PhilRice Magazine

A quarterly publication of the Philippine Rice Research Institute

ALL FOR RICE

PART TWO

GAME CHANGER: IS PH RICE READY TO COMPETE AT LEAST REGIONALLY?

RICE CROP MANAGER: YOUR PERSONAL RICE MANAGEMENT ASSISTANT

INFORMATION IS POWER

THE 'I' IN ICTs

MOVING MOUNTAINS TO SHINE A FADING GEM

REACHING THE FARMERS UPHILL

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Contents

ABOUT THE COVER

The hands of various sectors (farmers, policymakers, and consumers) represent how complex and elaborate is the process of providing food for everyone in a country with a ballooning population. These hands can unite to help PH's rice industry move forward and be more competitive. All for rice!

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2001 Gawad Florendo Awardee

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EDITOR'S NOTE

Making sense

In some developed countries, farmers pay for agricultural information. And at hefty fees!

In PH, farmers get them almost free of charge. They have the extension or other development workers. Or, they resort to prepaid cellphone credits, about a peso per text or P20 for unlimited information exchanges with a Text Center agent for one day.

In the past, and even in many rural communities at present, unnecessary information poverty afflicts farmers.

In this second special issue of the PhilRice Magazine featuring projects funded under the DA Food Staples Sufficiency Program, we talk about approaches that will help give options to farmers on how best to manage their rice farms. We expound on initiatives that aim to streamline the processes of accessing information on the science of rice and rice-based farming systems.

The government, though often criticized, cannot totally do away with its bureaucratic procedures in doing transactions. Certain quarters characterize them as a necessary evil. Others shrug them off as self preservation at its best. In this issue, we talk of attempts and deliberate efforts at making it easier to obtain agricultural information from the government.

Aside from decision-support tools, we also talk of products. Which machines are best for which rice farming environments? What else can we do with rice?

We also tell you more of things oftentimes not talked about such as heirloom and upland rices. Our agenda is to break the silence about the wealth of rices we have in the highlands and uplands.

With the ASEAN integration and other world trade agreements at the backdrop, we wish to situate these initiatives as efforts toward improved competitiveness in rice in the Philippines — rice that is affordable for most consumers, and makes its producers earn a decent income at the same time.

Allow us to talk about these good things happening in the agricultural sector at a time when the mainstream media seems to choose to be quiet about them. Our appetite for good things going on in the fields will never subside. ●

Three new PhilRice-bred varieties

In late 2014, the Rice Technical Working Group of the National Seed Industry Council (NSIC) approved 24 inbred and hybrid varieties developed by public and private rice breeding institutions.

Three of the new varieties - NSIC Rc354, Rc358, and Rc368H - were bred by PhilRice. Rc354 (Tubigan 28) is early-maturing (112 days) with high resistance to bacterial leaf blight (BLB), blast, green leafhopper (GLH), and white and yellow stemborers (W/YSB). It has an average yield of 5.4 t/ha, and is recommended nationwide.

Rc358 (Tubigan 30) averages 5.4t/ha, too, and is highly recommended in the Visayas. It is early-maturing at 114 days, with an intermediate amylose content of 19.7% with long (6.8 mm) and slender (3.2mm) grains; premium milling (72.4%), fair brown rice (78.6%), and grade 1 (54.6%) head rice recoveries.

Hybrid Rc368H or Mestiso 55 can yield up to 10 t/ha in the dry season. It has intermediate amylose content of 18.9%, with long (7.3 mm) and slender (3.3mm) grains; premium milling (70.4%), fair brown rice (77.5%), and grade 1 (52.2%) head rice recoveries. Like Rc358, this hybrid has good eating quality.

The three varieties grow best in irrigated lowland areas. The other 21 varieties approved by NSIC were bred by IRRI, and private seed companies Syngenta, Bioseed, Advanta, and Long Ping.
| **ASHLEE P. CANILANG**

Adapt to climate change

PhilRice has produced a kit to equip farmers with information on how they can better adapt to the scourges of climate change.

The info kit is a "ready-to-print" material that features climate change-ready technologies for rice and rice-based farming systems. It includes recommended varieties that can withstand climate-related stresses such as drought, salinity, and flood.

For water-saving practices, the alternate wetting and drying (AWD) and low-cost drip irrigation system (LDIS) technologies are recommended.

AWD guides farmers when to irrigate (or not) the rice field, thus preventing wasteful use of water and minimizing greenhouse gas emissions. LDIS best irrigates rice-based crops.

Fossil fuel-free technologies such as the rice hull gasifier and windmill-pump systems, rice hull stove, and carbonizer are also featured in the info kit.

The gasifier burns rice hull instead of gasoline or diesel in pumping water out of the ground in rainfed areas where fuel expenses are inevitably high.

The wind mill is applicable in areas where wind energy is abundant.

The carbonizer processes rice hull into biochar (charcoal). Aside from being used as soil conditioner, biochar is also a main ingredient in producing organic fertilizers thus reducing dependence on synthetic fertilizers.

The kit also features Palayamanan Plus and some harvest and postharvest technologies. Farmers, extension workers, or anybody may download the kit from the institute's website (www.philrice.gov.ph) or contact the PhilRice Text Center (0920-911-1398). | **MARY GRACE M. NIDOY**

PhilRice equips farmers with information on how they can better adapt to the impacts of climate change.

High-yielding, heat-tolerant lines identified

A study is closing in on promising breeding lines that are heat-tolerant and high-yielding through a series of field and laboratory heat stress screening.

Titled *"Screening of rice-induced mutants for heat and drought tolerance,"* the PhilRice study was among the posters presented under the Plant Breeding and Genetics category during the 23rd Federation of Crop Science Societies of the Philippines, Inc. Scientific Conference in Clark Zone, Pampanga, 11-16 May.

Thelma Padolina, lead researcher, said the screening will lead to the development of new varieties that help address climate change. She clarifies that although rice normally grows at temperatures between 20 and 35°C, it is most sensitive during the booting and flowering stages. Hence, even short-duration chronic dry spells occurring during these stages will result in substantial yield loss.

Padolina and her team (Lenie Pautin, Rustom Braceros, Dindo Tabanao, and Arnel Pocsedio) started the series of screening in 2012 involving 817 mutant lines for drought stress and leaf blast. These lines have valuable genetic variations for crop improvement. They are the results of induced mutation where one or two of their major traits, for instance plant height and resistance to biotic and abiotic stresses, were altered.

"We have identified promising lines from five backgrounds: 2 from traditional Ballatinaw and Azucena; 3 from modern PSB Rc72H, Rc4, and IR58; and 1 from Nipponbare," said Padolina.

Promising lines were exposed to 21.1°C to 34.4°C temperatures at field trials, and 34°C to 38°C at screenhouse for 3 consecutive seasons to test and validate their grain fertility and pollen viability. Nine mutant lines that showed more than 40% grain fertility under high temperature have been identified.

The best of the lines yielded at least 6 t/ha. Ballatinaw yielded 6 to 6.7 t/ha during the 2014 dry season, Rc72H had 6-6.2 t/ha, and Azucena had 2.7 to 4.3 t/ha, all better than their original parent stocks. Ballatinaw had 66.8-70% milling recovery, higher than Rc72H's 59.3-63.7%. | **ASHLEE P. CANILANG**

Future Vis-Min AgRiDOCs train

AgRiDOC training participants from the Visayas and Mindanao start their 4-month capacity-building course on 16 June - 23 October 2015 at PhilRice. Trainees will undergo an intensive training program that aims to strengthen their technical competence, nurture values relevant to development work, and sharpen their leadership, communication, and entrepreneurial skills.

Project IPaD recently welcomed 25 participants from the Visayas and Mindanao to its second batch of 4-month training titled *"Enabling the AgRiDOC: a new breed of rice extensionists."* (See related article on page 20).

The training program's foundation is farm community transformation, not just technology transmission. During the opening program, Julian Lapitan, interim head of the IRRI partnerships office and lead of Project IPaD at IRRI told the trainees: "As extension workers, your work should not only be limited to transmission, but it should go toward transformation. And you cannot transform if you yourselves are not transformed."

Edmund Sana of the National Rice Program, challenged the future AgRiDOCs to optimize their opportunity to learn from the training.

"You are here to get more, to increase your capacity, and be motivated to enjoy your work so that you can deliver," he said.

"The moment you give justice to your job, that's when you start to enjoy it, and it will not be work anymore if you enjoy it," he inspired the participants.

"You (extension workers) have to put it in your hearts to serve our farmers, our community, and our country," said Emelita Flores, municipal agriculturist of Sto. Domingo, Nueva Ecija, a three-time Rice Achiever awardee for outstanding performance in extension. The trainees (average age is 31 years old), are agricultural technologists, extension workers, college instructors, and staff members of the ATI and PhilRice branch stations.

The training curriculum consists of six modules: BeTransformed, AgRiCool, AgRiSurvivors, PalaYcheck and PalaYamanan v2.0, Rise with Rice, and Be RICEponsible." I expect to learn many things about rice production and agriculture in general, so I can better assist our farmers," said Jun Rey Samillano from ATI-RTC Region 12.

Plans for outscaling the project beyond 2015 are being laid out.
| **MARVIN R. SORIANO**

Dr. Calixto M. Protacio receives the key of leadership from DA Assistant Secretary Edilberto M. De Luna during the leadership turnover ceremony, 13 July 2015.

PhilRice has new head

President Aquino has appointed Dr. Calixto M. Protacio, a crop science professor and scientist, as the new executive director of PhilRice.

Agriculture Secretary Proceso J. Alcala swore him into office on 10 July replacing DA Assistant Secretary Edilberto M. De Luna who served as officer-in-charge after the retirement of Dr. Eufemio T. Rasco, Jr. in February.

During the leadership turnover ceremony, Protacio asked for the support of all PhilRice staff members to continue serving the Filipino farmers.

He also recognized the Institute's competencies in developing new varieties and rice farming technologies. He hopes to focus on the Institute's branch stations as the forefronts of PhilRice's services.

Protacio has worked with various institutions: UP Los Baños as professor and director of the Institute of Plant Breeding and Crop Science Cluster; Philippine Agricultural Scientist as editor-in-chief; University of California, Riverside as post-doctoral research associate; Pennsylvania and Louisiana State Universities as graduate research assistant.

He finished BS Agriculture and MS Horticulture at UPLB, and PhD in Plant Physiology from Pennsylvania State University, USA.

Protacio, 57, hails from Guinobatan, Albay. | **MARY GRACE M. NIDOY**

The science community in Muñoz, Nueva Ecija offers a toast to welcome Protacio as the new Executive Director of PhilRice.

(L-R: Dindo King M. Donayre, Val C. Garcia, Femia R. Sandoval, Jennifer T. Niones, Julian C. Macadamia, Norvie L. Manigbas, and Ricardo F. Orge)

Our Best For Our Farmers,

Our awards are dedicated to the most important people that we work for – Filipino rice farmers.

MIKE LOMBERIO
DAET, CAMARINES NORTE

Unless and until majority of our rice farmers mechanize farm operations, we're not ready yet! Considering that our agriculture sector has been neglected for so long because of government's reasoning that it is cheaper to import, it is still a long shot.

JENNY ROSE T. CORAL
TACLOBAN CITY, LEYTE

I am working in the rice granary of Eastern Samar. They produce native red rice which, quality wise can really compete globally. But sad to note, rice production in this area lacks local government support. Most rice farmers are left on their own to produce and market their output. In some cases they sell their native rice at a higher price outside the municipality, and then they buy commercial rice from the city for their consumption. As to quality, I believe the Philippine native rice is ready to compete globally, but in terms of the quantity, we still need a lot of support. And we must consider feeding the hungry within our place and have sustainable rice production before we go global.

DYBORRHAE JEWEL M. REYES
CALBAYOG CITY, WESTERN SAMAR

Philippine rice is not ready because we still import a large portion of our rice needs, and Philippine agriculture is continuously being affected by typhoons and El Niño. Non-agri cities are dependent on rice imports. Rice-producing areas are confronted with issues on land conversion.

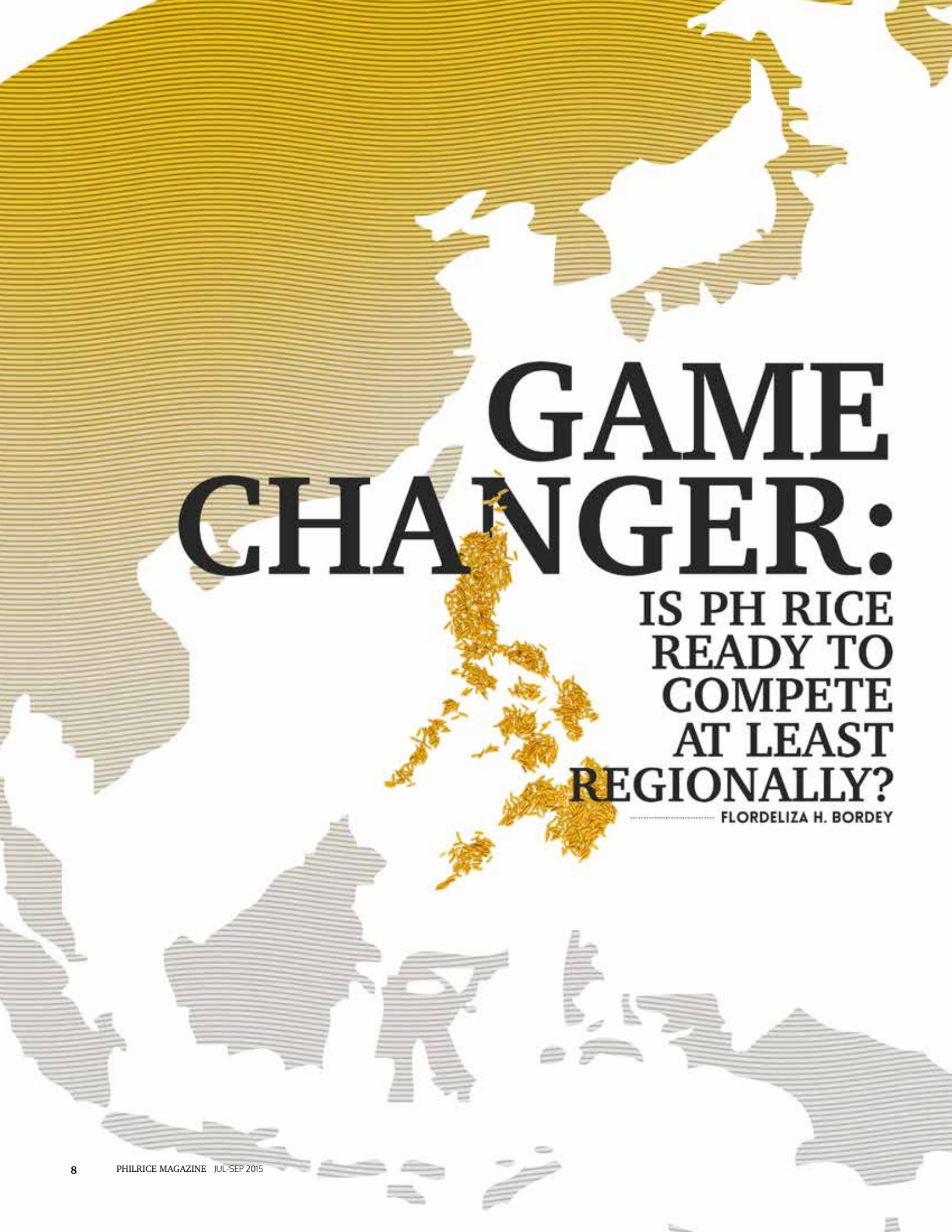
CHERRY CADIZ
ZAMBOANGA CITY

Our rice can compete globally but we might be facing higher costs of export rather than having higher benefits. The fancy- black rice, red rice, brown rice can really compete gobally since they have higher demand than white rice. However, it is still our best interest to let our country be rice-sufficient first then compete globally.

TIMOTHY JOHN REMORCA
IMUS CITY, CAVITE

Philippine rice has always been ready to compete globally. Since the inception of IRRI in the 1960s, we have been in the forefront of rice technology and innovation - we can even claim that our very rice paved the way for the global competitiveness of our counterparts. And with the establishment of PhilRice, we are surefooted to being rice-self- sufficient and a strong market competitor. All it takes is action - an open-minded approach to embrace the innovation that has been an arm's reach since decades ago that made PH rice globally competitive.

The question is are we ready?



GAME CHANGER:

IS PH RICE READY TO COMPETE AT LEAST REGIONALLY?

FLORDELIZA H. BORDEY

Zero rice importation or self-sufficiency has always been the elusive goal of Philippine agriculture policies regardless of political dispensation. Any inferior goal is unpatriotic and criticized as a failure of government and the nation as a whole.

The government can actually ban imports and declare self-sufficiency, but this triggers upsurge in rice prices, long queues, and a restive constituency as we experienced in the mid-1990s. With ever-growing demand, rice imports are allowed to stabilize domestic rice prices. Indeed, food security is not just about producing enough supply but also ensuring its affordability to consumers.

> "We ought to improve our competitiveness to cater to our ever-increasing demand for rice. Increasing rice yield is central to being competitive.

RICE TRADE POLICIES

Our country's rice trade policy confounds our quest for self-sufficiency. Our rice import policy is anchored on quota or quantitative restriction (QR) and tariff. This means we have to annually import at least 805,200 mt of rice (minimum access volume or MAV) with a tariff of 35%.

The government can, until 2017, limit the volume of rice imports above the MAV. QR extension on rice means we need to give up trade protection in other commodities; hence QR has a slim chance of surviving. Aside from QR elimination, eventual reduction in tariff rate looms.

Our rice trade policy implies two things. First, it is futile to target 100% self-sufficiency given the realities of our trade commitments. Second, we will SOON face competition with the rest of the world or the ASEAN at least. The big question no one wants to answer is: Are we ready to compete?

If QR were removed today and only the 35% tariff remained as trade protection, the straight answer would be NO, WE CAN'T COMPETE. At this tariff level, a world price of rice (FOB or freight on board price of 25% broken rice) around USD 400/t would lead to a wholesale import parity price of only P29.21/kg. This is the equivalent price of the imported good when sold at the wholesale level in the importing country. FOB is the price of a commodity at the port of the exporting country. This is 7.5% cheaper than the average wholesale price of regular milled rice (similar to 25% broken rice) in 2013, which was P31.56/kg.

COMPETITIVENESS

Why then are we not competitive?

We first need to understand what competitiveness is all about.

Competitiveness rests on the ability of a firm to produce products at the same or superior quality and at a lower cost than its local or international competitors. It is a firm level concept rather than a national one. Given the wide variation in the technological capacity and production environment of our local rice producers, it is not difficult to understand that some of them are competitive while others are not. Thus, instead of defining "national competitiveness level" we need to look at a local benchmark and see how it compares with "similar" producers in other countries.

PH AND NEIGHBORS: HOW DO WE FARE?

The Department of Agriculture, through PhilRice in collaboration with IRRI, conducted a cross-country study in 2013 that assessed the cost of producing palay among select intensively cultivated and irrigated ecosystems in six countries: Philippines (Nueva Ecija), China (Zhejiang), Indonesia (West Java), India (Tamil Nadu), Thailand (Suphan Buri), and Vietnam (Can Tho).
Among importing countries (PH, China, and Indonesia), Nueva Ecija appears to have the least cost of producing dry paddy (at 14% moisture content [MC] at P12.34/kg). Zhejiang's and West Java's were P13.99 and P16.21, respectively.

Relative to exporting countries, however, it is still expensive to produce paddy in Nueva Ecija, with only P8.87/kg in Tamil Nadu and

P9.46 in Suphan Buri. It is cheapest to produce dry paddy in Can Tho at P6.50/kg.

Why?

First is the wide difference in land productivity. Can Tho produces three rice crops in a year while Nueva Ecija has only two. Average rice yields at 14% MC in Nueva Ecija are 5.68 mt/ha (dry season) and 3.84 mt/ha (wet season). Can Tho boasts of 6.33 mt/ha during summer-autumn; 5.55 mt/ ha in autumn-winter; and a whopping 8.78 mt/ha during winter-spring. High rice yield is among the contributing factors to lower unit cost in Can Tho.

High labor cost is the second major reason why it is more expensive to produce rice in Nueva Ecija. On average, farmers here pay P3.76 on hired labor to produce a kilogram of paddy while farmers in Can Tho only pay P0.46. One can argue that Can Tho farmers probably depend on family labor. Can Tho's imputed cost of family labor is only P0.80/kg of paddy, which is slightly higher than P0.66 in Nueva Ecija.

The practice of direct seeding in crop establishment and the use of combine harvesters primarily explain the lower labor cost in Can Tho. In Nueva Ecija, transplanting, which is labor-intensive, remains popular together with manual harvesting and mechanized threshing.

Machine rental and fuel are more expensive in Nueva Ecija at P1.73/kg of paddy; only P0.80 in Can Tho. This could be explained by the use of more efficient machines in land preparation, harvesting, and threshing in Can Tho.

CLOSER LOOK: VN AND PH

Vietnamese farmers are competitive probably because they receive plenty of government support like subsidies. But look, no subsidies for material inputs were documented in Can Tho during the survey period. There's free use of water from state irrigation canals, and that's it.

Even with free water, Nueva Ecija farmers would still spend P11.90/kg, much higher than the P 6.50/kg cost in Can Tho.

But thank the heavens Nueva Ecija farmers receive higher profit margin than their Can Tho counterparts. In 2013, the average price of dry paddy was P17.21/kg in Nueva Ecija; only P9.59 in Can Tho. They profited P4.87, while the Vietnamese got only P3.09/kg.

Rice comes from paddy, hence higher price of paddy equals more expensive milled rice. Given the average milling recovery of 65% in Nueva Ecija, the milled rice equivalent of dry paddy price is already P26.48/kg; only P14.11/kg in Can Tho at a recovery of 68%.

The P5.08/kg estimated gross margin of local marketing players is derived by subtracting P26.48 from the 2013 wholesale price of milled rice (P31.56/kg). In contrast, a P16.97/kg (US$ 400/ mt) FOB price of 25% broken rice in Vietnam gave a gross margin of only P2.87/kg for their marketing players. The greater volume of paddy, more efficient handling, and higher milling recovery in Can Tho are the key factors for their lower marketing margin.

Clearly, from farm to market, rice in Nueva Ecija is far more expensive to produce than in Can Tho.

In 2013, Vietnam had an area harvested of 7.9 million ha that produced 44 M mt of paddy; PH produced 18.4 M mt from only 4.8 M ha. Vietnam's population was 91.7 M; ours was 98.4 M. Having what it has, Vietnam is no doubt in a better position to export rice.

WHAT TO DO

Just rely on the world market to supply the entire domestic rice requirement?

From 2008 to 2012, world rice exports averaged 34.23 M mt; its imports without the PH imports averaged 31.43 M mt. Therefore, the world's rice surplus available for PH to buy averaged 2.84 M mt a year.

Given the country's yearly total rice requirement of about 14.97 M mt, it will be impossible to rely solely on international trade to supply our rice needs. Besides, Litonjua and Bordey *"2014. How can rice trade liberalization affect producers and consumers"* estimated that the domestic supply would contract by only 8% when trade protection is reduced to 35% tariff, and QR is removed.

This means that we need to produce the bulk of the rice that we eat. We cannot count on imports.

We ought to improve our competitiveness to cater to our ever-increasing demand for rice. Increasing rice yield is central to being competitive. This is where hybrid rice technology helps, coupled with appropriate crop management in our suitable areas.

In reducing cost, the intensified use of labor-saving technologies such as the combine harvester and direct seeding is in the right direction. To alleviate rural labor displacement, jobs are to be generated outside the agriculture sector. Improving the efficiency of milling and handling can also reduce the cost of processing and marketing rice.

These are just several ways to improve competitiveness which could have an immediate impact.

We must also invest in state-of-the-art rice R&D to create next-generation technologies that would be future sources of yield growth.

PhilRice is trailblazing toward achieving competitiveness through the *Palayabangan* challenge. Using a competition as a platform, the challenge aims to find a complete set of cultivation techniques that can give a yield of at least 10 t/ha while costing only P5/kg at most. Through the Institute's contest, competing individual farmers associations, and private companies demonstrate their respective package of technologies, side by side with PhilRice's developed technologies, while their costs of production are closely monitored.

The winning entry is then promoted through the conduct of field days and open fora. During the dry season of 2014, the Syngenta company's entry in PhilRice Isabela emerged as the regional winner when it obtained 10.5 t/ha (14% moisture content) at P4.94 production cost per kg of paddy rice produced. This gives a ray of hope that we can still improve our paddy production system and be competitive compared to our Southeast Asian neigbors.

We cannot allow the rice industry to die a natural death, but we also cannot afford to be complacent and continue to produce expensive rice. We should start our quest for rice competitiveness. NOW! ●

> Hybrid rice technology helps, coupled with appropriate crop management in our suitable areas. We must also invest in state-of-the-art rice R&D to create next-generation technologies that would be future sources of yield growth.

Are you a rice farmer who's got a burning question about rice production that simply can't wait? Are you a rice production extensionist who needs to be extra-sure about the recommendations you want to give to farmers?

There is an app for you.

Launched in November 2013, the Rice Crop Manager (RCM) is an internet-based service jointly created by IRRI and PhilRice that serves as a decision-making and support tool for rice extension workers and farmers.

BETTER MANAGEMENT, BETTER RICE PRODUCTION

Dr. Manuel Jose C. Regalado, one of the proponents of the project and acting deputy executive director for research of PhilRice, said that the use of the RCM may bring a yield increase worth about P4,000/ha.

Through improved crop and nutrient management, RCM aims to add 300kg of palay to each crop per season/ha. If the proposed solutions of RCM can be applied to our 4.7 M ha of rice harvested area, an additional 1.41 M tons of paddy rice would be produced.

THE APP

The RCM is an offshoot of the Nutrient Manager for Rice, which users have requested an expanded version capable of combining improved nutrient management with field-specific rice management practices. It utilizes existing knowledge on best practices for rice management to provide a location-specific guidepost for farmers before the start of the growing season. Thus, it enables farmers to invest and prepare for the needed inputs and management of their crop.

Capitalizing on the popularity and wide user-base of gadgets such as smartphones and tablets, RCM was coded in HTML5, which most browsers (either desktop or portable gadgets) now support. HTML5 is a revision of the Hypertext Mark-up Language (HTML), the standard programming language for describing the contents and appearance of web pages. This makes RCM compatible for use on a wider range of devices that support web browsing without the need for downloading additional plug-ins.

Using the app is quite simple, too. On any HTML5-supported browser, a farmer or extensionist can open the website (http://webapps.irri.org/ph/rcm/) leading to the app. Once the page opens, the app asks some basic questions about the number and size of the rice field, location, season, cropping patterns and practices, variety to be planted, and others.

The information gathered is then transmitted over to a cloud-based database, which calculates and provides feedback based on the information given. The more precise the information given, the more accurate is the prescription.

TESTING AND EVALUATION

To validate and improve the app, field trials were set up and conducted in Isabela, Nueva Ecija, Oriental Mindoro, Northern Samar, and Agusan Del Norte, selected

for their contrasting climate and rice production conditions.

Rice farmers were interviewed to identify problems and possible solutions. The data gathered then became the basis for improving the next version of the RCM, which is currently on version 1.2. Like any app under development, RCM still has its drawbacks and limitations, says agronomist Wilfredo Collado of PhilRice.

"The app can be used in offline mode but cannot generate recommendations. It can only recommend after submission of results of interview via the internet. The use of tablets can only accommodate up to 50 recommendations per session in offline mode, i.e., the saved recommendations will be overwritten by the new results of interview after the 50th,"Collado explains.

He adds that the recommendations are based on calculations in the cloud-based server from the loaded database. The database includes results of the site-specific nutrient management of the Mega Project of IRRI and PhilRice, yield targets based on the Oryza 2000 model, and other data sources on crop management.

"Some areas in the country were not part of the Site-Specific Nutrient Management (SSNM) project, thus no or limited information specifically on the indigenous nutrient-supplying capacity of the rice ecosystem is available in the database. In this case, data from similar areas is interpolated, making the recommendations a bit inaccurate particularly on the nutrient aspects," Collado adds.

Another limitation against the app is our country's internet connectivity. Collado explains that options had been laid down during a meeting with RCM regional field office representatives.

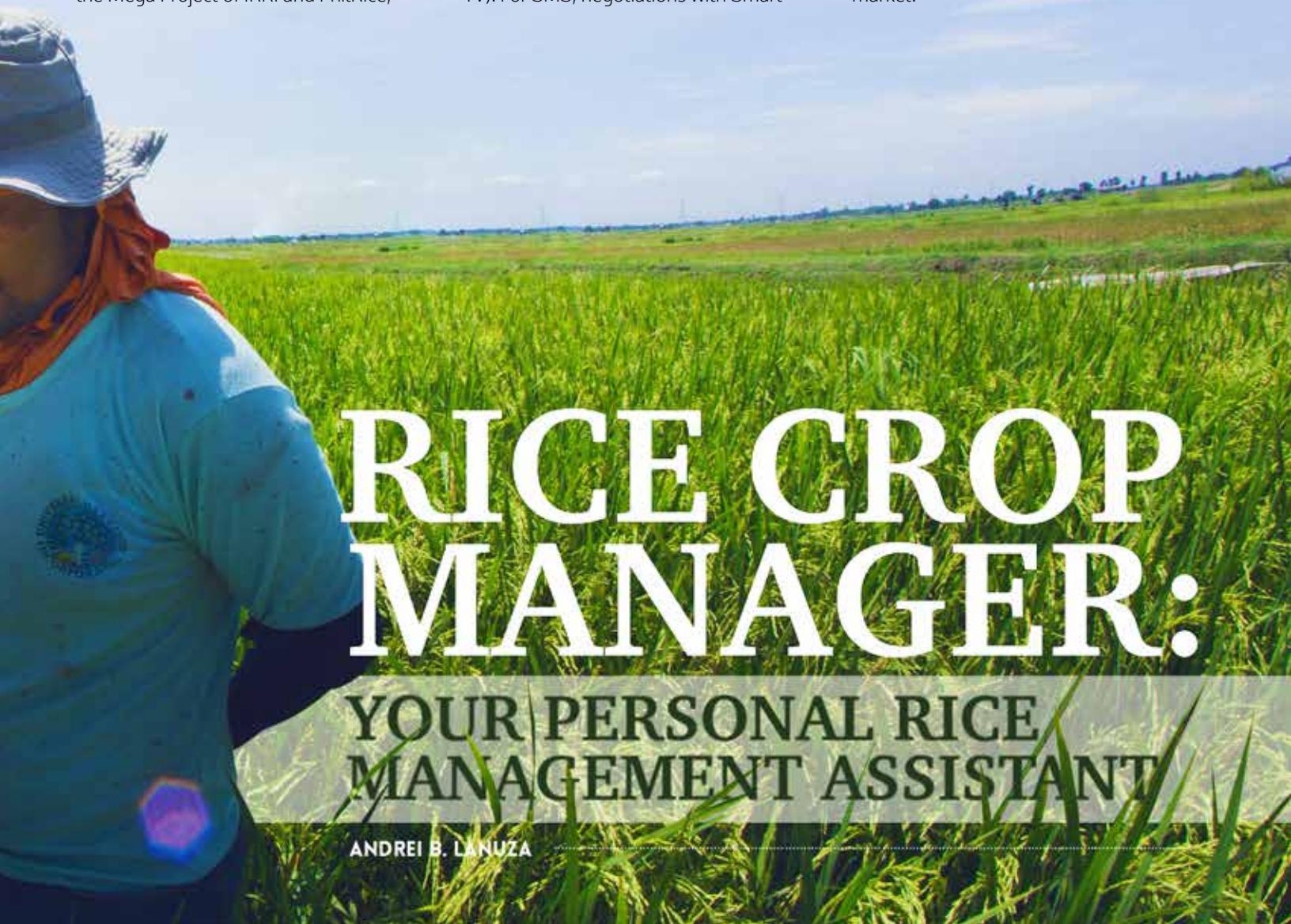
"We intend to collaborate with other government agencies such as the Information and Communications Technology Office (ICTO) of DOST in addressing the problems on connectivity (using the "White Space" TV). For SMS, negotiations with Smart and Globe telecoms are ongoing," says Collado.

A POSITIVE OUTLOOK

Initial results of regional field tests seem promising. Yield increased by about 400 kg/ha or an estimated added net benefit of P4,735 under the recommendations generated by the app.

The app can also help lower the input cost of rice production, assures Collado. These would be in terms of lower fertilizer inputs, seed rates, and other cultural management practices.

The Department of Agriculture is currently mainstreaming the use of RCM in all regions as each provides its targets based on the number of RCM recommendations per season. If widely adopted, along with other cost-saving and yield-increasing technologies developed by PhilRice and its partners, rice producers in the country may have a chance to go toe-to-toe with their counterparts in the international rice market. •



RICE CROP MANAGER:

YOUR PERSONAL RICE MANAGEMENT ASSISTANT

ANDREI B. LANUZA

INFORMATION is POWER

CHRISTINA A. FREDILES

With some 20 typhoons gate-crashing the country annually – a few of which devastate rice – worsened by drought spells and persistent crop pests and diseases, the pressure to the men and women of the country's agriculture sector is high.

How huge is the damage? What pests and diseases are we dealing with? Which areas need intervention most?

These are questions by policymakers that are often inadequately answered. Thus, interventions are at times given blindly or at best rely on data with low accuracy.

Accurate data results in guided decision-making. If all other factors align, hitting the jackpot in rice farming may not be farther than arm's length. And competitiveness may not, after all, remain a mere wish.

DECISION COMPASS

In 2012, the annual per capita rice consumption in the Philippines was 114.27kg. Although our country is among the top 10 rice-producing countries in the world, our national average yield remains relatively low at 4 t/ha.

While yield in many areas is increasing at an average of 52 kg/ha annually, this remains inferior to other major rice-producing countries in the region.

"To realize food security, the agriculture sector should know when and where to plant rice," said Eduardo Jimmy P. Quilang, acting deputy executive director for development of PhilRice.

This is something that can be achieved by providing up-to-date information to rice producers.

The Philippine Rice Information SysteM or PRiSM is a collaborative project led by DA-PhilRice and IRRI since 2013. It aims to establish a local rice information system that will estimate actual rice area, yield, yield gaps; detect and map rice-growing areas affected by calamities such as flood and drought, pests and diseases; and characterize the risks of disease epidemics and pest outbreaks.

Quilang believes PRiSM-generated information can help decision-makers make intelligent conclusions concerning appropriate technologies and strategies that will lead to improved rice farming practices, and consequently, rice yield.

The Philippines is about to tread the path of trade liberalization. In this free-for-all journey, other countries can sell their products here sans quantitative restrictions but with tariff as determined by our government. Hence, our farmers will face tough competitions with their counterparts in the ASEAN.

In a study by PhilRice's Socioeconomics Division, Filipino farmers spend P11-12 to produce a kilogram of *palay*; Vietnam and Thailand spend only P6 and P8-12.

To realize food security, the agriculture sector should know when and where to plant rice. This is something that can be achieved by providing up-to-date information to rice producers.

"With the PRiSM-generated information, we can provide appropriate recommendations relating to rice production, even in agriculture in general, in times of calamities," says Lealyn Ramos, regional executive director of DA in Northern Mindanao. "Updated information will increase the chance of farmers at getting higher rice yields and lowering their production costs," says Quilang.

HOW PRISM WORKS

Various state-of-the-art technologies are being used in generating rice information: cloud computing for processing and reliability; online information that enables sharing and ensures consistency format; field data recording via smartphone for standard data collection; crop health surveys; and remote sensing. Rice area is seen by Synthetic Aperture Radar (SAR) images. Imagery shows rice area and planting date.

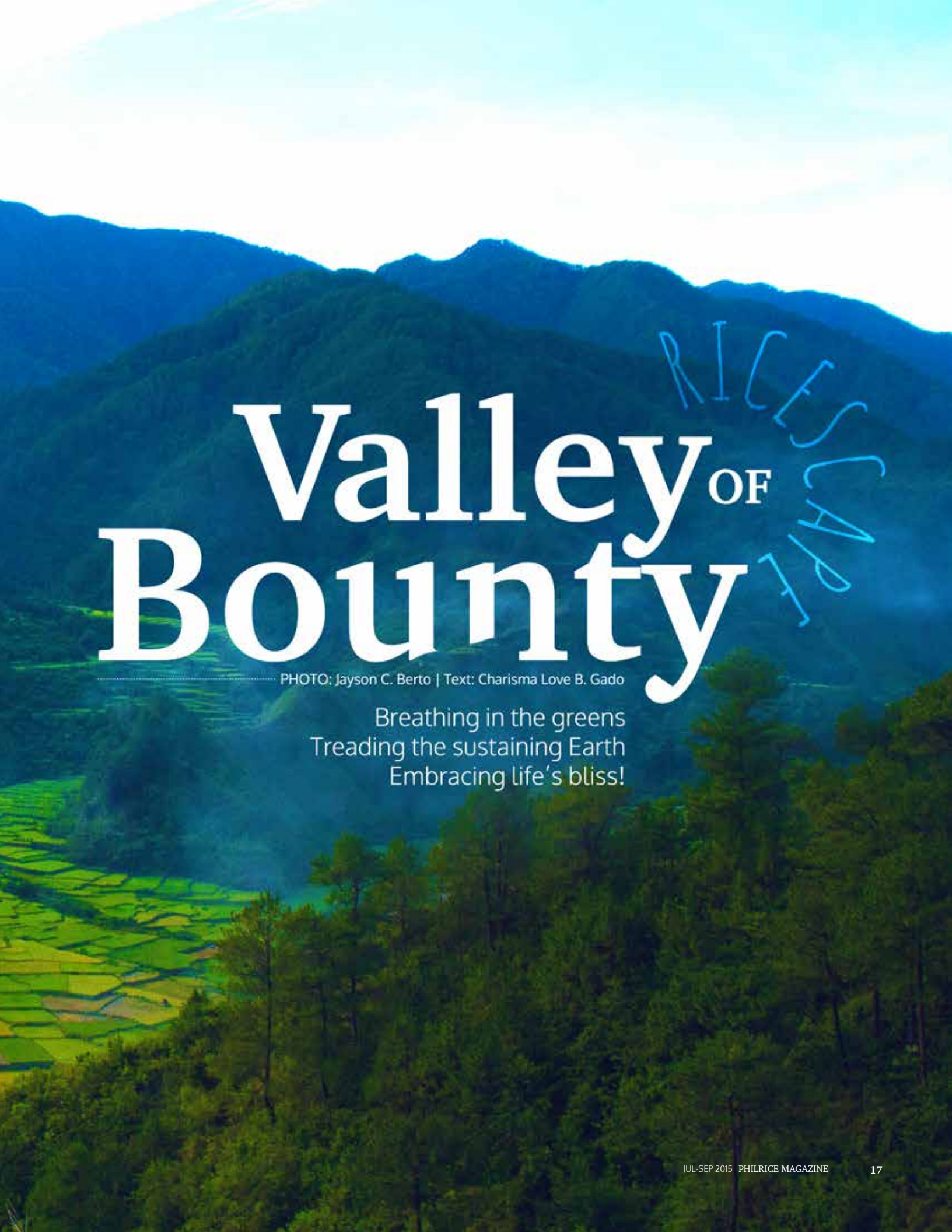
PRiSM can see exactly where and when rice is grown, the extent of area planted and production; can project losses owing to pests and diseases, and the magnitude of damage wrought by natural calamities such as typhoons, droughts, and floods.

"PRiSM helps our national planners estimate how much of the total rice demand can be domestically produced so that they could decide on how much to import. They need timely information to plan accordingly," Quilang adds.

All data collected by PRiSM will be deposited in a portal managed by the head office of DA for easy access by interested parties.

In 2014, PRiSM experts duly assessed the damages brought about by typhoons Mario, Ruby, Glenda, and Yolanda and sent damage reports to the DA. They have also acquired 120 SAR images of monitoring sites and mapped 482,876 ha of rice equivalent to 18% of the national wet season rice area with 74% to 88% accuracies based on over 1,000 validation points. •

A fragment of Mt. Province.



Valley of Bounty

RICESCAPE

PHOTO: Jayson C. Berto | Text: Charisma Love B. Gado

Breathing in the greens
Treading the sustaining Earth
Embracing life's bliss!

MA. VICTORIA STEPHANE G. ASIO

We have read about and actually experienced many times how useful ICTs are in various facets of human life, one of them agriculture. From a small handy gadget to internet-based platforms, ICTs are taking great strides in making access to information more equitable.

GO MOBILE FARMING

Crop production information? All you need is a mobile phone, and a good signal.

The PhilRice Text Center (PTC) and Farmer's Contact Center (FCC) of the Agricultural Training Institute (ATI) are mobile phone-based support services.

"I first texted PTC in 2013 when I inquired about planting hybrid seeds," said Leonardo Hormachuelos, 47, Bohol seed grower.

"I learned about the PTC number during a seed growers' seminar. I wanted to learn where to obtain hybrid seeds, so I tried texting it. PTC replied a few minutes later, and that's when I started using the service," he shared.

"My co-farmers and I used to apply fertilizer whenever we wanted to. PTC advised us on the proper techniques in fertilizer application – right kind, amount, and timing. We heeded the recommendations; we spent less yet we still managed to get high yield," he added.

Fredierick Saludez, PTC agent, explained that the Center operates more than answering queries of rice stakeholders.

"We make it sure that we go beyond the Q&A operation and offer quick, easy, and first-hand information on rice farming and technologies. We also send rice tips every month to our registered clients," Saludez said.

The convenience of the text center also benefited rice farmer Randy Donato, 47, from Tanay, Rizal. "I receive immediate responses to my queries, especially with the PTC's info-on-demand service. I just text the keyword and get instant reply in less than a minute," Donato testified.

"It costs me P200 to visit our provincial agriculturist office. With PTC, I only need a peso. It saves a lot of time and money!" he added.

Meanwhile, Helen Estandarte, 63, farmer-entrepreneur from Iloilo, discovered the FCC hotlines early this year while searching for the Fermented Plant Juice (FPJ) formula on the Internet.

"My friend asked me to research on the formula, which was featured in a TV program. Then I stumbled upon FCC and that's where it all started," she explained.

"FCC helps me manage my sugarcane farm. I usually inquire about proper management practices, and I always get useful answers," Estandarte said.

Like Estandarte, mushroom farmer John Martin Cayanan, 25, from Caloocan City, used FCC to obtain information. FCC provides contact numbers of experts or agencies that could provide assistance on mushroom production and marketing.

"You don't get this information from books, and I think that's where FCC has the edge," Cayanan emphasized.

ONE-STOP INFORMATION SOURCE

Farmers can also obtain detailed information on farming through the internet. PhilRice's PinoyRice, IRRI's Rice Knowledge Bank (RKB), and ATI's e-Learning are among the most useful and accessible web-based platforms for farmers.

Farmer Jun Estrella, 72, from Victoria, Laguna was introduced to PinoyRice in 2013 during phase 2 of IRRI's Cyber Village project. "PinoyRice really helps me manage problems in my farm. It offers complete information on pest and disease management," Estrella said.

Victoria farmers lessened pesticide use after learning from PinoyRice about beneficial insects. "Almost 60% of farmers here no longer use pesticide. It significantly lowered our input cost," he added.

"PinoyRice complements the work of extensionists," said Estrella.

Farmers Joely Reguindin, 53, from Zambales, and Halley Heria, 29, from Iloilo, use PinoyRice to download lecture materials.

"As a farmer and Farmers Field School (FFS) facilitator, it is important to have access to rice production information. Fortunately, PRKB provides not only handouts but also audio clips and videos, which I could share to my fellow farmers," Reguindin said.

While RKB and PinoyRice showcase rice production information, e-Learning offers users with modular information not only on rice.

Rodel Falculan, 21, from Romblon, enrolled courses in citrus production, vermiculture, goat and mushroom production, and rice mechanization in 2011. "Because of ATI's e-Learning, I am able to help my mother in our farm. We get additional farming information there aside from those that extension workers provide," he said.

E-Learning also proved useful to livelihood coordinator Mirasol Mayores, 40, from the Philippine Fiber Industry Development Authority (PhilFIDA) Cebu, as topics on extension and delivery, community organization, and training management help her in facilitating training programs.

"I was introduced to e-Learning during a training conducted in Iloilo. I didn't hesitate to enroll when I realized that the modules could be helpful when conducting training programs for the farmers. I was also surprised that it's free," she explained.

Other web-based diagnostic tools include IRRI's Rice Doctor and Weed Identification.

EMPOWERING FARMERS WITH ICT-ENABLED SERVICES

ICT has truly revolutionized the agriculture sector, empowering farmers and extension workers to improve farming practices and yield. ICT-based platforms, for one, provide farmers with direct connection to input suppliers, access to best practices that reduce cost, and link to markets. With these services, farmers feel appreciated and supported.

"ICTs opened doors for us farmers and gave us venues for easy access to agricultural information that empowers us. We feel like we can overcome challenges and accomplish anything with the right farm knowledge. It gives us the ability to transform and improve our lives," Estrella said.

Digital inclusion enhances farmers' economic opportunities through increased yield and product marketability thus making them more competitive. "This not only intensifies our potential to strive in the global market but also strengthens our country's agriculture sector," Estrella stressed.

Recognizing the critical role of ICT in agriculture extension, DA-FSSP projects such as IPaD and Rice Crop Manager are improving and promoting the said tools to help farmers make informed decisions. ●

ENERGIZING AGRI-EXTENSION IN PH

EV P. ANGELES
MARVIN R. SORIANO

In translating rice research results into sustainable improvements in farm communities, the agricultural extension system has often been considered a weak, if not a missing link. A confluence of factors has caused this unhealthy view of extension – lack of trust in extension personnel's competence owing to age and education; weak extension lobby; and low status of the extension profession relative to other agricultural disciplines (M.Khalil Qamar's *Modernizing National Agricultural Extension Systems*).

New challenges in agricultural development and an increasingly complex rice production environment, however, are inspiring a fresh and firmer resolve to modernize and invigorate extension to address new learning requirements.

Project IPaD *(Improving technology promotion and delivery through capability enhancement of the next generation of rice extension professionals and other intermediaries)* is contributing to the realization of the resolve. It is one of seven projects under the Department of Agriculture (DA) – International Rice Research Institute (IRRI) partnership funded by the National Rice Program through the DA-Bureau of Agricultural Research. PhilRice, the Agricultural Training Institute (ATI), and IRRI are implementing the project.

BROADER ROLE FOR NEXT-GEN RICE EXTENSIONISTS

Data gathered by the IPaD team have pointed to the need for a new breed of rice extensionists to help introduce reforms in technology promotion and delivery. They should not only be competent in rice production but should also have the heart and passion for agriculture and the farmers. Thus, from mere transmitters of technology, a new breed of extensionists called AgRiDOC or Agricultural Development Officers of the Community, are being honed to become catalysts of farm community transformation.

From the pilot batch of trainees from Luzon, 25 young AgRiDOCs are now in action and 25 more from the Visayas and Mindanao are being trained by the project (see related story on page 4). The majority are from local government units (i.e., municipal, provincial, regional), while others are from PhilRice, ATI and state universities.

More than technical knowledge, AgRiDOCs are armed with a good mix of field experience; communication, leadership, and entrepreneurial skills; and core values to effect community transformation.

"Just because you know the information doesn't mean you know the process of transformation. The transformation model requires a deeper understanding of reform. Reformation is the revolution of the heart, mind, and spirit", said Ramon Peñalosa, a Magsasakang Siyentista and owner of the famous Peñalosa Farms in Negros Occidental, one of the resource persons in the ongoing training.

Initial evaluation results revealed that the training was effective in increasing the AgRiDOCs' knowledge of rice-based farming systems and the process of agricultural community transformation. Trainees especially improved their skills in using computer and web-based applications, entrepreneurship, and writing development proposals, among other priorities. Trainees also claimed that they have developed a more positive attitude toward extension work and a renewed commitment to help transform communities through agripreneurship.

Sharing his experience from the training, Genesis Martin from the DA-RFO in Pampanga said, "The training helped me see things differently. The way it motivated me to think out of the box helps me not just in my work but in my personal life as well. The core values that we have adopted since the start of the training are the basic building blocks to make a great extension worker who can work for the development of communities."

"[The training] is a complete package. More than rice, it also gives emphasis on other commodities that is important in increasing productivity of farmers and in developing positive values that extensionists should possess," shared Norman Solar, now an AgRiDOC in Oriental Mindoro.

AgRiDOC Evelyn Likigan of Kalinga said, "I realized the importance of giving your all in your work... walk the talk, work without reservation, then work with passion... you have to be dedicated to your work."

MORE ROUTES THRU OTHER STRATEGIC GROUPS

While the project is capacitating the next generation of extensionists, it acknowledges that, still, they are severely outnumbered by their clients. Data from ATI on profiling the current extension force reveal an alarming full-time rice extension worker to rice farmer ratio of almost 1:1000. This demands tapping more partners to also serve as information conduits, learning facilitators, and farmers' link to providers of advisory and extension services to stretch the government's reach.

"We need partnerships with LGUs, civil society groups and other private sector organizations— in the service of farmers, for their sake," said Agriculture Secretary Proceso Alcala.

Based on their positions of strength, Project IPaD is engaging those who are academe-based such as agriculture and extension staff and managers who are responsible for molding future farmers and extensionists; private sector-based such as input dealers who are main go-to points for farming needs; media-based such as agriculture reporters and information officers who can spread agri-information faster with a wider reach; and community-based such as farmer-leaders and organizations that are strategically grounded in farming communities; and extension managers lodged in various DA agencies and field offices.

Knowledge sharing and learning (KSL) activities are being conducted nationwide to introduce these groups to the latest technologies on rice; available ICT-based resources and tools on rice and agriculture developed by PhilRice, ATI, and IRRI; and opportunities for partnerships in information dissemination. KSLs are conducted to provide a broader perspective of the challenges being faced by the farmers for better appreciation of the need to support agriculture and do more for the farmers.

Surveys with participants showed that the KSL mechanism has been effective in engaging rice stakeholders. Through the videos, they gained deeper appreciation for agriculture and the role of farmers, and were motivated to help farmers. Mr. Danton Pajarillaga, President-General Manager of Zetryl.Chem Phils., Inc., promised to "...post your text center number in our booth during exhibit events" while Mr. Abundio Quililan, a senior official of the New Rural Bank of San Leonardo, Inc. (Nueva Ecija) said that they will share the text center numbers to their 50,000 farmer clients, show them the videos while waiting to be served, and invite resource speakers from PhilRice, ATI, and IRRI during their rice training programs.

Another participant from the media, Maya Juni of *Radyo Ng Bayan* based in Butuan City, Agusan del Norte committed to "support the broadcast needs of the project...promote agri programs and technologies through interviews and guesting of experts and to share the PhilRice Text Center and Farmer's Contact Center during my radio program."

OPPORTUNITIES FOR EXTENSION PERSONNEL

Project IPaD has funds for nondegree scholarships such as participation in training programs, conferences, and study tours primarily for people doing rice extension/development work.

It is also formulating a training regulation for rice with TESDA to standardize competencies and pave the way for TESDA National Certificates related to the rice farming industry.

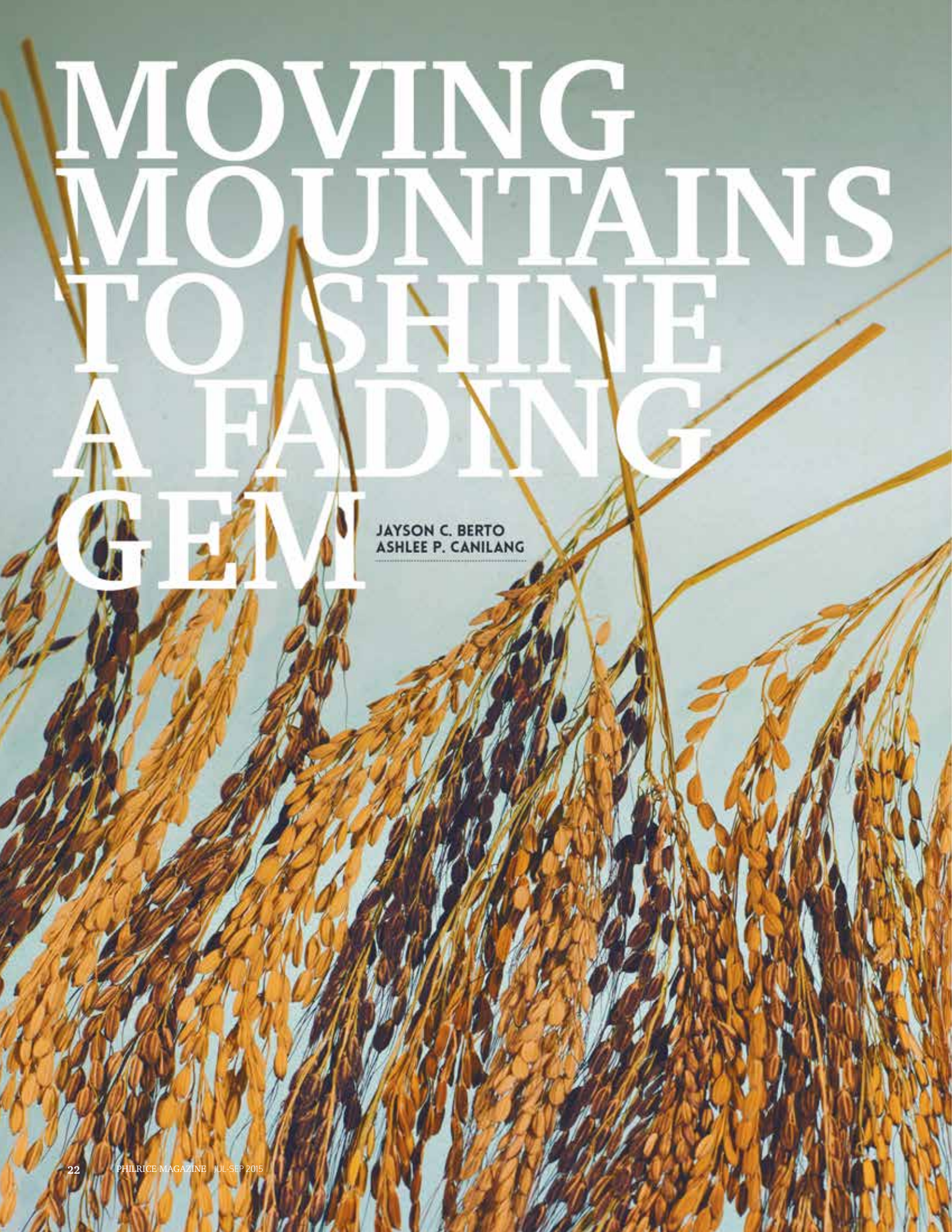
Extension personnel can now also avail of the enhanced collection of library resources and journal services at the PhilRice Library in Nueva Ecija and be updated of new developments in extension. Some of these collections will be made available electronically through the PhilRice Branch Stations.

Policy fora such as that on invigorating the rice extension system and a study profiling the current agriculture extension workforce of the LGUs are also being organized by the project. Based on these, policy papers are crafted to help strengthen and revitalize the Philippine agri-extension system.

By harnessing these strategic routes for technology promotion, Project IPaD hopes to raise the bar of PH agriculture and rice extension. •

MOVING MOUNTAINS TO SHINE A FADING GEM

JAYSON C. BERTO
ASHLEE P. CANILANG



High mountain peaks cloaked with the tranquility of murmuring pines, and the golden patches that color the scenery are commonplace in the Cordilleras. Though molded by unshaven terrains, the expanse is not humdrum with its abundance in culture and tradition.

Golenda Lumas-e, 53, heirloom rice farmer of Kadaclan, Barlig, Mt. Province wakes up every day to this scenery. A farmer since her teens, she fell in love with heirloom rice at a young age.

Golenda describes heirloom rice as special. The seeds are deferentially selected, planted, and preserved for the next generation of farmers. It even binds the communities of Kadaclan in the most interesting way. Preserving heirloom rice means valuing the special kinship that tightly connects the people in the highlands.

The DA Food Staples Sufficiency Program knows the value of heirloom rice. Together with PhilRice, it has collaborated with IRRI, state colleges and universities, and Rice, Inc. on a project to raise the productivity of heirloom rice and empower communities in the highlands.

LEARNING THROUGH SHARING

"Knowledge sharing is key to enhancing the local capacity of heirloom rice farmers," said PhilRice's Ruben Miranda, project lead.

Farmers Field Schools (FFS) are being conducted in the communities to create a venue for farmers, rice specialists, extension workers, and other stakeholders to exchange farming knowledge and experiences, and learn from one another.

During FFS, R&D workers discuss location-specific farming technologies, particularly the PalayCheck System for highland rice production where quality seed selection, land preparation, pest and postharvest management are taught.

"The FFS is a season-long activity and we usually conduct farm walks, site visits, seed exchanges, and community seed banking with farmers. Farmers are also educated on seed health, integrated crop management, and enterprise-building," Miranda said.

The Kadaclan farmers have accepted the FFS. According to Golenda, having it season-long enables her and her fellow farmers to witness and apply with technical guidance the new farming techniques in their farms.

"Mere demonstration is not enough for us. We need proper guidance on how we should properly apply the new methods taught," said Golenda.

They have been taught how to make their own soil conditioner using farm by-products and molasses. They have had lessons on practical seed viability-testing where seeds are soaked in salted water. The less viable seeds then float and are fed to chickens.

TRUMPETS OF INTERVENTIONS

After several visits in Kadaclan and other areas in the region, the heirloom rice team saw that aside from modern farming practices, farmers may need reinforcements on value-adding and marketing.

"Before the project came in, we sold our produce in simple packaging, which could be unappealing and less presentable to the buyers," Golenda related.

They sold *uminio* (mountain violet), *akangan* (red, long-grained rice), and *inofiag* (red, aromatic rice) at only P50.00 – P60.00 per kilo. The short shelf-life was also an issue.

To ease the problem, the project tapped the DOST-Industrial Technology Development Institute to teach the heirloom farmers how to better package and label their products, and extend shelf-life.

"The skills that they gained from the DOST training programs will hopefully improve the market competitiveness of heirloom rice products and help establish stronger market linkages. In fact, we are partnering with local and international chefs, restaurateurs, traders, and NGOs to bolster the promotions. Plus, consumer-preference survey and awareness campaigns will be conducted to link farmers directly to the market," Miranda said.

SCIENCE X MARKET X CULTURE

In order to penetrate and tame the burgeoning niche market, "science in action" is needed for heirloom rice. Systematic characterization and purity establishment will be conducted through the collection and cataloguing of varieties from different sites.

Miranda explained that the collected varieties will undergo participatory trials where their phenotypes will be examined at different growth stages.

"The varieties collected will also undergo DNA fingerprinting to establish their genetic identity. We also partner with the Bureau of Plant Industry to store the varietal information collected in the community seed registry. This will help protect the local farmers' claim to their respective varieties and safeguard varietal authenticity," Miranda added.

Heirloom rice is also getting more popular with health-conscious groups because of its nutritional value – rich in iron, zinc, and manganese, and its antioxidant properties.

PhilRice and IRRI are exploring its grain quality and nutritional values.

To protect the farmers' claims on ownership, varietal geo-tagging will also be conducted. The different farming practices, traditions, and other site-specific data will be "tagged" on a particular variety. This intervention will also help promote their culture, and most importantly assist the experts to optimize the location-specific farming practices to attain the desired yield and grain quality.

"Rice that has withstood the tests of time" – that's heirloom rice. Packed in each grain is not only the best nutritional benefits that rice can provide but also the rich culture and traditions of the Cordillerans, something we can call ours.

To let the heirloom rice's legacy live longer, it's time to move mountains. ●

Reaching the farmers UPHILL

HANAH HAZEL MAVI B. MANALO

Look up. The forgotten rice fields are there.

According to PhilRice's Ruben Miranda, national coordinator of the Upland Rice Development Program (URDP), the upland ecosystem in the Philippines, which is more than 100,000 ha, has been neglected for a long time.

In the uplands, soil fertility is low, erosion is a problem, and rainfall is the main source of water for farming. Thus, crop productivity is low at only 1 to 2 t/ha once a year.

The unfavorable condition in the uplands affects about 100,000 farmers and their families. IRRI sees upland farming communities as among the poorest of subsistence farmers. They are most vulnerable to food insecurity. URDP under DA's Food Staples Sufficiency Program aims to develop the upland rice areas as food-self-sufficient communities through farm diversification, rice seed assistance, and formation of organizations.

NOT RICE ALONE

The *Palayamanan* System promotes farm diversification instead of monocropping (rice alone) even in less favorable areas such as the uplands to help farmers make ends meet. Wherever feasible, the system resorts to high-value crops and trees, fish, poultry, livestock, and biomass recycling as well.

Edmer Gonzales, 45, of Calinog, Iloilo says, "I am practicing integrated farming including livestock production. I use hedgerows to manage soil and water, which I learned from our farmers field school (FFS). I also plant different traditional upland rice varieties, which seeds I sell to my fellow FFS alumni and upland farmer-neighbors who also want to plant upland rice. This has increased my income."

MORE SEEDS TO CHOOSE FROM

Access to modern upland and other traditional rice seeds is among the interventions of URDP, offering location-specific solutions to low productivity and profitability.

A 65-year-old farmer from Cavite, Ambrocio Layaban says "The rice varieties PhilRice brought to our place are far better than what we have. Our varieties yield less and are quite tall, which makes

them prone to lodging especially with the occurrence of wind and rain. This discouraged me to plant rice. I have not been planting rice for such a long time. But with the 2-kg NSIC Rc23 that produced 5 cav, I want to produce rice again for our own consumption."

Edionito Ylaran Jr, 26, of Masbate, has discovered that the black rice, which PhilRice introduced, is in high demand. He sells his produce as seeds or commercial rice in Cebu and other areas.

BETTER TO BE ORGANIZED

Individual upland farmers are organized into formal groups for manageability and efficiency in delivering technical assistance. This also somehow addresses issues relating to sustainability.

"Through URDP, we organized ourselves to form the Rangayen Upland Rice and Diversified Farming Association. We also registered our group with the Securities and Exchange Commission in 2014. We have received outpouring support such as vermicomposting facilities, training, and demonstration trials from the government, private agencies as well as NGOs. Our organization sells *Dinorado* seeds to PhilRice at P40/kg for it to reach more upland areas," said Jerry Nunag, 50, of North Cotabato.

Meanwhile, Allan Bubun, 48, of Palawan, shared that URDP has strengthened their existing organization named Marangas Upland Rice Farmers Association. Owing to this, they were provided with a tractor, thresher, community seed banks, weighing scale, and collapsible dryer making farming in the uplands easier. They also allow other farmers to rent their facilities and equipment at an affordable rate for their extra income. Bubun added that in joining a group, he learned how to save a portion of his monthly income.

Investing in the responsible development of the uplands might be costly but never a waste of resources because of the help it extends to also uplift the conditions of our subsistence farmers. ●

ALL IN FOR RICE MECHANIZATION

JOHN GLEN S. SAROL

With significant savings in labor costs and efficiency in farm operations, it's hard not to root for rice mechanization.

Results of PhilRice and Bureau of Agricultural Statistics' Rice-Based Farm Household Surveys (RBFHS), show that 40% of rice production expenditures come from labor alone.

"Mechanization is immensely important for us to be competitive. The more we save on labor cost through the use of machines, the higher are the chances to attain competitiveness," says Dr. Flordeliza H. Bordey, PhilRice economist.

NUMBERS DON'T LIE

Although farm mechanization is often not directly associated with yield increases, it can lead to timely crop establishment, reduced weeding costs and variability in seedling emergence, and better control of water movement.

Normally, transplanting a hectare of rice requires 20-25 people, and harvesting needs around 15 people in a day's work. With the rice combine machine that harvests, threshes, cleans, and bags grains in one passing, farmers can finish a hectare in as short as 2 hours with only two people involved.

Grain losses are reduced to 3%, far better than the 7-10% losses when done manually, which sums up to a bigger yield.

Mechanized transplanting also reduces labor cost and seed requirement from a minimum of 40 to 20 kg/ha for inbred, even less for a hybrid variety. It also shortens the period of raising the seedlings from 25-30 days to 15-18 days, as it is done in a nursery outside the farm using 300 seedling trays for a hectare.

TURN ON THE ENGINE

Local mechanization level is still very low due to expensive machines from other countries. Eden Gagelonia of PhilRice's Rice Engineering and Mechanization Division (REMD) explains that machines locally produced and tested can help address this issue.

"There is a long-standing belief that imported machines are better than the ones produced locally. We need to seriously deal with this issue," says Gagelonia.

PhilRice is helping increase mechanization through custom service provision in land preparation, transplanting, and harvesting.

The Microtiller is lightweight and can be dismantled into three parts, which is an advantage for farmers in the highlands. The *Laboy* Tiller is designed for fields with soft, deep, or very deep mud, and long stubbles during land preparation.

"We have to focus on mechanizing crop establishment and harvesting as these are labor-intensive," says Engr. Joel Ramos, also of REMD.

Mechanized transplanting is gaining appreciation due to inadequate manpower especially during peak periods.

A walk-behind, four-row transplanter was imported by PhilRice for custom service provision. Number of seedlings per hill and


RIDE-ON PRECISION SEEDER

spacing between hills could be adjusted using the transplanter.

IN THE PIPELINE

PhilRice is developing a transplanter that can overcome the capacity and operator-skill limitations of the manually operated design. It can even transplant 6 rows in one passing.

While transplanting is common, many farmers do direct seeding particularly during dry season to save on labor and production costs.

Direct seeding reduces labor and lessens drudgery with earlier crop maturity by 7-10 days. It also offers more efficient use of water, lesser methane emissions, and higher profits especially in irrigated areas.

PhilRice is working on a reduced-till planter with fertilizer applicator for direct dry-seeding. It is operated on pulverized soil. A direct-seeding machine for the wet season is also being designed based on a Korean seeder that can drop a precise number of seeds per hill.

With the rice combine, farmers need not worry about scarcity of labor during the peak of the harvest season. They can harvest at the right time, thus minimizing postharvest losses brought about by delayed harvest, grain deterioration, and shattering.

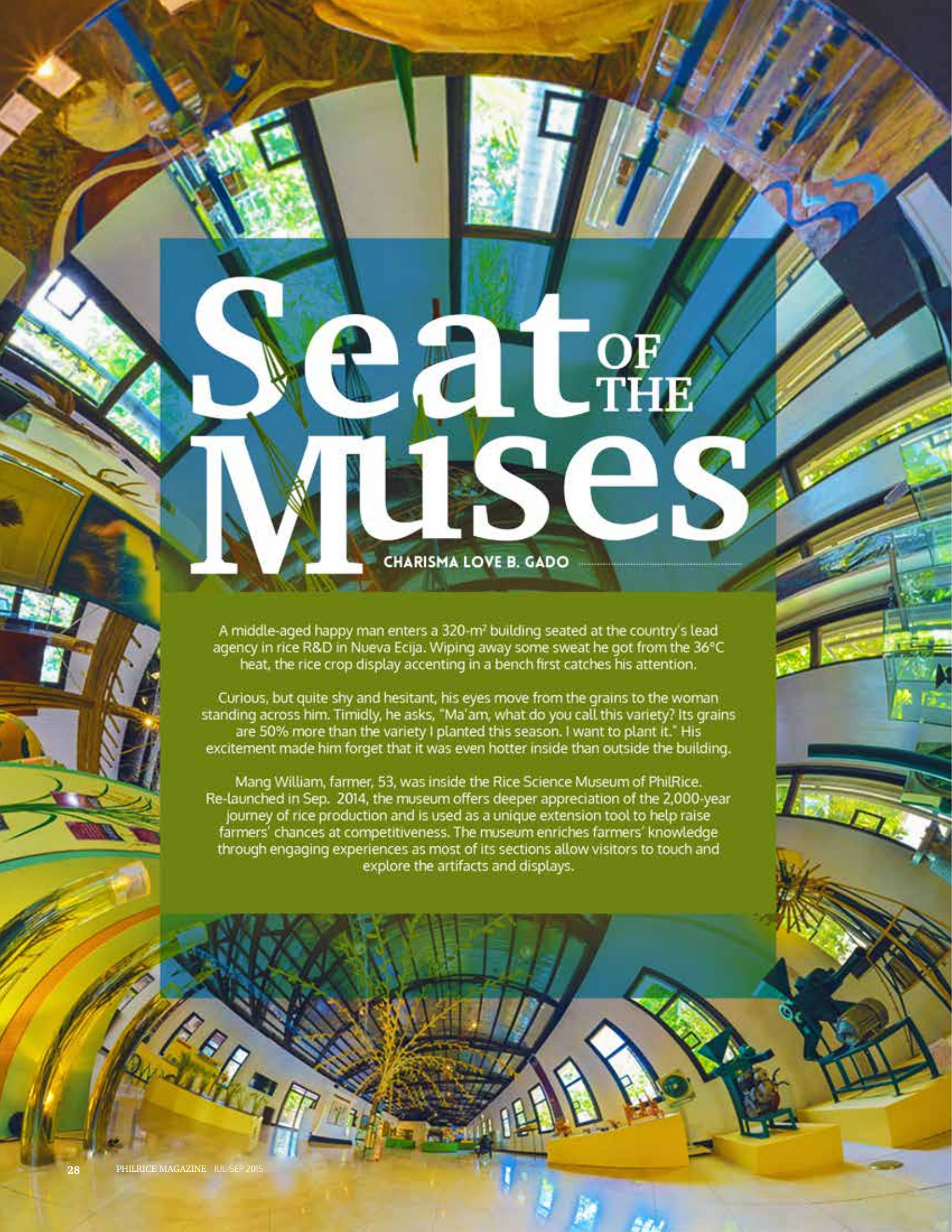
"The PhilRice combine has shown efficient performance on wet field conditions and has been introduced throughout the country but we can still improve it," says Engr. Arnold Juliano, also from REMD. Its ability to work on both dry and wet fields with 20cm depth, a high-capacity thresher, and cleaning system are being improved.

The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) funds the development of these machines. Prototypes will be field-tested before year-end.

"Five years from now, I see full mechanization in rice farming in the Philippines," Juliano said.

But Flordeliza Bordey, PhilRice economist, cautions everyone that not all farmers will benefit from mechanization. Many landless farm workers who depend on income from transplanting and harvesting could find themselves unemployed once these rice farm activities become mechanized.

"This is a real problem that could slow down the adoption of machinery and should not be shrugged off. However, the solution to labor displacement may not come from the rice sector alone. The local and national government can team up to generate more jobs outside agriculture such as in business, factories, and construction to absorb the workers who exit the rice sector. They must be trained so they could find work in the manufacturing and service sectors," Bordey stressed. ●



Seat of the Muses

CHARISMA LOVE B. GADO

A middle-aged happy man enters a 320-m² building seated at the country's lead agency in rice R&D in Nueva Ecija. Wiping away some sweat he got from the 36°C heat, the rice crop display accenting in a bench first catches his attention.

Curious, but quite shy and hesitant, his eyes move from the grains to the woman standing across him. Timidly, he asks, "Ma'am, what do you call this variety? Its grains are 50% more than the variety I planted this season. I want to plant it." His excitement made him forget that it was even hotter inside than outside the building.

Mang William, farmer, 53, was inside the Rice Science Museum of PhilRice. Re-launched in Sep. 2014, the museum offers deeper appreciation of the 2,000-year journey of rice production and is used as a unique extension tool to help raise farmers' chances at competitiveness. The museum enriches farmers' knowledge through engaging experiences as most of its sections allow visitors to touch and explore the artifacts and displays.

Diadem Esmero, proponent of the new Museum, said it was reformatted in a dynamic way to help farming communities keep up with the steady generation of knowledge in the rice science and development sector.

"Previously, the museum was set up to raise awareness on rice culture, but focused only on a few collections about the Cordilleras; limiting rice appreciation in the highlands. With our present setup, knowledge is always kept fresh with our transitory exhibits every 6 months," she said.

UNIQUE EXTENSION TOOL

In its Greek form, *mouseion* meant "Seat of the Muses" and "a designated philosophical institution or a place of contemplation." As Seat, Hans Aarsman said in a 2011 book, *More than worth it: The social significance of museums* that the museum has an indispensable role in a society owing to its educational value through informal learning and discovery. It also has experience value as "visiting museums is fun and that museums provide visitors with the freedom to think and reflect on identity, order, and memory."

In a report prepared by *BritainThinks* for the Museums Association in March 2013, museum-goers perceive that "creating knowledge for, and about, society" is one of the most essential roles of the museum. Respondents said that museums provide equal education for everyone through knowledge creation and sharing. They also view museums as more trusted sources of information or learning for adults than the government and the media.

As our Rice Science Museum experienced, farmers oftentimes express interest in sharing the information they learn from their visit. A La Union farmer in his 40s once asked the museum guide about the period when the traditional varieties became extinct. His belief, traditional means non-existent. He was surprised to know that the varieties are still being planted in Ifugao, Aurora, Palawan, and Mindoro. A farmer for more than half of his life said that he has yet to see traditional varieties with long awns – an information that he was eager to impart to his family and friends when he returns home.

Meanwhile, a farmer-visitor who identified himself only as Rogel Comesario, 53, said that the knowledge he gained from the museum can help him become a better rice grower.

"I love my first museum visit experience. I learned about the high-yielding varieties, which I can try in our area and the importance of maintaining biodiversity in my farm. I also became interested to buy the portable rice mill, which I can use to produce our household rice supply," the farmer who rated his museum visit as excellent said.

The potentials of the Rice Science Museum as an extension modality are concluded in a 2003 paper titled, *Measuring the outcomes and impact of learning in museums, archives, and libraries*. Researchers from the United Kingdom found that museum-goers can gain the following skills: intellectual such as thinking critically and analytically; information management such as locating and evaluating information; and social such as meeting people, introducing others, and remembering names. They also found that museums can effect change in attitudes and values, and can increase motivation.

THE RICE SCIENCE MUSEUM

Published studies about museums regard these institutions as social investment as they are powerful influencers in a country's culture. Museums were highly esteemed as shown during the Nuremberg Trials after World War II when Nazi officials were sentenced to death for destruction of cultural property.

In its re-launching, the Rice Science Museum now highlights rice science, art, and technology through its major sections: material culture of rice-farming communities in the country, labor-and cost-reducing machines, and rice seeds. Collections covering the species found in the rice environment, rice ecosystem, rice grains, and art works are also exhibited. Contents were updated during bi-annual transitory exhibits titled, *Lovelife with Rice* from Sep. 2014 to Feb. 2015 and *Bountiful Harvest*, March to June. *Colors of Rice*, an exhibit focusing on the health and nutrition aspects of rice, kicks-off in July 2015.

The research of PhilRice's Floper Gershwin E. Manuel and his team found that farmers consider understanding how the rice grows and appreciating rice culture in the Philippines as their most satisfying experience. Meanwhile, their most liked displays include the rice material culture and machines. The study, presented during the *University Museums and Collections Conference* at the University of Santo Tomas in May 2015, also showed that learning occurs through memory recall and sharing of previous knowledge and experiences.

Indicators of learning during farmer visits include discussing the contents of the exhibits with supporting arguments and being able to connect the contents with their experiences in everyday lives. They also spontaneously express their sense of identity with the other people and communities.

A certain Editha Cagasan, 50, said, "After my visit, I became familiar with the rice production areas and the yield across regions. These information inspire me to attain higher harvest."

SPREADING OUT

To bring rice learning experience closer to a wider audience, PhilRice launched a *Mobile Rice Science Museum* in November 2014, which allowed about 20,000 urban dwellers to view the exhibits within 5 days. In farming communities, the mobile museum was piloted in March 2015 during the week-long centennial celebration of the Romblon State University. Farmers said that the museum made them aware of the new varieties and modern machines.

Indeed, the museum, when used to deliver extension services, transcends the Seat of the Muses from its poetic form; from being a mind's lair where knowledge only lurks to a haven where knowledge possesses the open mind. And when knowledge is consumed, the museum creates more meaning to the lives in farming communities. An author had said it well, "Isn't the purpose of a museum to relate our memories with such sincerity as to transform individual happiness into a happiness all can share?" ●

In our celebrations such as christenings, weddings, birthdays, blowouts, and *fiestas,* we highlight our delicacies made out of our staple food.

The *kakanins* (glutinous rice cakes) such as the commercial *suman, palitaw, puto, kutsinta, biko, espasol, bibingka, puto bumbong,* and *sapin-sapin* make a salivating presentation of our delicacies at par with food exhibitions abroad.

Our breakfast routine includes our favorite porridge *arroz caldo, goto,* and *champorado.*

Our culinary genius is adorned with a flare of local flavors due to our special and exotic rices such as the *binato, dinorado, pulang lupa, ballatinaw* of Cordillera and Ilocos Sur, and *perurutong* of Laguna.

According to our food chemist Dr. Marissa Romero, PhilRice has combined art and science to develop rice-based food and drink products such as the *tapuy* (rice wine), nutri-rice milk, and baked products out of rice flour (cream puff, brownies and, chiffon cake).

The *tapuy,* a traditional wine adored in Ifugao and Mt. Province, was improved by PhilRice by stretching its shelf-life up to 10 months. Its alcohol is also used to disguise as rice scents.

The nutri-rice milk flows with germinated brown rice with gamma amino butyric acid (GABA) and buffalo's milk.

"GABA helps improve brain functions and lowers blood pressure while buffalo's milk is a good source of protein and calcium," Romero said.

Rice and its by-products are also used in food additives and mixes, beauty products (additives on baby powder, exfoliant, shampoo, conditioner and, lotion), health products (vitamins, ointment or balm, massage oil), bricks, and tiles.

The rice hull is burned to generate energy in electric power plants. Value-added rice products include brown rice and pigmented rice.

Recommended varieties for brown rice production are those that come soft when cooked, such as Rc268, Rc160, and Rc218.

PhilRice is now developing a new rice-based food product that could serve as a source of calories especially for healthy junkies. It's called rice-*adlai* energy bar.

RICE VENTURES

Indeed, rice is such a versatile staple food that some countries have enriched themselves with multi-billion-dollar incomes out of it.

In 2009, PhilStar cited Korea's leading business of processed rice foods *Haetban*, an aseptic-packaged cooked rice.

"One food manufacturing company alone, Chailjedang (CJ), recorded sales of $78 million from Haetban in 2007. Since CJ launched the aseptic-packaged rice business in 1996, the Haetban market has grown to a $12-billion-dollar venture, which is presently shared by four major companies," the article reported.

Due to government support, Thailand exports its rice-bran oil to Europe. The United States has highly commercialized cereals while Japan has *mochi* (rice cake).

Currently, the Philippines is exporting black and red rices in not-so-big quantitites.

"We cannot export the *kakanins* and porridges due to their short shelf-life. If we want to export them, we must apply food technology on the products," Romero said.

As for *tapuy,* nutri-rice milk, and other products, the challenge is on how to properly commercialize them.

MARKETING

For farmers' cooperatives in the country, Romero suggests that they find an intended market and suppliers to private companies.

"They can produce brown rice and supply the companies that sell the product in the market. This is what Nestle does with coffee farmers. We call this contract-growing," Romero said.

But what can an individual and ordinary farmer do?

Many enterprises have grown because of selling rice-based food products. Some popular examples are *Royal Bibingka* of Ilocos Sur and *Puto Calasiao* of Pangasinan.

Romero believes ordinary farmers can also be economically advantageous if they utilize rice by-products.

"They can sell rice hull for carbonizers and charcoal brickets like what they do in Isabela and Aurora while the bran can be used as feedstock. There are a lot of private companies today that look for quality rice bran used for animal feeds," Romero explained.

"A farmer needs to be guided where to sell the by-products, and that's where the local government unit (LGU) can help. LGUs or DA-Regional Field Offices can provide networking and linkages for ordinary farmers," she added.

With Filipinos' ingenuity and entrepreneurial skills, the possibilities are endless. •

> "Indeed, rice is the most versatile staple food that some countries have made a multi-billion-dollar revenue out of it.

MARY GRACE M. NIDOY

the Many Things you can DO with R·CE

KUR

NANGUNA, KUMITA, GUMINHAWA

Kwento ni **Blacio Akinchang**, 70, magsasaka mula sa Barlig, Mountain Province

JAYVEE P. MASILANG

LUSAKA

Dito sa amin ay marami pa rin ang hirap sa buhay. Kaya ako nagpursige upang maiangat ang aming pamumuhay.

Binata pa lang ako nang sinimulan kong itanim sa aking dalawang ektaryang sakahan ang *Uminio* – isang tradisyunal na barayti ng palay na mas kilala bilang *black rice*. Natutuhan ko ang pagtatanim ng *Uminio* mula sa aking mga magulang noong bata pa lamang ako.

Noong una, walang nagtatanim ng *Uminio* sa amin dahil hindi ito sikat sa mga taga-rito. Nag-aalangan ang mga magsasaka na baka walang pagbebentahan ng maaani nila. Pero naglakas-loob akong subukang itanim ito at umani nga ako ng marami at maganda! Nang nakita ito ng ibang magsasaka ay naenganyo silang subukan ding itanim ang *Uminio*.

BILI NA, ITALYA

Hindi lamang magandang ani at kita ang naidulot sa akin ng *Uminio*. Sa rekomendasyon ng aming *municipal agriculturist*, nabigyan ako ng pagkakataong makapunta sa Italya bilang isa sa mga kinatawan ng ating bansa sa isang *world meeting* ng mga magsasaka. Sa naturang pagtitipon, ako at mga kasama kong taga-Ifugao, bihis-na-bihis sa mga kasuotang Pilipino, ang nagpakilala ng ating mga tradisyunal na barayti at pamaaraan sa pagpapalayan gaya ng paggamit ng dayami bilang pataba, na ginagawa na namin simula pa noon. Dagdag pa rito, nakapagbenta rin kami ng aming mga produkto sa Italya. Naipagbili ko ang aking *Uminio* sa halagang 10 *euro* o mahigit P400 kada isang kilo; P70 lang dito sa Pilipinas.

Kung binhi naman ang pag-uusapan, sinisigurado namin na de-kalidad lahat ang aming mga binhi. Para maihiwalay ang hindi magandang binhi, inilalagay namin ang lahat ng buto sa isang balde na may tubig at asin, at ipinatutuka namin sa manok ang mga lulutang na binhi. Ang mga lumubog na butil ay ang mga magagandang binhi at siyang ginagamit sa pagpupunla.

Isa pang magandang dulot ng pagtatanim ng Uminio dito sa amin ay nagawa nitong tuluy-tuloy ang produksyon ng palay na maaari naming ibenta. Noon kasi ay halos pangkain lang ng aming mga pamilya ang aming inaaning palay. Dahil din dito, nabigyan kami ng Kagawaran ng Agrikultura ng mga makinarya sa pagsasaka tulad ng giikan, kiskisan, at iba pa. Nagsasagawa na rin dito ng mga seminar o pagsasanay para matulungan kaming mga magsasaka na mapaganda ang aming ani at kita.

Dalawang beses kaming nagtatanim at umaani rito sa loob ng isang taon. Magkaiba ang aking itinatanim na barayti sa bawat taniman. Maliban sa *Uminio*, nagtatanim na rin ako ng *Akangan* na pangkain namin sa bahay. Mas mahal pa rin kasing naibebenta ang *Uminio*.

MAHAL KONG LUYA

Ilan pa sa aking mga pinagkukunan ng kita ay ang pagtatanim ng kape (Arabica) at luya. Marami sa mga magsasaka rito sa amin ay nagtatanim din ng mga ito. Ilan sa kanila ay mga kapwa ko miyembro ng *Kadaclan Farmers Association*. Malaking tulong ang samahan sa aming mga magsasaka dahil dito na kami kumukuha ng binhi kung kailangan at iba pang tulong sa pagsasaka.

Hindi ko sukat akalain na may maraming magandang maidudulot ang pagtangkilik ko sa mga tradisyunal na barayti natin. Nang dahil sa pagtatanim ng *Uminio*, hindi lamang lumaki ang aking kita, nakapunta sa ibang bansa, kundi lumawak pa ang ugnayan ko at ng aking mga kasamahan sa ibang mga ahensya at organisasyon na tumutulong sa amin na mapaganda pa ang aming ani . Sa tanda kong ito, nakatutuwang isipin na nagbunga rin sa wakas ang aking nasimulan noon. ●

"The program [DA-FSSP] must be continued to achieve a certain level of competitiveness, which would allow sustainability of rice production through cost-reducing and yield-enhancing technologies as well as climate change resiliency. With this, it is my fervent hope that rice farming continue to be a profitable venture for the Filipino farmers."

- Edilberto M. De Luna -
National Rice Program Coordinator

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