

Feed the Future: Innovation Lab for Integrated Pest Management Trip Report

Country(s) Visited: Cambodia

Dates of Travel: April 26-29, 2016 (vary among travelers)

Travelers' Names and Affiliations:

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Purpose of Trip: Regional learning forum on rice IPM and inception meeting of EPIC project

Sites Visited: CARDI (Cambodian Agricultural Research and Development Institute), Phnom Penh, Cambodia

Description of Activities/Observations:

The main activities are to conduct regional learning forum on rice IPM (April 28) and inception meeting for EPIC (April 29). The schedule and participant list for the two fora

are attached. The full presentations of the fora will be archived at the project website currently being developed at IRRI (will be a part of IRRI website). The notes for the two fora are as follow:

Regional learning forum workshop (April 28 2016)

What are the dominant/important rice biotic stressors in Cambodia, how are they currently managed and what are the research gaps?

Invertebrate/Vertebrate pests

1. Rats

Currently managed by community tail collection, electric fence, trap barrier system and rat poison (zinc phosphate). Recommendation for research gaps include how to optimize bounty system (tail collection), community TBS, alternative to zinc phosphate and usage of bait attractants.

2. Stemborer

Currently managed by stubble removal (burning straw) and insecticide. Research gaps include usage of Trichogramma parasitoid in an inundative program, ecological engineering by incorporating vetiver grasses, pheromone traps (to monitor? May be even to control?) and working out economic threshold and optimum timing for insecticide application.

3. Golden apple snail

Currently managed by manual collection of eggs and adults (at individual field level), usage of molluscicide and baits (palm sugar), water level management and community-based bounty collection. Research gaps include exploration of alternative molluscicide (e.g. saponin) and rice-duck integration to manage golden apple snail.

Weeds

Important weeds	Current management
Grasses and Sedges	Land preparation (ploughing + harrowing) Pretilachlor (2-3 DAS) in standing water Butachlor (2-3 DAS) without standing water
Echinochloa spp., Leptochloa	Bispyribac (8-11 DAS) 2,4-D (18-25 DAS)

Fimbristylis milicea	2-3 herbicide application
Weedy rice	Seed sourcing (certified seeds) → challenge: ~80% are own seeds

Research gaps:

- Knowledge on application technology and product selection
- There is a shortage of weed scientists in the country
- There is a general lack of knowledge on weed management among practitioners

Diseases

Disease	Likelihood	Yield impact	Current management
Leaf blast	++++	---	Resistant varieties
Neck blast	+++	-----	Chemical fungicide
Brown spot	++++	-	Nutrient management
Bacterial leaf blight	++	---	Copper-based fungicide
Sheath blight	++++	--	Fungicide/cultural practices
Sheath rot	++	---	None listed

Research gaps:

- Identification of effective biological control agents and market incorporation of these agents
- Usage of fungicides as a preventative agents and whether over-application of fungicides have a negative impact
- Usage of certified seeds/ treated seeds to manage some of the seed-borne diseases.

What are the current scaling out/extension models in Cambodian rice sector?

What are the status of these models and how can they be strengthened?

Current scaling out models

Model	Status	How to strengthen
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<p>Cambodian national IPM program</p> <ul style="list-style-type: none"> • FFS • Farmer competition • Farmer exchange • Field days • Participatory field research 	<p>Approximately 250,000 farmers are covered by this training program (~3% of the nation's farmers)</p>	<ul style="list-style-type: none"> • Improving training curriculum by introducing topics such as: <ul style="list-style-type: none"> • Pesticide alternatives • Clearer guidance on decision-making (thresholds) • Climate resilience • Identify ways for extension to respond to farmers faster • Development of communication tools and materials in local language • Educational capacity enhancement for staff both in extension communication and in R&D to generate new knowledge and solutions • Development of policy environment that allows for higher levels of government funding will reduce dependency to external funding
<p>NGO programs (e.g. CEDAC)</p> <ul style="list-style-type: none"> • Organic rice cultivation • Organic pesticides • Pesticide use and safety awareness campaign • The common methods include farmer's training, exchange visits, demonstrations and broadcast of communication materials 	<p>Advanced in development but small scale</p>	<p>EPIC validated technologies may be incorporated to CEDAC farmers' guide</p>

University capacity building project	Research-based graduate student training at Royal University of Phnom Penh focusing on natural biocontrol function provided by wildlife community	Research support
Pest point mobile application to collect data on pest, diseases and other disorders	This is an output of an ACIAR funded project in Cambodia, Lao PDR and Thailand	Linkages may be formed with the project to improve the usage of the app and provide a real-time monitoring of rice pests and diseases in Cambodia

What are the policy/strategic gaps to improve rice IPM adoption in the Cambodia?

Policy gaps to improve IPM adoption in the country:

- There is a need to improve the regulatory and enforcement framework for registration, commercialization and scaling out of environmentally friendly IPM technologies.
- There are numerous extension modes/models in the country conducted by different organizations. There is a need to either integrate or build bridges between the different projects/extension models.
- IPM extension is usually communicated as stand-alone piece of information. This is taking IPM out of the broader context of rice cultivation. There is a need to embed IPM extension information into a broader crop management context during its communication to farmers.

EPIC inception meeting (April 29 2016)

Brainstorming session on impact assessment and M&E

- There is a need to realign the questionnaires and sampling strategy for impact assessment, rice health survey, particularly for production situation, and KAP survey. The sampling sizes for all three assessments are different. The impact assessment will have the largest sampling size followed by KAP survey and rice health survey. Thus the samples of the rice health survey can be a subset of the KAP survey and the samples of the KAP survey can be a subset of the impact assessment. There is a need to coordinate the questionnaire development for all

- three activities to avoid duplication and facilitate brevity. Coordination will be conducted via emails in the month of May and June. George Norton is leading the questionnaire development with input from EPIC participants.
- A postdoctoral fellow is being hired to be stationed at Phnom Penh. The fellow will oversee the implementation of impact assessment for EPIC and the synchronization of questionnaire development with KAP survey and rice health assessment survey.
 - A website for repository of project documents is being developed at IRRI.

Brainstorming session on adaptive and innovative research platforms

- Experimental design and technologies for adaptive research should be well planned. The preferred layout appears to be that a replication is superimposed on a farmer's field so that all the treatments or IPM packages are located in one farmer's field.
- There is a need to develop IPM packages after conducting needs assessment to tailor them to the needs of farmers.
- Selecting champion or advanced farmers as a subset of adaptive research participants will improve the likelihood of research success. This will also increase the likelihood of sustained adoption after the research phase. GDA through its national IPM program will be proactive in selecting champion farmers.
- There is a need to consider the use of resistant and popular varieties as part of IPM packages. Market demand of varieties should be considered to ensure adoption by farmers. Dule Zhao mentioned that suitable varieties were identified under the USAID ASTV project.
- Nagoya University gave a presentation on their innovative transnational PhD program. The agricultural program will be able to provide scholarship support for 1 student per year (research costs and co-supervision from EPIC/IRRI scientists). There is a possibility to involve a Master program in biodiversity conservation at RUPP and Master programs at RUA in the project.
- There is a significant concern on starting the adaptive research platform in the first year of the project. Since this will be conducted before the rice health survey is done, the target pests/diseases will be based on consultation with GDA. The plan is to start field experiments at a planned research center at RUA (funded and initiated by a consortium of Innovation Labs and USAID mission in Cambodia) the wet season of 2016. The protocol for the experiment will be developed by IRRI in consultation with GDA and RUA. The implementation of the experiment will mainly be done by the planned center at RUA with data collection by GDA in consultation with IRRI.

Brainstorming session on providing information and capacity building for policy reform

- Registration of *Trichoderma* as a biological control agent in Cambodia has been delayed and reasons for the delay are not clear. There seems to be a need for a targeted information campaign on the safety of biocontrol options toward the policy makers.
- *Trichoderma* can be cultured and mass produced by farmers but efficacy is usually lower than the efficacy of commercially available product. There is also a significant risk of contamination in farmer-produced *Trichoderma*.
- *Trichoderma* is registered as an organic fertilizer in Cambodia and will be used as a part of the intervention technology in EPIC.

Brainstorming session on mapping rice pest and disease risks

- Assessment of nematodes should be considered particularly in drought-prone areas.
- Rice health survey should generate information on the relationship between the intensity of pests and diseases on yield and on the relationship between production situation on pest profile.

Training Activities Conducted:

Program type (workshop, seminar, field day, short course, etc.)	Date	Audience	Number of Participants		Training Provider (US university, host country institution, etc.)	Training Objective
			Men	Women		
Regional learning forum on rice IPM	April 28 2016	Regional IPM experts; other international organizations with ongoing rice related projects in Cambodia; CARDI, GDA, PDA, CEDAC, RUA, RUPP staffers; representatives from Nagoya University, Cornell University; IRRI scientists; Management entity	36	10	Regional IPM experts from Cu Long Delta Rice Research Institute (Vietnam), Zhejiang academy of agricultural sciences (China) and Thai Department of Agriculture (Thailand), international organizations (IFAD, CABI, IRRI, FAO), GDA and CARDI	Providing a learning platform on IPM research and practices across the region, discussing IPM challenges (target pests/weeds/diseases, research gaps), and gaps in outscaling modes and policy for successful rice IPM implementation in the country.
EPIC Inception meeting	April 29 2016	CARDI, GDA, PDA, CEDAC, RUA, RUPP staffers; representatives from Nagoya University, Cornell University, GIZ; IRRI scientists; Management entity	28	9	IRRI, Virginia Tech, Cornell University, CEDAC, GIZ	Presenting the plan for the first year activities of EPIC and brainstorming for the details of each activity

Suggestions, Recommendations, and/or Follow-up Items:

- Questionnaire development for the impact assessment and pesticide KAP survey will be conducted as an online exchange of ideas between George Norton and EPIC participants (Buyung Hadi, Postdoctoral fellow, Harvey Reissig, Keam Makarady) and will take place in May-June 2016. The impact assessment is planned for July 2016 (assuming a normal onstart of wet season).
- The training for rice health survey surveyors and enumerators is planned at CARDI in June 2016.
- Sampling strategy and site selection for the impact assessment, pesticide KAP survey and rice health survey will be synchronized via a number of visits and online discussions between George Norton, Harvey Reissig, Keam Makarady, CARDI, GDA and PDA.
- To jumpstart field activity in the first year, a field experiment is planned at the new research center at RUA (funded and initiated by a consortium of Innovation Labs and USAID mission in Cambodia) the wet season of 2016. The protocol for the experiment will be developed by IRRI in consultation with GDA and RUA (to be sent out in May 2016). The implementation of the experiment will mainly be done by the planned center at RUA with data collection by GDA in consultation with IRRI (to start by the onstart of wet season 2016). The management entity (Virginia Tech) will coordinate and facilitate collaboration/relations with the new center at RUA.

List of Contacts Made:

Same as the participant list (appendix 2)

Name	Title/Organization	Contact Info (address, phone, email)

Appendix 1. Schedule of regional learning forum on rice IPM and EPIC inception meeting

Thursday, 28 April 2016 – Regional learning forum on rice IPM

Section 1 – Overview

Chair: Khay Sathya and Dule Zhao

0830-0900	Welcome messages	Vang Seng, CARDI Sang Lee, USAID Mission Grant Singleton, IRRI
0900-0920	IPM IL – An Overview	Rangaswamy Muniappan IPM Innovation Lab-Virginia Tech
0920-0935	EPIC: Project overview	Buyung Hadi
0935-0945	Group photo	
0945-1000	Coffee/tea break	

Section 2 – Rice IPM in East and Southeast Asia – Lessons Learned

Chair: Chou Cheythyrih and Buyung Hadi

1000-1020	Cambodia – Rice IPM experience	Nginn Chhay, GDA
1020-1040	Vietnam – Rice IPM experience	Nguyen Duc Cuong, CLRRI
1040-1100	China – Rice IPM experience	Lu Zhong Xian, Zhejiang Academy of Agricultural Sciences
1100-1120	Thailand – Rice IPM experience	Chanya Maneechote President, Weed Science Society of Thailand
1120-1135	Q & A	

Section 3 – Sustainable Rice Production in Southeast Asia – National and Regional Programs/Projects

Chair: Keam Makarady and Ill Ryong Choi

1135-1155	FAO policy advise and initiatives	Jan Willem Ketelaar, FAO in support of up-scaling Rice IPM in Asia
1155-1215	IFAD Portfolio in Cambodia	Sakphouseth Meng, IFAD
1215-1225	Q & A	
1225-1330	Lunch	
1330-1350	Plantwise	Annamalai Sivapragasam, CABI SE Asia
1350-1410	ASTV	Dule Zhao, IRRI
1410-1420	Q & A	
1420-1435	Coffee/tea break	

Section 4 – Workshop on policy, extension and research needs for Cambodian Rice IPM

Chair: Ricardo Oliva (Disease), Virender Kumar (Weed), Alex Stuart (Pests)

1435-1630 Research, outscaling and policy needs for rice IPM in Cambodia

1630-1700 Workgroup reports

1700-1715 Closing remarks Ngin Chhay, GDA

Friday, 29 April 2016 – EPIC inception meeting

Section 1 – Impact Assessment

0830-0840 Workshop overview Khay Sathya, CARDI

0840-0900 M&E and Communication Strategy Buyung Hadi, IRRI

0900-0920 Impact assessment and indicators George Norton,
Virginia Tech

0920-1000 Brainstorming on impact assessmentB Hadi & G Norton
and M&E strategy

1000-1015 Coffee/tea break

Section 2 – Adaptive and Innovative Research Platforms

1015-1035 Adaptive research cycle Alexander Stuart, IRRI

1035-1055 Innovative graduate training Akira Yamauchi, Nagoya University

1055-1105 Developing the national collection Ricardo Oliva, IRRI
for rice pathogen strains in Cambodia – A capacity building exercise

1105-1145 Brainstorming on adaptive and innovative A Stuart,
Research platforms A Yamauchi, R Oliva

Section 3 – Providing Information and Capacity Building for Policy Reform

1300-1320 Validation, promotion and registration of Thomas Jäkel, GIZ
Biocontrol products in SE Asia

1320-1340 Pesticide KAP survey among rice farmers - Keam Makarady
Survey objectives and strategy CEDAC

1340-1420 Brainstorming on KAP survey and pathways T Jäkel, H Reissig,
to policy reform K Makarady

1420-1435 Coffee/tea break

Section 4 – Mapping Rice Pest and Disease Risks

1435-1455 Rice health survey portfolio Nancy Castilla IRRI

1455-1515	Pulling everything together: Analysis of rice health survey data	Adam Sparks, USQ
1515-1555	Brainstorming on risk mapping, training, implementation and needed data	N Castilla A Sparks
1555-1610	Closing remarks	Short Heinrichs, Virginia Tech

Appendix 2. Participant list

List of Participants - EPIC Workshop, CARDI, Phnom Penh, Cambodia
28-29 April 2016

No	NAME	INSTITUTION	GENDE R	E-MAIL ADDRESS
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