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Philippine Rice Research Institute

FRIENDLY TECHNOLOGIES

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ABOUT THE COVER

In December 2017, President Duterte signed Republic Act 10963 or the Tax Reform for Acceleration and Inclusion (TRAIN) Law. Like any innovation, this reform comes with birth pains. But don't fret! PhilRice has a set of technologies for affected farmers to ease the pain.

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2007 Binhi Hall of Fame Awardee
2001 Gawad Florendo Awardee

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EDITOR'S NOTE

FUEL UP WITH TRAIN-FRIENDLY TECHNOLOGIES

The increases in fuel cost beginning early this year will particularly injure rice farmers who depend on pumps for irrigation or as a conveyor of water. Their total fuel consumption constitutes 30% of their whole farm production cost. Estimates indicate that the fuel price hikes threaten to reduce a farmer's rice income by 10%.

Although only a handful (18% of the 2,500 farmers interviewed) are affected, this problem should not be snubbed.

To outmaneuver the threat, our economists admonish farmers to produce 105 kg/ha more rice to offset the intimidating 10% income loss.

This issue of our magazine carries a bag of remedies to address rice production constraints brought about by the restless fuel difficulties. Farming activities that consume fuel are irrigation, land preparation, crop establishment, and harvesting.

The specific technologies featured here are: wind pump drip irrigation, pump gasifier using rice straw, alternate wetting and drying solution, mechanical transplanter, and the like. To further enhance farmers' efficiency, this magazine also features some useful nutrient diagnostic tools (e.g., MOET).

Deliberate efforts to promote these technologies across the farmers are seriously needed. An enabling policy environment must be put in place, and concrete programs formulated to ensure that these technologies are widely adopted among the small-scale farmers. At the farmers' level, behavioral change is desired; they should be more resourceful and flexible to adapt to the changing economic landscape in the country, not to mention being open-minded to embrace new innovations and options.

The bottomline is we help make our farmers competitive and resilient so that when any economic quandary strikes they would not be easily trampled upon. To be competitive, as highlighted on the back cover, the farmer must produce a yield of 6 t/ha at a cost of P8/kg. •

QUALITY RICE. QUALITY LIFE. OUR NEW BATTLECRY

To uphold its commitment to help our rice farmers and the rice industry become competitive, PhilRice is embracing a new slogan: "Quality Rice. Quality Life."

From the quality rice that PhilRice breeds must come the quality seeds for seed growers and farmers to cultivate, which impact on the quality of paddy rice (*palay*) that they harvest, and which traders and millers buy and sell. Eventually, this affects the quality of milled rice (*bigas*) sold by retailers that has an effect on the quality of cooked rice (*kanin*) that consumers eat and, ultimately, on their health and way of life.

Be it *palay, bigas,* or *kanin*, the quality of rice keeps our economy and the rice industry in good shape. This means a life free from worries on rice shortage, farmers' low income, and poor nutrition – a life that will enable every household to have access to affordable, safe, and nutritious rice at all times. •

VILLAR: QUALITY SEEDS, MACHINES KEYS TO COMPETITIVENESS

Senator Cynthia A. Villar, agriculture committee chair, urged rice farmers to use quality seeds and farm machines to earn good income and become competitive in the local and international markets.

"Trade liberalization compels us to be more competitive as rice and other goods from other countries will easily be available in the market. To compete, you have to reduce production cost by using quality rice seeds and farm machines," Villar said during the 2018 *Lakbay Palay* at PhilRice CES, April 3.

"I am instructing PhilRice to educate as many farmers as possible on the use of quality rice seeds. Help them increase their yields and reduce farm expenses. Your survival as farmers under trade liberalization depends on yourselves. We can only help you with government programs and services," she told the farmers.

"If Nueva Ecija can, other provinces can also do it. PhilRice has bred a number of varieties that exceed the national average of production. Let's explore the options to enhance our yield," she continued. The national average yield in rice is 4t/ha while Nueva Ecija produces 5.8t/ha.

ANNA MARIE F. BAUTISTA

The mechanical transplanter, combine harvester, and mechanical dryer can reduce labor cost, she added. To produce a kilogram of *palay*, Vietnam only spends P6.00 while Filipino farmers shell out P12.41, a greater portion of it for labor.

Villar also said that government interventions such as the shared facilities, loan services, and free irrigation programs are easily available and accessible for farmers. The Senate Agriculture Committee is improving government assistance for the rice industry. **-ANNA MARIE F. BAUTISTA**

TRAINERS BRUSH UP ON SEED PRODUCTION

A total of 133 regional and provincial seed coordinators and inspectors, rice information officers and focal persons, agricultural extension workers, municipal agriculturists, and agricultural program coordinating officers participated in a training on seed production jointly sponsored by DA, PhilRice, and the Bureau of Plant Industry (BPI).

The training was conducted simultaneously on April 18-19 at PhilRice in Nueva Ecija for the Luzon trainers; in Bacolod City, Negros Occidental for the Visayas group; and at PhilRice Agusan for the Mindanao personnel. Region 9 delegates had a similar training in Pagadian City, May 3-4.

According to Dr. Karen Eloisa T. Barroga, PhilRice's acting deputy executive director for development, this training is in support of the new DA project *Farmers' Production and Exchange of High-Quality Inbred Rice Seeds* (SEEDEX). PhilRice and BPI are leading the project's capability enhancement activities in coordination with the Agricultural Training Institute.

The SEEDEX project aims to strengthen the use of quality seeds of appropriate inbred varieties in provinces that have average yields below 4 t/ha.

"The training enhanced the capacity of regional training teams to educate rice farmers on how to produce their own quality inbred rice seeds and help them understand and appreciate the advantages of using such," said PhilRice Rice Seed System Program Leader Dr. Glenn Y. Ilar. **-HANNA MAE C. TOLENTINO**

LAKBAY PALAY PROMOTES QUALITY SEED, RENEWABLE ENERGY


PHILRICE PHOTO

About 1,500 farmers, students, extension workers, and researchers dominated this year's week-long *Lakbay Palay* Dry Season at PhilRice Nueva Ecija, April 3-6.

The field day revolved around the use of quality seed and renewable energy. Activities included farm visits, distribution of rice knowledge products, and on-site expert dialogues/consultations.

Featured were: public hybrid rice varieties, hybrid rice seed production (AxR), wireless sensor network, rice machines, mobile rice-husk gasifier, kwebo (typhoon-resistant structure), capillarigation (low-cost irrigation system), zero-waste pig and goat production, solar-powered smart house, drone application in rice production, traditional rice varieties, rice paddy art, and organic rice production.

The event also accentuated the advantages of planting the five nationally recommended inbred varieties (NSIC Rc 222, Rc 216, Rc 160, Rc 300, and Rc 238).

Senator Cynthia A. Villar and Butil Party-List Representative Cecilia Leonila V. Chavez alternately graced the field day.

PhilRice Los Baños and Bicol also conducted their own *Lakbay Palay* on April 18 and 20. Farmers, extension workers, students, provincial and municipal agriculturists, experts, and partners of both stations participated in the events.

CALABARZON participants were urged to strengthen their partnerships for more bountiful harvests. With the theme "*Binhing Dekalidad, Pagpapalayang Maunlad*!", the field day zeroed in on the use of high-quality seeds for progressive rice farming.

Meanwhile, Bicolano participants were introduced to new rice and rice-based technologies available in the station. Emphasizing the importance of quality seeds as key to competitiveness, activities, and discussions circled on the theme, "*Banhing Oragon, an Simbag sa Pag-omang Mauswag.*" **-DONNA CRIS P. CORPUZ**


PHILRICE LOS BAÑOS


PHILRICE BICOL

Field tours at PhilRice Los Baños (L) and Bicol (R) provided an avenue for CALABARZON and Bicol farmers to learn about new rice and rice-based technologies that they can explore and duplicate.

PAPER, POSTER AWARDS REAPED

PhilRice R4D workers bagged major awards in two recent national scientific conferences.

29th Philippine Agri-Engineering Week

During this event that ended in Davao City on April 28, our engineers and researchers received awards from the Phil. Society of Agricultural and Biosystems Engineers.

Under the development category, Kristine S. Pascual and team won first place for their paper *Accelerating the Dissemination of Alternate Wetting and Drying and Associated Rice Production Technologies that are Resource-Use-Efficient*.

Pascual, Marvelin L. Rafael, and Dr. Manuel Jose C. Regalado also won first place for their poster *Development and performance evaluation of a multi-crop reduced-till planter (RTP) for rice and rice-based crops.*

Under the research category, the paper *Development of Appropriate Rice-Based Biomass Gasification Unit as Source of Power for Farm Use* by Alexis T. Belonio, Regalado, and Phoebe R. Castillo was awarded first place.

The papers *Development of a Post- harvest Management Protocol for the Philippine Rice Post Production Industry* by Regalado, Paulino S. Ramos, and Jan 11 Dela Cruz; and *Sustainability Assessment of Hand-Dug Wells* by Jessica P. Jimenez, Armando N. Espino Jr., Vitaliana U. Malamug, and Melissa E. Agulto were both awarded as third placers.

21st Phil. Society of Soil Science and Technology (PSSST)

Our soil scientists and researchers also glittered with three best paper awards at the PSSST Annual Meeting and Scientific Conference held in Davao City, May 2-5, highlighting innovations in soil science for improved ecosystems.

Jayvee A. Cruz, Josef Mikhail R. Bautista, Editha V. Evangelista, Alexandra R. Agpaoa, Dr. Jonathan M. Niones, Trinidad C. Fernando, Dr. Roel R. Suralta, and Erlinda S. Paterno placed second in the senior category for their paper *Variation in growth of rice varieties in response to inoculation with a plant growth-promoting actinomycete*.

In the junior category, Central Luzon State University student-researcher Paul John M. Pangilinan with professor Florida C. Garcia, PhilRice researchers Wilfredo B. Collado, Dr. Jennifer T. Niones, Evangelista, and Cruz, and UP Diliman researcher Maria Auxilia T. Siringan received the 1st place award for their paper *Soil microbial functional diversity under long-term irrigated lowland rice ecosystem.*

Bicol University College of Agriculture and Forestry student-researchers Christian Lits O. Delfino and Sonny B. Vista, with their professor Judith R. Chavez, and Cruz of PhilRice also took 3rd place in the same category for their paper *Growth and yield performance of Blonde red rice (Oryza sativa L.) inoculated with actinomycetes in Balasbas, Manito, Albay.* **-ANNA MARIE F. BAUTISTA AND DONNA CRIS P. CORPUZ**

MANNY PIÑOL'S FB PAGE

PH, PNG SIGN TIES FOR RICE INDUSTRY DEV'T

Philippine Agriculture Secretary Emmanuel Piñol (R) and Papua New Guinea (PNG) Prime Minister Peter O'neill (L) inked a partnership to boost rice production and improve agri-trade relations between the two countries. According to Acting PhilRice Executive Director Sailila E. Abdula, the partnership aims to advance the rice industry growth of PNG and the Philippines by developing hybrid varieties, investing in infrastructure, postharvest technologies and agribusiness, and organizing agricultural research, education, and training.

SCIENTIST RECOGNIZED FOR ENGINEERING EXCELLENCE

Orge (L) receives his plaque of recognition.

Agri-engineer Dr. Ricardo F. Orge was the sole recipient of the Manila Water Foundation (MWF) Prize for Engineering Excellence 2017.

Every other year, this award is given to outstanding Filipino scientists and engineers whose inventions and innovations enable change in the lives of the marginal sector while championing water, sanitation, environment, and sustainability. In 2015, five engineers received the award from the MWF, in partnership with the DOST and the Philippine Technological Council.

Orge's more than 20 years of research work focuses on developing machines that can help enhance farmers' productivity and resilience to climate change.

One of these inventions is the continuous-type rice hull (CtRH) carbonizer, a smokeless biomass machine that processes rice husk into biochar (carbonized rice hull) and is equipped with heat recovery attachments for various applications in the farm. Its attachments include a poultry heating system that can substitute an LPG heater for brooding chicks, high-volume cooker, baking oven, and pasteurizer for mushroom fruiting bags. The biochar can be used as organic fertilizer, soil conditioner, or pest control agent.

Orge also steered the development of the "capillarigation" technology for areas with scarce water, and the "kwebo" a multipurpose farm structure meant for typhoon-prone areas, which are both on field trial.

A son of Merida, Leyte, he now leads the Climate Resiliency for Enhanced Agricultural Trade and Efficiency for Rice (CREATE-Rice) program. The 57-year-old grandpa has received the Most Outstanding Agricultural Engineer or Maramba Award given by the Philippine Society of Agricultural and Biosystems Engineers, Gawad Saka Outstanding Agri-Scientist for Central Luzon, and other various conference paper awards. **-ANNA MARIE F. BAUTISTA**

PHILRICE HAS MOST NUMBER OF PATENTS IN GOV'T

On behalf of PhilRice, in-house Intellectual Property specialist Atty. Jerry Serapion (middle) receives the plaque.

The Intellectual Property Office of the Philippines (IPOPH) recognized PhilRice as the government institution with the most number of patent grants since 1998 during the Property Convergence 2018 in Makati City, April 26.

The special award is bestowed on private and public institutions with record-breaking achievements in the areas of IP protection, utilization, and/or commercialization.

"This is a testament that PhilRice is a leading institution with innovative culture," said Atty. Jerry Serapion, the in-house IP specialist.

Among our patents are the portable floating pump, gravity-type drip irrigation system, method to protect the rice plant against sheath blight, mobile rice hull-gasifier system for different applications, and the rice-hull-charcoal maker. At present, the institute brandishes 11 patents and 22 on-going applications.

Serapion contends PhilRice has to sustain the status and increase the number of patents, hence, the need for a pool of scientists and researchers who could work on improving technologies and be trained on intellectual property protection, commercialization, and patent-drafting.

A patent is an exclusive right granted to the developer of a product, process, or an improvement of either, which is new, inventive, and useful.
-ALLAN C. BIWANG, JR.

GOLDEN RICE DECLARED SAFE

Food regulatory bodies in Australia, New Zealand (Food Standards Australia New Zealand or FSANZ), and Canada (Health Canada) have declared the GR2E strain of Golden Rice as safe for food, feed, and processing (FFP). This is the first nutritionally enhanced genetically modified rice to receive regulatory approval for food.

Golden Rice is a new type of rice that contains beta carotene, which is converted to vitamin A needed by the human body. It is developed as a complementary intervention to help address vitamin A deficiency, a persistent public health problem in the Philippines affecting 2.1 million children, and at least 9% pregnant and 5% lactating mothers.

FSANZ declared Golden Rice "to be safe for human consumption as food derived from conventional rice varieties." Health Canada said, "GR2E would have no impact on allergies, and that there were no differences in the nutritional value of GR2E compared to other traditional rice varieties available for consumption, except for increased levels of provitamin A."

These assessments were thoroughly conducted by the regulatory bodies following internationally accepted guidelines on food safety, developed over the past 20 years by the World Health Organization, the Food and Agriculture Organization of the United Nations, the Organization for Economic Co-operation and Development, and the Codex Alimentarius Commission.

The DA-Bureau of Plant Industry is currently reviewing the Golden Rice (GR2E) FFP application submitted in 2017.

"The Healthier Rice (formerly Golden Rice) Project strongly adheres to the country's stringent regulatory procedures, and we are very optimistic that our application will be approved" Project Lead Dr. Reynante Ordonio said.

FFP approval is a part of the R&D process necessary in conducting a nutrition study to determine the effectiveness of Golden Rice in providing vitamin A to humans.

PhilRice and IRRI are collaborating to develop healthier rice varieties biofortified with beta carotene (vitamin A), iron, and zinc to complement existing efforts to reduce micronutrient malnutrition.

"Since we widely cultivate and eat rice, it would be good to make it healthier to address nutritional deficiencies especially in areas that are hardly reached by existing interventions," Ordonio concluded -**JUNGIE Q. AMACANIN**

COMREL AT YOUR SERVICE

If you visit and engage with PhilRice, the Community Relations Office (ComRel), a newly established unit, will be happy to accommodate and assist you.

ComRel nurtures the Institute's relations with its stakeholders including farmers, seed growers, extension workers, rice consumers, agricultural information intermediaries, and policymakers. It also educates and engages the public in experiential learning to better understand rice science using various media and platforms, such as artworks, stories, exhibits, science museum, laboratories, and demonstration farms.

Easy contact with ComRel through: (044) 456-0394 loc. 520; or email: prri.mail@philrice.gov.ph.

MORE IN-HOUSE SEMINARS HELD

PhilRice keeps its personnel abreast with the latest knowledge through institutional seminars.

Managing soils in the world of 11 billion people (April 20). Dr. Rattan Lal, soil scientist from Ohio State University, said feeding 11 billion people by 2050 can degrade the soil gradually. Visiting PhilRice, he urged researchers and policymakers to explore sustainable intensification as a strategy to produce more food from less production resources, including soil.

"We have to change the way we treat our soils in terms of food production. This would imply empowering farmers and land managers to produce food while reducing waste, enhancing the eco-efficiency, and restoring the degraded soils and afforesting denuded lands," Dr. Lal added.

Some technological innovations that he cited include soil-less and nutrition-sensitive agriculture, precision farming, soil restoration, and urban/sky and space farming.

New breeding techniques (NBT): Precision genome-editing tools for modern plant breeders (April 17). Dr. Reynante L. Ordonio, Golden Rice/Healthier Rice project leader, introduced to his fellow plant breeders the following: Oligonucleotide- directed mutagenesis, Cisgenesis and Intragenesis, RNA-dependent/ directed DNA Methylation, Grafting (on GM rootstock), Reverse breeding, Agro-infiltration "sensu-stricto", agro inoculation, floral dip, and Synthetic Genomics.

Ordonio also highlighted the potentials of modern biotechnology.

Dr. Rattan Lal speaks on maintaining soil quality while sustaining food production.

Statistical methods for rice research and basic excel functions. Dr. Anna Maria Lourdes S. Latonio, head of the Department of Statistics of Central Luzon State University, discussed inferential statistics as used in rice-related researches, April 23.

Meanwhile, Mr. Rolan Ynion, Philippine Trade Training Center development specialist also discussed the basic logical and statistical functions of MS Excel application that are valuable to PhilRice administrative and research works, April 19 and 20.

Both seminars refreshed PhilRice researchers about correct planning, design, implementation, and interpretation of their findings.

NATIONAL RICE CONFAB SLATED

The **31st National Rice R4D Conference** will be held on **September 6-7** at the PhilRice Central Experiment Station, Maligaya, Science City of Muñoz, Nueva Ecija.

This year's conference specifically centers on the value of rice R4D in advancing the lives of the rice farmers and seed growers, the rice traders and millers, the rice retailers and consumers, the researchers and development workers, and all others who depend on rice.

Hence, this year's conference theme is **"Quality Rice. Quality Life".**

Topics to be presented here will be research updates and outputs that underscore Quality Rice, and development initiatives that spur Quality Life. By Quality Life, it refers to a life free from worries on rice shortage, farmers' low income, and poor nutrition.

For more details, contact us through ricesecretariat@gmail.com or (044) 456-5388.

Library solutions, predatory journals, plagiarism (April 25). R&D staff were updated about the growing services that the PhilRice Library offers. It now houses 7,478 books; 636 eBooks, 1,034 printed journal titles; 7,149 rice reprints; 1,497 non-rice reprints; 25,974 XCardbox entries; 47,054 digital collections; and one online full-text journal database.

Head Librarian Elaine Joshi urged the staff to optimize the wide array of R&D resources available in the reading room and uploaded in the library's online page.

Joshi also gave tips on how to maintain scientific integrity while being cautious about plagiarism, and "predatory" journals or open-access publishers that have questionable reputation. **-ALLAN C. BIWANG JR., DONNA CRIS P. CORPUZ, AND ELSIE E. REYES**

MOA signing between officials of PhilRice led by Dr. Sailila E. Abdula (7th from right) and CLSU led by Dr. Tereso A. Abella (7th from left).

TIES WITH DSWD, CLSU, BFAR INTENSIFIED

To help more farmers benefit from additional sources of income, PhilRice Batac and Nueva Ecija have agreed with new partner-agencies to create more opportunities for them.

Batac is collaborating with the Department of Social Welfare and Development Region 1 to capacitate farmer-beneficiaries of its Sustainable Livelihood Program effective until 2020.

Skills Training on Micro-Enterprise Development Project Leader Dr. Reynaldo C. Castro said more than 900 beneficiaries from Ilocos Norte/ Sur and La Union will be trained on rice, vegetable, and oyster mushroom production at the station.

"We aim to reach out and capacitate more farmers and help increase their productivity and income through this collaboration," said Castro.

The FutureRice Farm Project signed a Memorandum of Agreement (MOA) with the Central Luzon State University and the Bureau of Fisheries and Aquatic Resources - National Freshwater Fisheries Technology Center (BFAR-NFFTC) for the development and promotion of rice-based technologies, including zero-waste animal production, a low-cost and odorless pig-farming system, and hydroponics (soil-less) vegetable production.

BFAR-NFFTC committed to support aquaculture production by demonstrating and promoting its best practices for rice farmers to replicate on their own farms.

"We recognize the expertise of both agencies in agriculture. When these technologies are integrated with rice production, farmers will have diversified streams of income," said FutureRice's Roger F. Barroga. **-ALLAN C. BIWANG, JR.**

INFO MATERIALS FOR POLICYMAKERS LAUNCHED

PhilRice executives hand over info materials on rice to Butil Partylist Representative Cecilia Leonila V. Chavez (3rd from left).

The Science-Based Policies in Advancing Rice Communities (SPARC) Program of PhilRice on April 27 launched information materials primarily in support of rice policymakers held at DA in Quezon City.

"The materials popularize data derived from PhilRice studies to guide decision-makers in formulating policies mostly benefiting the farmers. The key points and calls for action will further enhance their understanding on urgent issues affecting our rice growers," Program Leader Myriam G. Layaoen said.

Among the materials launched was the 120-page book titled "Comparative Efficiency of Rice Farming in Asia and the Philippines" compares local rice farming with Asia's major rice-producing countries.

Other info materials were on the impact of TRAIN Law on rice farmers, advantages of investing in hybrid rice, and effects of mechanization on farmers' competitiveness.

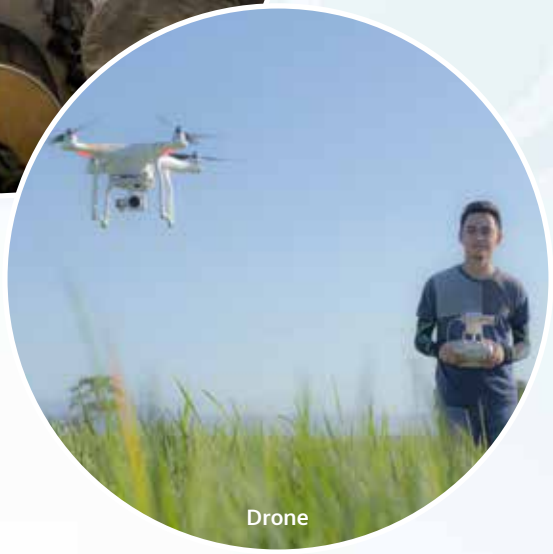
Students, policymakers, government officials, media, researchers, development workers, academicians, and officials from DA, Agricultural Training Institute, and PhilRice participated in the activity.

The SPARC program aims to create and strengthen "science-based and supportive policy environment" to help farmers reduce farm labor costs, narrow yield gaps, and have easier access to farm credit. **-DONNA CRIS P. CORPUZ**

WHAT'S NEW IN RICE RESEARCH?

PAMELA V. CARBUNGCO,
JESSICA C. RAMENTO, AND ALEXIS T. MITAS


Bag-drying system


Drone

DRONES IN RICE FARMING

PhilRice through its Rice Farming Mechanization and Modernization Program is currently exploring possible uses of unmanned aerial vehicles or drones in rice farming. It aims to increase the precision and efficiency in decision-making among rice farmers and extension workers.

"It is difficult to equally monitor all portions of the field owing to limited eyesight. However, with the use of any kind of drone, we can create a map of the entire planting area and see many aspects of the field. Monitoring the field is made easier," said Nehemiah Caballong, PhilRice ICT specialist.

Caballong explained that one of the primary applications of drones in rice farming is to create field maps. Farmers can take photos of their fields. These photos will be combined by a software into a high-resolution farm map. These maps help farmers and extension workers identify missing hills in the field, observe inconsistency in the greenness of the canopy, monitor pest and disease incidence, pinpoint areas affected by typhoons and strong winds, and determine the readiness of the field for harvest.

"In an era when gadgets like drones are affordable and easy-to-operate, integrating ICTs in agriculture can be a way to win back the youth's interest in agriculture. Welcome to the new generation of farming," Caballong heralded.

BAG-DRYING SYSTEM

To mitigate the ill effects of typhoons during harvesting, PhilRice, in collaboration with the Bureau of Agricultural Research, is developing an efficient bag-drying system for typhoon-affected paddy rice (*palay*).

"We started to develop the dryer because some devastating typhoons hit the country during harvesting. If not dried immediately, the quality of flooded *palay* deteriorates quickly thus more losses," PhilRice Engineer-Scientist Ricardo F. Orge said.

In the bag-drying system, *palay* is placed inside large bags that are mounted on holes inside a drying facility. The heat generated by the rice hull carbonizer is blown into the holes and eventually to the bags to facilitate drying. Each bag can hold up to half ton (500kg) of *palay*.

Orge explained that the system doesn't require a minimum amount of *palay* before drying unlike the conventional flatbed dryers. Moreover, placing the *palay* in separate bags allows staggered drying. It is also possible to dry different varieties at the same time, as these are placed in separate bags.

"You can start drying one bag of *palay* while the other bags are still on their way to the dryer. The drying process is continuous. If one bag of *palay* is already dry, you can replace it with another bag," he bargained.

The system is housed inside the *Kwebo*, a typhoon-resilient, low-cost, and easy-to-build structure that can also serve as a storage facility for seeds, animals, and farm machinery in times of bad weather.

Orge said the system is not yet commercially available. They are still improving the system's design before it undergoes various performance tests. He estimates that the system would need about 8hr to dry *palay* that is dripping wet.

"Once this is fully developed and released, it can be included in the DA program that promotes the use of combine harvesters among farmers' cooperatives. Harvesting machines should be provided to farmers together with drying facilities to serve as safety nets against typhoon damage," Orge recommended. •

RICE ACROSS

DONNA CRIS P. CORPUZ

BATAC IS SIKAP AWARDEE

PhilRice Batac received the 2017 *Sambayanang Itinataguyod ang Kaalamang Agrikultura at Pangisdaan* (SIKAP) award for its support to extension initiatives for agriculture development. The award is given by the Agricultural Training Institute (ATI)- Region 1.

Batac Branch Director Dr. Mary Ann U. Baradi said the recognition inspires them to be more persistent in their convergence project with ATI to help more farmers in the area.

MARIBEL ALUPAY

The station was recognized for leading the season-long training on rice production, establishing a technology demonstration and variety trial site on rice and vegetables in Sto. Nino, Nueva Era, Ilocos Norte, and serving as resource persons on rice production and climate change in a school-on-the-air program of ATI and Mariano Marcos State University.

LOS BAÑOS LAUNCHES SCIENTISTS' CORNER AND LEARNING SHED

The scientists' corner showcases portraits of the late national scientist Bienvenido O. Juliano and first PhilRice Executive Director and now Consultant Santiago R. Obien, together with some of their works and contributions to Philippine agriculture. The corner aims to entice the youth and other stakeholders to venture in agriculture,


MARITHA C. MANUBAY

ISABELA PROMOTES PALAYAMANAN

PhilRice Isabela encourages farmers to continuously adopt the Palayamanan Plus (PalayPlus) models in the rice areas of San Juan, Quirino, Isabela. Various *PalayPlus* components are being established for local farmers, such as intensified rice-based cropping systems, livestock integration, mushroom-growing, and organic fertilizer production. Recently, the implementing agencies provided rice seeds and piglets to farmers for capital build-up through a roll-over scheme.

The station aims to create a database on the socio-economic and site profiles, its market information; design and evaluate the adaptability of the PalayPlus models; improve the capacity of farmers and other stakeholders involved; and ensure sustainability. Partners of the project include the LGU of Isabela, Isabela State University- Roxas Campus, Department of Trade and Industry, and DA-Regional Field Office 2.

THE COUNTRY

and science and technology. Staff and partners of PhilRice Los Baños, and Althea Roa, the artist who created the portraits, attended the launching.

A farm learning shed was also established for visitors during station tours where the latest released rice varieties and other farm technologies are introduced. Dr. Obien and PhilRice Director Sailila E. Abdula led the ribbon-cutting ceremony for this facility.

MIDSAYAP HEATS UP RICE EXTENSION THRU KSL

Around 120 farmers, students, and other rice stakeholders attended a knowledge-sharing and learning (KSL) activity organized by PhilRice Midsayap.

The activity involved more intermediaries to invigorate rice and agriculture extension in the country, highlighted the important role of extension intermediaries in helping local farmers, and introduced to the stakeholders some ICT-based resources and tools in agriculture. Videos discussing the challenges that threaten the agriculture industry and other issues related to agriculture such as poverty, malnutrition, fast population growth, and climate change were also shown to the participants.

RUBY MOSELLE TUMANGUIL


PHILRICE NEGROS

DA TO FUND SOLAR-POWERED IRRIGATION FOR NEGROS STATION

Agriculture Secretary Emmanuel Piñol, during his visit to PhilRice Negros, committed to provide funding for the establishment of a solar-powered irrigation system in the station come 2019.

Negros R&D Coordinator Cherryl Seville said the system will help irrigate the station's 60-ha seed production and 12-ha research areas.

Piñol was briefed on the station's available seed stocks, area of coverage, and performance of varieties. He then encouraged the station to continue its efforts to identify appropriate hybrid varieties for the region that can help farmers increase their yield and income.
DA-RFO 6 Director Remelyn Recoter and Negros Occidental Provincial Agriculturist Japhet Masculino accompanied the Secretary.


PHILRICE BICOL


PHILRICE BICOL

BICOL TURNS 7

Local government officials, farmers, and students joined PhilRice Bicol's 7th founding anniversary celebration.

The station's laboratory and lodging facilities were inaugurated after the turn-over ceremony of the DA-RFO 5-funded seed warehouse.

Acting Branch Director Dr. Victoria C. Lapitan said the warehouse will help ensure the availability, affordability, and accessibility of high-quality seeds in the area, including Eastern Visayas. The facility caters to the produce of the station's 65-ha seed production area.

The celebration also included a seminar for youth on agripreneurship, sports fest, and employees' night.

BUKIDNON OFFICE RECEIVES NEW FARM MACHINES

DA-Northern Mindanao Integrated Agricultural Research Center (NOMIARC) turned over P888,000-worth farm machines to the PhilRice Field Office at the Central Mindanao University (CMU) in Bukidnon. The Office is thankful for the mini-4WD tractor with rotavator, disc plow, and trailer.

DA-RFO 10 Director Carlene Collado handed the certificates of turnover to PhilRice Executive Director Sailila E. Abdula and Office Head Dante Dela Cruz.

BRAVING THE TRAIN RIDE

HANAH HAZEL MAVI B. MANALO

For Pepito "Kabog" Orcino, 61, of Palusapis, Science City of Munoz, Nueva Ecija, who feeds ten mouths, paying P36.5 for every liter of diesel is a burden as he heavily relies on pump to irrigate his 3,000-square-meter farm. Back in 2017, Mang Kabog only paid P29 per liter.

"I could have brought home 6 kg of rice for my family," lamented Mang Kabog.

Increased fuel specific tax is one of the stipulations of the Tax Reform for Acceleration and Inclusion (TRAIN) Law.

ESCALATING FUEL PRICES

In December 2017, President Duterte signed Republic Act 10963, known as TRAIN Law. It is the first package of the Comprehensive Tax Reform Program aiming to create a simpler, fairer, and more efficient tax system. Here, taxpayers who earn more will pay higher taxes starting 2018.

One of TRAIN's provisions is the higher specific tax on petroleum products that has not been adjusted since 1997. Specific tax refers to the tax on the production, sale, or consumption of a commodity in a country based on the weight or volume capacity.

For diesel, there is an increase in tax of P2.50/L in 2018, P4.50 in 2019, and P6.00 in 2020. Gasoline, on the other hand, has a tax hike of P7.00/L in 2018, P9.00 in 2019, and P10.00 in 2020.

According to the PhilRice policy brief *How the Tax Reform for Acceleration and Inclusion Law Impacts Rice Farmers*, the effects of increased fuel prices are directly felt by farmers like Mang Kabog who depend on pumps for irrigation water. It was noted that only 18% of the 2,500 surveyed farmers were pump-dependent, thus only a few farmers in certain areas would be hit by the higher fuel prices.

"Their fuel consumption accounts for some 29% of their total production cost," said PhilRice Senior Economist Aileen C. Litonjua.

She also explained that TRAIN increases the production cost of pump-dependent farmers by 50 centavos for every kilogram of *palay* produced. Using farmers' income in 2016 as baseline, the increase in production cost results in a 10% reduction in income.

CUSHIONING THE EFFECTS OF TRAIN

Higher fuel price and increase in cost of farm production may lead to lower income of pump-dependent farmers if farmgate price of palay remains the same.

To offset the increased cost, farmers have to use yield-enhancing

PHOTO BY JAYSON C. BERTO

To offset the increased production cost owing to higher fuel prices, pump-dependent farmers have to use yield-enhancing technologies, mechanize to reduce harvest and postharvest losses and adopt water-saving technologies like Alternate Wetting and Drying.

technologies, mechanize to reduce harvest and postharvest losses, and adopt water-saving technologies like Alternate Wetting and Drying (AWD).

The farmers are encouraged to plant high-yielding varieties to produce an additional yield of 105 kg per hectare to maintain the same level of income.

Also, lesser harvest losses mean more net yield. According to the DA - Philippine Center for Postharvest Development and Mechanization (DA-PHilMech), farmers incur 4.29% harvest losses. Farmers are therefore urged to mechanize their harvesting operations.

"Adopting the combine harvester could help farmers reduce these losses to 2.11% thereby saving more of their produce without significantly increasing fuel cost," according to PhilRice Engineers Dr. Manuel Regalado and Paulino Ramos.

Apart from mechanization and high-yielding varieties, farmers should use AWD to reduce water-use by 16-35% without penalizing their yield.

Meanwhile, the government has to hasten the completion of existing large-scale irrigation projects. This will provide farmers, especially the pump-dependent ones, with a free and reliable irrigation supply to help them save on fuel cost.

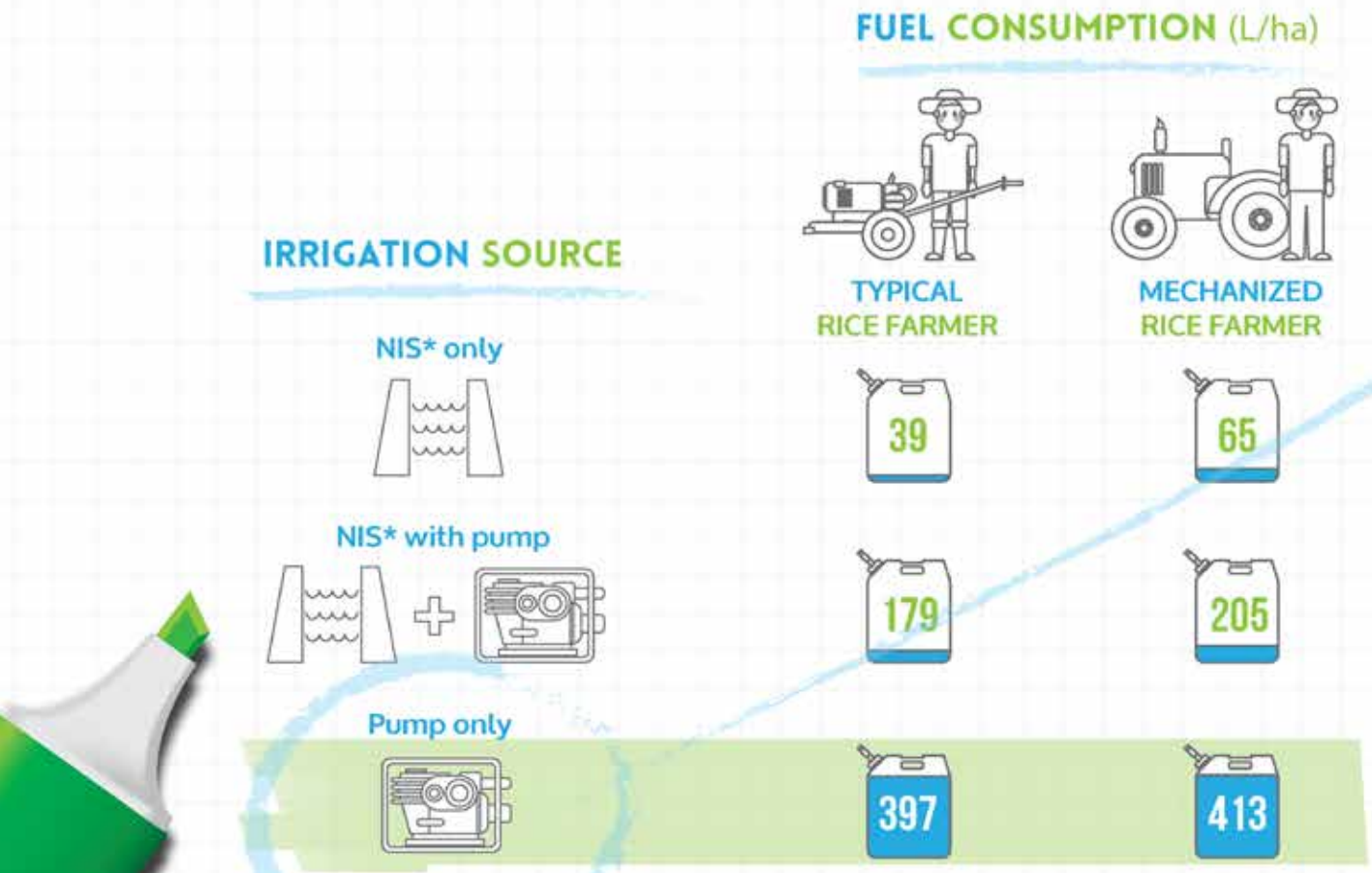
For Mang Kabog, he hopes that the TRAIN trip would not turn into a rollercoaster ride with extreme and rapid changes in his life as a farmer. •

FUEL USE IN RICE FARMING

ILLUSTRATED BY: **ANDREI B. LANUZA**
SUBJECT MATTER SPECIALISTS: **MYRIAM G. LAYAOEN AND AILEEN C. LITONJUA**

ESTIMATED FUEL CONSUMPTION, BY FARMER CLASSIFICATION AND IRRIGATION SOURCE

Fuel consumptions of typical and more mechanized farmers show very little difference, with the latter using only 16-26 liters more. This is about P600 – P1,000 per hectare.



* National Irrigation System

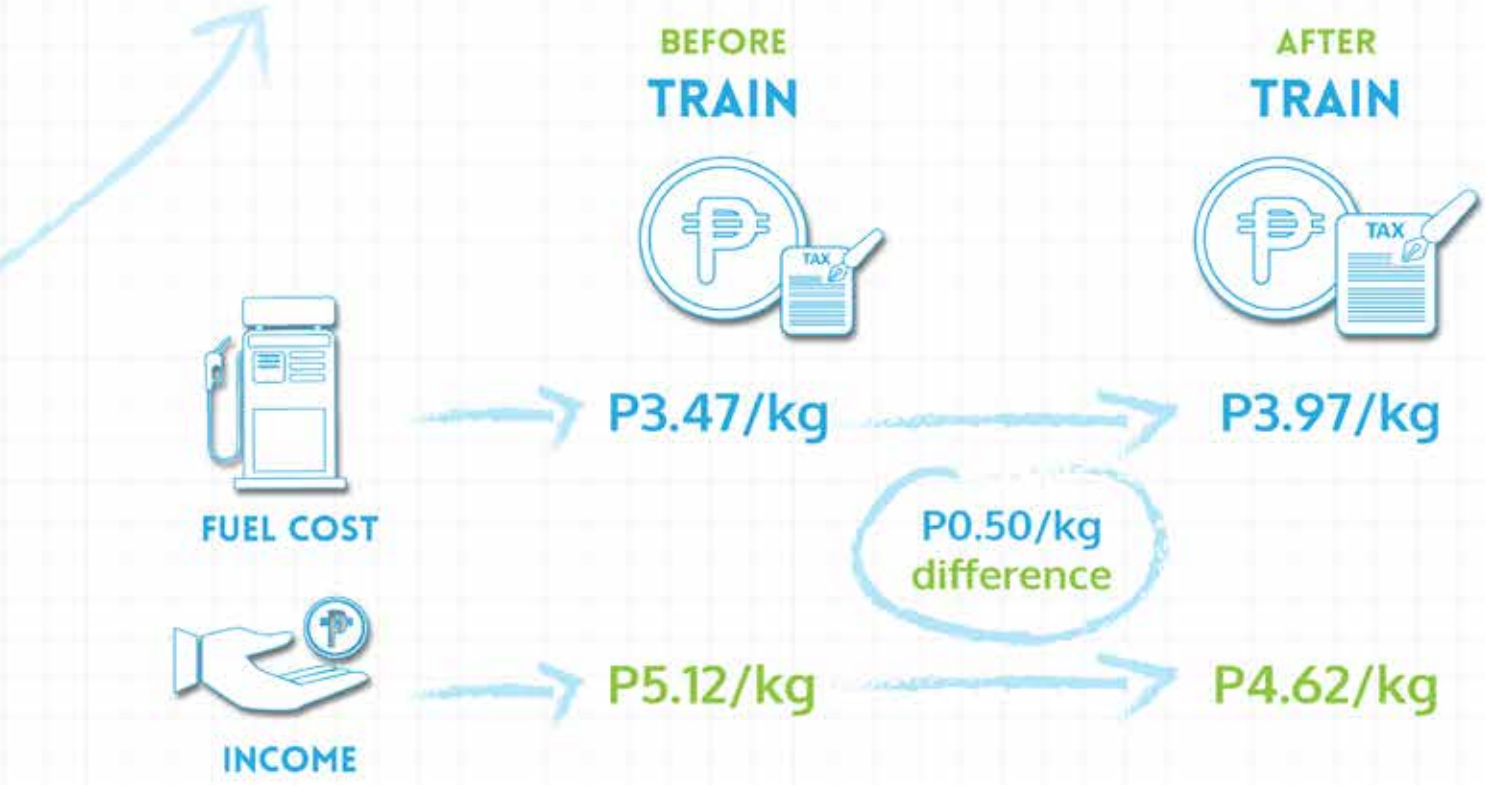
Based on the data below, farmers who are highly dependent on pumps for irrigation are the most vulnerable to fuel price hikes. In a fresh survey by PhilRice, only 18% of the 2,500 sample farmers are pump-dependent. This means only a few Filipino farmers would be affected.

If the added production cost increases *palay* farmgate prices, the income of pump-dependent farmers would not shrink. However, if farmgate price remains, then their income constricts by 10%. Thus, the need to outsmart the situation with the right interventions on the part of government and the farmers.

(Lifted from: Rice Science for Decision Makers: How the Tax Reform for Acceleration and Inclusion Law Impacts Rice Farmers by Litonjua, A.C. and Beltran, J.C. (2018)

FUEL COST AND INCOME OF PUMP-DEPENDENT FARMERS

Before the enactment of TRAIN Law, pump-dependent farmers were spending nearly P14,000/ha on fuel. After the law was passed, fueld cost increased by about P2,000/ha or about 50 centavos more for every one kilogram of *palay* produced.



SOURCES:
Socioeconomics Division, PhilRice 2018
Rice Engineering and Mechanization Division, PhilRice 2017
Philippine Statistics Authority, 2016-2017

Water pump gasifier

Rice hull-fuelled flat bed dryer

THE FUEL WONDERS

Rice hull or husk is commonly treated as a farm waste, usually burned or dumped anywhere. In 2017, over 4 million MT of rice hull were obtained from the 19.28 million MT of harvested palay. Surprisingly, this material is slowly attracting the limelight because of its several uses, either as a substrate for fertilizer, soil conditioner, pest control agent, or as odor suppressant. And more creatively now, as a renewable energy resource for farm machines! This is one key to coping with the Tax Reform for Acceleration and Inclusion (TRAIN) Law or Republic Act 10963.

Who would have thought that one answer to today's increasing cost of fuel is right at the farmers' fingertips? No wonder, growing rice has wonders of its own.

POWERING PUMP ENGINES

Drawing out water for irrigation requires farmers to use pumping engines. In using diesel and gasoline-fuelled pumps, farmers have to spend around P1.52/m^3 to P1.72/m^3 of water, respectively. This is expected to increase further as diesel cost is now P40. This means more burden for the pump-dependent farmers. Hence, machines like the water pump gasifier that burns rice hull as fuel were developed.

The gasifier is a mobile engine-pump system developed purposely for rainfed lowland rice farmers. It uses 17kg of rice hull. It usually runs for two hours and can discharge an average of 10L of water per second. Results of studies conducted by our Rice Engineering and Mechanization Division revealed that it only costs farmers an amount of P1.23/m^3 of water on the assumption that rice hull costs P1/kg. With this, farmers can save up to 30-40% on irrigation cost.

"The expected cost of using the gasifier can be pulled down in areas where rice hull is not sold. Farmers may acquire rice hull from nearby rice mills, which makes it more convenient and affordable for them," PhilRice engineer and research team lead Arnold Juliano said.

Aside from its main function, the water pump gasifier can also run the brown rice milling machine, micro mill, and the flour mill. Juliano also noted that the pumping system produces 2,000 watts, which is enough to use as source of household electricity.

"At present, the machine is still being tested in farmers' fields and the results are promising. We target to conduct a machine demonstration per PhilRice branch station before it can be made available for potential manufacturing," Juliano mentioned.

Rice husk gasifying stove

> To cope with the increasing cost of fuel is to explore options that can reduce the cost of rice production. Good thing, alternative solutions can be found right in the farms waiting to be discovered – like rice hull.

OF RICE HULL

ANNA MARIE F. BAUTISTA

Meanwhile, an Occidental Mindoro farmer who participated in the pilot-testing of the machine in one cropping season said that he was able to reduce his irrigation expenses from P15,000 to P2,000 in his 1.5-ha rice field.

HEATING UP DRYERS

At least 70% of the cost of drying operations using the vertical-type mechanical dryer is accounted for fuel and electricity. PhilRice Engineer Joel Ramos said the high cost of fuel is equal to high cost of drying operations and labor for farmers.

With the use of the rice hull-fuelled reversible airflow dryer, farmers can now save up to 50% on drying cost. This machinery is a batch-type reversible mechanical dryer that is used to reduce moisture content of rice grains down to a safe level for storing and further processing, usually at 14%, and with burning rice hull as source of heat. The whole drying operation lasts for 8-10 hours.

It has three major parts: the drying bed, the furnace where the rice hull is burnt to generate heat, and the blower. It also comes in three versions that differ in size: the smallest dryer that uses 20 sacks of rice hull to dry 4t of grains; the medium-sized burns 35 sacks of rice hull to dry 6t; and, the largest dryer that uses 40 sacks of rice hull to dry 8t.

"The use of rice hull-fuelled flatbed dryer can reduce the cost of drying from P120 to as low as P50 per bag of fresh *palay*," Ramos noted.

He also mentioned that this type of dryer is more affordable and easier to maintain compared with the vertical-type mechanical dryer. Currently, we have manufacturers in Luzon, Visayas, and Mindanao.

"Here at PhilRice, our usual customers are individual traders, millers, and cooperatives," Ramos said.

GASIFYING STOVES

Cooking is also affected by the rising cost of fuel. Now, households can worry less with the use of the rice-husk gasifier stove, a machine that uses rice husk as fuel to cook food or simply boil water.

This stove has a fuel requirement of 0.8kg of dry rice husk per load and can cook for 30 min. Two liters of water can boil in 11 min. It has a 9-W, 12-V DC fan.

"The main purpose of this equipment is for farm households to maximize the use of rice hull and to spend less in using gas for cooking," said PhilRice researcher Jan 11 Dela Cruz.

At present, this gasifier stove is manufactured in PhilRice Nueva Ecija and Bulacan.

To cope with the increasing cost of fuel is to explore options that can reduce the cost of rice production. Good thing, alternative solutions can be found right in the farms waiting to be discovered – like the rice hull. •

WIND-WIN SOLUTION:
TAMING THE WIND FOR AGRICULTURE

ASHLEE P. CANILANG

Typical rice farmers who fully rely on pumps for irrigation usually consume 397 liters of fuel per hectare. This accounts for 29-30% of their total production cost.

The spike of prices of fossil fuels in recent years and Republic Act 9513 (Renewable Energy Act of 2008), which aims to achieve energy self-reliance to reduce the country's dependence on fossil fuels, have inspired the team of PhilRice Senior Engineer Manuel Jose Regalado and his partners from the Central Luzon State University and Nong Lam University in Vietnam to optimize water usage through the deployment of a wind pump-drip irrigation system.

HOW IT WORKS

The system has the following components: a 24-bladed 10-meter-tall windmill, water suction pump, water tank, and a drip system. Wind speed of about 1.6 m/s is needed for the blades to rotate and activate the suction pump. This will draw out water to the tanks, and to the drip irrigation system.

The system is installed on a 0.18-ha area with 1-m lateral spacing and 0.3-m drip spacing. It has 5 manifolds and can discharge water at 6,000 m^3/h. Its mainline is a 25-mm PVC pipe and has a 16-mm drip line with low-pressure drippers that can discharge 1 L/h.

Results showed that water discharge varies on certain months, ranging 3.2-14 m^3/day.

"There is a functional relationship between wind speed and the amount of water being discharged. During the study, the volume of water drawn was higher in January when strong winds were evident, and lower during May and August when winds were weaker," Regalado explained.

GETTING THINGS DONE

The system was built and studied at a rainfed area in Gerona, Tarlac where there was no domestic water supply available. With an average daily wind speed of 2.2 m/s, the system discharged 9.2m^3 of water every day. The water was used for irrigation, household, and storing purposes.

High-value crops, such as tomato and eggplant, were planted on 558-m^2 and 1, 242m^2 lots, respectively. The tomatoes had a 3-month life span while the eggplants had 6. The crops were watered with 1.33 mm/day during their early stages, and was increased to 4.6 mm/day during their growing period.

"The whole system is feasible for high-value crops like tomato to hasten the return on investment. Also, it could be tapped for household and livestock needs," Regalado said.

Our current system can provide supplemental irrigation water to only about 0.3 ha to a maximum of half-hectare. For a group of rice-based farmers, we may need multiple units based on their total area.

-Dr. Manuel Jose Regalado

RENEWABLE REWARDS

Results of the study showed that on the given land area, the system applied to high-value crops (tomato with 3 cropping seasons per year, in this instance), can generate an annual net income of P176,000.00, with an average daily peak water requirement of 16.2 m^3. On the other hand, off-season crops such as string beans, pechay, and rice can generate an additional annual income of P38,000.

In addition, excess water from irrigation can be diverted for household and livestock consumption.

"The volume of water that the system discharges can cater to the daily water needs of 15 households with at least four members each," Regalado added.

With proper maintenance and care, the windmill can last up to 20 years, and 5 years for the pump and drip irrigation system. The return on investment will be at its full in less than a decade.

Can the system be applied to a larger land area and benefit more farmers? According to Regalado, it is possible.

"Our current system can provide supplemental irrigation water to only about 0.3 ha to a maximum of half-hectare. For a group of rice-based farmers, we may need multiple units based on their total area," Regalado said.

Certainly, the power of the wind goes beyond whooshing from different directions. Capitalizing on this older-than-ancient renewable inexhaustible resource could whisper an answer to agriculture's current dilemma on fuel price hikes, so long as we listen.

EYES ON RICE MACHINES

ELSIE E. REYES AND YVANNAH IOZABELLE V. SALUPEN

The majority of the production cost incurred by Filipino farmers goes to labor, making it one of the crucial factors that retard their competitiveness. For 2013-2014, our average hired labor cost was at P3.76/kg of paddy rice. In the book, *Competitiveness of Philippine Rice in Asia*, this amount roughly covers 30% of the P12.41 average *palay* production cost/kg.

So much work begs to be done to pull down the labor cost to a more competitive level. Among Asia's six top rice-producing countries Vietnam, Thailand, India, Indonesia, and China, the Philippines would rank fifth in the lowest cost of hired labor. In overall production cost, fourth.

LOUIS PARK

Of course, these data don't exist in a vacuum. Many factors have affected the local rice industry and other factors will not stop emerging, like the recent implementation of TRAIN Law.

While there are early projections on the possible short- and long-term effects of TRAIN Law on the prices of petroleum products and other commodities, what is certain is that even before it was implemented, the necessity to reduce the cost of production in rice was already staring us in the eye.

Luckily, some machines have already been developed to reduce labor cost during crop establishment and harvesting – the costliest operations in rice production (P4,196 and P5,967/ha in the 2013 wet season).

MACHINES FOR CROP ESTABLISHMENT

Discourse on the fate of fuel prices is prominent today because of the higher specific tax on petroleum products. Hence, machines like the plastic drumseeder that do not consume fuel would attract farmers.

Plastic drumseeder complements the direct seeding method. According to Dr. Arnold Juliano, head of PhilRice Rice Engineering and Mechanization Division, drumseeder rentals are not a priority among farmers, unlike other farming machines. It is usually bought by or given to farmer cooperatives.

Juliano noted that using the plastic drumseeder is very convenient because it is portable at only 10kg. Equal spacing of plants can be achieved, hence it is superior to manual transplanting.

"If a farmer decides to purchase a drumseeder, the cost can be recovered in just one cropping season, depending on the area to be seeded. However, drumseeder is not advisable for seed growers," he clarified.

The mechanical transplanter can also establish rice crops. While this machine consumes fuel, it drastically reduces labor requirement and cost, and man-days in manual transplanting.

"Using the machine can help lessen transplanting shock in young rice seedlings, promote early seedling vigor, uniform crop stand, and enough density of seedlings per square meter. We can also expect less stress, drudgery, and health risks on the farmers' end," Juliano explained.

Meanwhile, the multi-crop reduced-till planter (MCRTP) also reduces labor cost. With the machine, tillage in dry-seeding operations can be reduced, thus fuel consumption is lessened. Also, it only requires one person to operate.

PhilRice Engineer Kristine Pascual said using the machine to sow seeds in dry soil conditions and grow rice in aerobic setting significantly diminishes irrigation water use. Hence, fuel for irrigation can also be reduced.

It can be used as well for different crops such as corn and mungbean. Still at its evaluation stage, the advantages of MCRTP can already be established. It will come very handy for farmers who practice multi-cropping.

MACHINES FOR HARVESTING

To economize on labor cost during harvest, choose among the combine harvester, mini-combine harvester which is currently being pilot tested, or reaper. They almost eliminate labor requirements of 10-15 people for manual harvesting to just 1-3 people for mechanized harvesting.

Farmers can likewise net more yield because of lower losses than with manual harvesting. Each machine has its special features. The lightweight reaper and compact mini-combine harvester are ideal for small plots. To top it all, the three machines are ideal for standing rice crops.

PhilRice engineers continue designing machines that will help farmers spend less for labor, especially now that TRAIN is "roaring" fast. Certain machines that operate with lesser fuel but with multiple functions are in the pipeline. •

The AWD's observation well.

JAYSON C. BERTO

SAVE ON WATER, CUT ON COST

The restlessly rising fuel prices will hit the few farmers who are dependent on pumps for irrigation. They will breathe deeply, exhale slowly, and scratch their heads. They will probably forget the name of their patron saints for a while.

The alternate wetting and drying (AWD) technology could help them lighten this burden.

ALLAN C. BIWANG JR.

SAVING ON WATER

AWD is a water-saving technology that rice farmers could adopt to reduce their use of irrigation water without penalizing crop yield.

According to PhilRice engineer Kristine Pascual, this technology for lowland rice farmers could help save on water by up to 50%, if properly implemented.

"Water saved can be used to irrigate farms at the tail-end of the service area. Rice farms dependent on supplemental irrigation sources like shallow tube well would also benefit from this technology," Pascual said.

AWD technology comes with an observation well that helps farmers to monitor the water table until the root zone during the tillering to pre-flowering stages of the rice plant. Use of the observation well must be suspended during fertilizer application to enhance the plants' nutrient-uptake efficiency and prevent flower sterility.

Also, experts contend that AWD could reduce emissions of greenhouse gases and increase the number of productive tillers, resulting further in more filled grains per panicle.

CUTTING ON COST

Mario M. Ermita, 51, from Masinloc, Zambales testified that AWD is a farming ally as it helped him save on fuel use by up to 25%.

"Prior to my use of AWD technology in 2016, I spent P8,000/ha for diesel from planting to harvesting. With AWD, I saved about P2,000/ha. Honestly, I was surprised with the result," he shook his head.

Mario's experience spreads like wildfire. Eight farm operators adopted the AWD technology after hearing his story.

Meanwhile, the use of pumps for irrigation was reduced in Mallig, Isabela with the advent of AWD technology.

Igmedio Ventura, 49, was still in awe when his diesel consumption in a hectare per cropping season tremendously dipped from 500L to 300L.

"For pump-dependent farmers, I can attest that AWD saves 50% on labor cost. Instead of hiring a pump operator twice a week, I only have to hire once weekly," Igmedio enunciated.

In Bulacan, officers and members of the Kapatiran Irrigators' Association (KIA) were satisfied with the technology. Before, they used electricity to run their pumps. AWD decreased power cost by 7% in 2015 – from 118,178 kW/h electric consumption in 2014, to 109,660 kW/h. That's about P160,000 worth of savings.

Attesting to the advantage of using AWD technology, Thelma Mallari of the National Irrigation Administration-Bulacan said that they managed to irrigate an additional 15ha with the AWD-saved water. KIA now sustains a total of 200ha of rice fields using AWD technology.

AUTOMATED WATER MONITORING

Researchers are now working on a decision support tool called Automated monitoring (AutoMon^{PH}), which is based on the principle of AWD that rationalizes water-use and management.

AutoMon^{PH} provides continuous real-time monitoring and reporting of water status in the field. It even transmits information automatically from the field to the central database that can be utilized by irrigation managers as reference for water demand at a landscape level.

It can also send alerts to farmers' mobile phones about the water level in the field, which is useful in coming up with irrigation schedules. This technology is being developed under the IRRI-PhilRice WateRice project.

Indeed, AWD helps wash away some of the anxieties that farmers, especially the pump-dependent ones, have after the enactment of TRAIN Law. •

For pump-dependent farmers, I can attest that AWD saves 50% on labor cost. Instead of hiring a pump operator twice a week, I only have to hire once weekly.

-Igmedio Ventura

AutoMon^{PH}

RAISING YIELD DIGITALLY

ANDREI B. LANUZA AND JOHN HAROLD D. DELA ROSA

Increasing farmers' profitability despite the additional cost owing to higher fuel prices does not only speak of ways to cut on other inputs. It also accentuates the need for technologies that can enhance farm productivity, particularly in nutrient management. Digital farming could be explored.

The popularity, functionality, and drop in prices of mobile phones, personal computers (PC), and laptops make them more appealing for people, especially the millennials, to acquire a unit or two for themselves. Having a gadget accords them the advantage to search and access information faster, easier, and sometimes for free with the use of a digital application (app) to help them in making sound decisions, especially in rice farming.

AGRIDOC APP

The AgriDOC is a farm management app allowing farmers to record their day-to-day major activities in the farm. According to PhilRice IT specialist Nehemiah Caballong, ICT-literate farmers would find this useful as they can easily keep track of their activities, finances, and expenditures.

Also, through geo-visualization, they are enabled to generate and view maps of their farms through satellite images provided by Google Maps.

This mobile app also provides important information on the primary needs of the rice plant in every growth stage, comprehensive descriptions of released rice varieties, recommendations from the PalayCheck System, and links to rice knowledge banks and other websites. All the features and information in the app could still be accessed even without internet connection, Caballong added.

Caballong and his team continue to upgrade the services of the AgriDOC App even after its release.

"We are thinking of redesigning the app's interface to make it more appealing to young farmers," he noted.

The AgriDOC app can be downloaded at www.bit.ly/AgriDOCApp.

MOET APP

The Minus-One Element Technique (MOET) app was designed to assess the nutrient requirement of the rice crop. It has two main features, the fertilizer requirement calculator (FRC), and the yield protector (YP).

FRC computes the precise amount of nitrogen-phosphorus-potassium-sulfur fertilizer needed by the crop and its recommended timing of application. This helps the farmers save on fertilizer and labor costs. YP, on the other hand, estimates the potential yield of the farmer based on the result of the fertilizer

> **By making farm planning and monitoring, and access to information more accurate or precise, faster, and easier through the use of ICT, farmers could save on other input costs offsetting the high cost of fuel owing to TRAIN law.**

requirement calculations. The app also contains a link to an instructional video on how to conduct the MOET test.

"This mobile app is more flexible in recommending the right amount of fertilizer to apply compared with the MOET test kit that only features a simple chart with a maximum yield of 5t/ha. The app can provide computations and recommendations for different varieties that can generate more than 5t/ha," said PhilRice crop stress physiologist Ailon Oliver Capistrano.

The MOET app can be downloaded at https://tinyurl.com/ydf8u7su.

LCC APP

The Leaf Color Chart (LCC) app can determine the level of nitrogen (N) concentration in the rice plant in just an effortless click.

N is one of the major nutrients the rice plant needs for leaf, stem and root growth; better quality and color of leaves; more protein content of the plant, and enhanced survival of vital soil organisms.

The main feature of the LCC app is to capture photos of the leaves of the rice plant using a smartphone camera. The app will analyze the photo and recommend the right amount of N and timing of application.

Capistrano noted that the app can generate similar results despite the different camera resolutions of various smartphones. Currently, the app is being evaluated for accuracy before its release.

RCM APP

Officially released in November 2013, the Rice Crop Manager (RCM) is a web app co-developed by PhilRice, IRRI, and UP-Los Baños.

This app, which could be accessed through a personal computer or laptop, serves as an advisory and information service providing farmers with personalized crop management recommendations to reduce input cost, raise yield and income, and provide appropriate information at the right time.

The recommendations generated by RCM can be printed or sent via text message. Also, the app can save historical rice production information to help craft future recommendations.

The DA's National Rice Program through the Bureau of Agricultural Research and the Agricultural Training Institute supports the development, maintenance, and deployment of the RCM.

The RCM app can be accessed at http://webapps.irri.org/ph/rcm/.

Marrying rice farming with IT applications could help cushion the effects of TRAIN law. By making farm planning and monitoring, and access to information more accurate or precise, faster, and easier through the use of ICT, farmers could save on other input costs offsetting the high cost of fuel owing to TRAIN law. •

RISE
WITH RICE

REAPING WHAT WAS SOWN

CARLO G. DACUMOS

CHARISMA LOVE B. GADO-GONZALES

PHILRICE PHOTO

"The soaring fuel prices are beyond our control but our farming practices are within our control," Rolando C. San Gabriel, 67, of Maligaya in Muñoz said with a beaming smile.

San Gabriel recalled that his crops were sullied with whiteheads as he planted two weeks late. However, a passerby asked him why his crops still looked more robust and healthier than his fellow farmers'. This farmer for 35 years revealed his secrets during a farming competition in PhilRice.

Rolly, also a seed grower, first joined PhilRice's Palayabangan Challenge 2016 wet season (WS) – a competition showcasing the best farm practices that can produce a harvest of 10t/ha at a cost of P5/kg.

Owing to the whiteheads, no thanks to the stemborers, he yielded 5.17t/ha with a production cost of P7.44/kg. This was way better than the country's average of 4t/ha and production cost of P12/kg.

In the following contest season, his set of technologies recorded the most productive and profitable with a yield of 8.9t/ha at P5.96/kg. He grossed almost P99,000.

PRACTICAL TIPS

San Gabriel shared his sentiments that farmers like him directly feel the effects of fuel price hikes. He said that he used to spend only P27-P28/L for diesel but now, he's paying P40/L. San Gabriel consumed 40L of fuel/ha for seedbed and land preparation alone. Hauling cost also increased from P12 to P15 per cavan. However, he said that they have yet to feel the burden from fertilizer cost.

A retired training specialist of PhilRice for 15 years, San Gabriel targets at least 10t/ha every cropping season. He achieved 12t from his 1.3 ha this 2018 DS.

I will still farm despite the cost adjustments. I've always believed, and this is based on my experience, that if I give my all to the land, the earth will give back what I've provided. This is my secret.

-Rolando C. San Gabriel

"Rice farming largely supported our household needs, especially during the growing years of my two children. Our family's income was handed to our hands then to our mouths. In rice farming, we can double or triple our income," he said.

The good harvest, according to San Gabriel, started from a quality rice variety, NSIC Rc402, which has a maximum yield of 14 t/ha and matures in 114 days. It is also resistant to bacterial leaf blight and sheath blight.

In growing the variety, he combined organic and inorganic fertilizers. He applied two splits of organic fertilizer including vermicast, chicken dung, and commercial organic fertilizer, and three bags of complete fertilizer. He only sprayed herbicide at six days after transplanting, constantly cleaned the dikes, and monitored the presence of insects for pest management. He also irrigated his field every 3-5 days at 2-3-cm depth.

San Gabriel also recalled that his first harvest (4 t/ha) from the farm they inherited from his father-in-law gradually increased to 5t/ha. He did not stop learning. He still asks for the latest reading materials on rice production and attends trainings, meetings, and field days.

But this is not his secret in getting quality yield at low cost.

"With the enactment of the TRAIN Law, the additional cost of producing a kilogram of *palay* will surely increase. Have a target yield per cropping season and see how you can cut down on the cost," Rolly said.

Come the next planting season, he intends to further reduce his operational costs. In land preparation, he will try dry-plowing and harrow only twice, not thrice. He will also reduce his nitrogen application.

"I will still farm despite the cost adjustments. I've always believed, and this is based on my experience, that if I give my all to the land, the earth will give back what I've provided. This is my secret," he revealed.

The best secret is kept, they say. But for San Gabriel, it should be shared. •

PARTNERS IN THE FIELD

CRADLING A COMMUNITY OF COMPETITIVE FA

REUEL M. MARAMARA

Competitiveness is an easy path to tread if leaders in a community also commit to journey with the farmers despite the many hurdles. The local government unit (LGU) of Piddig, Ilocos Norte, for one, walks with its rice farmers.

BIRTH PAINS

Former Mayor and now Municipal Consultant Engr. Eddie G. Guillen envisions that LGU-Piddig, some 30km northeast of Laoag City, builds a community of competitive farmers where leaders help farmers help themselves.

Guillen prompted the LGU to initiate farm consolidation where farmers, regardless of the area they cultivate, are organized into an association. Thus, Piddig Basi Multi-Purpose Cooperative (PBMPC) was established, consisting of six *zanjeras*, a centuries-old association of farm irrigators.

However, PBMPC's birth was not painless. Some agencies they expected to help had the *'kanya-kanya'* mentality while some farmers had reservations.

"They were so trapped on conventional farming that they became reluctant in joining us," Guillen shook his head.

Nevertheless, Guillen was not shaken. He initiated the Piddig Care to win the favor of the farmers. Under the program, they are given free medical services including medicines and hospitalization. Even coffins are free. The catch is, farmer-recipients have to be open to adopting new farming strategies.

GROWING STRONGER

Rice farming in Piddig has never been better. Through consolidated farming, clustered PBMPC farmer-members, who plant rice and rotate it with lowland vegetables, are provided with seeds and fertilizers at an affordable rate.

Also, Piddig pushes for the adoption of machines, from land preparation to postharvest. Guillen believes that mechanization is one of the best strategies to reduce the cost of production and withstand the ever-challenging rice market, not to mention the imposition of the higher specific tax on petroleum products under the TRAIN Law.

"Though we are using gasoline to run the machines, it will still be more cost-efficient in the long run" he contended.

Aside from mechanization, the LGU also promotes other cost-saving projects related to solar energy.

PBMPC buys their members' produce at a price higher than of local traders'. "This scheme protects farmers from unjust offers of some middle men," Guillen noted.

RMERS

HANNAH MAE TOLENTINO

HANNAH MAE TOLENTINO

REUEL M. MARAMARA

Meanwhile, Piddig allocated budget for the completion of a soil fertility and crop suitability map to provide complete guidance for agricultural production throughout the municipality. This is directed by a Geographic Information System (GIS) that helps prevent the excessive application of fertilizers thus saving the farmers from wasteful usage and unnecessary expenses.

CREATING SYNERGIES

The synergy that Guillen initiated did not end with the cooperative. He liaised with various institutions for the establishment of the National Convergence for Sustainable Rural Development in Piddig, a program wherein all government agencies can take part.

The DA funded the development of a rice processing center (RPC) that houses drying and milling facilities for the members of the cooperative. Here, the rice hull that is burned to fuel the dryer is converted into carbonized rice hull (CRH).

Further, the Department of Social Welfare and Development through its Sustainable Livelihood Program provided assistance to the cooperative members for the production of vermicast. These coop members are also beneficiaries of the Pantawid Pamilyang Pilipino Program.

On the other hand, the Department of Labor and Employment also gave funding to the non-4Ps members of the cooperative to also produce vermicast.

Valuing all the assistance and efforts, PBMPC purchases the vermicast from their farmer-members and they sell it to other farmers who are producing organic coffee and other crops that they plant.

"This is all part of our advocacy to help farmers achieve good yield and income while producing safe and nutritious food for the community," Guillen shared.

By good grace, he declared that the rice farmers' average yield shot up from 3.8t/ha to 6.5t/ha in 2017 – higher than the national average of 4t/ha.

Such overwhelming result was a wish-come-true for Piddig and for the farmers.

"We did not make any magic. Our farmers only need to have access to timely and adequate assistance to enhance their productivity. We, as leaders, have to provide that," Guillen noted.

For him and LGU-Piddig, the work never stops. They set a good example and hope that other communities would find it worth emulating.

"It would be better if other community leaders also unite for a good cause, " Guillen concluded. •

EXPERT'S CORNER

COMPILED BY DONNA CRIS P. CORPUZ

WHAT OTHER STRATEGIES CAN FARMERS AND POLICYMAKERS EXPLORE TO ALLEVIATE THE UNDESIRABLE EFFECTS OF TRAIN LAW?

The use of precision agriculture tools, such as drone sprayer and automated drip irrigation systems, can help farmers save on water, protect humans, and save the environment. Precision drone sprayer uses only 16 L/ha, and can complete the spraying in 20 min/ha. In drip irrigation, we reduce water run-off and excessive evaporation. It can also be automated with the use of shelf controllers, soil moisture sensors, electronic water gate valves, and solar power. These are now readily available and easy to install, enabling young farmers to control the watering system thru their smartphones.

- ROGER F. BARROGA, PHILRICE INFORMATION SYSTEMS DIVISION HEAD

I urge farmers to use very early-maturing varieties to increase total productivity under favorable and adverse environments. High-yielding and resistant varieties minimize the application of pesticides, thereby producing healthy rice. Lodging-resistant and moderate shattering varieties also help control postharvest losses. Varieties with good milling and eating qualities have price incentives that will add up to farmers' income.

- THELMA F. PADOLINA, PHILRICE PLANT BREEDING CONSULTANT

The increase in fuel prices caused by TRAIN Law must not challenge farmers to stop mechanizing. Rather, it should be a call for the local government units to implement policies that will help farmers avail of discounted fuel for their farm machine needs. The key is to strengthen the connection of policies, R4D efforts, and actual practices of those who are in rice farming and agriculture industry.

- DR. NORVIE L. MANIGBAS, PHILRICE PLANT BREEDER

Enhancing yields is a key to recovering from the added cost brought about by TRAIN Law. We are currently improving breeding lines particularly on root elongation for drought tolerance. Root elongation complements the nitrogen efficiency and water-uptake of plants, ending up in more productive yield and income for farmers.

- DR. JONATHAN M. NIONES, PHILRICE GENETICIST

The use of measuring devices in the field can be helpful. The AWD technology's observation well, for example, enables us to know the right time to irrigate our farm. Right timing prevents us from spending needlessly on fuel. I learned this strategy by attending agricultural trainings in the community and being open to new rice farming technologies.

- MARITES A. BENICO, 38, PROGRESSIVE FARMER, MACARSE, ZARAGOZA, NUEVA ECIJA

A stronger sense of cooperation and bayanihan in the community of farmers will help. Joining groups and cooperatives that offer loan services and financial assistance can help shield farmers from the high cost of fuel. These groups can also lend/ provide farm machines that can hasten processes and enhance farm productivity. We, the farmers, can achieve more if we work collectively.

- GERMAN PANGILINAN, 60, SECRETARY OF PINAGBUKLOD NA ADHIKA AGRICULTURAL COOPERATIVE, MACARSE, ZARAGOZA, NUEVA ECIJA (RICEBIS COMMUNITY)

STAFF EXTRAORDINAIRE

PhilRice researchers on international trainings

CHRISTINA A. FREDILES AND MARY JOY Y. JUAN

DR. MARISSA V. ROMERO
Chief SRS
Rice Chemistry and Food Science Division (RCFSD)

EVELYN H. BANDONILL
Supervising SRS, RCFSD

They were trained on the methods of analyzing water-extractable and unextractable dietary fiber in polished rice at Rothamsted Research in the United Kingdom in February 2018.

Through the methods, rice lines with high fiber and acceptable to the Filipino taste could be identified and used by breeders in the development of new varieties.

Romero reports that rice with high resistant starch (RS) and dietary fiber (DF) contents could stunt the escalation of chronic ailments such as type-2 diabetes, cardiovascular diseases, and some forms of cancer.

"Low dietary fiber in rice can result in high glycemic index (GI) because the rice starch is easily digested. Consumption of foods with high GI may increase risk of the said diseases," Bandonill explained.

Their training was sponsored by their Newton-funded project "*Enhanced Rice Quality for Health (EnRicH)*", a collaborative work with Rothamsted and IRRI. EnRicH identifies rice lines with RS and DF contents, with good cooking and organoleptic (as taste, color, aroma, and feel) properties, that will eventually be included in our national rice breeding program.

DR. JONATHAN M. NIONES
Chief SRS
Genetic Resources Division (GRD)

TEODORA E. MANANGHAYA
SRS II, GRD

They participated in a training on rice breeding research to improve root systems thus increasing yield and tolerance to soil problem. It was conducted at the Japan International Research Center for Agricultural Sciences (JIRCAS) in Tsukuba on February 26 to March 10, 2018.

The geneticists were trained on the methods of using DNA marker systems such as cleaved amplified polymorphic sequence (CAPS) and simple sequence repeat (SSR), to improve genes associated with root elongation.

Both CAPS and SSR help reveal the genetic diversity of rice and other crops accessions using morphological analysis. The DNA marker system will facilitate the purification, management, and breeding of rice germplasms.

Niones and Mananghaya were also exposed to JIRCAS' methods and facilities that help analyze data faster. With this, they were able to analyze the DNA of traditional Philippine rice varieties in the hope of finding similar or novel genes or traits that can elongate roots under water-limiting environments.

Their training is part of their project with JIRCAS on improving breeding lines and technology for drought and rice blast prevalence in the Philippines.

CONGRATULATIONS TO OUR NEWLY APPOINTED AND PROMOTED STAFFERS!

DARYL F. GENERAL, Farm Superintendent I, Physical Plant Division, CES

MARVIN D. MANALANG, SRS II, Technology Management and Services Division, CES

MARY GRACE M. NIDOY, SRS I, Development Communication Division, CES

MA. SALOME V. DUCA, from SRS I to SRS II, Crop Protection Division, CES

LEX C. TAGUDA, from SRS I to SRS II, Batac

WORRY-FREE RICE TIPS

CHRISTINA A. FREDILES

INVEST

For your money needs, the Production Loan Easy Access (PLEA) program might help you!

- PLEA is a fast, convenient, and affordable credit assistance for small farmers and fisherfolk.
- Eligible borrowers can loan up to P50,000.
- Interest rate is 6% per annum or 0.5% per month.
- Loan payable within 2-10 years depending on the commodity or the activity of the borrower.
- For more information, visit www.acpc.gov.ph.

INSURE

Rice Crop Insurance Program is here for you!

- Amount of coverage:
- **Inbreds:**
  Irrigated/Rainfed: P41,000/ha
  Seed Production: P50,000/ha
- **Hybrids:**
  F1/Commercial Production: P50,000/ha
  Seed Production (AxR): P65,000/ha
- All varieties accredited for production by the National Seed Industry Council are insurable.
- Applications should be filed before or up to 15 calendar days after planting.
- For more information, visit http://pcic.gov.ph/rice-crop-insurance/.

STRATEGIZE

Establish your farm with these recommended strategies.

- Use high-quality seeds of a recommended variety.
- Level the field for uniform water distribution and even crop maturity.
- Practice synchronous planting to break insect pest cycles and destroy disease hosts.
- Plant the right amount of healthy seedlings to ensure vigorous growth and advantage over weeds.
- Observe proper nutrient management to secure crop growth and bountiful yield.
- Avoid excessive water or drought stress. Practice alternate wetting and drying.
- Care for beneficial organisms. Pesticides should only be used as a corrective measure during pest outbreaks.
- Harvest when 85% of the grains are golden yellow to ensure good grain quality, high market value, and consumer acceptance.
- Farming is business so learn how to best market your produce.

EXPAND YOUR KNOWLEDGE ON RICE THROUGH THIS FUN GAME!

Ricepedia

CHRISTINA A. FREDILES AND RIEMON D. BALAN-EG

INSTRUCTION: Answer the questions below then shade the box that corresponds to your answer. If you get all the correct answers, a **check mark** figure will be formed.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A																				
B																				
C																				
D																				
E																				
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Q																				
R																				
S																				
T																				

1. Labor cost accounts for _% of the total rice production cost.
   C10: 10%
   C20: 56%

2. Which classification of seeds should an ordinary farmer plant?
   P8: foundation seeds
   P7: certified seeds

3. What is the color of the tag of certified seeds?
   H10: red
   H15: blue

4. Inbred rice is produced through cross pollination of two different varieties while hybrid is through self-pollination.
   M8. True
   M4. False

5. _____ cannot be replanted as it can result in a 40-60% reduction in yield. Hence, farmers are advised to buy new seeds every cropping if they plant this kind of seeds.
   J1. Hybrid F2 Seeds
   S1. Inbred Seeds
   T1. Modern rice varieties' seeds

6. Hybrid has _____ yield advantage over inbred.
   A10. 5%
   S11. 10%
   M10. 15%

7. With proper farm management and favorable environment, hybrid can yield up to _____ or more.
   L10. 8 t/ha
   D11. 10 t/ha
   L11. 12 t/ha

8. Transplanted inbred requires _____ of seeds per hectare.
   F17. 40-50 kg
   O20. 60-70 kg
   I12. 10-20 kg

9. Hybrid requires _____of seeds per hectare.
   A2. 5-10 kg
   H14. 40-50 kg
   K2. 15-20 kg

10. Weeds do not only compete with rice for sunlight, nutrients, and water but also serve as alternate hosts to disease-causing organisms like nematodes and insect pests.
    D19. Yes
    D20. No
    L28. Maybe

11. High-quality seeds have more than ____ seed germination thereby reducing replanting.
    E12. 50%
    E18. 85%
    B17. 45%

12. A kilogram of seeds is more or less equivalent to _____ if germination is 100%.
    P1. 20,000 seedlings
    L3. 40,000 seedlings
    C5. 10,000 seedlings

13. A bag of 40kg seeds is approximately equivalent to _____.
    O10. 500,000 seeds
    O8. 1,600,000 seeds
    L2. 300,000 seeds

14. Breeder Seeds carry a ____ tag.
    I14. White
    N16. Blue
    O19. Pink

15. Foundation Seeds carry a ___ tag.
    N18. Orange
    N5. Red
    O12. Violet

16. Registered Seeds have at least ___ % germination rate.
    N9. 85%
    C2. 50%
    A.4. 65%

17. Certified Seeds have ___% seed purity.
    O2. 85%
    O6. 98%
    Q10. 75%

18. What is not recommended in germinating seeds?
    J4. Change the water every 5-6hr
    B3. Incubation of seeds for 24hr
    G16. Do not wash the seeds before and after soaking

19. *Palay*-drying on roads contributes to ____ % yield loss.
    J13. 3.8%
    I5. 200%
    G10. 10%

20. Water at more than 7-cm depth is good for the rice plant.
    K12. False
    C12. True

(Answers: C20, P7, H15, M4, J1, M10, L11, F17, K2, D19, E18, L3, O8, I14, N5, N9, O6, G16, J13, K12)

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