

IFA INTERNATIONAL WORKSHOP on Effective Last-Mile Delivery

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DEVELOPMENT OF DECISION-MAKING SUPPORT TOOLS ADAPTED TO SMALL-SCALE FARMING SYSTEMS

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Development of decision-making support tools adapted to small- scale farming systems

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Background on presentation

- **Present new opportunities in**
 - *Developing decision-making tools for extension workers and farmers*
 - *Deploying decision-making tools using computers, internet, and phones*
- **Draw upon recent experiences with nutrient management for irrigated rice in Asia**
- **Show opportunities go beyond irrigated rice to other cereal crops (wheat and maize)**

Basic premises for small-scale farming systems (1)

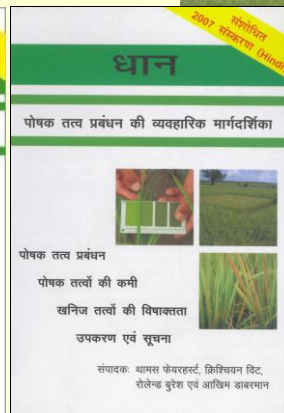
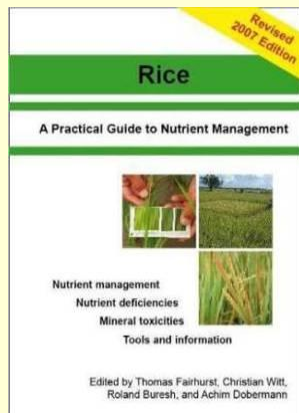
1. Tools should provide field- or location-specific guidelines

- Farming practices vary among farmers and fields
- Crop needs for nutrient inputs vary greatly across short distances and among fields



Basic premises for small-scale farming systems (2)

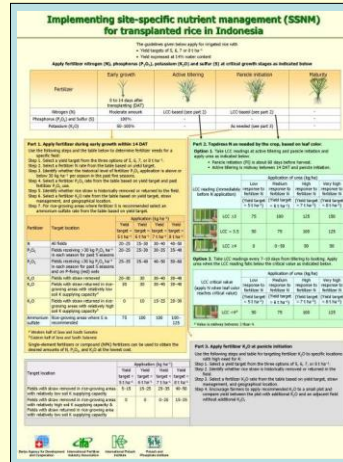
2. Scientific principles exist to develop field-specific nutrient management guidelines



Basic premises for small-scale farming systems (3)

3. Complexities of science must be made easy-to-use for extension workers and farmers

- Aim to reach many farmers fast
- Printed materials failed to facilitate interactive decision making
- Hence we examined interactive software tailored to local needs and conditions



Framework for developing decision-making software

- Scientific principles are sufficiently mature
- Extension workers and farmers are the target
- Output of software must be tailored to location/field-specific conditions



1. Identified 'new' information on nutrient management most helpful to a rice farmer

- Time application of fertilizer N by crop growth stage
- Adjust fertilizer rates to anticipated yield
- Adjust fertilizer K for amount of added crop residues and organic materials

2. Developed a format for presenting most essential information to a farmer

Name: Juan dela Cruz	Location: Los Banos, Laguna
Field Size: 1 ha	Variety: PSB Rc 82
Yield (14% MC, 2nd crop): 5.4 t/ha	Transplanted 101-110 days from seed to harvest
Yield (fresh weight, 2nd Crop): 6 t/ha	Seedling: Less than 23 days

Values are adjusted to actual field area: 1 ha

Early (0-14 DAT):	urea (kg): 143
Active Tillering (23-27 DAT):	urea (kg): 61
Panicle Initiation (33-37 DAT):	urea (kg): 78

Example for the Philippines

- Other inputs:**
1. Crop residue: **medium**
 2. Organic materials: (kg) N: 10 P₂O₅ : 5 K₂O: 10
 3. Other organic materials: (kg) N: 2 P₂O₅ : 1 K₂O: 4
 4. Composted straw: **none**
 5. Sediment input: **none**

3. Formulated the fewest possible questions to provide information to calculate the fertilizer guideline

- *Questions must be answered by extension worker or farmer for a field in 15 minutes*
- *Questions must use local units and language*
- *Questions must be extract accurate and reliable information*



Information needed to determine a field-specific nutrient requirement

Essential in all locations

- *Anticipated grain yield*
- *Field duration of rice variety*
- *Amount of crop residue retained*

Tailored to local conditions

- *Input of organic materials*
- *Approximate deposition of sediment during flooding*
- *Fertilization of previous crop*

***Nutrient Manager for Rice* released for the Philippines and Indonesia in 2008**

- Provided a fertilizer guideline based on reply to about 15 questions
- Consolidated scientific information
- Enhanced consistency in messages from scientists and technical experts
- Demonstrated feasibility of quickly providing field-specific guidelines



***Steps in Nutrient Manager* development**

Step #1: Develop a pre-release version for field testing

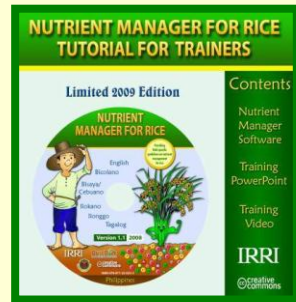
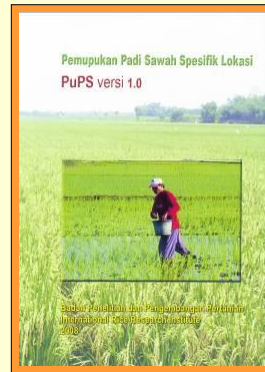
Step #2: Evaluate and improve

- *Conduct field evaluation*
- *Refine based on findings from evaluation*

Step #3: Release version 1 on CD

Nutrient Manager for Rice for Philippines and Indonesia

- Released and distributed on CD
- A training video was provided with the CD in the Philippines
- Philippines version was in 5 local dialects



Nutrient Manager for Rice in the Philippines is now available on the internet



First page with questions

NUTRIENT MANAGER FOR RICE Philippines Version 1.11

Field-specific guidelines on nutrient management for rice

Field size: ___ ha

Choose the season for which you desire a guideline:
 First/main crop(May-Oct) Second crop(Nov-Apr)

What is your planting method? Transplanting Direct seeding

What variety will you grow for the chosen season? ___

What was the usual fresh weight of total harvested grain (right after threshing) obtained from the area (___ ha) for the chosen growing season (___) and variety in the past 2 years?

Number of cavans(sacks): kg per cavan(sack): Moisture content % (if known):

Was the soil in the field analyzed within the past 12 months?
 No Yes(using soil test kit) Yes(MOET)

* Nutrient Manager does not require results from soil testing and MOET, but it uses those results when available.

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Output page with fertilizer guideline

NUTRIENT MANAGER FOR RICE Philippines Version 1.11

Field-specific guidelines on nutrient management for rice

Field Size: 1 ha Variety: Angelica
 Season: 2nd crop (Nov-Apr) Transplanted: 121-130 days from seed to harvest
 Yield (14% MC): 5.4 t/ha Seeding: Less than 23 days
 Yield (fresh weight): 6 t/ha

Values are adjusted to actual field area: 1 ha

Early (0-14 DAT):	14-14-14 (kg): 200	Other inputs: 1. Crop residue: medium 2. Organic materials: none 3. Other organic materials: none 4. Composted straw: none 5. Sediment input: none
Active tillering (28-32 DAT):	urea (kg): 65	
Panicle initiation (43-47 DAT):	urea (kg): 83	

Fertilizer Cost	Fertilizer	PhP/bag*	Total Amount
	urea	1500	P 4440
	14-14-14	1500	P 6000
		Total Cost:	P 10440

* 1 bag fertilizer = 50 kg

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Nutrient Manager is a tool under development

Step #1: Develop a pre-release version for field testing

Step #2: Evaluate and improve

- *Conduct field evaluation*
- *Refine based on findings from evaluation*

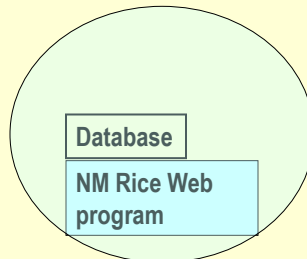
Step #3: Release version 1 on CD

Step #4: Continue to evaluate and refine

Step #5: Release updated version on internet (and CD)

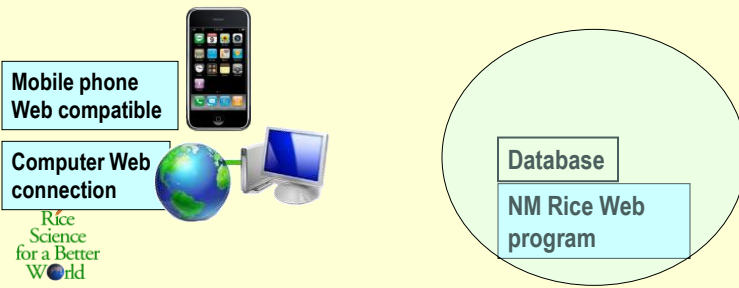
Step #6: Examine other opportunities with mobile phones

Deployment of decision-making support tools



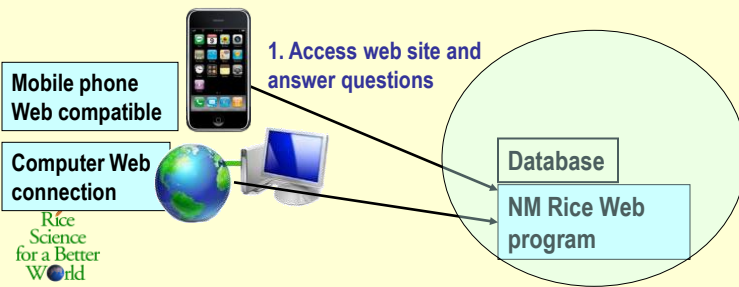
Deployment of decision-making support tools

Farmer or extension worker



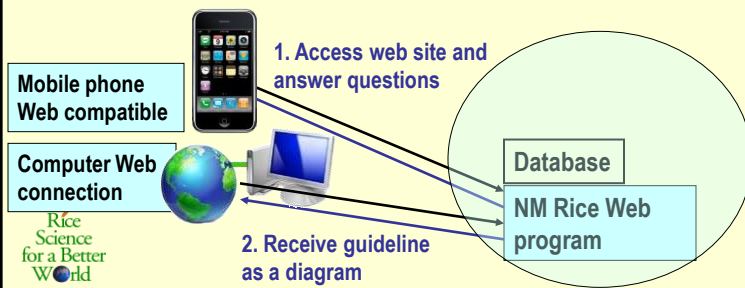
Deployment of decision-making support tools

Farmer or extension worker



Deployment of decision-making support tools

Farmer or extension worker



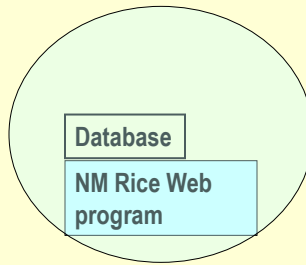
Interactive Voice Response (IVR)

- An interactive technology that allows a computer to detect keypad inputs on phone
- IVR allows farmer to access a decision tool via a telephone keypad
- IVR systems breaks down decisions into a series of simple menu choices

Deployment of decision-making support tools (2)

Farmer

Mobile phone
SMS compatible



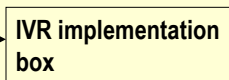
Deployment of decision-making support tools (2)

Farmer

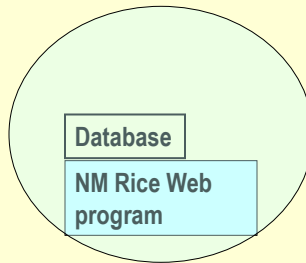
Mobile phone
SMS compatible



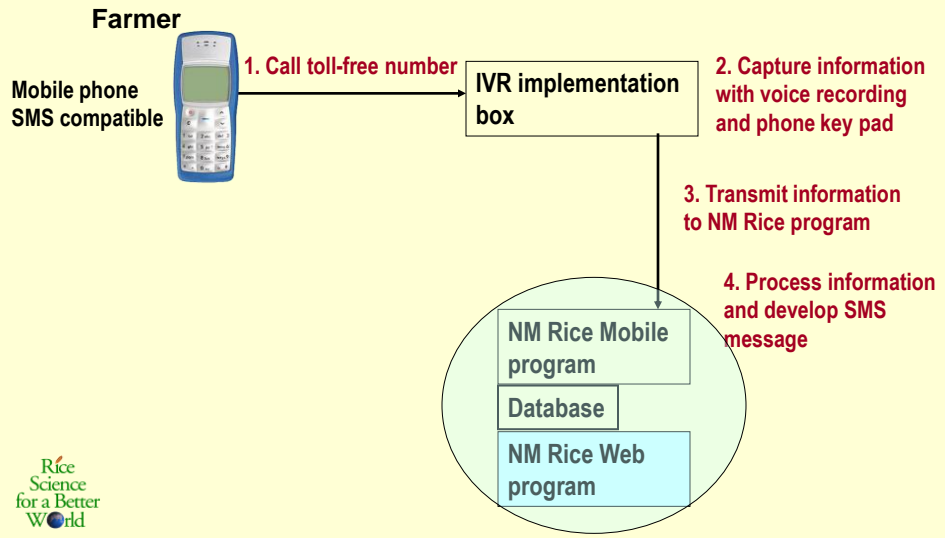
1. Call toll-free number



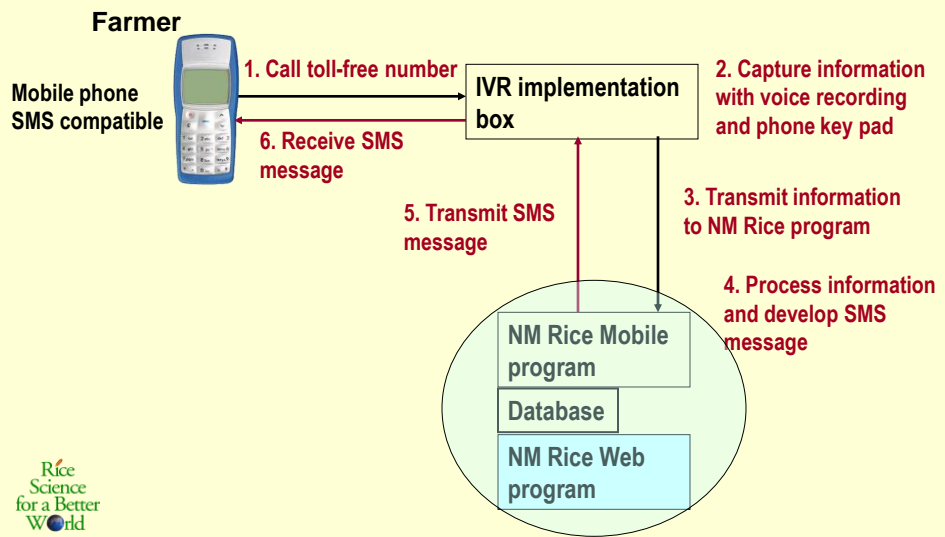
2. Capture information
with voice recording
and phone key pad



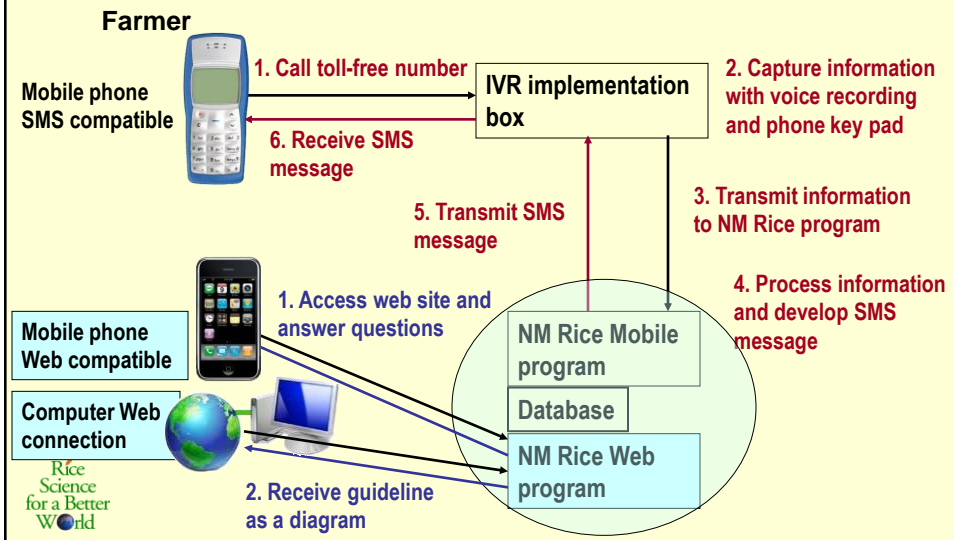
Deployment of decision-making support tools (2)



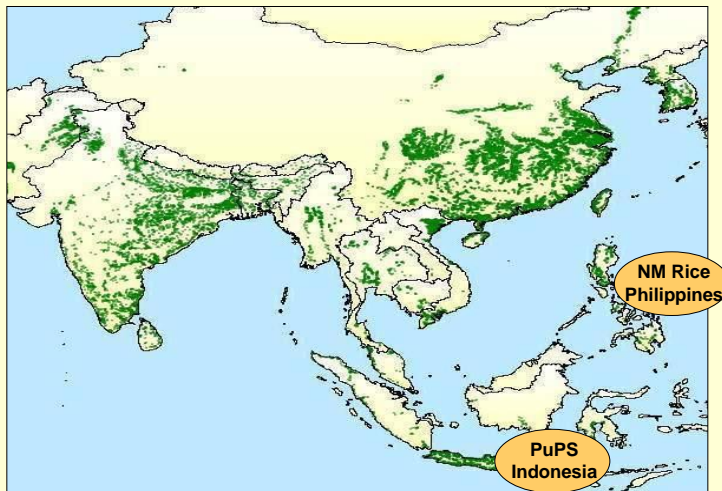
Deployment of decision-making support tools (2)



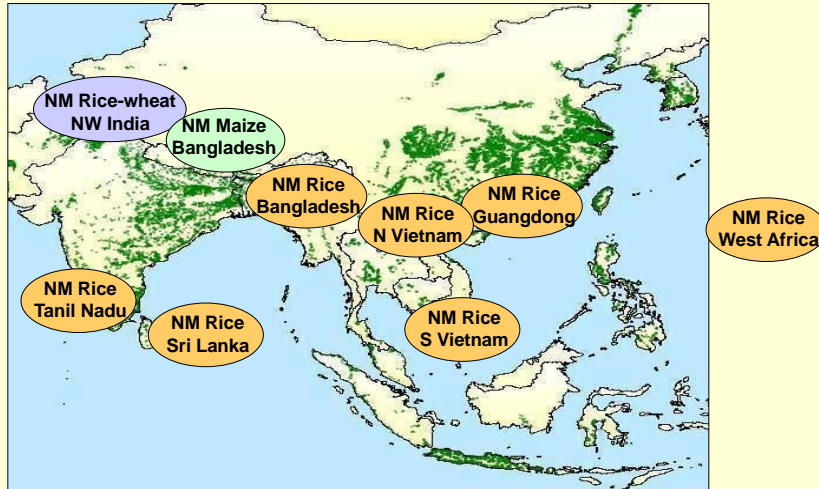
Integration of SMS and web options



Nutrient Manager for Rice at stage of web version and initial exploration of opportunities with mobile phones



IRRI *Nutrient Manager* still under field evaluation before release on CD and then web



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IRRI *Steps in Nutrient Manager development*

Step #1: Develop a pre-release version for field testing

Step #2: Evaluate and improve

- *Conduct field evaluation*
- *Refine based on findings from evaluation*

Step #3: Release version 1 on CD

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Videos for farmers

Example from the Philippines on YouTube



Tagalog version

<http://www.youtube.com/watch?v=KrnuvhXm7-8>



English version

<http://www.youtube.com/watch?v=tkVNnZcF07o>



<http://www.pinoyrkb.com/resources>

Conclusions

- **Computer programs can be developed for interactive decision making in small-scale farming systems**
 - *Use existing science*
 - *Target extension workers and farmers*
 - *Optimize for location/field-specific conditions*
 - *Easy-to-use*
 - *Use local units and language*
- **Computers, internet, and phones can be used for deployment**



IRRI

**The development of decision-making tools
was made possible through long-term
support from**

- **Swiss Agency for Development and Cooperation (SDC)**
- **International Fertilizer Industry Association (IFA)**
- **International Plant Nutrition Institute (IPNI)**
- **International Potash Institute (IPI)**

**Opportunities for development, evaluation, and future
deployment if decision-making tools is further made possible
in South Asia by CSISA**

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