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CGIAR

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Smarter farming via text messaging

Real-time "when and how much" advice. *NMRiceMobile* (see photo on opposite page) answers the questions raised in fields, thus providing both farmers and extension workers with fertilizer recommendations—type, timing, and rate of application—via text.

AfricaRice (2)

Since its debut in the Philippines in 2011, Nutrient Manager for RiceMobile (NMRiceMobile) *has provided rice farmers and extension workers with free fertilizer guidelines via their mobile phones. Through text messages, they can receive advice on the right time, amount, and type of fertilizer to apply to their rice crop to maximize production and profits—and reduce waste. Now, African farmers will soon be getting the same sound advice when they need it.*

Fertilizer is an expensive investment for subsistence farmers. But most farmers, due to a lack of awareness, fail to apply fertilizers in the right combination, at the right dosage, and at the right time.

"The nutrient needs of the crop can vary, even across short distances within and among fields," says Dr. Roland Buresh, IRRI's nutrient management expert and lead developer of *NMRiceMobile*. "Insufficient application of fertilizers can result in loss of yield and profit, whereas too much can reduce profit and can also increase risks to the environment."

Today, farmers and extension workers in the Philippines are getting field-specific nutrient best management guidelines through mobile phone applications of a computer-based decision tool, *Nutrient Manager for Rice (NMRice). NMRice* provides farmers with fertilizer recommendations on the basis of where their field is (geographically), the variety of rice they use and when it was sown, the availability of irrigation water, how they manage crop residues, and the yield history of the field.

NMRice for Africa

NMRice is now being adapted to Sahelian conditions using AfricaRice's databases developed in the 1990s by Marco Wopereis, now AfricaRice deputy director general, and Stephan Haefele, currently IRRI's soil expert.

The "draft" *NMRice* has been going through field testing and validation for 2 years in Mali and Senegal. For the validation phase, the *NMRice* recommendations were typically tested on a 200-m^2 area of the field, and compared with the farmers' usual practices.

"Validation in farmers' fields and on our research stations has been positive," says Kabirou N'Diaye, AfricaRice agronomist in the Sahel. "*NMRice* provides cost-effective and balanced nutrient management to deliver the target rice yield. This indicates that it can be used at these sites in the Sahel."

Bridging gaps in knowledge and income

AfricaRice has worked on developing options for improved crop management (the when and how much questions) with farmers since the late 1990s, first in irrigated systems and later in rainfed systems. AfricaRice and its partners looked at farmer involvement in the development of such crop management recommendations and the importance of proposing prototype technologies and good agronomic principles and decision tools rather than fixed technologies.

For systems with a potential for relatively high crop management precision, such as irrigated systems, the use of information and communications technology (ICT) may allow farmers to benefit from "real-time advice" on crop management, based on new research.

"For irrigated systems, we are looking at decision tools to maximize farmers' investment potential," explains Frank Mussgnug, AfricaRice cropping systems agronomist. "For example, if a farmer has US$100 to invest in his or her rice crop, on what should he or she spend the money?"

Sending out an SMS

"*NMRice* provides an online or downloadable questionnaire with 15 to 20 questions," says Dr. Mussgnug. "An extension agent or farmer answers these questions for one farmer's field, and the program provides fertilizer recommendations—type, timing, and rate of application."

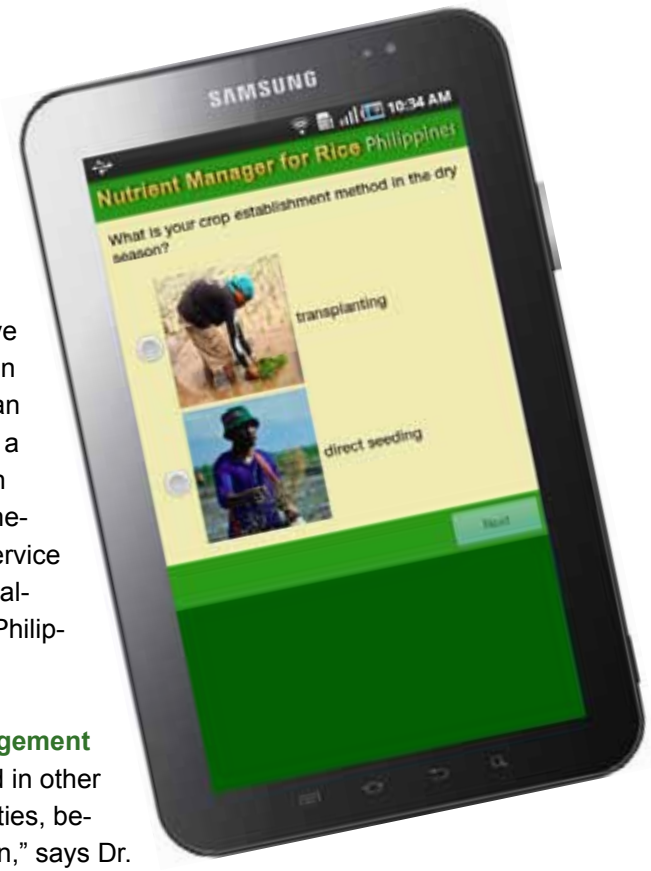
Moreover, it is a simple step to have the application available in local languages. For example, the online test version of *NMRice* is already available in Wolof and Poular for Senegal, and in Bambara for Mali.

"The application is highly adaptable," says Dr. Haefele, who is providing technical backstopping for the project. "We already have the Web-based version in advanced testing. We can adapt that for a tablet or a smartphone, and we can move toward a cell-phone-based short message service (SMS), like the one that already works well in the Philippines."

Beyond nutrient management

"The next step is to build in other crop management activities, besides fertilizer application," says Dr. Mussgnug. "To this end, AfricaRice is updating its earlier RIDEV (rice development) crop model. RIDEV will allow us to better predict the best planting window for a given variety to avoid heat or cold sterility at flowering in the dry and wet season, respectively."

It will also allow AfricaRice to provide recommendations with respect to the best timing of fertilizer application, drainage before harvest, and harvest itself.



"With RIDEV and *NMRice* combined, we would be better able to tackle the when and how much questions raised in farmers' fields," Dr. Wopereis says.

Once that is done, AfricaRice will work with its development partners to determine how to ensure that the maximum number of farmers can benefit from the technology, be it by phone or through traditional word of mouth from extension staff using the tool.