

Providing small-scale rice growers with field-specific nutrient management

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Rice is the main food crop in Asia

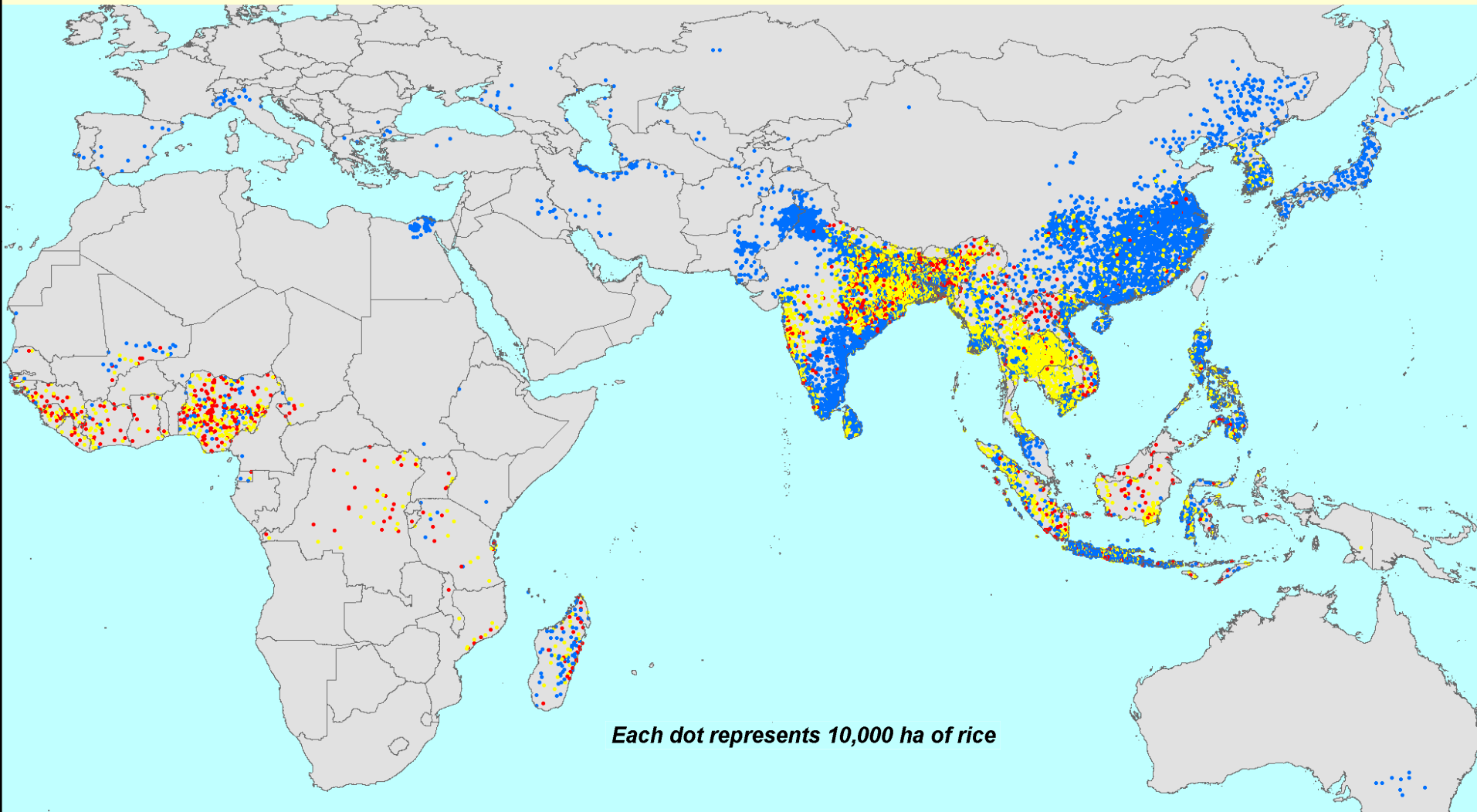


The livelihoods of millions depends on the production of rice

Asia produces 90% of global rice – typically on small fields with soil flooding



Rice growing areas and ecosystems



- Irrigated rice – Flooded soils, 75% of production
- Rainfed lowland rice – Flooded soils, 20% of production
- Rainfed upland rice – Drained soils, < 5% of production

Fertilizers are essential to produce sufficient rice, but fertilizers are usually not used effectively

1. Fertilizers are a major cost for rice growers

2. Farmers often do not apply nutrients most effectively

- Wrong fertilizer source
- Wrong rate
- Wrong time
- Wrong place



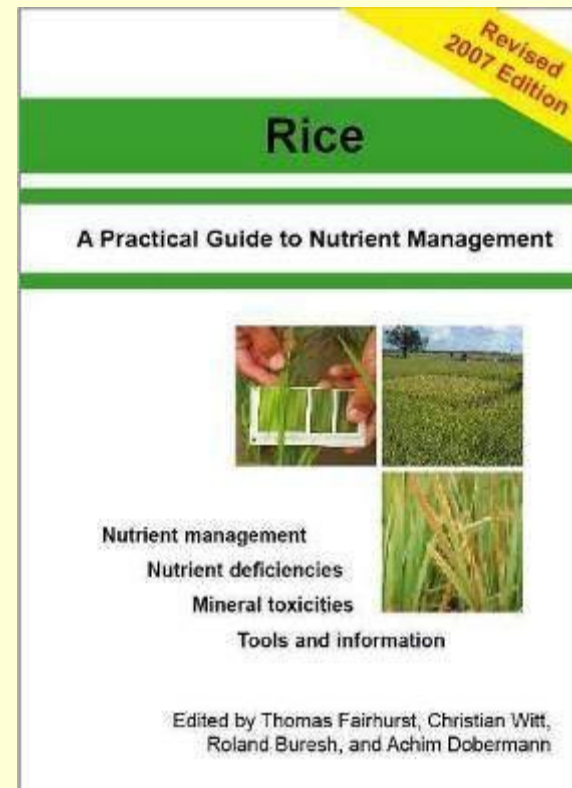
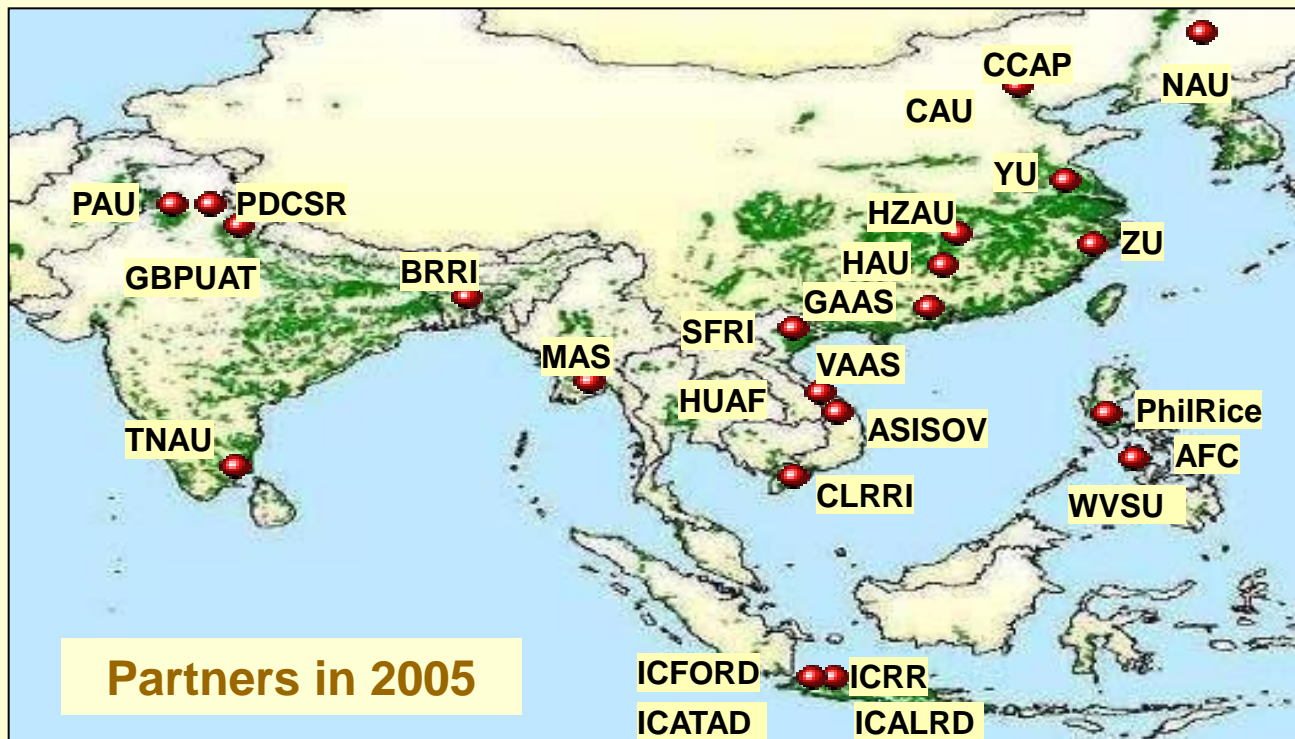
Landholdings are typically small, and they vary greatly in fertilizer needs



- Farming practices vary among farmers and fields
- The best management for high profit and high yield differs among fields
- Need field-specific nutrient management
- Need an rapid, cost-effective alternative to soil testing

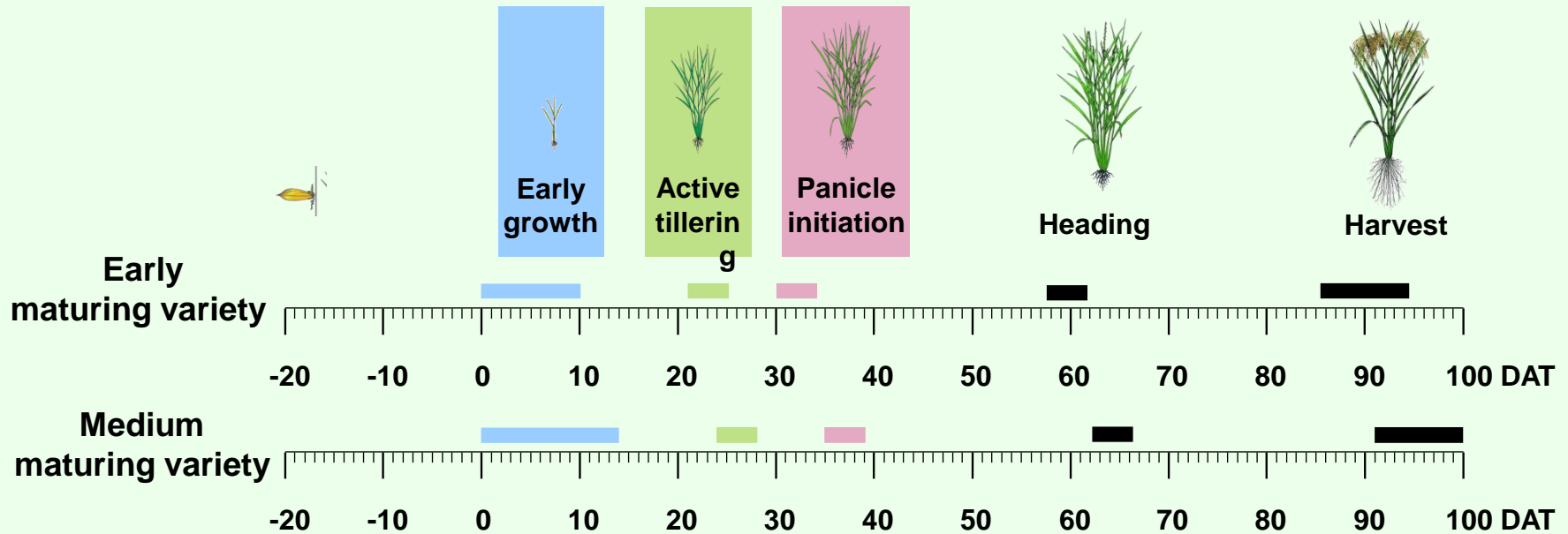
Field-specific nutrient management is possible using scientific principles from site-specific nutrient management (SSNM)

SSNM developed through more than 10 years of collaborative research via the Irrigated Rice Research Consortium (IRRC) across Asia



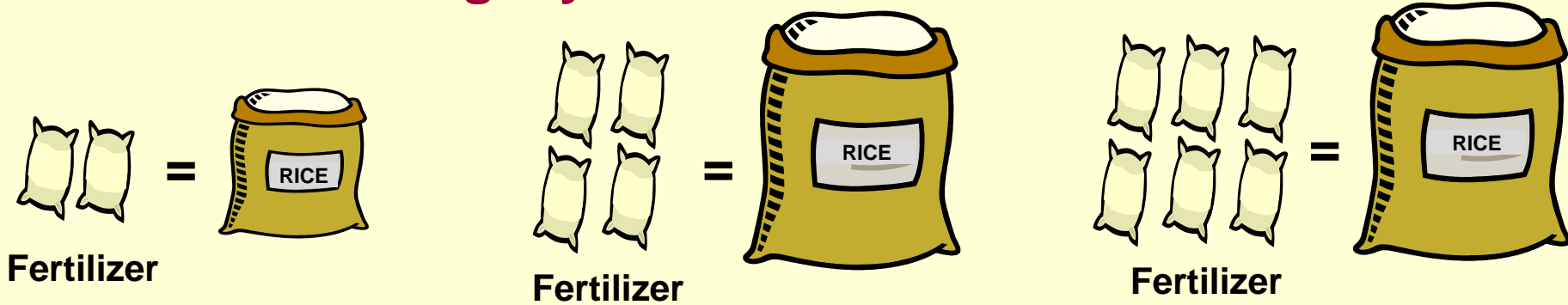
How does SSNM benefit a rice grower?

1. Adjust timing of fertilizer to match critical growth stages of a rice variety



How does SSNM benefit a rice grower?

2. Adjust fertilizer rates to match a field-specific attainable target yield



3. Adjust fertilizer P and K for inputs from crop residues and organic materials



Use ICT to provide rice growers with field-specific, SSNM-based management

Develop *Nutrient Manager for Rice* software

- Use science of SSNM to calculate field-specific management guidelines
- Use a computer to make the calculations
- Develop country-specific versions



Use ICT to communicate with extension and rice growers



Provide rice growers with 'precision' management for their field

1. Acquire information for a specific field ---often less than 1 hectare



2. Compute field-specific nutrient needs



Web-based decision tool

3. Provide location-specific guidelines --- often with no internet and infrequent contact with extension



Printed guidelines



SMS



Smartphone

Enable extension workers and rice growers to select from ICT options

- **Web application: for locations with access to internet**
- **Mobile phone application: for direct use by rice growers at locations with no access to internet**
- **Smartphone apps: for off-line use by extension workers with rice growers**

Use of Web application with rice grower coming to extension worker



1. Access web site
2. Interview rice grower
3. Answer 15 to 20 simple questions about field

Computer with Web connection



NMRiceWeb Philippines

Decision tool for providing field-specific guidelines on nutrient management for rice

Instructions

I agree with the terms and conditions

Select a language to start

Bicolano	Sulu
Cebuano	Tagalog
Hiligaynon	English

Download Questionnaire

Developed by: **IRRI**

as a product of research collaboration with: **PHILRICE** and **University of the Philippines Los Baños**

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Nutrient Manager for Rice Philippines Version 2.0

Name: Juan Jose Cruz
Mobile number: 09952607777
Location: 5013050, Nueva Ecija, Region III
Field size: 1 ha
Variety: IR64 (Angkor)

Rice crops per year: two
Season: dry season
Transplanted: 121-150 days from seed to harvest
Seedling: less than 25 days

Substrate from other inputs:
1. 0.00 T/ha (0%)
2. 0.00 T/ha (0%)
3. 0.00 T/ha (0%)
4. 0.00 T/ha (0%)

Values are adjusted to actual field area: 1 ha

Growth stage	DAT**	Current yield	Higher yield***
		100 kg/ha at 50 kg N/ha	110-127 kg/ha at 50 kg N/ha
		4.5-5.0 t/ha (144% MC)	5.3-6.0 t/ha (144% MC)
Early*	0-14	14-14-14: 1 bag	14-14-14: 1 1/2 bags
Active tillering	28-32	Urea: 1 bag	Urea: 1 bag
Grain initiation	43-47	Urea: 1 bag	Urea: 1 1/2 bags

* Application of fertilizer during early stage can be less
** DAT = days after transplanting
*** Achievable yield in the dry season with good management practices

Consult Policy Check for good crop management practices.
www.nmrice.com

4a. Give rice grower guideline as a printout

4b. Send guideline as SMS to rice grower



www.irri.org/nmrice

Use of mobile phone application using interactive voice response (IVR) in Philippines

1. Call phone number with voice recording



Globe: 2378
Smart: *2378

IVR implementation box

2. Answer 10 to 12 questions by pushing number on phone key pad

3. Transmit answers to Web based Nutrient Manager program

5. Transmit SMS to rice grower

4. Calculate guideline and develop SMS message



Totally automated: No phone operator required

Use of Smartphone application, usually with extension worker going to rice grower

3. Interview rice grower without web access
4. Answer off-line 15 to 20 simple questions about field

5. Transmit answers to Web based Nutrient Manager program



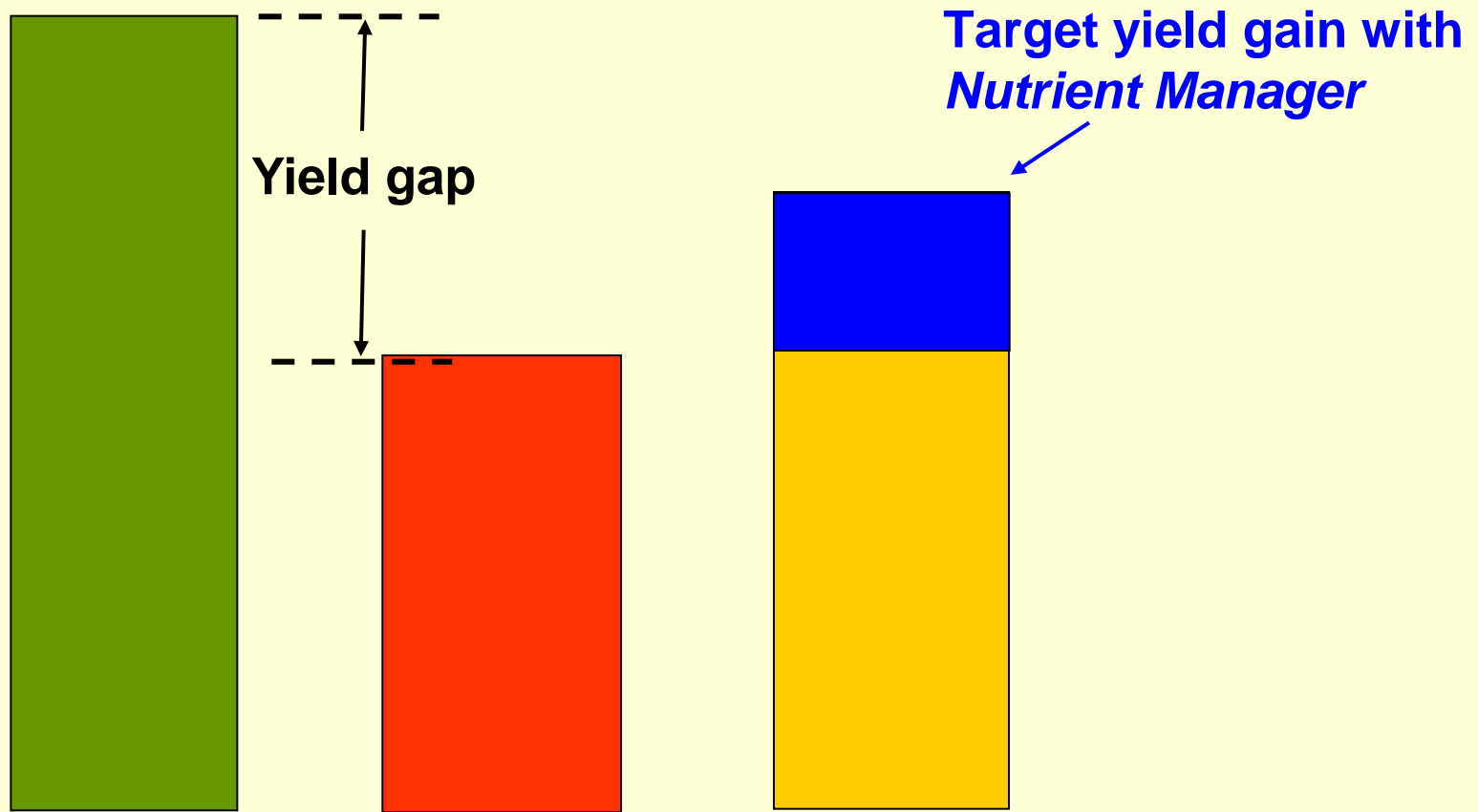
6. Send guideline as SMS to rice grower



1. Access web site
2. Download or update application

For Philippines beta version download 'SSNM' at market

Nutrient Manager aims to increase profit of a rice grower by USD 100 per hectare per season



Yield attainable with optimal nutrient and crop management

Current yield of rice grower

Target yield with Nutrient Manager

IRRI Country-specific *Nutrient Manager* for Rice software in development and testing

Nutrient Manager for Rice Philippines Version 2.0

<http://webapps.irri.org/nm/ph>

Pemupukan Hara Spesifik Lokasi (PHSL) Padi Sawah

<http://webapps.irri.org/nm/id>

水稻三控施肥软件 Version 1.0

<http://webapps.irri.org/nm/cngd>

উফসী ধানে সারের মাত্রা মাধ্যম ১.০

Nutrient Manager for Rice (NM Rice) Version 1.0

<http://webapps.irri.org/nm/bd>

Gestion des éléments nutritifs pour le riz (GENuRiz)

<http://webapps.irri.org/nm/vnsouth>

Selectionner un lieu:

Ghana, Perte Nord

Mali

Nigeria, Kano et environs

Sénégal

<http://webapps.irri.org/nm/wa>



Début

IRRI

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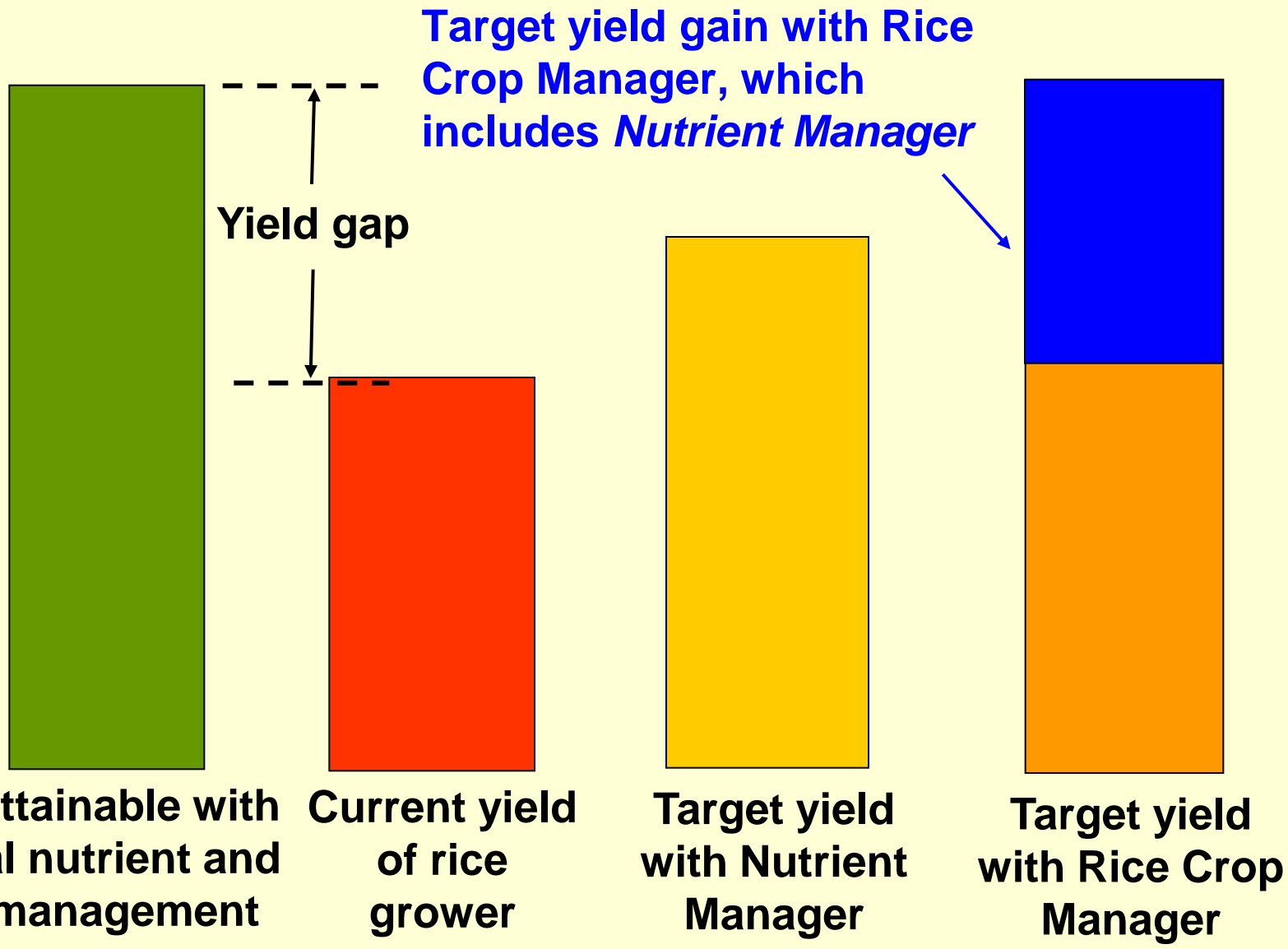
Summary

- 1. The scientific principles of SSNM enable the calculation of field-specific nutrient management practices**
- 2. Country-specific *Nutrient Manager for Rice* software quickly calculate field-specific nutrient management based on SSNM**
- 3. Web and mobile phone applications enable calculated field-specific nutrient management to quickly reach extension workers and rice growers**

But rice growers need more!

- **Need field-specific guidelines for managing the rice crop in addition to managing nutrients**
- **Need access to affordable and reliable financial services**

Rice Crop Manager aims to close the yield gap and future increase profit

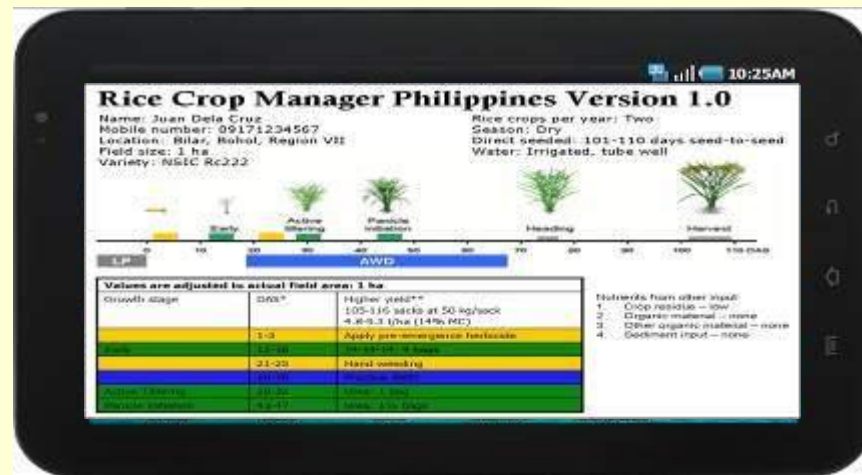


Beta version of *Rice Crop Manager* is under development in the Philippines

1. Use web site or downloadable mobile phone app
2. Interview rice grower
3. Answer 20 questions about field

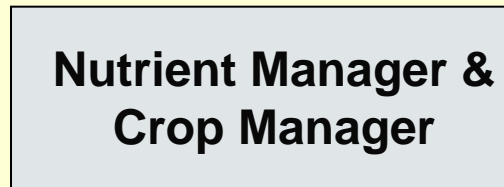


5. Provide guideline to rice grower

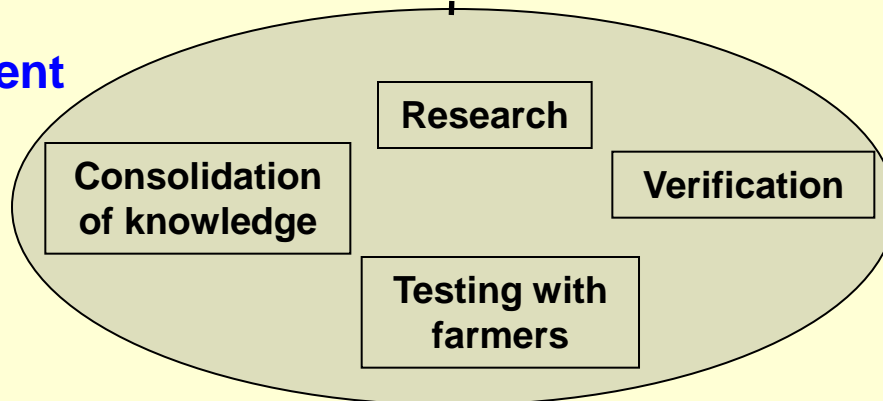


Nutrient Manager and Crop Manager continue to be developed and tested with many partners

Decision tools to
help rice growers



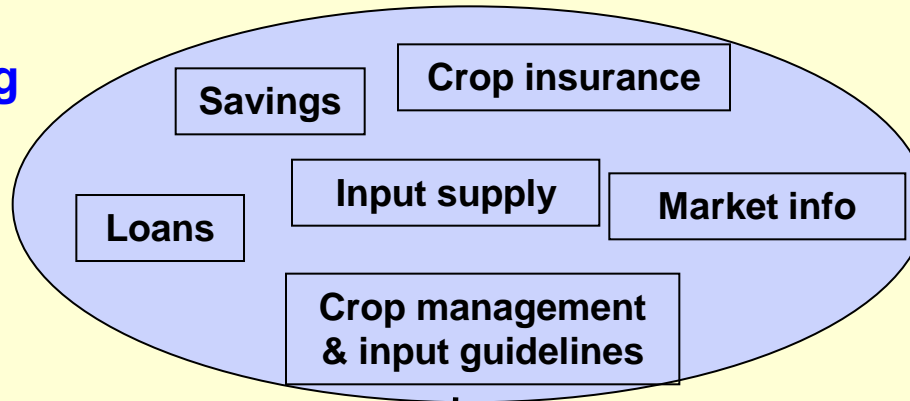
Product development
and testing



Partners: Ministry of
Agriculture, extension
services, NGOs,
universities, private
sector, agriculture
input suppliers

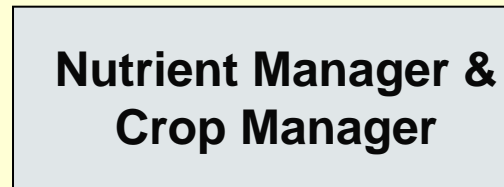
Use of ICT can provide customized compelling services to rice growers

Suite of compelling services and financial products

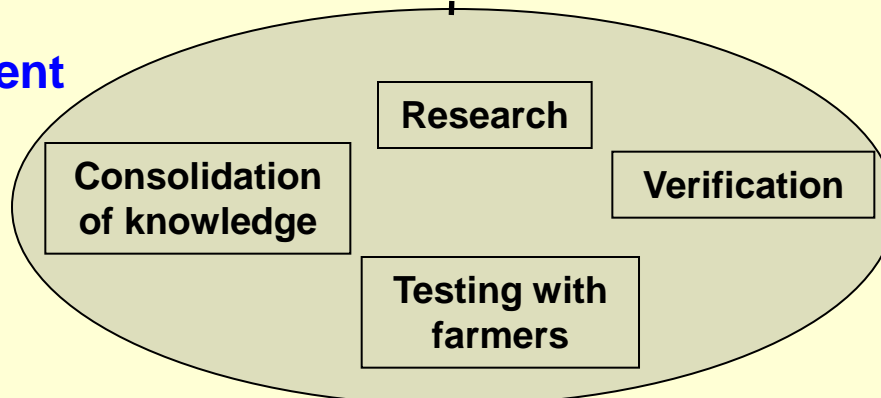


Partners: NGOs, mobile phone companies, banking services, agriculture input suppliers, Ministry of Agriculture

Decision tools to help rice growers



Product development and testing



Partners: Ministry of Agriculture, extension services, NGOs, universities, private sector, agriculture input suppliers

Summary

- **An appropriate application of SSNM is available to increase income of rice growers**
- **This application enables appropriate ‘precision’ management by small-scale rice growers**
- **Web and mobile phone applications provide opportunities to bring together services to meet ‘customized’ needs of rice growers**

Acknowledgement

- **Partners in organizations across Asia contributing to the development of SSNM**
- **Partners in organizations across Asia and Africa and now contributing to the development and the evaluation of *Nutrient Manager* and ICT applications**
- ***Nutrient Manager* development team at IRRI: Rowena Castillo, Marco van den Berg, PJ Sinohin, and Marlon Guerra**

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- **International Plant Nutrition Institute (IPNI)**
- **International Potash Institute (IPI)**