES	• Actors capacity/motivation • Identify • Guide/demonstration • Train/practice	▪ Operators problem ▪ Benefit oriented ▪ Farmers knowledge
Hermetic Storage	✓ No pests ✓ Stable MC ✓ High Quality ✓ Long time storage	▪ Project Team ▪ Local Authorities ▪ Private ▪ Farmers ▪ NGOs ▪ NARES	• Good news from others • Farmers group • Key farmers • Demonstrations	▪ Not properly used ▪ Unwillingness to pay (for succeeding units/pieces)
Mill	✓ Store more ✓ Higher outputs ✓ God quality ✓ More employment	▪ Project team ▪ Local authorities ▪ Private sector ▪ Millers	• Good-willed millers • Demo/trainings • Sharing good cases • Peoples ideas	▪ Uncontrolled export ▪ Infrastructure ▪ Cheating each other

Key notes from Pyseth Meas:

- ❖ "Key to success of technology dissemination is the capacity and motivation of the actors."
- ❖ Demonstrate to the farmers the advantages and disadvantages of the technology thru actual field demos is essential.
- ❖ Price, complications in the use of the machine and maintenance are some of the constraints.
- ❖ If the owner of the dryer knows how to operate and make business with his dryer then he will promote more the dryer. Farmers' knowledge – if the farmers know about the quality and are updated about market prices of rice then they cannot be cheated by middlemen. Although this is also relative, there are also cases when cheating goes both ways: some millers and middlemen cheat the farmers with grain weight. Sometimes the farmers also cheat the millers and middlemen by not drying the grain properly.

Looking Ahead:

Technologies		Target	
Main	Detail	Provinces	Number District
Combine Harvester	-Small to large scale	-Prey Veng -Battambang -Pursat -Takeo -Kompong Thom	-2/province -old districts still renewable +Total 14 (10 new and 4 old)
Dryer	-Small to large scale	As above	As above
Storage	Improve. Farmer's Granaries	As above	As above
	IRRI Super bag		
	Cocoon		
	Others Grainpro storage facilities		
Milling:	Village & commercial	As above	As above
Processing	-Main product… -By-product: animal feeding, oil, chalk-coal…	As above	As above
Market Info		As above	As above

- **Local PH Teams**:
  - necessary to create management team (large or small rely on project available)

- **Partnerships?**
  - How to get the needed extension expertise on board?
    - Experts → PCs, district extension workers → Key farmers, millers and manufactures → other (farmers, millers and manufactures)
  - Business development and market linkages
    - Yes.
  - Centers of excellences for key technologies?
    - Yes, like from NLU, other better project sites…
  - What role can the private sector play?
    - Yes.

- **Mechanisms for collaboration and roles?**
  - How to coordinate activities in the countries
    - Direct contracts
  - IRRI as catalyst/facilitators
    - Executive agency, overall management.

Indonesia

The country's activity (supported by the Postproduction workgroup of the IRRC and the South Sumatra Forest Fire Management Project (SSFFMP) funded by the European Union) focused on the development, testing and dissemination of a box dryer (another name for a flat bed dryer) with rice husk furnace. The activity was implemented in collaboration with various stakeholders such as private workshops and rice millers, universities (e.g. Sriwijaya University in Palembang) and institutions (e.g. BPTP-Assessment Institute for Agricultural Technology, ICRR- Indonesian Center for Rice Research). The box dryer with a capacity of 3-ton has been disseminated in the swampy areas of South Sumatra, and was also piloted in West Java (Binong) and West Nusa Tenggara (NTB).

Experiments on hermetic storage and activities related to labor and productivity workgroup have also been conducted.

See Appendix 7 and Power Point Presentation on the CD.

Issues and Concerns

- The cost of drying at US 0.4cent/kg of wet paddy in 2002 is computed based on operation and cost of product which is mainly an overhead cost (which includes operator's fee, husked used, price of diesel) but does not include depreciation.
- The adoption of the box dryer with rice husk furnace started in 2004 when the cost of kerosene (which is commonly used as fuel in box dryers) rose to US 30 cents/liter or 3,000rupiah per liter.
- The smallest capacity of box dryer disseminated in target areas is 3tons and the biggest is 10tons. Investment cost for 3tons made of steel box is USD5,000 (45M Rupiah).

Budi Raharjo presenting group work output of Indonesia.

- The hermetic storage technology (Super bag) is disseminated by the project and also by the local government since a district head (Bupati) provided Super bags with his photo printed on them as campaign promotion giveaways. There was no widespread training to the end users/farmers in those events. Around 15,000[1] pieces have been distributed to the farmers but it uses the grain at the local government for storage and not the farmers' grain at the village level.

[1] This number might be too high since the Agribusiness Club in Jakarta provided feedback to IRRI that 5,000 bags were sold for that purpose only. Other suppliers are not known to the project.

Status of Adoption

Needs / Background
Labor shortage; High precipitation/wet Conditions; and limited sun drying facility.

Technologies introduced
Husk fuel furnace

How were they introduced?
not sure??

Validation status
Added benefit 234USD

Outcomes of technology introduction
40 RMUs have build the box dryer for 3 t paddy made of concrete

Scale of outreach
40 RMUs

Adoption status
40 rice milling units using the dryer; orders being placed to manufacture dryer

Impacts

Weaknesses
more improvements on the dryer

Suggestions

Plan for the future

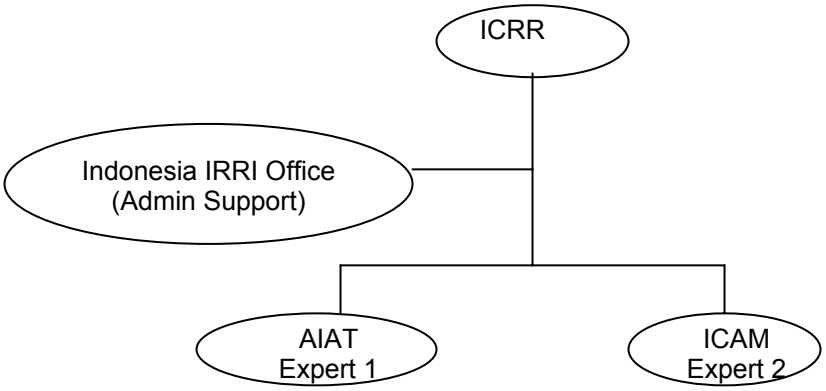
Suggested Case Study

Technology	Benefits	Actors	Key to Success	Risks-Difficulties
Mechanical/Box dryer with husk fuel furnace - Indirect heating system - Multi-commodities - Knock down construction of iron plates/ stationary concrete bins Installed at Rice Milling Units	✓ Increase rice milling recovery ✓ Increase in head rice quality (average of 14.5%) ✓ Reduction in drying cost ✓ Added value of US$200/ha (to wet paddy) ✓ Business opportunity to local workshops	▪ ICRR ▪ AIAT ▪ RMU owner ▪ SSFFMP-EU ▪ IRRI ▪ ICAM Extension workers	▪ The technology as solution to drying problems in paddy ▪ Suitable location and good cooperator ▪ Speedy adoption process in swampy areas of SumSel	▪ Difficulty in operation compared to oil fired dryer ▪ Labor intensive as compared to oil fueled dryer (high cost of labor)

Looking Ahead

National Priority	Location	Local PH Team*	Role of Private Sector	Partnerships**	Mechanism for Collaboration and Roles
▪ Mini-Combine (Vietnam-type) ▪ Power thresher (local type) ▪ Husk fuel box dryer (ABC furnace type) ▪ Hermetic storage ▪ Milling machinery	▪ - South Sumatera (Banyuasin District) ▪ - S – South Kalimantan Province (Barito Kuala District)	▪ ICRR ⇨Design PHT package ▪ AIAT ⇨Dissemination and field coordination with local institution ▪ ICAM ⇨M & E performance technology pakcage	▪ Placement of students ▪ Development of technology ▪ Provide access for credit to farmers	▪ Center for Excellence for key technologies: ▪ Role of the private sector is stipulated in the MOU	▪ A Team Leader will be designated to lead the project and coordinate with the Team Members ▪ IRRI as catalyst is very important

* The organizational set-up of the PH Team can be elaborated by the figure below:



****** Partnership will define how to get the needed extension expertise on board via selection of extension workers from extension institution guided by the following criteria:

1. Postharvest experts
2. Experience in disseminating technology
3. Potential person

Business development and market linkages shall also be established with the following interventions:

1. Socialization/dissemination will involve stakeholders (RMU owner, Local workshop, Local Government Agricultural Service, ICRR, AIAT)
2. Training and demonstration on drying paddy for the farmers and local operator
3. RMU owner/farmer group that needs Agricultural Machinery will directly order to local workshop

Lao PDR

The Postproduction Workgroup of the IRRC has also been working closely with NAFRI in Lao PDR. This is through the National Rice Research Program, the Agricultural Research Centers in Savannakhet, Champasak, Louangphrabang and a private manufacturer in Vientiane. The collaboration seeks to address problems in rice postharvest losses (estimated at 10%-15), increase quality and increase rice farmers' benefits and income through introduction and adoption of appropriate rice PHTs.

See Appendix 8 and the Power Point Presentation on the CD.

Issues and Concerns:

- A problem of disseminating PH technology in Laos is mainly poor germination obtained for seeds stored in Super bag due to storage at high moisture content and high ambient temperature of storage condition (moisture content was above 14% in most farmers trials).
- A private manufacturer who attended training in dryer manufacturing in Nong Lam University in HCMC made a modification of the Vietnamese flat bed dryer to suit to local conditions. The modification caused some problems like fly ash accumulating under the false floor. Flat bed dryers with capacities of 1ton, 2tons and 4tons have been installed in Vientiane, Vientiane Capital and Savannakhet for demonstration and testing.
- High cost of labor input during the harvesting season; labor shortage during due to competitive wages in industrial zones of neighboring countries (e.g. Thailand). Mini-combine provides a good option to replace manual labor (total harvesting cost with mini-combine at 505,200 kip/ha versus manual harvesting at 2,190,000 kip/ha) during harvest season but some technical weaknesses of the equipment were seen, such as:
  - Spare parts are not locally available (chains, cutter bar)
  - Some easily worn out components are made with soft steel (e.g. tines of threshing drum
  - No choice for engine (diesel or petrol)
  - The tires deteriorate after one season use
  - Some grain losses when the cutter-bar goes up
  - Takes up more time in small paddy field (more turning, traveling)

Lao PDR participants preparing workshop output

Status of Adoption

Needs / Background

- On-farm postharvest losses are high
- Low quality produce, low milling yields
- Postharvest equipment/capacity is low
- No value adding

Technologies introduced

- Dryers
- Laser leveling
- Quality kit/moisture meter
- Mini-combine harvester

How were they introduced

- Training
- TOT of dryers
- Training in Cambodia

Validation status

Super bags:

- Germination still low compared to local system
- High paddy moisture during storage

Outcomes of technology introduction

- Dryers manufactured locally
- One demo dryer with 4t capacity at Vientiane Capital and Savannakhet
- Two dryers with 1t and 2 t capacity installed in Vientiane, Vientiane Capital, Savannakhet
- 31 low cost dryers for demonstration in the 6 provinces

Scale of outreach

- Manufacturers installed dryers in 6 provinces

Adoption status

Impacts

Weaknesses

Mini combine:

- Some main spare parts are not available in Laos (chains ,cutter…)
- Some wearing components are made by soft steel (e.g. types of threshing drum), may need hard-facing or stainless steel

- No choice of engine (diesel or petrol)
- The tires are not good quality (deteriorated after one season)
- Some grain losses when the cutter-bar goes up
- Take more time in small paddy field (more turning, traveling)

Suggestions

Plan for the future

- Conduct more hands-on postharvest training for extension and farmers.
- Demonstrate laser leveling and provide training.
- Combine training (on demand).
- Follow-up on ProRice activity (improve paddy quality through village level extension).
- Collaboration with private to develop thresher able to thresh high moisture paddy rice
- Graduate training MsC and BsC in postharvest

Suggested Case Study

Technology	Benefits	Actors	Key to Success	Risks-Difficulties
Mini-Combine Harvester	▪ Cheap cost: 500,000kip/ha versus 2Mkip/ha for manual harvesting ▪ Less labor req't: 2 person/day versus 57man-day/ha for manual harvesting ▪ Minimal losses at <3% versus 10% for manual harvesting	▪ Seed Multiplication Centers ▪ University (e.g. NLU)	▪ Networking with neighboring countries	▪ Availability of spare parts ▪ Lodging plants can not be harvested ▪ Can not be used in too muddy soil ▪ Requires additional labor to cut the corner plot ▪ Can not work with local (traditional) varieties

Looking Ahead

National Priority	Location	Local PH Team	Role of Private Sector	Partnerships	Mechanism for Collaboration and Roles
▪ Dryer ▪ Super Bags ▪ Laser Leveling ▪ Quality Kits ▪ Mills ▪ Mini-combine ▪ Market info dissemination	▪ Vientiane Capital ▪ Savannakhet Province ▪ Champasak Province (2 districts)	▪ Research Institute ▪ Extension system ▪ Private sector ▪ Local network coordinator	▪ Placement of students ▪ Development of technology ▪ Provide access for credit to farmers	▪ APB ▪ Chamber of Commerce ▪ SMEs ▪ Rural Dev't. Projects	▪ 6 monthly meeting ▪ Communication by e-mail (monthly) ▪ IRRI as supervisor

Myanmar

Dr. Myo Aung Kyaw from the Myanmar Rice and Paddy Traders Association (MRPTA) presented for both IRRC PPWG partners, MRPTA and MAS.

See Appendix 9 and the Power Point Presentation on the CD.

Issues and Concerns

- Awareness of the farmers on the effectiveness of the IRRI super bag as hermetic storage system for seed (not only for rice but groundnut, peas and beans also); farmers are also aware of maintaining a stable moisture content for high germination rate even after 6 months of storage. But the cost of US$1.2 per piece is quite constraining to some farmers.
- Great potential for the 5ton cocoon for the private seed growers and bean exporters.
- Adoption of the low-cost IRRI moisture meters by many farmers and millers.
- 'Wide acceptance' of the flat bed dryer from Vietnam (with 37 units disseminated), but some operators are not properly trained that they have the tendency to increase drying air temperature (even more than 60°C) in order to hasten drying time during the peak season. One operator tried to weld back broken fan blades which resulted to total breakdown of the fan housing.
- Need for further training on fan testing, design and fabrication and also in laser leveling as the equipment is already in place and grounds/areas are now waiting to be leveled.

Dr. Myo Aung Kywa and Mr. U Soe Myint discussing their workshop output.

Status of Adoption

Needs / Background

Technologies introduced

- Hermetic Sealed Storage
- (Volcani Cube)
- Rice Market Development Survey

How were they introduced

- Practical Hands on Training on Rice Mill Evaluation
- Practical Training on Laser Land Leveling System in Rice Production
- Collaboration between IRRI, MAS and MRPTA
- Post Harvest Management for Improved Quality of Rice Grain and Seed
- Presentation
- Demo
- Training

Local champions (for future activities)

Validation status

Super Bags-

- stable moisture content with the higher germination rate of rice and ground nut

5 tons Volcani cube-

- stable moisture contents and higher germination rate
- High head rice yield and decreased after 6 months

Outcomes of technology introduction

- 12 millers learned about PH technologies
- 300 farmers and extension staff trained (IMOP)
- 3200 (farmers, millers, traders, business entrepreneurs,
- MAS Extension Staffs, village heads and
- government ministerial officials and employees) trained on dryers

Scale of outreach

Millers

Adoption status

- Uptake of organized groups: 37 dryers manufactured and used
- Positive potential adoption

Impacts

Weaknesses

- problems in promoting low-cost dryers
- investment constraint in commercial dryers
- Bank loan assistance not possible

Suggestions

Plan for the future

Local champions for technology dissemination

Suggested Case Study

Technology	Benefits	Actors	Key to Success	Risks-Difficulties
Mini-Combine Harvester; Thresher	▪ Better post Harvest Handling ▪ Reduction in yield loss ▪ Reduction in seed rate ▪ Increase farmers' income ▪ Improved livelihood of farmer	▪ Farmers ▪ MAS Staff ▪ Local authority ▪ NGOs ▪ Private companies (e.g. seed, pesticides, etc)	▪ Select local champion ▪ Easy to understand, easy to operate, less risky to uptake the technology ▪ Representative of a local area ▪ Proper timing of training ▪ Support equipment and technologies like low cost moisture meters, super bags, dryers	▪ As investment for cultivation is very low, farmers do not uptake the technology immediately ▪ One technology may not be adapted to all areas due to differences in culture, practice ▪ Most farmers are occupied with their activities as timing for next crop is very limited ▪ Limitations with labor, farm machinery (e.g. thresher, harvester) to get the better post harvest handling

Looking Ahead

National Priority	Location	Local PH Team	Role of Private Sector	Partnerships	Mechanism for Collaboration and Roles
▪ Capacity Bldg. (PHT awareness) ▪ Dryer dev't. ▪ Mechanized harvesting ▪ Laser leveling ▪ Rice market information system	1. **Rainfed ecosystem** ▪ a. Ayeyarwaddy Division – Myaung Mya District ▪ b. West Bago Division – Tharyarwaddy District 2**. Irrigated Ecosystem** ▪ a. Sagaing Division – Shwe Bo District ▪ b. Mandalay Division – Pyin Ma Na District	▪ MAS of MOAI (Public) ▪ MRPTA (Private) ▪ Community-Based Organization (e.g. Pioner Postharvest Dev't. Group) ▪ Postharvest Technology Application Center (PTAC)	• Coordinate and cooperate with developme nt activities	▪ Centers of Excellence: NLU in HCMC, Vietnam	▪ Synergy between private and public institutions ▪ IRRI as catalyst for technology dissemination

Vietnam – ADB Project

For Vietnam the ADB project partners and the IRRC project partners reported separately project results but formed a common group in the group work sessions. Vu Cong Khanh reported the ADB project activities.

See Appendix 10 and the Power Point Presentation on the CD.

Issues and Concerns

- Showed benefits derived by farmers from hermetic storage systems like the IRRI super bags and cocoon (e.g. maintained high germination rate at 80%-90% even after 9 months of storage) lead to farmers buying the super bag at a subsidized price of US$0.35/piece. Need to identify local manufacturer of hermetic bags to meet demands of farmers.

Status of Adoption

Needs / Background

- High losses at post-harvest stages (11-15%).
- Backwards equipment and technologies-
- Poor knowledge and understanding of farmers on post-harvest technologies.

Technologies introduced

- Drying
- Storage
- Milling
- Marketing

How were they introduced

- Leaflets
- Training
- Provided dryers, storage facilitates, milling system, vcd/dvd

Validation status

Storage:

- Commercial paddy: low lose of stored paddy < 1% compared to 3- 5%
- Higher white rice and higher head rice recovery
- Higher germination rate after 9 months: 80 – 90% (30 – 70% higher than normal storage)
- For 5 tons storage: net benefit after debt repaid (loan term of 4 years) will be $320.56

Outcomes of technology introduction

- Market information disseminated by radio
- Millers in 4 villages trained
- Dryers installed (one in Long Anh)
- Use FBD for handicraft material
- Reduce post harvest losses
- Improve the livelihoods of farmers.
- Model for expanding to other places

Scale of outreach

4 communes in 2 provinces

Adoption status

- Use of dryers
- Request for more super bags
- Manufacture of copied dryer design

Impacts

Weaknesses

Suggestions

- Expansion to other provinces (model project)
- Sustainability in project sites
- Project to be reported and modeled by a workshop organization for farmers and authorities at provincial and district levels

Plan for the future

Vietnam – IRRC

The Vietnam IRRC presentation included three speakers, Dr. Phan Hieu Hien reporting on laser leveling and the other IRRC activities, also laser leveling activities in Bac Lieu Province in behalf of Diep Chan Ben and Thi Bich Thuy presented the hermetic storage experiments from Central Vietnam.

See Appendix 11, Appendix 12 and the Power Point Presentations on the CD.

Issues and Concerns

- Rice Civilization: A laser-leveled land to modernize agriculture and reduce poverty?
  - Future of Vietnam will not rely on the Mekong and the Red River Deltas but in sloping land (leveled) with more rice area. The "extremist" view of providing "Not so small equipment for small farmers" instead of small equipment for small farmers as it has happened in the past might add fuel to some technologies such as laser leveling.
  - Fan testing and the capability to do it is an important condition for successfully introducing dryers and NLU had always made it a condition that manufacturers who got support had to construct a fan test rig.
  - With the positive results of hermetic storage trials (e.g. good germination rate and reduced storage losses), there is a need to identify local manufacturer/investor for the hermetic bag in Vietnam.
  - Mini-mills (0.5-1ton.hr) are dying out and the State rice milling is losing the enterprise to the private sector as more large scale mills (100tons/day) are rapidly being put up. Helping the small mills is not necessarily helping the small farmers.
- Super bag – useful in areas with one crop per year for seed storage of 6months and for areas with 2crops per year (to store seed for 3 months).
- For market information, there are two approaches, depending on the area. Market information gathering by NLU only scratched the surface and the fact that there is a lot of media such as radio, TV and DVD/CDs. The fluctuation in the price of rice is driven because of the ignorance of some people of the rice crop.

Participants from Vietnam (North and South) while discussing assigned topics during the workshop.

Status of Adoption

Needs / Background

Technologies introduced

- Laser land leveling.
- Automatic rice furnace.
- Hermetic paddy storage.
- Other: market data, rice mill performance, and quality monitoring kits.

How were they introduced

- Field demonstration and seminar.
- work with "3 reductions 3 gains" in An Giang.
- Equipment loan so farmers can use laser leveling.

Validation status

- Hermetic storage did not get positive results.
- Market information was documented but no data on whether farmers use the information.
- Moisture meter is fairly accurate.

Outcomes of technology introduction

Mekong Delta

- 100 trained on laser leveling in Bac Lieu.
- 100 farmers, cooperative staff and agriculturists attended site visit.
- Designed a low-cost moisture meter.
- Trained participants from Laos, Cambodia and Myanmar.

Hue

- The sealed storage included both super bag and commercial hermetic system provided insect control without pesticides due to the modified.

atmosphere inside the storage systems. It made the insects can not live.

- The sealed storage also limits the moisture content increase because the storage system prevents the grains adsorbing water from the ambient air. As a result the seeds are not discolor and the seed vigor is stable so the germination rate high.
- The sealed storage method is effective, easy to use, and it is suggested that the Agricultural extension center will advise and transfer the technology to farmers who live in cultivate areas.

Scale of outreach

- Farmers
- Partners in country
- Partners in neighboring countries

Adoption status

Not much data on adoption (assumed that in areas where training were done, farmers adopted)

Impacts

Weaknesses

Suggestions

Plan for the future

Vietnam, both projects

Suggested Case Studies

The Vietnam group had already looked ahead and not focused so much on identifying case studies but on approaches and what should be done better in the future.

Technology	Benefits	Actors	Key to Success	Risks-Difficulties
Laser Leveling	▪ Increase provincial and bigger sites	▪ Private farmer counterparts ▪ Bac Lieu	▪ Incorporate technologies to National Extension Programs ▪ Cross-visits for farmers ▪ Provide a number of laser kits for experiment at Northern, Central and Southern Provinces	▪ Farmers users contributes partly to materials/equipment cost
Super Bag			▪ Priority supply to rainfed rice production area (1 crop/year)	▪ High cost of hermetic bags
Automatic Furnace			▪ Incorporate technologies to National Extension Programs	
Market Info				▪ "Just on the surface" in complex system of rice in Vietnam

Case studies that could be identified:

North Vietnam: Hermetic storage, market Info and dryers
South Vietnam: All technologies

Looking Ahead

National Priority	Location	Local PH Team	Role of Private Sector	Partnerships	Mechanism for Collaboration and Roles
✓ Rice-based processing (small-scale) ✓ Super bags ✓ Laser-leveling ✓ Dryers ✓ Combines	10 Provinces - Northern (3) -Central (3) - Mekong (4) 2 Districts/Province	▪ Central Agencies (Ministry) ▪ Research Institutes; Universities ▪ Extension ▪ Farmer Ass'ns.	• Manufacturers • Rice Millers • Dealers Structure is embedded in Country's structure Duties: Organize and Consult	▪ Training of Extension Staff ▪ Pilot Demo with Private partner ▪ Training on Business Mgt. (Hands-on) ▪ 3 Centers of Excellence ▪ Private Sector Receive and apply technology and demo sites	▪ IRRI as catalyst; facilitator and fundseeker ▪ Coordinate with Local PH teams with regular meetings ▪ Network of information

Guest Presentation from Thailand

Ms. Amara Wiengweera had joined an initial meeting attended by IRRC scientists and Thai Rice Department staff in January 2008 where it was agreed to exchange information about postharvest activities in Thailand and the IRRC Postproduction Workgroup in the IRRC partner countries. The objective was to identify whether there is any potential for future collaboration between IRRC and Thailand.
Ms. Amara Wiengweera participated in the workshop at own travel cost and presented an overview on the postharvest sector in Thailand.

See Appendix 13 Power Point Presentation on the CD.

Highlights:

- Rice communities in Thailand are mainly located in the north and central part.
- Most of the marketing quality is dependent on postproduction.
- Harvesting is still with the use of sickle (manual as opposed to mechanized) especially in areas where machines cannot operate.
- Combine harvester is popular in Thailand (about 99%).
- Thailand is far advanced especially in secondary products, the other countries could benefit potentially from technologies from Thailand (MG).
- 10% of the rice produced by one farmer in Thailand is consumed locally and 90% is marketed to the capital city Bangkok (where 28% is exported and 62% is for domestic consumption). The government cannot control rice price increases but they can help a bit in rice price fluctuations.

Highlight Presentations

Introduction of Flat bed Dryers in Vietnam

Dr. Phan Hieu Hien gave a presentation on the history of the introduction of the flat bed dryers in Vietnam, which started with the first units in 1982 and has led to more than 6,000 units installed in the Mekong Delta until 2008. MG had asked Dr. Phan Hieu Hien for this presentation since there are a lot of lessons to be learned from this successful introduction. Dr. Phan Hieu Hien not only presented a story of introduction of a technology but also impressive life time achievement in drying research and extension since he was the major driver in the introduction and adaptation of the technology. Congratulations!

See Appendix 14 *and Word document on the CD.*

Issues arising from the presentation and discussion

- Dr. Hien emphasized a very strong business approach by not giving technology for free. Various stages of subsidy for farmers: Some farmers can enjoy subsidies at different levels, say 50%, 40%, 30% 10% and 0% for various technologies. But subsidies are only given for the first units.
- Automatic Rice hull furnace (RHF) installed in provinces, subsidize partly like what was done with the subsidized dryer costs using IRRI funds. It cost 8M dong. In return researchers can make experiments in the site.
- Dr. Hien's idea is that top down approach should cover all areas of extension and training, and the bottom up should be left to the end-user to influence the policy makers. (Martin Gummert added that top down and bottom up have their own specific application and the mix between the two approaches is important).
- Flat bed dryer (FBD) has developed significantly in the Mekong Delta since 1982. This started with 2 units but now has grown to 6,000 units of 8-10tons/bathc among which are the 600 units of reversible dryer. The design originated from NLU and IRRI and then it was disseminated, copied and improved by farmers and mechanics (local workshops) and NLU monitored the modifications and instituted a major design change and repeated the cycle.
- MG said that form his point of view a number of factors contributed to the success:
  - The researchers stayed involved after the first dryers were introduced and monitored the modifications made by manufacturers and farmers.
  - The NLU team made continuous improvements to the technology with each new model having one innovation. Improvements were based on strong science and engineering (example: fan test duct).
  - NLU guaranteed for the performance and provided after sales services. If the improvement turned out to be a step backwards the user was given the original version free of charge.
  - NLU used a business approach where the users paid for the equipment. Only improvements were subsidized in the first units.

Hermetic Storage Systems from GrainPro

IRRI has collaborated over the years with Grainpro in the evaluation of hermetic storage systems for rice and in the development of the hermetic Super bag. Ms. Thess Ambrocio from Grainpro was invited to provide a private sector view on the technology and its promotion.

See Appendix 15 *and the Power Point Presentation on the CD.*

Highlights from the presentation and discussion:

- GrainPro a US based company that has been in the business for the past 10 years with products that are proven to be effective. Cost structure for hermetic storage products is being reviewed for possible cost reduction; although the price is mainly driven by the cost of materials. The main principle is not to compromise the quality of the product with the price.
- Clarifications as to how the hermetic storage system works: Respiration produces water but the water is very low to increase moisture content. Initially MC increases depending on the initial MC but it stabilizes after some time. If there are a lot of insects then there are a lot of biological activities as well and there is no significant increase in MC.
- Thess showed an interesting video from Africa which a local distributor uses for promoting the Super bags for seeds of rice and other crops. The African farmers pay US$ 3 per bag.

Sharing Rice Knowledge

David Shires presented in Sharing Rice Knowledge the history and principles of capturing and making available the learning and rice knowledge through the Rice Knowledge Bank (RKB). Currently the RKB contains mainly technical information targeting extension workers. There are plans to add information on processes, e.g. on how technology was transferred to end users, in the form of case studies. The presentation set the scene for the country groups identifying and discussing possible case studies coming out of the postharvest activities and included a template structure for a case study for the participants to consider.

See Appendix 16 and the Power Point presentation on the CD.

Highlights

- "Information collected was deposited in the RKB for the public's access. Information is from high level expert in the form of knowledge and is not applicable to the farmers so we reformat and restructure it in the form useful to the non-technical especially the farmers. So the RKB was created.
- The RKB combines local knowledge and IRRI's knowledge and developed a knowledge bank in each country. IRRI's knowledge + farmers knowledge and local experiment results and from other people knowledge = RKB.
- "How to get the info from RKB out to farmers?" The traditional is to use the gov't extension service but it has some advantages and disadvantages.
- The farmers like to see what they are getting, "seeing is believing."
- When you put something in the RKB it should work, the technology should be at a stage where it has already been proven effective and can be brought to farmers already

Template for case studies

Summary
benefit; technology; actors; key to success; risks/difficulties
conclusion

- Benefits: details the benefits to the farmer of the new technology – include cost, yields, easy-of-use
- Technology: details the new technology used –describe all the farmer needs to implement the same
- Actors: detail all of the partnerships and support required to successfully implement the new technology
- Key to success: what are the important points in determining success for the new technology

- Risks & difficulties: what are the risks in implementing the new technology and what were the difficulties you had to overcome

For the results of the group work refer to the topics "Suggested Case Studies" in the country chapters above.

Feedback

Observations on the Presentations in Day 1 by Rica Joy Flor

Technology validation has produced positive results (except for some cases like in SB when high moisture grain was stored); some technological adaptations have been made (these are mostly initiated by the partners, not the end users)→Is the next step outscaling/upscaling?

Ways of bringing out the technologies: Have these worked? Which (or what combination) would be most effective in bringing out technologies? What has been used by some countries might also work in other countries

1.) Largely top-down in most countries →
**Trainings*
**Demos, Field days, Congresses, Meetings, Workshops, Study tours*
**Mill benchmarking*
**Training materials, Technical reports*
No problem with top-down, but is this enough; what else should be done to speed up the dissemination process and to set up structures to facilitate adoption?

2.) Work with mid to end users/setting up networks →
**Information boards*
**rice milling units*
**farmer groups, community based organizations*

3.) Local champions at village level →

4.) Media →
**e-learning*
**VCD/DVDs*
**Posters, Fact sheets, banderoles*
**Video/Radio*

5.) Partnership with private organizations →

Adoption: (Not very clear) some end users are adopting; in most countries, adoption potential was presented (If they have heard/learned, are they using the technology? Will they use it even if no support will be provided?)
If top-down (trainings, technology transfer) is most effective approach and these have been done already, what are the results?
What support is necessary for early adopters?
Change in knowledge and behavioral intent to technology use has been observed in some areas for some technologies?

Good linkages between countries, some exchange of knowledge have been ongoing
**exchange visits*
**bringing technology*

Common research to impact framework:
IRRI→IRRI and Partner work together→some stakeholders validate and make adaptations→next users take up technology→end users take up the technology→impact

↳ Most of the countries are at this point

Note that framework does not have to be linear: might also need to work with end users and identify needs/requirements for them to use the technology (some assumptions made so far)
What would the end users be doing differently if they take up the technology? (For Vietnam, some indicators were already seen)

Feedback on first days presentations and second day group work by M Gummet

MG gave his personal view as feedback on the presentations of day one and also during the discussions emerging from the group works. Some of the findings and the key issues that need to be further discussed are:

- There has been good progress in all countries in participatory evaluation and adaptation of technologies with farmers but also in dissemination of some of the technologies like dryers in some countries.
- There is a strong scientific backing of the technologies (e.g. hermetic storage) and management options. The presentation from Hue UAF on testing the Super bags shows excellent results that are in line with previous findings. There are some problems in some countries with using the bags but they are management related problems (too high MC, too little training) and not caused by the technology.
- The cross country technology transfer (from Vietnam to Lao, Myanmar and Cambodia) was seen as highly successful and beneficial by almost all presenters. This should be continued and strengthened with institutions like NLU as "technology champions" and with a more active role in the initiation and planning of the activities together with the recipients country stakeholders.
- All technologies suitable in some areas on a pilot scale, especially in the ADB project villages.
- There were presentations about a business oriented approach for dissemination of dryers from Vietnam, Myanmar and Grainpro. These are very successful and we should learn from the experience.
- Different technologies need very different support in the different stages of dissemination
    - The combine harvester activities show that after some initial demo/training activities supported by the project and generating awareness the technology is almost "on its own" and dissemination can happen by the private sector without much further support.
    - Super bags, on the other hand need continued support to ensure a supply chain for the bags that reaches the framers.
- Sufficient time is needed for new technologies for getting ownership, first with farmer intermediaries and then second with the end users. There is no shortcut.
- Data on outcome and impact is still weak, mainly anecdotal. The IRRC Management Unit Team is currently conducting impact assessments in Vietnam and Cambodia and the data will be available from the project villages later this year.
- The number of farmers reached is with a few thousand still very limited.

- How to move from "providing" technologies to a demand oriented "business" approach? The term "providing" technology was used many times in the presentations. There needs to be a paradigm shift towards establishing sustainable delivery of technologies.
- How to make the benefit of the technologies visible to farmers? This seems to be one of the major reasons why farmers are slow in adapting, the benefits of using the technologies are not presented to them in a way that they understand. At the end of the day the end users want to know how much money they have more in the pocket if they use new technologies. We need to work on this.
- How to capture the successful approaches and technologies? How to make them available to other stakeholders? David's presentation and group work session was a starting point but we need to build on this.
- For the plans for the future each country identified a big "shopping list" of technologies, often including all the technologies that the project is working with. After the initial need assessments the technologies need to be prioritized according to the local needs and the economic feasibility. The same is true for the number of provinces and project locations.
- MG stressed the point several times that without national outreach programs that the postharvest project can feed it's technologies into it will not be possible to reach a large number of farmers and processors. These outreach programs need to be funded by the national governments. IRRI can assist in writing the proposals for those programs and identify potential donors.
- The new moisture meter prototype got a lot of attention. Some participants wanted to buy units straight away.

Next Steps

Workshop report completed and sent to the partners until May 16.

ADB/JFPR 9036 project: Major activities until end of 2008 which is the end of the project include the following.

- Impact assessments in Cambodia and Vietnam (ongoing).
- Financial audit in Vietnam and Cambodia.
- Final project evaluation (no more mid term review).

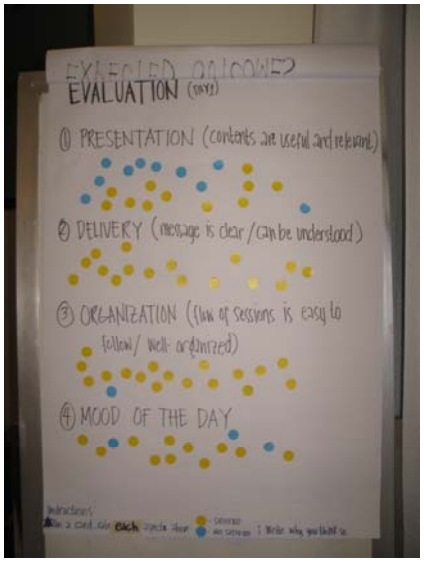
Preparation of new ADB Project proposal:

- Project proposal for IRRI component to ADB end of May
- Letters of support from Governments needed from Cambodia, Indonesia, Vietnam, MG will send draft project proposal as soon as possible
- IRRI targets a start of initial activities in August 08.
- First activities will be participatory impact pathway workshops in major countries in October 08.
- Initiate national learning alliances.

Proposal for IRRC Phase IV

- Deadline for the proposal is September 08
- In country consultations are ongoing

Workshop Evaluation by the Participants



Participants' evaluation of the workshop's conduct at Day 1.

Evaluation of Day1

1. Presentation
11 participants found the content of the presentations useful and relevant
10 participants were not satisfied with the contents of the presentation

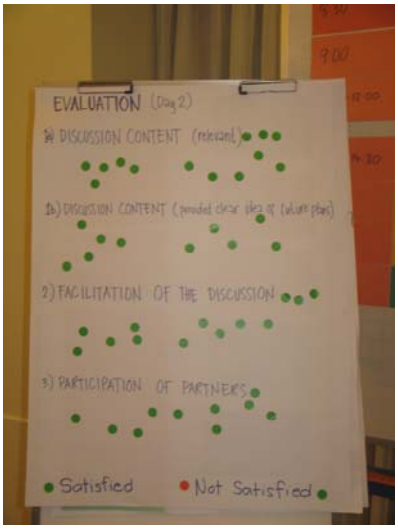
2. Delivery
16 said that the delivery of the presentations was clear, and they understood what was being said
Nobody said they were dissatisfied with the presentation delivery

3. Organization
17 said that the organization of the sessions was easy to follow and well organized
1 participant was not satisfied with the way the sessions were ordered

4. Mood of the day
11 participants found the mood of the day good, 3 did not

Evaluation of Day2

1. **Discussion Contents**
   a. Relevant – 13 participants found the content of the workshop satisfactory, no one said unsatisfied
   b. Provided clear idea of future plans – 10 participants said they were properly guided on how to make future plans for their country relative to PH projects, not one said unsatisfied
2. **Facilitation of the discussion**
   13 participants said they are satisfied with the way the workshop is facilitated, nobody was unsatisfied
3. **Participation of Partners**
   10 participants said they are satisfied with the partners active participation and selfless cooperation during the workshop, nobody said they are not satisfied



Participants' evaluation of the workshop at Day 2.

Field Trip

VinnaPro Company

- Manufacturer of agricultural machineries that was established in 1968 in collaboration with Japan.
- Fabricates rice postharvest facilities like combine harvester, rice milling machines, etc.
- At present there are around 300 mini-combines (with 1.2m cutter bar width) that were produced for the local market. Combines with 1.4m-1.6m cutter bar is under experiment and testing.
- There are two wheel options for the mini combine to suit different soil conditions:
  - rubber wheel for hard soil
  - star wheel for soft soil
- The company has helped the small rice millers with their lines of smaller capacity rice milling units/equipment.
- The company market 40% of their product in the local market and the rest is being exported to neighboring countries like Lao PDR< Cambodia and even in Yemen.

Machines in the fabrication line at Vinnapro company.

Postharvest Project village

Field Visit at Hau Tanh Dong Village, Tan Thanh District, Long An Province.

- The cooperative has installed another 4-ton flat bed dryer with automatic rice husk furnace just beside the existing unit near the house of a coop member. According to Dr. Hien (the principal designer of the automatic rice hull furnace) there are only four (4) units of the automatic rice husk that are presently produced in the entire Vietnam and his plan is to produce 10 prototype units and then do testing and evaluation of the 10 units before mass producing them.

A prototype of the Automatic Rice Husk Furnace that is attached to the 4ton flat bed dryer.

Buivanngo Company

- A family-owned company that started in 1955 that specializes in the manufacture of sugarcane press, centrifuge, wine brewery, agricultural product dryer and design and installation of milling machines. Since 1988 the company focused on manufacture of rice machines only.

- The company holds a large market share in the South, North and Central part of Vietnam especially in the Mekong Delta and began exporting to other countries like Thailand, Cambodia, Indonesia, Malaysia, Korean, Taiwan, Australia and the Philippines. 50% of the products are sold in the local market and 50% are exported to other countries.
- DANIDA Program in Vietnam has highly prized the company's products and signed many contracts with the company in repairing and upgrading equipment like rice mills that were imported from foreign countries
- According to the Director of the Company they are have produced rice milling unit which can process paddy even at high moisture content (above 16%) and produce less broken (the rice polisher can separate the paddy according to sizes; with two passes at whitening stage and 2 passes for polishing)
- The company values the reliability of their products in order to avoid breakdown during operation, thus, minimal for servicing and maintenance
- Considers more the benefit of the farmers rather than the traders/processors; have projects with farmer groups/association with a total cultivated area of at least 500 ha in which the company install a rice milling unit for the farmers use and the farmer group pays the company in installment from the income of their rice produce.

Acknowledgements

The Postharvest team thanks the following donors and projects who with their contributions made the workshop a success:

- JFPT through the ADB/JFPR 9036 Improving Poor Farmers' Livelihoods through Improved Rice Post Harvest Technology project
- SDC through the Irrigated Rice Research Consortium, Postproduction Workgroup
- The IRRC Coordination unit
- Helvetas through ProRice in Lao PDR for sponsoring the participation of two Lao participants
- The IRRI GMS office for sponsoring the participation of another two Lao participants
- The Rice Department of the Ministry of Agriculture and Cooperatives for sponsoring the participant from Thailand.
- Grainpro Philippines for sending two participants.

Appendices

Research to Impact in Postharvest: Lessons Learned Workshop
6-8 May 2008, Ho Chi Minh City, Vietnam

With support from

ADB

Asian Development Bank

Contact:
Postproduction Unit, GQNPC
Telephone: +63 (2) 580-5600 ext. 2772;
Fax: +63 (2) 812-7689 or 580-5699
E-mail address: m.gummert@cgiar.org
Mailing address: DAPO 7777, Metro Manila, Philippines

With support from

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

Appendix 1: Workshop rationale

Background

Post harvest grain losses across all Asian countries have been estimated at 10-15% and, when combined with the loss of quality, represent a potential loss in value of between 25-50% at market. Conservatively, this equates to a value of $50 per ton of rice that farmers are losing. Studies by IRRI in Cambodia, Philippines, and Indonesia have found that post harvest losses occur mainly because of spoilage and wastage at the farm level, poor storage, reduced milling yields, and grain quality reduction during processing. The cause of these losses is similar in all countries. These losses result in lower quality rice for consumption or sale, smaller returns to the farmer, higher prices for consumers, and greater pressure on the environment as farmers try to compensate by growing more rice.

Smaller landholder farmers suffer most from the lack of information and poor post harvest technology, since up to 95% of their grain is initially dried and stored on-farm. Because these farmers have limited access to knowledge of the appropriate technologies for drying, storage, and milling, they end up with less after milling. If they don't sell immediately after harvest, the grain further deteriorates at a rapid rate and loses more value and, if they do sell, they have less bargaining power, as they are often selling into a restricted or oversupplied market. The net result for the farmers is a lower price for their harvest and reduced income. By increasing the farmers' knowledge of rice milling processes as well as improving the rice millers' knowledge, better milling yields of a higher quality will result and the value of the crop will be enhanced. By increasing the market knowledge and information available to farmers, they will have greater flexibility in seeking markets for their harvest and greater bargaining power**.**

IRRI in collaboration with National Agricultural Research and Extension Systems (NARES) and selected private sector stakeholders have addressed these postharvest problems through two complementary postharvest projects: The Postproduction Workgroup (PPWG) of the Irrigated Rice Research Consortium (IRRC) Phase III (2005-2008) with activities in Cambodia, Indonesia, Lao PDR, Vietnam and Myanmar and the ADB/JFPR 9036 project "Improving Poor Farmers' Livelihoods through Improved Rice Post Harvest Technology" project (2004-2008) with activities in two province each in Vietnam and Cambodia.

While the IRRC PPGW was focusing more on the adaptation of selected postharvest technologies to local conditions and the participatory evaluation of promising technologies with farmers and rice millers the ADB/JFPR 9036 project's focus was on improving livelihoods of farmers in four villages in Vietnam and 8 villages in Cambodia through introduction of better postharvest management. The improved postharvest management options include the provision of market information, mechanized harvesting, mechanized drying, hermetic storage systems, rice mill improvements and the facilitation of a better understanding of quality. Major activity groups were applied research for technology adaptation, capacity building, methodology development and cross country networking.

Both projects tried to include private sector stakeholders as implementing partners in project activities. This was successful in some countries (Myanmar, Cambodia, Lao) and not so much in others. Farmers and millers in the project areas have now realized the benefits of the improved postharvest management and are increasingly asking for more assistance in sourcing the technologies that they find beneficial (especially the hermetic storage and drying systems).

Both projects will terminate in December 2008. An external review of the IRRC Phase III held in late 2007 recognized that the IRRC had helped IRRI pioneer the evolution and transfer of applied research to the research-extension interface and has also confirmed the importance of the postharvest workgroup. The review team believes that we should stay "on course" and build on the extension delivery to rural communities. One important step in the process is to capture and document the experiences in the projects, identify which approaches have worked and which didn't considering the particular frame conditions and identify which were the driving and limiting factors and stakeholders. These "lessons learned" will provide the basis for the planning of the postharvest activities for Phase IV of the IRRC, writing proposals for submission to other donors and for national follow-up activities.

Objectives

- To discuss and document the status of technology validation and dissemination for each country.
- To serve as a baseline for cross country learning.
- To set the scene for the planning of Phase IV of the IRRC postproduction workgroup and other postharvest initiatives.

Outputs

- A document on the process of learning, technology adaptation and dissemination in the rice postharvest improvement projects, supportive and inhibiting factors, key stakeholders/partnerships and successful methodologies.
- Update postharvest country profiles (Myanmar, Lao and Cambodia) and new ones for the other countries for which no profile was compiled yet.
- Priority areas and recommendations for a Phase IV of the IRRC and for other follow-up project proposals.
- Assessment of the current status of adoption of post production technologies.

Expected Outcome

- Better understanding of the research extension impact interface and of approaches that worked well.
- Better use of outputs of the postharvest workgroup in formulation of proposals for follow-up projects and in national outreach initiatives.

Appendix 2: Workshop Program

Research to Impact in Postharvest: Lessons-learned

Workshop Program
Venue: Victory Hotel, Ho Chi Minh City, Vietnam

Day 1 (May 6, 2008)

08:00	Registration	
08:30	Opening session - Welcome remarks - Background and Rationale - Introduction of Participants	 Dr. Phan Thanh Tinh Martin Gummert Participants
09:00	Administrative matters, announcements	IRRI Team
09:05	Overview on projects and technologies	Martin Gummert
09:35	Group photo session	
09:45	*Coffee break*	
Block 1	**Country presentations**	
10:00-10:30	Cambodia	Dr. Meas Pyseth
10:30-11:00	Indonesia	Dr. Budi Raharjo and Ir. Sutrisno
11:00-11:30	Lao	Dr. Khamouane Kampoukheo and Dr. Phoudalay Lathvilayvong
11:30-12:00	Myanmar	Dr. Myo Aung Kyaw and U Soe Myint
12:00	*Lunch break*	
Block 2	**Country presentations, continued**	
13:00-13:30	Vietnam, ADB project	Mr. Vu Cong Khanh
13:30-14:10	Vietnam, IRRC	Dr. Phan Hieu Hien; Dr. Do Thi Bich Thuy
14:10-14:40	Thailand (Guest presentation)	Ms. Amara Wiengweera
14:40	Discussion of all country presentations	Forum
15:00	*Coffee break*	
Block 3	**Highlight presentations**	
15:15-15:45	Development and commercialization of dryers in Vietnam	Dr. Phan Hieu Hien, NLU
15:45-16:15	Hermetic storage of dry agricultural products, a private sector view	Thess Ambrosio, Grainpro
16:15	Discussion	Forum
17:00	*Finish day 1*	
18:45	Leave from hotel for welcome dinner	

Day 2 (May 7, 2008)

08:00	Feedback from day one Discussion of topics from day one	Martin Gummert
Block 4	**Capturing learning and documentation**	
08:30	Documentation of high priority technologies and approaches	David Shires
9:00	Group work	Participants
10:00	*Coffee break*	
11:30	Presentations of group work	Participants
Block 5	**Looking ahead**	
11:45	Introduction, new postharvest initiatives	Martin Gummert
12:00	*Lunch break*	
13:00	Group work… - Country priorities (for research – extension – impact pathways) - new partnership models - suggestions for proposals	Participants
15:00	*Coffee break*	
15:15	Presentations of group work, discussions (10 minutes each group)	Participants
16:40	Conclusions, next steps	Martin Gummert
16:50	Closing remarks	Dr. Tran Thi Mai

Day 3 (May 8, 2008): Field trip

Field trip was arranged to visit sites in Long An province and Ho Chi Minh City:
- Postharvest project villages (flat bed dryer and hermetic storage).
- VINAPRO, manufacturer of the mini combine.
- BuiVanNgo, rice milling equipment manufacturer.

Appendix 3: List of participants

	Participants	Position Institute/Department	Address
MMRr	Dr. Myo Aung Kyaw	Secretary General Myanmar Rice and Paddy Traders Association (MRPTA)	K-10, Yuzana Street, Bayint Naung, Mayang Gone Towhship, Yangon, Myanmar 95-1-2201301; 09-1-680934; 95-9-5107059 drmakmrpta@gmail.com
	U Soe Myint	Township Manager Myanmar Agriculture Service	Township Manager Office, MAS, Myaungmya 95-042-70457
THA	Amara Wiengweera	Researcher Rice Product Dep't. Bureau, Rice Dep't., Ministry of Agriculture and Cooperatives	50 Phaholyotin Rd. Chatuchuck, Bangkok 10900 +6125614970 amara_wiengweera@yahoo.com
INO	Budi Raharjo	Researcher AIAT of South Sumatera	JL. Kol. H. Barlian 83, Palembang +62(0711)410155; 0816-3282812 budi.Fire@telkom.net
	Sutrisno	Researcher, Indonesian Center for Rice Research ICRR	JL. Raya 9, Sukamandi, Subang, 41256, West Java (0260) 520157; 081316210935 balitpa@telkom.net
CAM	Dr. Meas Pyseth	Deputy Director Cambodian Agricultural Research and Dev't. Institute (CARDI) IRRI consultant	Phnom Penh, Cambodia +85512759440 pmeas@online.com.kh
	Mr. So Khan Rithykun	Director Dept. of Agricultural Extension (DoAE) MAFF	#200 Preah Norodom Blvd., Phnom Penh, Cambodia (855)12833777 kunso@camnet.com.kh
	Mr. Oeun Sophat	Senior Value Chain Coordinator NGO	Phnom Penh, Cambodia +85512692880 oeunsophath@yahoo.com.au
	Mr. Prak Thaveak Amida	Deputy Director General MAFF IRRI Focal Point at MAFF	#200 Preah Norodom Blvd., Tonle Bassac, Chamarmon (855-12)615120; (855-13)717120 amida@mobitel.com.kh
	Mr. Sorn Vichet	Local Postharvest Expert/Consultant IRRI, Cambodia	Phnom Penh, Cambodia 012263592 sornvi70@yahoo.com
	Ms. Chea Hong	Chief of Intervention Section Department of Agricultural Machinery	Phnom Penh, Cambodia (855)12890407 chea_hong@yahoo.com
	Mr. Vann Thy	Director Manufacturer Private Sector	Battambang Province 012680904
	Mr. Seang Chhoeruth	Director Provincial Dept. of Agriculture (PDA)	Battambang Province 016865267 schet@online.com.kh
	Mr. Yous Mony	Director Provincial Dept. of Agriculture (PDA)	Prey Veng Province (855)12950156 mony_yos@mcdd.gov.com.kh
LAO	Dr. Khampoukheo Khamouane	Deputy Director National Agriculture and Forestry Research Institute (NAFRI)	Vientiane, Lao PDR 856(21)770082 khamouane@yahoo.com
	Dr. Poudalay Lathvilayvong	Head Thasano Rice Research and Seed Multiplication Center (TRRSMC)	TRRSMC, PAFO Savannakhet Province, Lao PDR 856(0202318589 phoulay@laotel.com
	Mr. Outhai Thaimani	Director Private Sector Manufacturer	Ban Phosy, Vientiane, Lao PDR 856(21)218696
	Dr. Sengpaseuth Rasbandith	Project manager National Agriculture and Foresty Extension Service (NAFES)	Vientiane, Lao PDR
	Dr. Khemmarath Sitha	Vice Dean for Academic Affairs National University of Laos, Faculty of Agriculture	P.O. Box. 7322, Vientiane, Lao PDR (020)2409764; (856-21)870130 khemmarathsitha@hotmail.com

Research to Impact in Postharvest: Lessons Learned Workshop
6-8 May 2008, Ho Chi Minh City, Vietnam

	Participants	Position Institute/Department	Address
VTN	Dr. Phan Hieu Hien	Lecturer NLU, Center for Energy and Mechanization	NLU, HCMC 8482818037; 0913127481 phhien1948@yahoo.com
	Dr. Truong Vinh	Researcher Bac Lieu Seed Center	
	Diep Chan Ben	Vice Director MARD, Bac Lieu	Bac Lieu Province 0913892339 chanben_blu@hcm.vnn.vn
	Dr. Phan Thanh Tinh	Director General VIAEP, Hanoi	102/54 Trung Trinh Road, Hanoi, VN 0913232531
	Dr. Tran Thi Mai	Vice Director General VIAEP, Hanoi	102/54 Trung Trinh Road, Hanoi, VN 0904732233 tranthimai05@yahoo.com
	Ms. Hoang Thi Tuat	Vice Head VIAEP, Hanoi	0982094994 hgtuatvn@yahoo.com
	Mr. Vu Cong Khanh	Head of Department SIAEP, HCMC	HCMC, VN 0986561019 vckhanh2001@yahoo.com
	Mr. Nguyen Thanh Tung	Vice Head MARD, Long An	Long An Province 0903176798 tungchicucptnt@yahoo.com.vn
	Mr. Nguyen The Truong	Vice Head MARD, Nam Dinh	807 Tran Nham Dinh-TP.NA, VN 0983200488 nthetruong05@gmail.com
	Ms. Do Thi Bich Thuy	Vice Dean of Faculty Hue UAF	102 Phung Hung, Hue City, Vietnam 0914091340
	Ms. Sam Tram Anh	Researcher SIAEP, HCMC	HCMC, VN (+84)8229916; (+84)902855493 tramanhbiotech@gmail.com
	Ms. Tran Thi Kim Oanh	Researcher SIAEP, HCMC	HCMC, VN (+84)8229916; (+84)0987079124 kimoanhCNTP@gmail.com
IRRI	Martin Gummert	Postharvest Development Specialist Postharvest Unit, GQNPC	IRRI, College, Los Banos, Laguna, Philippines 4030 +639178006752; +63(2)580-5600 ext. 2772 m.gummert@cgiar.org
	David Shires	Training Expert Training Center	IRRI, College, Los Banos, Laguna, Philippines 4030 +63(2)580-5600 ext. 2801 d.shires@cgiar.org
	Elenita Sunaz	Officer, Administrative Coordinator Postharvest Unit, GQNPC	IRRI, College, Los Banos, Laguna, Philippines 4030 +63(2)580-5600 ext. 2474 e.sunaz@cgiar.org
	Rica Joy Flor	Researcher IRRC Coordination Unit	IRRI, College, Los Banos, Laguna, Philippines 4030 +63(2)580-5600 ext. 2639 r.flor@cgiar.org
	Carlito Balingbing	Asst. Scientist Postharvest Unit, GQNPC	IRRI, College, Los Banos, Laguna, Philippines 4030 +639184128746; +63(2)580-5600 ext. 2474 c.balingbing@cgiar.org
Phil	Ma. Theresa G. Ambrosio	Sales & Marketing Coordinator GrainPro	Subic Bay Industrial Park 6347 2527884 ext. 103 tess@grainpro.com
	Tommy Ng	International Sales & Business Development Manager GrainPro	Subic Bay Industrial Park 6347 2527884 tommyng@grainpro.com

Appendix 4: Questions sent to presenters

Questions to Presenters, Lessons Learned Workshop

Draft Version 1, 12 March 2008

A. Project background and activities

- (not so important since this data is contained in the project reports). Just a brief overview for the other participants is sufficient.

B. Technologies and current status of adoption

- Who has been involved and how in project activities (Output)
- Who is working with the technology in your country who did not have a formal agreement with the project (Outcome)
- How many end users are using the technologies, currently, potential?
- What indicators are used to identify end users as adopters (e.g. purchase of equipment, change in practice, increase in milling quality..)
- What is the benefit for the first users and final users (Impact)

C. Innovations and Innovation System

- What have been the main adaptive changes (novelties or modifications from original design or recommendation of usage)?
- Who made the modifications?
- Who requested for the modification?
- Which modifications were beneficial, which were set-backs?
- Why do you think the development has gone in this direction?
- Is there a clearly identifiable product champion? Who?
- What external trends / drivers were they responding to?
- What were the major constraints in innovation?

D. Research to impact Pathway (RIP)

- Describe the RIP, institutions and other stakeholders and their roles.
- What methodologies were used to move the technologies out to the final users. Which ones were successful and which failed?
- Constraints, how can they be addressed.
- How to reach “millions of final users” in the next project phase?