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ppine Rice Research Institute

Embracing our heritage

Chronicling our evolving culture with rice

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Cover Photo: Ace D. Willis

About the cover

Winnowing rice is an image we often see in the rural areas. The process may be tedious, but it is a manifestation of how much we want to cook the most important grains in perfection.

The way we plant, harvest, cook, and consume rice has advanced over the years. Our cover reminds us there are things in our culture that are fleeting, in response to the changing rice industry landscape.

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2009 Binhi Agri Magazine of the year
2007 Binhi Hall of Fame Awardee
2001 Gawad Florendo Awardee

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Editor's note

CO-CREATION

Rice is deeply embedded in our daily lives. It is a part of our culture, our way of life. To countless of our countrymen, rice is actually their existence. It flows in our blood, and is moistened by our sweat.

Through centuries of history, the representation of rice in our lives has evolved from being the symbol of spirituality during precolonial times to becoming an irresistible source of carbohydrates. During the ancient times, rice was regarded as the magical invigoration of life. Farming was considered sacred, as attested by annals of history.

When modernity, as we know it, permeates our social systems, community structures, and industrial development, rice farming also witnessed and adapted to technological breakthroughs. Culture and technology actually evolve in parallel lines. Hence, there is mutual influence on and by each sphere in the development practice and work.

Sustaining a culturally rich nation, we have not in any way neglected the influence of our values and traditions as we go on with the flow of natural, human, and economic development. However, as the demand for adaptation soars, we heed the call for self-preservation.

In the rice research for development (R4D) sector, we particularly work on ensuring availability and access to yield-enhancing farming technologies while addressing the current and impending issues that confront the rice industry. As we perform our duties, we always consider all facets of development, with emphasis on our clients' needs and wants.

Gone are the days of impositions on rural communities. Current trends in agricultural innovation systems reflect the sensitivity of rural development platforms to addressing concerns in the grassroots.

While we acknowledge the modern society's contributions, our culture has also been adapting along the loop. Current R4D efforts now recognize the beneficial coexistence of culture and modernization.

In this issue of our magazine, we maintain that culture and modernization are never detrimental to each other. Given enough knowledge and understanding of both worlds, they are in fact immensely complementary.

We then feature here the highs of rice production in varying cultural perspectives. We highlight the contributions of entrenched social beliefs and practices to making rice farming progressive yet culturally sensitive to participating communities. In recounting farmer stories willingly shared, the articles give justice to how our indigenous brothers and sisters marry their deep-rooted convictions with technological perorations from the outside.

But we also present the other side of the coin. To establish the beautiful relationship between the past and present courses of rice production and its ecosystems, we walk you through the process of innovations in the rice R4D sector. With deeper internalization of the importance of user-preference in technology conception and development, we show how we value the deepest aspirations of our beneficiaries in all levels.

Our R4D initiatives stride toward co-development of knowledge and technologies to attain sustainable and inclusive agricultural rural growth. When we say inclusive, we especially think of those in the outskirts of our society who have yet to feel our impact.

Let their stories inspire us. •

VOL. 29 NO. 2 news
APR-JUNE 2016

Kto12 teachers train on climate-smart rice agriculture

Responding to the urgency of tackling impacts of climate change on rice production, PhilRice conducted anew the *Climate-Smart Agriculture (CSA) and Rice Production* training, April 22-26, May 16-20, and June 20-24, for 113 high school teachers from across the country.

The key aim of the training was to integrate lessons on CSA-rice in the curriculum of the participating schools. It was under PhilRice's Infomediary Campaign, an initiative that engages the youth in agriculture.

"This is the third year that we are focusing on CSA and rice production," said Jaime A. Manalo IV, campaign team lead.

CSA-rice technologies such as controlled irrigation, leaf color chart (LCC), minus-one element technique (MOET), and use of drought and submergence-tolerant rice varieties were discussed by PhilRice experts.

Controlled irrigation or alternate wetting and drying is a water management technology that avoids wasteful use of water. It guides a farmer in judiciously irrigating crops.

"We learned about pest management, *Palayamanan* Plus, and other ways to improve our farming. This training is very useful in Kto12," said Fe De Guzman of the Vicente B. Ylagan National High School in Oriental Mindoro.

Palayamanan Plus or rice-based farming integrates several activities such as growing vegetables and raising livestock and other farm animals. It embodies the importance of integration, intensification, and diversification concepts in rice farming.

Elizabeth Pajarillo of San Jose Agro-Industrial High School in Mindoro Occidental, one of the best implementers of the Infomediary Campaign in 2014, presented how she is integrating the campaign in her school.

Pajarillo highlighted their rice garden managed by students and talked about the agricultural extension activity on CSA and rice production, which they conducted in their surrounding community.

The training was a series of lectures and hands-on activities. The teachers were also exposed to the rice machines developed by PhilRice.

Irwin Husmalaga from the Climate Change Commission (CCC) discussed the science of climate change to the trainees. His lecture aimed to demystify climate change to avoid misinformation on the issue.

The participants also toured around the Science City of Muñoz, and visited the Phil. Carabao Center (PCC) and the Phil. Center for Postharvest Development and Mechanization (PHilMech).

"The teacher-trainees will be additions to the Infomediary Campaign-participating schools. By end of June 2016, there will be more than 200 participating schools nationwide," Manalo said.

The campaign is in partnership with the Department of Education (DepEd) and the Consultative Group on International Agricultural Research on Climate Change, Agriculture, and Food Security (CCAFS). •

Midsayap is 2015 Best Station

A well-organized-and-executed farmers' field day and forum in September 2015 that gathered over 700 farmers from southwestern Mindanao served as finishing touch in PhilRice Midsayap's snaring the 2015 Best Station award. The contest among the seven branch stations of the Institute began in 2013.

Dr. Sailila E. Abdula, acting branch director, attributes this recognition to capacity-building efforts for the 112 staff and personnel who serve as the backbone of rice R&D initiatives of the station.

Abdula said that the strategic development plan on ecological R&D programs for southwestern Mindanao, the station's primary coverage area, is already in the pipeline. Strengthening

New DA Secretary visits PhilRice

JAYSON C. BERTO

Agriculture Secretary Emmanuel F. Piñol (left) visited the PhilRice Central Experiment Station on June 10, 2016.

He inspected the seed warehouse, *Palayamanan* Plus, rice engineering shop, and its seed production area. He also dialogued with key officials of the Institute in his concurrent capacity as ex-officio Chairperson of the PhilRice Board of Trustees. •

partnerships and infrastructure development will be their key focus areas.

"As a research institution, we want to develop a biotechnology center for Mindanao," Abdula said referring to a molecular laboratory expected to be completed in 2016.

Also in 2015, the station was recognized by the Midsayap, North Cotabato local government unit for its community development efforts through rice R&D. Recently, the DA awarded Midsayap as one of the country's top rice-producing municipalities.

PhilRice Agusan won the award in 2013 and 2014. The Institute's leadership plans to evaluate the impact of the contest this year, hence no 2016 award will be given. •


CARLO G. DACUMOS

A CULTURE OF

JOHN GLEN S. SAROL • ANDREI B. LANUZA

WHETHER WE ARE AWARE OF IT OR NOT, RICE CONTROLS PHILIPPINE LIFE. IT HAS SHAPED AND CONTINUES TO INFLUENCE THE CULTURE AND TRADITIONS OF FILIPINOS. RICE IS ALSO ONE OF THE PROVERBIAL BRICKS FROM WHICH THE STORY OF THE FILIPINO PEOPLE, ITS CULTURE, AND ITS TRADITIONS WERE BUILT.

Celebrating rice

Nothing probably exemplifies more succinctly how deeply engrained rice is in our traditions than our festivals. The *Pahiyas* Festival in Lucban, Quezon every May 15 appears to be the most popular due to the colorful and fancy decorations of rice straw, fruits, and vegetables. Most prominent is the use of *kiping* or rice wafers that "apron" the entire façade of houses, which magnetizes tourists and the curious alike.

In Ilocos Norte, March marks the *Ani* Festival in Dingras, and the *Mannalon* Festival in Marcos. The *Agawan sa Sariaya* celebration in Quezon welcomes good harvests. In nearby Tayabas City, thanksgiving celebrations and agriculture fairs, usually in September, are known for their *Agawan ng Suman* to honor the patron saint of Catholic farmers.

In October, Cebuanos celebrate the *Sinanggiyaw* Festival as thanksgiving for a bountiful harvest by way of street-dancing. In April in the city of La Carlota, Negros Occidental residents conduct the *Pasalamat* Festival to celebrate the successful harvest.

Why so many celebrations dedicated to rice harvests? In pre-Spanish Philippines, eating rice was considered a luxury and a mark of prestige mainly due to how capital and labor-intensive it was to produce it compared to root crops, which was the common staple at the time. The abundance of rice was a testimony to a town's wealth

and prosperity. Always at the mercy of natural disasters such as pests, diseases, drought and typhoons, successfully harvesting the rice crop must be a sign of generous divine intervention. That's reason enough to celebrate.

Rice rituals and practices

The indispensability of rice among Filipinos throughout the centuries has brought about customs and practices that gravitate toward rice and its cultivation. For generations, rice has been a symbol of life, fertility, and prosperity. In some cultures, handfuls of rice are traditionally thrown on the new couple during weddings to spur good luck. In India, rice is also thrown during *puja*, a religious practice that includes songs, prayers, and invocations to show reverence to their deities.

Many rituals involving rice are usually connected to agricultural traditions, one of which is that practiced by the Ifugaos. Twelve rice rituals which define the Ifugao's agrarian calendar are performed regularly by the *mumbaki*, or spiritual specialist. These rituals aim to maintain balance with the environment and ensure bountiful rice harvests. No rice, no rites.

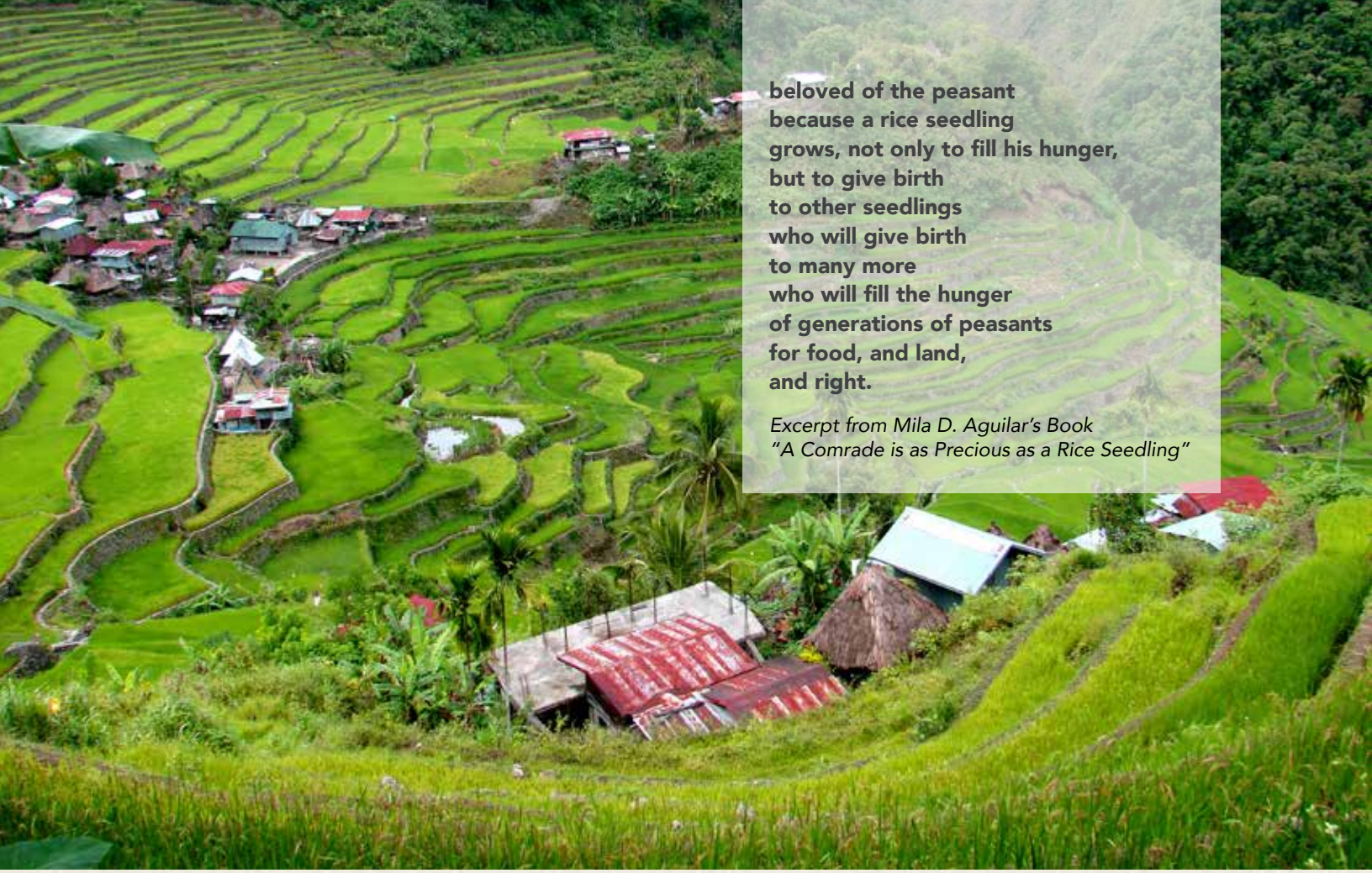
The Tirurays of South Cotabato conduct a ritual feast four times a year, known as *Kanduli*. Families within the community exchange glutinous rice with one another signifying their sticky bonds. During weddings, the bride and groom of the Tirurays would also exchange rice as a symbol of abundance and prosperity since the wealth and status of a family within the tribe are measured by how much rice they have stored.

The Tagbanwa in Palawan, one of the oldest ethnic groups in PH, performs the *Pagdiwata* ritual when the moon is full. They give offerings to their deities and the spirits of their ancestors after a successful rice harvest or when asking for the healing of the sick.

Rice is sometimes used in indigenous judicial practices. The T'bolis of Mindanao use rice in their "trial by ordeal" or *K'molot Libol*. When a person is accused of a crime, the village chief would put water, raw rice, and a piece of small stone in a cooking pot. When the water boils, the accused is ordered to retrieve the stone from the pot with his bare hand. If his hand remains unscathed after picking the stone, he is declared innocent of the crime.

Song and dance

Rice also features prominently in Filipino folk songs and dances



beloved of the peasant
because a rice seedling
grows, not only to fill his hunger,
but to give birth
to other seedlings
who will give birth
to many more
who will fill the hunger
of generations of peasants
for food, and land,
and right.

Excerpt from Mila D. Aguilar's Book
"A Comrade is as Precious as a Rice Seedling"

that are forms or parts of a ritual. Many school children, even in highly urbanized cities, can effortlessly sing *Magtanim ay di Biro*. The song mainly narrates how difficult and back-breaking planting rice can be, and should be taken very seriously. Even more illustrative is the *Maral* dance of the B'laan in Southern Mindanao which dramatizes the different stages of upland rice planting. The dance starts with the *Kaingin* where performers search for a plot and burn away the vegetation. *Almigo* or the clearing of the area comes next, which leads to *Amla* or the planting or sowing of rice. The dance ends with the *Kamto* where harvesting is depicted in graceful steps.

Literature of rice

Filipinos are known for their wealth of folklores and short stories, and all other forms of literature that had been told and re-told through time. Poet Mila D. Aguilar, also an essayist, teacher, video documentarian, and website designer, has written about 300 poems in English, including the poetry book, *A Comrade is as Precious as a Rice Seedling*, which romanticizes the life and struggles of rice farmers in the country.

Another notable writeup is the fictional short story, *Rice,* by Manuel E. Arguilla about Pablo, an honest husband to his wife and a good father to his children, providing for his family. Andres, his neighbor, gives him ideas on stealing rice. At first Pablo ignored him but after seeing his family suffer in hunger and pain, he then asks for his bolo and joins Andres.

The story depicts value for things and their usefulness in the society. For the oppressed, rice is valuable and they eat it to satisfy their hunger. For the oppressors, they value rice that symbolizes social status and powers to dominate.

Rice in architecture

One cannot simply take for granted the impeccable architecture that is conspicuous in the Ifugao *Rice Terraces*. It is an example of an evolving, living, continuing, cultural landscape that can be traced to as far back as two millennia in pre-colonial Philippines.

Over the course of time, the terraces have emerged to be an influence, not only on agriculture but also on architects and designers who draw inspiration from the natural wonder.

Brothers Manuel, Francisco, and Jose Mañosa who were designers, brought to foundation another terraces in the form of the San Miguel Corporation head office building in Manila. The landscaping, inspired by the terraces, was doe by the National Artist for Architecture in 2006, Ildefonso Santos, who is honored as the father of Philippine landscape architecture.

Crop of all crops

Rice has drawn a mark on the roots and distinction of the Filipino people, a prominence that inarguably not many crops in the country can claim. As rice transcends time, it has etched its imprint on the foundation of what the Filipino culture is today. "Rice forever" is even easy to pronounce. •

Rice BY THE NUMBERS

ASHLEE P. CANILANG

1 RICE MAKES THE WORLD GO ROUND

Rice makes the world go round - nearly half of the world's population eat rice as a staple and the number is expected to grow to 50% in 2030.

2 RICE PERPETUITY

Rice has been feeding the world for over 5,000 years. The first account recorded about rice farming was in China, about 2,800 BC. Early rice cultivations were also recorded in India and Thailand.

3 BASMATI RICE

Basmati means "queen of fragrances" in Hindi. Basmati is said to be the world's most fragrant rice. Most of the world's Basmati rice production are in India's Himalayan region.

4 RICE FAMILY

The world has over 40,000 different rice varieties. Over 100 of these are cultivated and farmed, but only around 10% of them are being sold in the market. Each rice seed can produce up to 3,000 grains in one season.

5 RICE FARMING

To manually prepare a hectare of rice field, a farmer and his carabao walk an equivalent distance of 60-80 kilometers. Using the conventional farming systems, around 5,000 liters of water are needed to produce a kilogram of palay.

6 RICE AND DIET

A cup of brown rice has 3.5 grams of fiber while a cup of white rice has less than 1 gram. Fiber is essential in the prevention of gastrointestinal and heart diseases, and also reduces the risks of certain types of cancers.

7 RICE CONSUMPTION

An ordinary person in the United Kingdom eats an average of only 6 kg of rice every year. In the Philippines, we each eat 120kg on average.

8 FILIPINOS AND RICE CALORIES

Per capita caloric intake (PCCI) per day rose by 32% from 1995 to 2009 (917 kilocalories [kcal] to 1,213 kcal).

9 FILIPINOS AND RICE WASTAGE

Each Filipino on average wastes 9 grams (2 tablespoons) of cooked rice daily. Total wastage redounds to 12% of our country's total annual rice imports; costs around P7.2B, and could feed 2.5 M Filipinos for a year.

10 PHILIPPINES' RICE PRODUCTION

Our total rice production has increased by 184%; from 6.4M tons in 1975 to 18M tons in 2015. The national average yield (both irrigated and non-irrigated areas) also increased from 1.76 t/ha in 1975 to 4.0 t/ha in 2015. The total harvested rice area in 2015 was around 4.7 million hectares.

11 THE FILIPINO FARMER

In 2012, his average age was 54 years old, 89% of whom were men; 87% were married and generally had 5 household members. The average annual income of a typical farming household was P104,268.00, and 89% of our farmers rely solely on rice farming as source of income.

Sources:
International Rice Research Institute
PhilRice Socioeconomics Division

Rice - FROM FOOD TO HEAT ENERGY

CHRISTINA A. FREDILES

WHEN TALK IS ABOUT RICE, MOST PEOPLE THINK OF THE STEAMING FLUFFY WHITE GRAINS SERVED ON A PLATE WITH THEIR FAVORITE *ULAM* ON THE SIDE. SOME IMAGINE DRINKING IT IN THE FORM OF COFFEE, MILK, OR WINE. FOR THOSE WHO LOVE STICKY SWEETS, THEY PICTURE THEMSELVES EATING RICE PREPARED AS *KAKANINS* SUCH AS *SUMAN, PUTO,* OR *BIBINGKA* DELICACIES. OR, WHO DOESN'T CRAVE FOR *GOTO* OR *LUGAW* AT TIMES? EAT ALL YOU CAN.

CARLO G. DACUMOS

Indeed, our rice can be enjoyed in so many forms! It serves as an appetizer, snack, main course in "unli" serving, dessert, or a favorite health drink. Get what you like, but eat what you get.

But rice doesn't only fill our stomachs. It and its by-products can also be used in other ways.

Animals feed on the rice bran. Burning rice hull serves as fuel for cooking. It can also be processed into a soil ameliorant or conditioner. And don't forget, rice hull as is appears to slow down the melting of ice blocks.

Rice straw is used as organic fertilizer and mulch for onions, garlic, or mungbean.

Rice provides energy

Eat rice and be strong physically. It is an essential source of Vitamin B1.

Rice hull generates heat energy that can be used in cooking and drying.

According to Dr. Ricardo F. Orge, a PhilRice engineer, carbonizing rice hull maximizes its use.

Orge led the development of the continuous-type rice hull (CtRH) carbonizer in 2010.

"The CtRH carbonizer was developed to improve the process of producing and help promote the use of carbonized rice hull. It can operate in continuous mode with almost smokeless emission," Orge said.

The CRH produced from the carbonizer can be used as soil conditioner in seedbeds and filler for organic fertilizer.

"The CtRH carbonizer was developed to improve the process of producing and help promote the use of carbonized rice hull. It can operate in continuous mode with almost smokeless emission.

- DR. RICARDO F. ORGE

Orge said that the heat generated by the CtRH carbonizer can be used to pasteurize mushroom fruiting bags, extracting essential oils from medicinal plants, water-pumping, poultry-heating, and cooking, which can provide farmers additional income opportunities as well as reduce their dependence on fossil fuels.

The heat is on

A group of housewives in Bagtu, Maria, Aurora uses the CtRH carbonizer with cooking attachment to repeatedly boil salted eggs.

It would take them half-day to boil 18 pieces of salted eggs using firewood, they say. But using the machine with cooking attachment, it only takes an hour to boil 100 eggs.

The carbonizer-attached cooking stove can cook for 2-3 hr when loaded with six 10-kg sacks of rice hull.

Jonathan Ramos from Cuyapo, Nueva Ecija has two poultry houses, each equipped with LPG-fueled automatically controlled heating system. He fires 4 burners/poultry house, each burning 6 big tanks of LPG for the whole production period during cold days.

The expenses is equivalent to P21,000/ burner or P168,000 for 8 burners!

Ramos tried the CtRH carbonizer in one burner and spent only P640. He will use the machine in all his burners, he says.

"Aside from the big savings courtesy of this machine, I can also use the carbonized rice hull as an ingredient for my organic fertilizer," Ramos figures out.

Orge said rice hull instead of LPG can help mitigate climate change impacts, since greenhouse gas emission is eliminated.

Some 2.9M metric tons of rice hull is produced nationwide every year. Orge said 1 ton of rice hull is equivalent to 360 L of diesel fuel or 408 L of gasoline consumed.

The CtRH carbonizer with its attachments creates the chance for farmers to earn more while providing nutrients to their rice crop, and helping mitigate climate change at the same time.

From food, to energy source, undoubtedly, rice is the most versatile crop in the world. •

Rice...
NOW WE KNOW IT NOW WE DON'T

CHARISMA LOVE B. GADO

THERE'S TOO MUCH FAMILIARITY WITH THE PERMEATING RICE THAT, OFTENTIMES, WE DO NOT EVEN RAISE AN EYEBROW ABOUT IT. WE HAD THOUGHT EVERYTHING ABOUT OUR STAPLE FOOD WAS OBVIOUS.

But do not be shocked with Nap Enrick, Grade 5 pupil in Muntinlupa City, who could tell you cooked rice comes from "water hyacinth," which abounds in the Laguna Bay.

"My classmates and I grew up thinking that rice is from water hyacinth. We just learned of its true origin after the visit of the PhilRice museum staff," Nap said.

Nap's school doesn't teach rice science. Science literacy in the country remains low as 6th graders showed 67.2% achievement rates, short of the 75% passing rate.

PhilRice's Floper Gershwin Manuel, museum researcher and educator, said that schools have yet to cover more areas on science. Thus, the need to complement knowledge acquisition through informal learning such as visits to museums and science centers.

Museum visitors act on new knowledge

Manuel says the Rice Science Museum of PhilRice performs social tasks beyond its traditional role as an educational institution, in which contents are static and merely awaiting the public to view. Since its re-launching in 2014, the museum promotes the history, science, technology, and culture of rice, and its arts through changing thematic displays. The museum also brings itself closer to the public through mobile exhibits. These initiatives of the museum make knowledge on rice more accessible, especially in the urban areas.

The museum thus far had presented four major thematic and two special exhibits to the public, including *Lovelife with Rice*, *Bountiful Harvest*, *Colors of Rice*, and *Transformations in Progress*. The displays showed the deep connection between Filipinos and rice; the practices and technologies that have brought abundance to traditional and modern farming; the staple food's healthy aspect; and the changing landscape from the pre-colonial to the modern world. The special exhibits featured *Palay Kamalayan* to raise awareness on the culture of rice and the social issues affecting it; and the *Botong Francisco: A Nation Imagined* – courtesy of the Ayala


RAFFEL HIDALGO


JOHN GLEN S. SAROL


JOHN GLEN S. SAROL

Museum, to encourage the youth to think of their role in feeding the nation.

Elementary and high school students in Metro Manila who viewed one of the exhibits said they eat white rice at least thrice a day. They were unaware of the pigmented rices such as the red, black, and purple already sold in the supermarkets, and they mistook brown rice or whole rice for fried rice or *suman*.

"In my visit, I learned that eating better rice forms can make me strong while the white rice I was accustomed to is not that healthy. Polishing rice removes almost all of the nutrients so I will request my mother to buy brown rice," Rubylyn Romero, 11, said.

Teener Jetzka Abogado said that as a future doctor, "I am happy to learn that rices with darker pigments are healthier. Black rice makes us strong and for us to be healthy, let us eat the colored rice. Ignorance of this would damage our body system." Abogado said she will convince her family to consume pigmented rice as well.

Farmers also benefit from the science they learn in the museum. The *Transformations in Progress* exhibit taught them the science of ecological engineering, an emerging concept in rice production, which promotes the use of cultural techniques to increase the populations of beneficial insects and parasitoids.

Victoria Pancho, 61, of the Science City of Munoz, said she did not know that pesticide use can be minimized by planting flowering plants such as biddens and butter daisies along the rice paddy dikes. The flowers attract helpful insects that multiply fast, then defeat the insect pests.

"I'm glad I visited the museum where I learned about this concept. My farm hand sprays pesticides more than five times per cropping season that cost about P5,000. I'll start planting these flowers when I get home," the farm manager for nine years said.

Museum as science aide

Ana Delicado of the Portuguese academe said that the representation of scientific results is at the core of most science museums. She said there is debate on whether scientific museums can teach science or merely create an appetite for it, but museums work as "showcases" for scientific disciplines through artefacts, images, and texts.

In a recent worldwide review of The European Network of Science Centres and Museums, it was found that interactive science exhibitions increase visitors' knowledge and understanding of science; promote trust and understanding between the public and the scientific community; and provide memorable learning experiences, which can have a lasting impact on attitudes and behaviors.

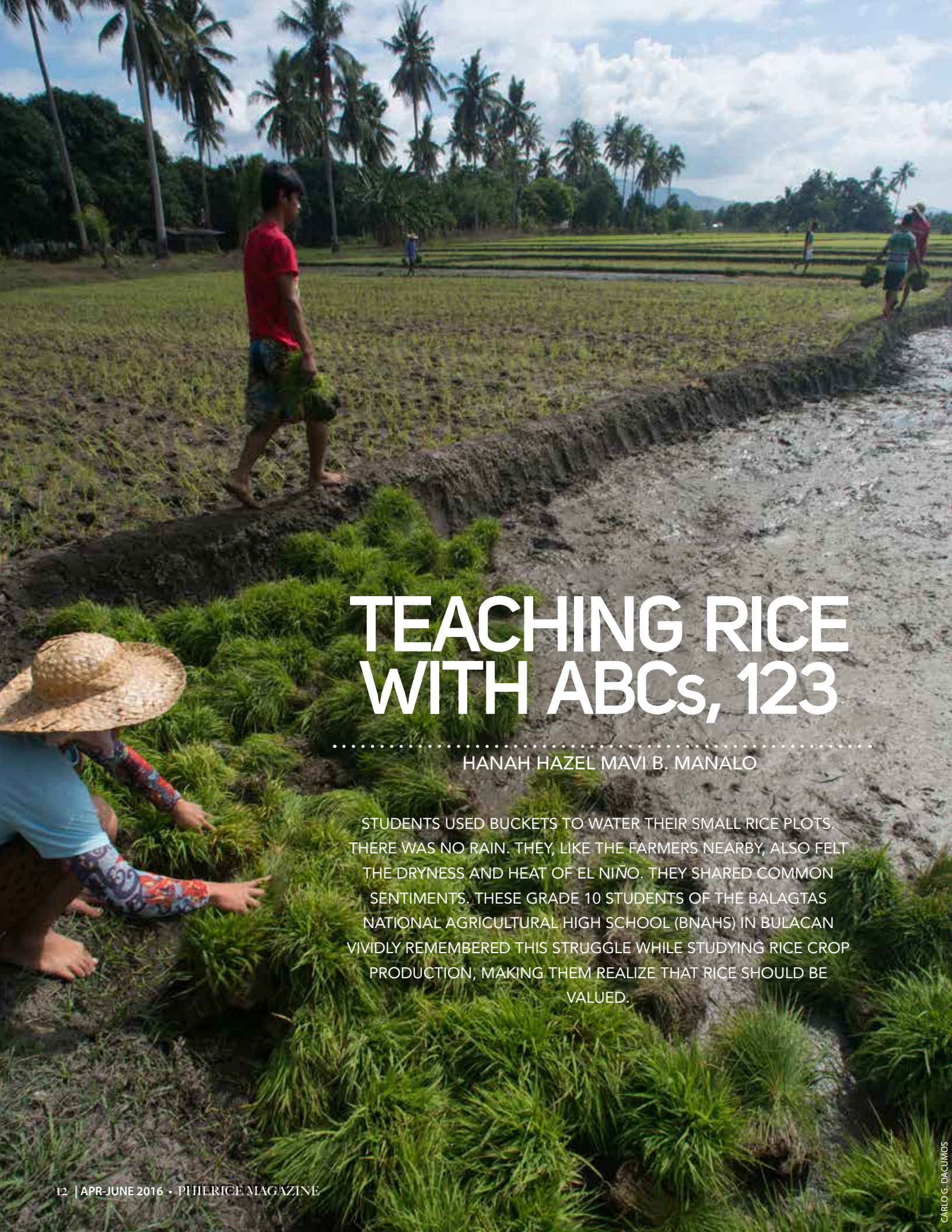
Diadem Gonzales-Esmero, curator of the Rice Science Museum, said that museums provide a popular venue to promote the findings of scientific researches.

The curator said that based on their study on social influence, displays or exhibits are starting points of farmer-to-farmer conversations and exchanges on best farming practices. Farmer-visitors relate the best farming practices to their fellow farmers, then gradually show interest in adopting technologies displayed in the museum.

> Knowledge generated on rice is often published on research publications. Not all of us have access to these publications that are also highly technical. As a repository of knowledge, the Rice Science Museum makes the knowledge on this staple food more available to and easily reachable by the public
>
> - DIADEM GONZALES-ESMERO

"Usually, farmers show interest in buying certified seeds because they learned in one of the sections that good-quality seeds will produce healthy seedlings," Esmero said.

Children giving premium on their health and farmers expressing interest in improving their farm practices are just few of the stories that prove science literacy is "much more than the memorization or even comprehension of scientific facts and principles." New knowledge on science, no matter how little, can help change one's life. •



TEACHING RICE WITH ABCs, 123

HANAH HAZEL MAVI B. MANALO

STUDENTS USED BUCKETS TO WATER THEIR SMALL RICE PLOTS. THERE WAS NO RAIN. THEY, LIKE THE FARMERS NEARBY, ALSO FELT THE DRYNESS AND HEAT OF EL NIÑO. THEY SHARED COMMON SENTIMENTS. THESE GRADE 10 STUDENTS OF THE BALAGTAS NATIONAL AGRICULTURAL HIGH SCHOOL (BNAHS) IN BULACAN VIVIDLY REMEMBERED THIS STRUGGLE WHILE STUDYING RICE CROP PRODUCTION, MAKING THEM REALIZE THAT RICE SHOULD BE VALUED.

CARLO G. DACUMOS

> The value of rice should be instilled in the young minds of the students to prevent it from becoming a part of a distant past.
>
> - REYNALDO CRISTOBAL

Reynaldo Cristobal, BNAHS principal, said that the value of rice should be instilled in the young minds of the students to prevent it from becoming a part of a distant past.

A culturally conscious education could highly engage the students to learn as it is aligned with their beliefs, values, and hopes. In the case of BANHS', integrating the value of rice in education is recognizing the culture that these students have.

Putting the 'Rice' message across

Dr. Joel Vasallo, head teacher VI of the school's vocational department, who is so passionate about integrating the value of rice in the educational system, said he will ensure that their students will learn to increasingly appreciate rice.

Vasallo recalls that in 2007, through a Technical Education and Skills Development Authority (TESDA) module, rice production was taught in the Technology and Livelihood Education subject of high school students.

He said that efforts to integrate rice production in the educational system grew through an agreement between the DA and the Department of Education. Under the tie-up, PhilRice has been providing technical assistance to NAHS nationwide in their module development and implementation thrusts. Agriculture teachers thus revised and updated their modules on rice production.

Vasallo maintains that teaching rice in the classroom using print materials and audio-visual presentations helps students understand the crop but sending them out in the farms for immersion is the best way for them to appreciate rice. The school borrowed farms from farmers in their community.

He said that when resources are scarce, the school taps its partners in sharing its knowledge on rice to its students and immediate community. Margie Cabuhat, Teacher 1 and agriculture subject coordinator, shared her knowledge and presentations on rice to her fellow BNAHS teachers and other teachers in Guiguinto, Bulacan and Floridablanca, Pampanga. Cabuhat earlier trained at PhilRice.

The teachers' dedication and competency in teaching rice production helped them bag awards such as Outstanding Agriculture School, Training Venue, and Pilot School for Agriculture given by DepEd Bulacan.

More than Learning

BNAHS student Vanessa Inocencio, 16, said she passes by vast rice fields on her way to school but hardly gets curious about how those grains on the panicles are turned into "*kanin*." In Grade 8, she slowly realized how hard it is to produce rice after she herself helped grow the crop. After retelling her farming experience, Inocencio pledged, "I will not waste rice, promise."

Her classmate, Andrea Marie Ajose, agreed with Inocencio's realization remembering that every time she recites the *Panatang Makapalay* she's reminded of how one should value rice.

Cindy Ollero said that the most memorable rice production activity that she did as student was harvesting as their hard work has paid them off with a good yield. "It gave me a sense of fulfilment," Ollero recalled.

Carmina Villafuente had a different point of view. She chose crop production as her specialization to help her grandfather improve his yield. She told him to text the PhilRice Text Center for his queries on rice. She related that her grandfather received responses from the Center about rice varieties and judicious use of pesticides.

Orlan Rabago, a son of a farmer, is decided to take up agriculture in senior high school. He is optimistic that he can turn the tide in his family's quest for a better life. He recalled that he mentioned to his father about the rice varieties adaptable in Bulacan to help raise his awareness. To his surprise, his father returned the favor by encouraging Orlan to study harder.

The BNAHS principal contends that teaching the value of rice must be the common concern of both agri and non-agri schools. This effort needs additional costs from the government but reliving the rice culture among the youth is priceless, especially for a country dependent on rice for survival, Cristobal professed. •

CULTURE inspires R&D

JAIME A. MANALO IV

RICE R&D IS NOT WITHOUT ROOTS. IT IS CULTURAL. "CULTURE" IS TOO LOADED A WORD.

THIS ARTICLE SIMPLIFIES CULTURE AS HOW AND WHO WE ARE. IT IS OUR WAY OF LIFE.

Rice is central to our lives as Filipinos. Many of us probably grew up occasionally gazing at the romantic and nostalgic depictions of rice farming in the Philippines either by Fernando Amorsolo or younger artists today. This artistry comes alive in Nueva Ecija—the country's top rice-producing province, hence among the very few places that can hardly relate with discussions on rice insufficiency.

Planting and harvest are among the most festive seasons here. One can see farmers, ladies and men alike, in colorful attires frolicking in the rice fields. Even the now near-ubiquitous combine harvesters are colorful. At San Sebastian Parish in Muñoz, farmers for 2 years now offer portions of their harvest often during masses that they call "*Ani ko, balik-handog ko!*"

Rice is synonymous with Nueva Ecija. It is one reason why the PhilRice Central Experiment Station (CES) is here. From the vast rice fields our researchers and scientists figure out their research questions.

Culture drives rice R&D

Since 1987, PhilRice's men and women, and their partners, have been meticulously working toward improving local rice production. Our rice breeders have produced 9 to 10-tonners, inbred or hybrid, now planted in many rice fields.

"We continue to elevate our rice breeding standards, so our farmers can benefit more from rice farming," said Dr. Norvie L. Manigbas, one PhilRice scientist and head of the Plant Breeding and Biotechnology Division.

Now being bred are 12 to 15-tonners. This is an ambitious target, but is urgent, given the increasingly complicating rice production woes.

Scientist Dr. Roel Suralta, 2014 Presidential Lingkod-Bayan Awardee, has been working on how improved root structure can boost rice yields in water-stressed environments.

R&D enhances CULTURE

JAYSON C. BERTO

"This work is an important input in our breeding process. If we can breed varieties that have improved root structures, this can mean higher yields for our farmers in the uplands," says Suralta.

Every day it is all-systems-go at PhilRice. Our research teams work either in the laboratories or on-field scrutinizing their experiments. All because our work is culturally tied with rice and the rice eaters.

Rice R&D shines culture

It is said that culture is among the most difficult-to-define words. It evolves, comes, goes, returns, never static, or frozen.

For Jose S. Gagelonia, 61, son of Brgy. Maligaya that hosts CES, things have changed tremendously since PhilRice came here in 1989.

He recalls that in the 1970s his mother used to get seeds from IRRI in Laguna. It was difficult, considering the distance and the energy required to travel.

With PhilRice based here, seed growers could easily buy foundation and registered seeds that they multiply into certified seeds.

The National Seed Quality Control Services (NSQCS) of BPI also trained many seed growers from the Science City of Muñoz.

As we write, the Nueva Ecija Seed Growers Multi-Purpose Cooperative has 56 members from Muñoz alone. In the whole province, more than 500 seed growers are active, according to the NSQCS.

"There were only 10 seed growers here in the 1980s," said Gagelonia.

The country's first Agri Mall, which sells thousands of sacks of certified seeds nationwide, among other farm needs, is based in Maligaya. Truckloads of milled rice go in and out of Muñoz.

A rice coffee exporter is also rooted in Maligaya. And, recently, a rice hull-fueled power plant was established some 3 km north of PhilRice along the Maharlika Highway.

Meanwhile, Guimba, a neighboring town southwest of Muñoz, was named among the *10 Most Competitive Municipalities* by the National Competitiveness Council in 2013. Major enterprises in Guimba include rice and rice machines.

Roman Lugto, 47, is a progressive PhilRice-accredited farm machines fabricator in Guimba. Yearly Roman sells some 600 units of hand tractors (P30,000/unit), 200 units of trailers (P30,000), and 1,000 units of riding levelers (P3,700). Roman and his 70 employees supply machines in Tarlac and Pangasinan as well.

For sure, more nice things about rice will come in the future. If the culture of rice-farming drives rice R&D, through time we have shown that R&D enhances culture. The give-and-take relationship never stops. It cycles back to itself. It is a question of where culture will bring rice R&D or vice-versa—both are equal in their capacity to impact on each other, good or bad. •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JUANA B. DELA CRUZ

RAFAEL HIDALGO


TIMOTHY JOSEPH BALONGLONG

Rice NARRATIVES

The indigenous people (IP) communities are a testament to our rich heritage as an agricultural country. Their stories, as diverse as they are, collectively compel us to be responsible stewards of our land. Let their wisdom inspire us to do more.

All informants of the following stories have been properly informed about the purpose of the interviews. Prior arrangements were made before the actual conduct of the data gathering.

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MEDRIC SHUN D. PIACOS

CAUGHT IN THE MIDDLE

MYRIAM G. LAYAOEN

ADAPTING TO CHANGE, BE IT NATURAL OR OTHERWISE, HAS ALWAYS BEEN A GREAT CHALLENGE FOR THE UPLAND AETA FARMERS. WITH PRACTICES DEEPLY EMBEDDED IN THEIR BIRTHRIGHTS, THEIR FARMING DECISIONS LIE MOSTLY ON THEIR EXPERIENCES.

> I have grown up with the farming practices passed on to us by our fathers which may be traced farther back to our ancestors. We have somehow improved because of the times, but as you see, we still value our natural environment and the things that it is giving us.
>
> - MAURICIO JIMENEZ

Immensely adept on their mutable surroundings, the rice production practices of Aetas in the mountains of Zambales have been guided by their histories – their cultural heritage. Despite various influences, they always manage.

Aetas are traditionally hunters and gatherers who are most skilled in jungle survival. Archeologists believe that Aetas were among the earliest, if not the first, human settlers in the Philippines. Because of their natural environment, they have a vast knowledge of the plant and animal kingdoms, as reported by R. Waddington in 2002.

Centuries have passed and they have survived. However, it only took the apocalyptic afternoon of June 15, 1991 to change almost everything they had been accustomed to. In a spur of unending moments, the wrath and fury of the mountain that once cradled their families and communities literally wiped out their lives.

With the thick dark and dusty haze obscuring the next morning's skies, the lush mountaintops suddenly disappeared, replaced by a turbulent sea of smoldering ashes and remains of the erupted Mount Pinatubo. Their livelihoods, as they knew it, were buried under the waves of molten lava.

Having survived through hunting and gathering in the uplands, the Aetas spared by the eruption had to move on. Despite their hesitance to evacuate their birthplace, they had to heed the call for subsistence.

Stories told

Farmer Mauricio Jimenez of Cawag, Subic, Zambales can still vividly remember how he and his family hurriedly fled from the town of San Marcelino to escape the devastation. At 58, his stories remain woven in his mind, especially when he had to leave hectares of ash-laden agricultural land he used to till for food and income.

"Living in the mountains, we had no other source of income but to hunt and plant. Pinatubo destroyed all my crops, leaving us with nothing. Still, I am thankful we are alive," Jimenez recounted.

Before the volcanic eruption, Jimenez cultivated an upland area, where his family also lived, with root crops such as cassava, yam, and *gabi*. He also planted fruit-bearing trees, the products of which he sold in the downtown market or to tourists on the streets. He also planted rice during rainy seasons.

Jimenez' production regimen was anchored on the traditional practices he was born into. In rice farming, for instance, only three activities mattered before harvest – the clearing of the area to plant, the actual planting of seeds, and hand weeding.

"I have grown up with the farming practices passed on to us by our fathers which may be traced farther back to our ancestors. We have somehow improved because of the times, but as you see, we still value our natural environment and the things that it is giving us," Jimenez explained.

In 1992, thousands of Aetas were dislodged from their upland communities owing to the non-habitable conditions of their areas. They had to move to other places where they could still practice their "profession" – farming. They brought with them their treasured culture as they learned to adapt to the requisites of their new situation.

"Farming in the lowland has taught me certain practices that I did not know before. I now know the importance of using certified seeds and applying fertilizers. However, in the upland, I still plant our old root crops. If I plant rice, we just dibble the seeds using a bamboo stick," Jimenez explained. ▶

I have no qualms in trying new things in my field for as long as my capability as a farmer would allow. I have very limited financial resources, but I have the environment to help me. I just hope to learn more.

- MAURICIO JIMENEZ

Another farmer, 33-year-old Ronald Cabalic, cheerfully recalled the stories told by his mother on enriching the fertility of the land. His forefathers would extract blood from a native pig or chicken and spill it through the soils before planting to ensure bountiful harvest. He even chanted the Zambal harvest song their tribe used to sing during thanksgiving feasts.

Jimenez vowed highest respect for their customs and rituals. Yet, he is also open to more productive means to cultivate his farmland in a way that would further enrich their indigenous practices.

"There are still some of us who chant the Duroro Song around the rice field during heavy rains to halt flooding. I don't find anything wrong with that. If it helps, then we still do it. It has been a part of our lives," Jimenez added.

During drought, they create sounds with a handcrafted bamboo rainmaker to attract rains.

Interventions modified

The eruption severely damaged the natural environment of the Aetas. The lahar remobilized volcanic deposits, eventually re-routing the river systems for years. Then came help in all sorts.

Jimenez, Cabalic, and other members of the tribe in Cawag II Resettlement Area underwent various training programs conducted by government and other organizations that taught them farming technologies in rice and other crops. However, sustaining their learnings was a challenge as practices cannot be changed overnight.

"I got acquainted with a lot of crop management practices and technologies. Varieties, fertilizers, pesticides, machines – but we have to innovate with what we have," Jimenez said.

Technologists told him that *tungro* may cause the rice crop to turn yellow. He now always relates a yellowish crop with the disease. To ensure that his crop gets the nutrient it needs, he broadcasts 2 bags of urea with *kakawati* (madre de cacao) leaves that enrich the soil with nitrogen and result in good crop stand and more green leaves.

In his 1-ha farm in the upland, Jimenez plants high-value and root crops along with rice. He gets 10 cavans per hectare with just perseverance as investment. The other crops give him on the average an additional P100/day income. He plants 0.8 ha in the lowland with rice alone and manages it with the practices he has learned and self-improvised. He is happy with the 60 cavans he gets from it every season.

"I have no qualms in trying new things in my field for as long as my capability as a farmer would allow. I have very limited financial resources, but I have the environment to help me. I just hope to learn more," Jimenez shared.

Cabalic, on the other hand, believes that humans can be the most efficient tools of farming. And he literally means it. "My feet can be the thresher. My hands can be the mill. As a farmer, I am a complete worker," he quipped.

Cabalic is an agripreneur in his own terms. He processes his produce into handicrafts and sells them along with fruits he harvests in the market. He earns P10,000/year from the novelty items and P200/day from the fruits.

Shelter that cares

Government helps preserve the cultural heritage of our indigenous peoples while presenting opportunities to improve their livelihoods.

The Department of Environment and Natural Resources is implementing the Community-Based Forest Management Project (CBFMP) under the National Greening Program, in partnership with the natives of Cawag and the Association of Bicolanos for Environmental Protection, a non-government organization.

"The project provides employment to our community. It gives additional income to our people who maintain nurseries for trees," CBFMP President and former Cawag chieftain Perla Jimenez said.

The project extends to a vast 784 ha of forest and rainfed lowland areas, accommodating 534 families under the association, 20 of whom are directly involved in the nurseries. An earning of P2,500 to P2,900 per week is assured per family.

"We try to inspire each other to work with what we have and be open to what we do not know. I must say we are moving forward," Perla added.

The inhabitants of Cawag have witnessed years of transformation in their community. They have been able to adapt to the challenges of change and are continuously growing with it. Their cultural farming practices continuously evolve with the hands of time. It has always been a marriage of what they believe in and the realities in front of them.

Their culture remains relevant with the adjustments they have to make. •

LIVES AND TERRACES INTERTWINED

MARY GRACE M. NIDOY

THEY TREK 2-4 HOURS ON FOOT. THE TRAIL CAN EITHER BE TOO DUSTY OR SLIPPERY, OR BOTH. SWELTERING HEAT OR NAIL-BITING COLD MAY SPOIL THE JOURNEY.

THE ADULTS OFTEN TROD THE PATH CARRYING BIG FISHES CLINCHED TO WOODEN RODS. THE YOUNGSTERS TRAVERSE THE ROUTE BRINGING GOODIES COMMONLY SEEN IN A SARI-SARI STORE. THEY CROSS RIVERS, SLAP INSISTENT INSECTS ON THEIR ARMS OR CHEEKS, STUMP ON BIG ROCKS, CLING TO VULNERABLE ROCKY WALLS, AND CLIMB THE SOARING PEAKS. THE TRAVEL IS EXHAUSTING, YET FAMILIAR, CUSTOMARY, AND NECESSARY.

JAYSON C. BERTO

JAYSON C. BERTO

Five mountains or 18 km after, they reach their village.

Welcome to Brgy. Gen. Fullon in San Remigio, Antique. Hidden deep in the mountains of Panay Island in Western Visayas, this village is home to a community of indigenous people (IP) called the Bukidnon Iraynons.

But why settle in an unknown place? What lies beneath their dwelling?

The whole life of the Iraynons has been witnessed by a treasure they have been protecting for the past 200 years – the 600-ha rice terraces built by their ancestors that they inherited.

A testament to their heritage, the Antique Rice Terraces were rediscovered in 2014 and had since been visited by people coming from all sectors.

Stewardship and bayanihan

Like the Ifugao Rice Terraces of the Cordillera, the Antique terraces had thrived chiefly because of the tribe's diligence and hard work.

Midela Gomez, barangay services program officer, unveils another reason for the rice terraces' survival as *"dagyaw"* - a *Kinaray-a* word equivalent to *bayanihan*. In a village where almost everyone and everything is related and connected, this characteristic is engraved in the households and in their social structure.

"Dagyaw is important since we are far from the town proper, we need to look after and help each other here," Gomez explained.

Dagyaw was exemplified when the local government established electricity in Gen. Fullon in May this year, which switches on 6-9PM, thanks to the generator.

"Our men helped each other in carrying the electric posts from the town proper to our village," Brgy. Captain Noli Maguad disclosed.

To the Iraynons, land is of utmost importance, according to Joyce Christine Colon of the UP Visayas Center for West Visayan Studies and National Commission on Indigenous Peoples (NCIP) Regions VI and VII consultant.

"The continued existence of these rice terraces stems from the centrality of land for IPs, land means life. Culturally, land is sacred for them because it defines their very existence. It is not only a source of life but also a sanctuary of collective memories, reflective of their origins and history as an indigenous group," Colon emphasized.

"The survival of the rice terraces through the years is also, I think, reflective and illustrative of the concept of stewardship among our IPs, the responsible use and protection of the natural environment through sustainable conservation and management of resources," she added.

History and natural resources

Maguad credits the stewardship trait and farming knowledge to their ancestors. While another group of IP called the Atis came first to their village, Maguad said it is their ancestors who started cultivating the land and eventually crafted the rice terraces.

Colon explained that the early traditional life of the Atis may be considered as non-sedentary or wandering.

"Agricultural revolution is associated to the transition of human cultures from hunting and gathering to a sedentary form of life. Agriculture and the


JAYSON C. BERTO


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> The continued existence of these rice terraces stems from the centrality of land for IPs, land means life. Culturally, land is sacred for them because it defines their very existence. It is not only a source of life but also a sanctuary of collective memories, reflective of their origins and history as an indigenous group
>
> - JOYCE CHRISTINE COLON

emergence of sedentary communities are closely related. With this, one can surmise that the Bukidnon Iraynons are most likely more inclined to agriculture than the Atis."

What sustains the Iraynons' farming are abundant natural resources that more than 700 people or 128 registered families have learned to efficiently use for many years.

In Gen. Fullon, fruit-bearing trees, root crops, and vegetables are everywhere. Cows, pigs, chickens, and goats are reared and roam in their natural habitat. The village is surrounded by three major waterfalls - *Iglangit, Igtamoni, Balikaskasan*.

Rice above all, and other crops

The rice terraces, owned and shared by the tribal families in Gen. Fullon, have fed generations of Bukidnon Iraynons.

In a typical Iraynon house, stored sacks of rice are a common sight.

"We plant rice mainly for daily consumption," Maguad said. The whole village harvests an average of 3,000 sacks (45 kg) every cropping season.

"When we harvest more than enough, we sell each sack of rice for P800," Maguad revealed.

Like other rice fields, the Antique Rice Terraces are not spared from pests. During the rice maturity stage, birds like *maya* attack their crops. How do they cope? They attach colored plastics to twigs and lodge them around the fields.

"Birds are afraid of plastics so we scatter them in the field to scare them away," Gomez said.

Fertilizers are sold by the lowlanders in San Remigio. For irrigation and domestic purposes, they have attached long pipes from the waterfalls. During harvest, threshers are transported from the town proper to their village.

In summer, the Bukidnon Iraynons plant tobacco which they sell to the lowlanders. Each bundle earns them P500-P2,000.

"Most of our buyers are fishermen as they find our tobacco cheaper than the commercial cigarettes. They enjoy it to keep them warm when they work in the sea," Gomez said.

Developments

Aside from limited electricity, Maguad hopes that the government will create concrete pavements to make it easier for the Iraynons to travel and have easier access to rice-farming technologies.

Colon thinks that electricity and concrete pavements will also improve their accessibility to the market for their cash necessities.

While developments are part of their evolving culture, Maguad is optimistic that these will not be detrimental to their rice terraces.

"Greater interaction with the lowland and mainstream society may also mean exposure to modern lifestyles and may either enhance or pose a risk on their environment, as well as prevailing indigenous artistic, and cultural expressions in the community," Colon explained.

"Developments are welcome as long as our environment will not be adversely affected," Maguad said.

After all, their lives and the rice terraces are intertwined. They breathe together. •

WHAT SHIELDS MAGUINDANAO?

SONNY P. PASIONA

The Maguindanao Massacre, the Mamasapano Clash, and most recently, the desiccating El Niño.

TV coverage of the Autonomous Region in Muslim Mindanao (ARMM), particularly in Maguindanao, repeatedly portrays its vulnerability to armed conflict and climate change. With these misfortunes impeding development interventions, agriculture remains at higher risk — farming communities being displaced, rice fields becoming part of the war zones, and families losing their crops to drought.

True enough, farmers living in a vulnerable community need an extra dose of resilience. Farming in Datu Hoffer in Maguindanao, Zahria Kundo, 47, uncovers that her resilience draws energy from their culture and farming practices. It becomes part of their rich culture of handwoven fabrics, such as *malong* and *hijab* that exude vibrant colors, *kulintang* that echoes a soothing music, and many more. Zahria now weaves a story of resilience from the fusion of culture and modern agriculture. It is a line of defense she values amidst the threats as manifested by how she handles a cropping cycle.

Traditional groundwork

Wearing her favorite golden *hijab*, Zahria starts a rice cropping season with a simple tradition she inherited from her ancestors.

"We compare two rice varieties. With a handful of each, the one with more seeds is what we plant," she shared.

During crop establishment, Zahria performs a wishing ritual.

On a dike between paddy fields, she positions herself and delicately puts cotton, garlic, and rice on top of a *kabalitya* leaf. Then she jabs four wooden sticks on the ground forming a pyramid. Shortly after, she whispers a solemn prayer.

"*Kabalitya* in our language also means compliant. We believe that *kabalitya* leaf will comply with our wish for a bountiful harvest," Zahria explains.

This practice, according to her, would safeguard their crops and keep evil spirits away.

With variety chosen and ritual performed, Zahria and her husband and laborers can start sowing.

In monitoring the rice fields, *apo na palay* or "grandfather of rice"

PHILRICE PHOTO

comes in. Normally an old man from the community, locals believe that his incantations over the rice crops appease environmental spirits and ensure a good harvest.

The Muslim feast

It is harvest time. Zahria and her family hope that traditions and rituals will not fail them. But regardless of the yield, the Muslim community stays grateful. Through the thanksgiving rites called *Kanduli*, they profess their gratitude for a cropping season that is coming to a close.

Kanduli may take shapes and forms depending on occasion or location. For Zahria, they hold *Kanduli* a day before harvest.

"From the ripe field, we reap about a kilo of rice then cook it along with sea foods and vegetables," she said.

To the food that she prepares, Zahria links meaningful symbolism. Local sea food like *pupuyo* represents abundance, *dulog* means several piles of rice sacks, shrimp for early maturity of rice, and *gabi* for a repeat of a generous yield.

When all foods are set on the table, *Kanduli* continues by burning charcoal. The smoke fills the air at the dining place as Zahria murmurs words of thanks to Allah for giving them good yields.

As they keep themselves filled with gratitude and food, Zahria and her family are now ready to reap the fruits of their labor the following day.

Religious tax

Upon harvest, it is customary for Muslims to practice what they preach about generosity.

"I believe this bounty comes from Allah. During harvest, from every hundred sacks, I set aside 10 sacks or 10% for the poor or religious leaders," Zahria said.

As one of the five pillars of Islam, Zakāt is a form of charity and religious tax.

"When I give Zakāt, I also feel that Allah guides me in efficiently managing our finances," Zahria added.

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An evolving culture

Zahria believes that cultural practices and traditions are important but she keeps her mind and heart open to modern knowledge especially on agriculture. As participants of PhilRice's Technical Cooperation 5 (TCP-5) project, she and her fellow farmers from other barangays learned several techniques in crop management from varietal selection to post-harvest procedures.

Traditionally at the start of a cropping season, she used to compare *Burdagol* and *Aklan* that were then popular rice varieties in their area. But soon after she was introduced to modern varieties in a demonstration, she realized they could give her better yields. And they did. She now chooses between Rc128 and Rc226 known for their good yields and eating quality.

In field monitoring, Zahria does not just rely on *apo na palay*. Now, she also practices judicious application of fertilizer and pest management.

"We used to apply fertilizer just once, now we do it twice so our rice gets the nutrient it needs," she said.

PhilRice Midsayap in North Cotabato presides over development interventions in southwestern Mindanao including ARMM. Dr. Sailila E. Abdula, acting branch director, said it is truly challenging to bring science-based interventions to communities with deeply rooted cultural practices.

"While we recognize the cultural practices of farmers, we also believe in their capability to adopt the science of rice farming. They adopt especially when you show them that modern technologies are climate-smart and could augment their livelihood. It becomes part of their evolving culture," Abdula said.

The Midsayap station is also at the forefront of initiating an upland development program for religious leaders of the Bangsamoro. Aside from empowerment, this also aims to integrate the Islamic faith in agricultural development.

"The essence of this program is to teach agriculture not just as a community social responsibility but as a spiritual obligation," Abdula added.

Dealing with adversities

Being in a vulnerable place, Zahria could not escape from the atrocities of nature and humans. When caught in a crossfire, they are forced to evacuate. Crops are therefore abandoned and when they come back, the crops are lost.

"Others harvest our crops," she shook her head.

In their most recent harvest, the normal yield of 140 cavans dwindled to only 95 - a miserable fate of her 1.5-ha rice farm due to prolonged dry spell in most parts of Mindanao.

Clearly, bloody conflict and climate change threaten their livelihood. But despite these threats, Muslim farmers like Zahria are adopting modern agriculture while preserving a rich culture and a strong Islamic faith. Agriculture is evolving, so is culture.

Zahria, her family, and the Muslim community remain hopeful that sooner all the armed encounters would find peace. That instead of fear, farmers would live with utmost hope for a prolific harvest. And that one day, all crops are strong enough to outsmart the changing climate.

These layers of hope, faith, and an evolving culture are shields of Maguindanao — their arsenal that transcends modernization and the dire consequences of natural and human-induced catastrophes. •

NOT LIVING ON RICE ALONE

(CONDENSED from the study *Anthropological and socioeconomic characterization of Bicol's Agta indigenous peoples* by Jacqueline Lee O. Canilao, Sophia Maria M. Cuevas, Ferdinand S. Aguilar, Marion Francis Q. Austero, Imelda D. Olvida, and Mario M. Movillon of PhilRice Los Banos.)

Bicol's indigenous peoples (IP) eat three rice meals a day. When their own harvest is emptied, they buy commercial rice spending money earned from their fruits, root crops, corn, and abaca materials.

The Agtas of Camarines Sur and Albay do not live on rice alone. They believe in government and in God. Their youngsters go to school; watch TV and operate gadgets; talk, text, facebook, and shoot selfies. They are not unlike the majority of Bicolanos. They run for elective posts and vote. They share in the general aspirations of Filipinos.

Cimarron

The Agta-Cimarron live and farm in the corners of Barangay San Pedro, 24 kilometers away from Iriga City in CamSur. In 2012 when they participated in this social research, "inclusive growth" had yet to bring them electricity and running water. They were applying for an ancestral domain title.

Most of their farmers were in their 50s, making ends meet for their 7-member families on average. They have spent half of their lives growing rice. They


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Rice is no longer a primary source of income in Danao, the researchers assert. They eat what they reap and augment it with bought rice. The more rice they produce, the bigger "savings" they generate.

left school as elementary graders, but many of their children now have either finished or are in college. Parents know and still practice their traditions as IP. Before establishing their crops, they do the *apag* ritual to implore the spirits for blessings. It is performed also on All Souls' Day. Farming in their community dates back to 1818 but present-day ways of life are now prominent.

From subsistence farming, many Cimarrons had for some time replaced rice with yellow corn as commercial crop that proved unsustainable. Only a few of them plant corn now. They instead make money out of dried coconut meat (copra), abaca fibers, fruits, vegetables, and root crops.

They eat all their limited rice harvest; buy more often. They recycle seeds. Their soils are less fertile now, and even pests and diseases persecute their crops. Yet planting rice at the same time as they used to do through the *bayanihan* practice is among their self-imposed solutions. What the Cimarrons lament is having almost all of their children, who are mostly in school instead of being farm hands, not knowing how to produce rice themselves.

These youngsters need to be attracted back into farming. They have coconuts, bananas, and abaca to choose from if rice is not productive. Add pili and coffee, too.

Tabangnon

More than 2 km away from the thriving Ocampo town also in CamSur, 71 Agta-Tabangnon families were concentrated in Barangay Gatbo. With Mount Isarog as their neighbor, they have electricity and tap water. Many of them had been upland rice farmers, who now instead plant abaca, root crops, corn, and fruit trees.

Lowland Gatbo has well-irrigated rice fields. Unfortunately, farmers are aging. Modern methods have made them aggressive in hunting for opportunities to produce cash. The young adults are employed outside their barangay. Indigenous culture has markedly tapered off. Residents are reminded of it only when their children would be taught about Agta tradition in school.

Along with modern rices, *Bulaw* is their most popular traditional variety for its special properties and sentimental value. It is less responsive to fertilizers, though. Rice is Gatbo's major source of income. Yet most farmers have stopped believing in incantations or talking to the plants and animals.

Another Tabangnon upland settlement thrives in Danao, Polangui, Albay, which shares borders with Tabaco City, Malinao, and Buhi in CamSur. Cemented roads connect upland farms to the markets. Their schools are accessible and safe for children to attend even during wet days. Employment chances abound.

Near their homes are upland fields that yield rice, bananas, coconuts, peanuts, corn, sugar, root crops, and trees for lumber. Irrigated lowlands turn out rice only for home use. Those living along the roads enjoy electricity. They value their family over everything else.

Rice is no longer a primary source of income in Danao, the researchers assert. They eat what they reap and augment it with bought rice. The more rice they produce, the bigger savings they generate. ▶

These Filipinos may not be living on rice alone, but they cannot live without it. Like the many varieties of traditional and modern rices, these indigenous peoples have their own peculiar traits and ways.

Many Danao farmers now see traditional methods such as shifting fields, conducting rituals, and praying to their deities for good harvest as folk beliefs or superstitions. They pray the way their religion guides them but they no longer offer foods to their gods.

Danao sustains its purchasing power. They now work to earn cash, not to immortalize the *bayanihan* spirit. They need to buy this and that; to load their cellphones and feed other gadgets. The rides require fares as well. But all told, rice remains as their top food.

After they harvest rainfed rice, they keep the fields productive with peanuts, sweet potatoes, cassava, or corn. The *Palayamanan* System capitalizes on the diversity of both agri-products and knowledge – indigenous, local, and scientific.

More Agtas

Barangays Joroan, Misibis, and Mayong in Tiwi, Albay straddle the eastern slopes of Mt. Malinao, descending to the shores of Lagonoy Gulf. Local historians told the researchers their Agta ancestors produced salt, gathered abaca fiber, and traded them along with more goodies in other settlements. They subsisted on upland rice, sweet potato, cassava, and other foods. The little cash they earned bought them tobacco, sugar, and other pieces of merchandise.

World War II and subsequent atrocities brought diverse miseries to the Agtas. When peace stabilized in 2006, they chose to remain in the lowlands where they sought refuge, where the schools were, and the market nearer their homes. Today they buy rice, using the money they make from abaca, bananas, and copra.

On where they used to plant rice and root crops only now flourish either coconut or abaca plantations. They first clear, dry, and burn to ashes the natural vegetation, then sow upland rice and plant young tree seedlings. Root crops come after rice. Later, they burn adjacent areas. The *kaingin* farmers today are descendants of kaingin parents long gone now.

Abaca is their most useful crop. The fiber is crafted into ropes, baskets, cloths, papers among other products. On small irrigated fields, they grow rice for domestic consumption. Diseased abaca trees are burned and replaced with corn or upland rice. Palay yield was measly and unprofitable at 1.41t/ha average in 2012. Production is not plentiful, but rice lingers as part of Agta culture.

The Agtas in Tiwi are at a juncture: young ladies and men interested in farming are dwindling; more and more youngsters leaving home to find their luck elsewhere; older citizens who remember their traditions and history are diminishing.

But look at how important to them rice could be! Certain farmers invest their earnings from banana and abaca to build permanent wet rice paddies in the uplands. Non-contiguous mini-rice terraces in Mayong are near sources of water that flows into many fields. Among the senior farmers, a good rice field is a most valuable asset. The rice produce is not even sold for profit. The farmer and his loved ones eat it, shared among his relatives when possible.

What the IPs of Bicol have in common are not few. This is not to say, though, that what government does for the Cimarrons in San Pedro could simply be replicated in Gatbo, Danao, Joroan, Misibis, and Mayong. The IPs do not yearn for a one-size-fits-all approach to unleashing their potent capabilities. They must be treated one by one.

These Filipinos may not be living on rice alone, but they cannot live without it. Like the many varieties of traditional and modern rices, these indigenous peoples have their own unique traits and ways. •

VOX POP

How do you see rice in the next 50 years?

ANSWERS COMPILED BY ZENNY G. AWING, JESON C. CANDOLE, KRISTIANNE MARIE C. DAVID, REGINA MAE C. RONQUILLO, AND JULIANNE A. SUAREZ OF CENTRAL MINDANAO UNIVERSITY

"We'll be short of rice. We have to look for substitutes, and use the best technology so that people will like them. We'll have to eat less rice and more substitutes, but with added nutritional value."

DR. RICARDO LANTICAN
National Scientist, Plant Breeder

"In today's evolution of technology and recent ways of farming, I am certain that 50 years from now rice would have its nicest variety and supply would be enough for every consumer. In 50 years, our rice would be of best variety and by then we project that other countries would also export rice from us and would somehow contribute to our economic stability."

MR. BERTOLDO S. RONQUILLO
Teacher, Agusan Del Sur

"There would still be rice by that time but it will be more expensive than today, because it will undergo several processes and technologies that will improve the varieties and breeds. Also, maybe people will buy more organic rice or alternative foods since it can't be afforded by many."

REV. FR. DANNY ARELLANO
Chaplain Priest, Butuan City

"There will be less area devoted to rice farming but average yield will be higher (300 cavans per hectare) as plant breeding improves. There will be younger farmers and portions of upland areas may be converted to rice fields."

MR. DIOSDADO IRANON II
Farmer, Bay, Laguna

"Through various innovations from researches of institutions like PhilRice, there will be varieties that are tolerant to drought. Despite climate change, we will be able to sustain the Filipino tables in the next 50 years."

MS. MAE JOY LAGARAS
Fresh Graduate, Central Mindanao University, Bukidnon

"I can see the future of rice in two possible outcomes. First, it may be scarce and hard-to-grow due to environmental hazards and unavailability of rice paddies. Second, rice will be abundant due to genetic enhancements through research."

MR. JUAN CARLOS CORROS
NGO worker, Roxas City, Capiz

RICE IN A 9-BILLION-

SHEREEN P. RAZON

Sometime in 2050—or earlier—the 9-billionth person on earth will be born. And like the rest of humanity, the fellow will have to be fed, clothed, and sheltered.

By then, the magnitude of natural resources needed for the world's subsistence would have billowed and humans would have to be more creative at producing more from less. What will our farms look like? How will we eat? Will we be hiring robot-laborers?

Predicting the future is not our forte but laying down the possibilities could help us to better prepare, if not fully get ready, for what is to come.

Soil-less possibilities

In a seemingly land-strapped future, soil-less and vertical farming advocates say the only way for food production systems to cope is up. It seems their space-optimizing, soil-less techniques of growing fruits and vegetables will characterize future farms as cities expand and flourish.

In 2015, Saleh Al Mansouri, an Emirati farmer, showed the world that rice can be grown in the desert-- through hydroponics—a technique of growing food in a water-based solution.

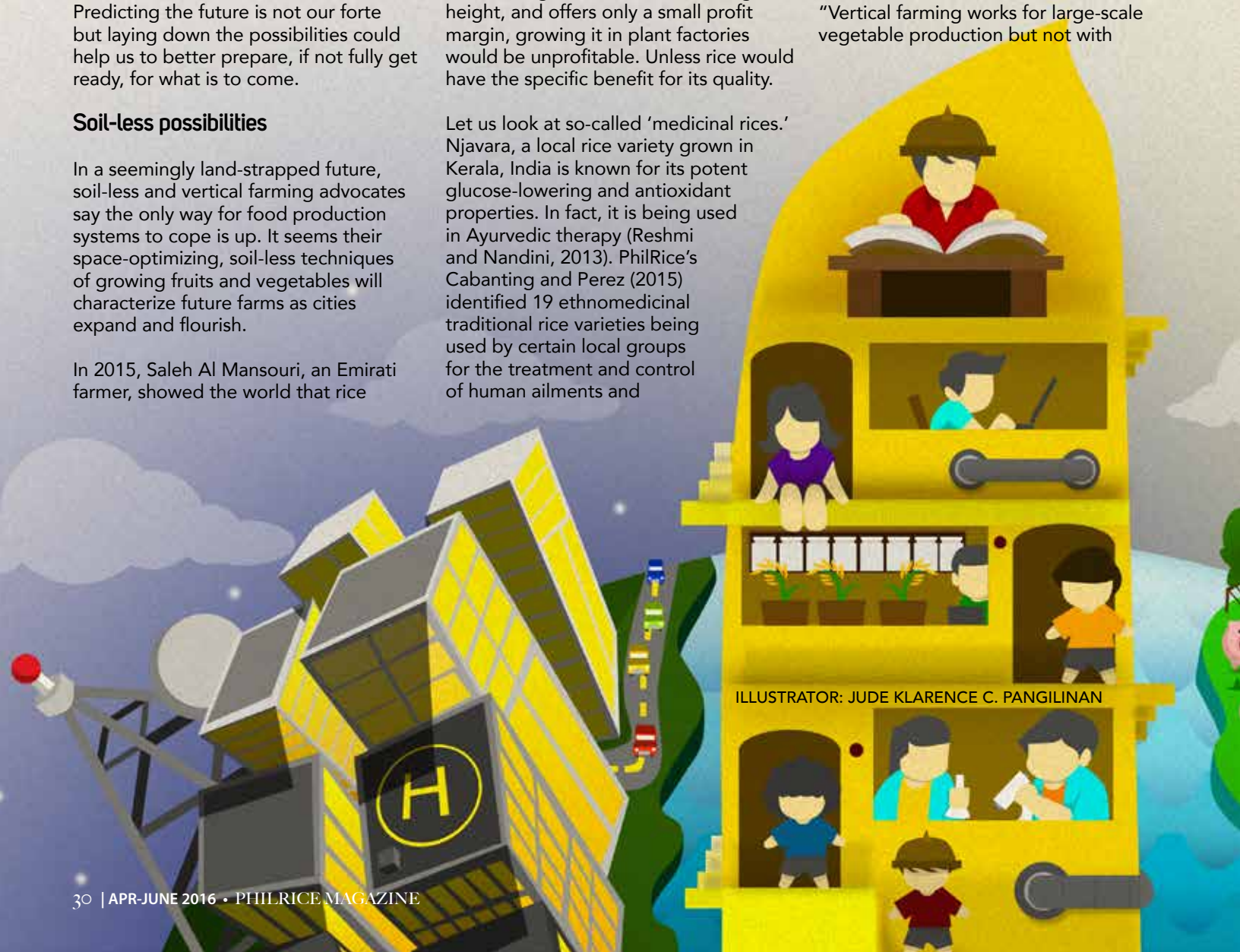
Although a refreshing feat in arid areas such as the Middle East kingdoms and emirates, experts doubt that the soil-less technology would sit well with large-scale grains production.

Yamori and Takagaki (2014) studied the feasibility of growing rice in plant factories. They concluded that since rice takes a long time to mature, has high height, and offers only a small profit margin, growing it in plant factories would be unprofitable. Unless rice would have the specific benefit for its quality.

Let us look at so-called 'medicinal rices.' Njavara, a local rice variety grown in Kerala, India is known for its potent glucose-lowering and antioxidant properties. In fact, it is being used in Ayurvedic therapy (Reshmi and Nandini, 2013). PhilRice's Cabanting and Perez (2015) identified 19 ethnomedicinal traditional rice varieties being used by certain local groups for the treatment and control of human ailments and diseases—a potential gold mine for cutting-edge rice-based applications in the field of medicine!

Interestingly, how to turn rice into edible vaccine is now being studied. The Scientific American magazine suggests that one day children may get immunized by munching on foods instead of enduring injections. These food vaccines may save millions who now die for lack of access to traditional inoculants.

"Vertical farming works for large-scale vegetable production but not with



ILLUSTRATOR: JUDE KLARENCE C. PANGILINAN

-PEOPLE PLANET

(regular, for milling) rice," says Dr. Jasper G. Tallada, PhilRice Climate Change Center director. "By 2050, we will see more intensification in the rice fields. Rainfed areas will have been irrigated, with yields doubling what we produce now. Global warming will be felt as it decreases production, but by then, we will be more ready."

Pro-diversity

Filipino farmers must prepare for two possible scenarios: high-tech mechanized farming for a more competitive local rice economy, and natural farming for a more sustainable food production system, says PhilRice's FutureRice Farm Program Lead Roger Barroga.

The future rice farms, according to Barroga, will consist of these features: water-harvesting, renewable energy, high-tech sensing equipment, own weather station, connected to apps, farming machines, right rice varieties, make the most out of extreme weather conditions, use of natural fertilizers and pesticides, and multiple cropping.

PhilRice 2012 data show that more than 80% of Filipino farmers are still engaged in rice monocropping, most of them with an average landholding of 1 ha. Average rice farmers earn a measly P50,000 a year from this scheme. Lesser when calamities hit.

An average of 21 typhoons hit the country every year, a few of them leaving costly damages to farming communities. This is why in the long haul, changes in how farmers use and see their land will be mandatory.

The rice sector needs a strong extension support system to catalyze integrative transformation in the field. But this will only follow if the farmer has first been transformed and convinced that for the sector to progress, he needs to share with the vision of sustainability.

For one, sustainability will continue to become a buzz word and a driving force behind all of man's ventures in the coming decades. Therefore, it is imperative for farmers to adopt a system of farming that is economically, socially, and ecologically sustainable, says agricultural economist and University of Missouri Professor John Ikerd.

For Ikerd, (farming) communities of the future will be those that have preserved and restored the fertile farmlands that have remained. There will be greater emphasis for local food systems that will allow people to economically support their local farmers. Through local farmers, people will reconnect spiritually with the land and regain a sense of purpose and meaning in life through a commitment to the stewardship of nature. And farmers will again be held in high esteem as the icons of democracy and the caretakers of the future of humanity.

(White) rice-less societies

"Agriculture is all about energy," says Dr. Eufemio T. Rasco, former PhilRice head. "The more efficient a crop is in harvesting and using sunlight to produce edible parts, the cheaper it is to grow. That is why in terms of production of calories per hectare per day, rice is inferior to other alternative staple crops such as, say, *kamote*."

So should we be growing and eating more kamote instead? This is a highly climate change-resilient crop, able to withstand dry spells and typhoons. So is its *kamoteng kahoy* relative.

National scientist and plant breeder Dr. Ricardo Lantican maintains that as the country heads toward modernization, Filipinos will be eating less rice and more of other staples.

Per capita demand for rice in Japan, Taiwan, and Korea has been continuously declining in recent decades.

Since 2013, the PH government has been actively promoting a more responsible and diversified diet through the consumption of brown or whole rice and other local staples such as banana, *kamote*, and *kamoteng kahoy*; and the Pinggang Pinoy (healthy plate) practice where rice takes only ¼ of the plate and the rest is filled with vegetables, fruits, and meat. These are after curbing rice wastage and educating Filipinos on making wiser and more appropriate food choices.

Let there be more reasons for current farmers to stay in farming and the future generation to take good hold of the prized heritage.

Then, the arrival of the 9-billionth person should not be a cause for the least undue anxiety. •

KURU-SAKA

JAYVEE P. MASILANG

KUMIKITA ANG PAGTATANIM NG MAGANDANG BINHI

Kwento ni Edgar Pesebre, 49, mula sa Polangui, Albay

SA PANG-ARAW-ARAW NA BUHAY NATING MGA PILIPINO, KASAMA ANG BIGAS TUWING TAYO AY KAKAIN. BILANG ISANG MAGSASAKA, MULA PAGTATANIM HANGGANG SA PAG-ANI NG PALAY AY DAPAT NASA BUKID AKO UPANG MASIGURO ANG KALIDAD NG BIGAS NA AKING MAIHAHATID SA HAPAG-KAINAN.

Paggising ko alas singko nang umaga ay diretso na ako madalas sa bukid upang mag-*monitor*. Mas mabuti kasing umaga pa lang ay makita mo na ang kailangan ng iyong palayan. Sa tuwina, naglalaan ako ng 2-3 oras sa umaga sa aking bukid at karagdagang 1-2 oras sa hapon. Kapag wala ako, ang aking Ina ang nangangalaga sa aming bukid katulong ang ilang regular naming trabahador dito.

Balik-bukid

Taong 2002 nang magpasya akong magsaka dito sa aming barangay Balangibang. Bago ito, 15 taon akong namasukan sa isang *dealer* ng sasakyan bilang *Accounting Staff*. Ito ang kursong natapos ko ngunit naisip kong bumalik sa bukid dahil ito talaga ang *passion* ko mula pa noong aking kabataan. Itinuturing kong negosyo ang pagsasaka dahil maganda ang kita rito.

Nagsimula ako sa 4,400 metro-kwadradong lupa. Nakita ko na maganda ang kita sa palay kaya naisipan kong palawakin ang aming bukid. Una kong nabili ang 1.2 ektaryang nakasangla lamang sa amin noong una. Mula rito, patuloy kaming nagdaragdag ng lupa tuwing kami ay tumitiba.

Sa ngayon ay mayroon na kaming walong ektaryang sakahan, 6 nito para sa produksyon ng binhi at 2 pambigas. Marami na akong nasubukang barayti ng palay at nakikita ko kung alin ang umaani ng malaki dahil sa paggawa ng *varietal trials* o pagsusubok ng iba't-ibang barayti upang malaman kung ano ang mas aangkop sa lupa at klima.

Tamang binhi

Napakahalaga para sa akin ng *trial* dahil dapat nakaakma sa iyong lupa ang barayti na iyong gagamitin. Hindi mo maaaring isugal ang laki ng lupa mo kapag 'di ka sigurado dahil mahihirapan kang bawiin ito kung hindi tama ang iyong gagamiting pamamaraan. Mas mabuti nang malugi ka sa isang kilo sa *trial* kaysa sa isang ektaryang palayan mo.

Dahil sa paggamit ng teknik na ito ay maganda ang aking naaani. Pinakamataas kong naani sa isang ektarya ay 12 tonelada o 240 kaban gamit ang barayting Rc18. Sa ngayon ay mayroon akong 16 barayti na nakatanim bilang *trial* sa isang kilo lamang ng binhi kada barayti. Sa aking kalkulasyon ay aani ako ng humigit-kumulang 10 kaban kada barayti.

JAYVEE P. MASILANG

Madali para sa akin ang pagtutuos ng gastos at kita dahil sa napag-aralan ko ito sa kolehiyo. Bawat taniman, tinutuos ko ito lahat at nakikita ko kung saan mas makatitipid at mas kikita. Makababuti na mayroon tayong *record* ng lahat ng ating ginagamit sa bukid upang malaman kung saan mas malaki ang makukuhang balik ng ating puhunan.

Mas kumikita ako sa pagbebenta ng binhi ng palay. Ang diskarte ko ay ito ang pangunahing ibinebenta ko mula sa aking taniman. Ang mga 'di maibebenta na binhi ay ipapatuyo ko para maibenta na palay. Mas malaki kasi ang presyo ng tuyo kaysa sa sariwang palay. Sa huli, kung may natira pa ay ibebenta sa mga *traders*.

Nakadaragdag din sa aking kita ngayon ang pagtatanim ng ibang produkto sa aking bukid. Nagagamit ko ang kabuuan ng aking bukid sa pamamagitan ng pagtatanim ng okra, sili, gabi, at iba pang gulay. Wala na akong gastos dito at kumikita pa ako. Mayroon akong 1,000 puno ng gabi sa gilid ng aking pilapil na maibebenta ko ng 5 piso bawat isa. Dito pa lamang ay may P5,000 na agad akong dagdag kita.

> Dahil sa pagsasaka ay nakabili na kami ng gamit sa bukid na nakatutulong nang malaki upang mapalago itong aming negosyo. Mayroon na kaming limang traktora, tatlong trak, tatlong kalabaw, at may sarili na kaming bodega at makinang panlinis ng binhi.
>
> - EDGAR PESEBRE

May pundar

Dahil sa pagsasaka ay nakabili na kami ng gamit sa bukid na nakatutulong ng malaki upang mapalago itong aming negosyo. Mayroon na kaming limang traktora, tatlong trak, tatlong kalabaw, at may sarili na kaming bodega at makinang panlinis ng binhi. Pamparenta ang iba kong gamit. Sa tulong ng Poong Maykapal ay kinilala rin ako ng Kagawaran ng Agrikultura bilang *National Agri-Pinoy Rice Achiever Awardee* noong 2015.

Katulad ng ibang larangan ay maaari rin tayong kumita sa pagsasaka. Kailangan lamang na marunong tayong magplano at nasa puso natin ang ating ginagawa. At tandaan natin na hindi lahat ng gusto mo ay bibilhin mo, makababuti na ikaw ay magtanim upang kukuhanin mo na lang sa iyong bukirin ang iyong kakainin. •

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