HORIZON

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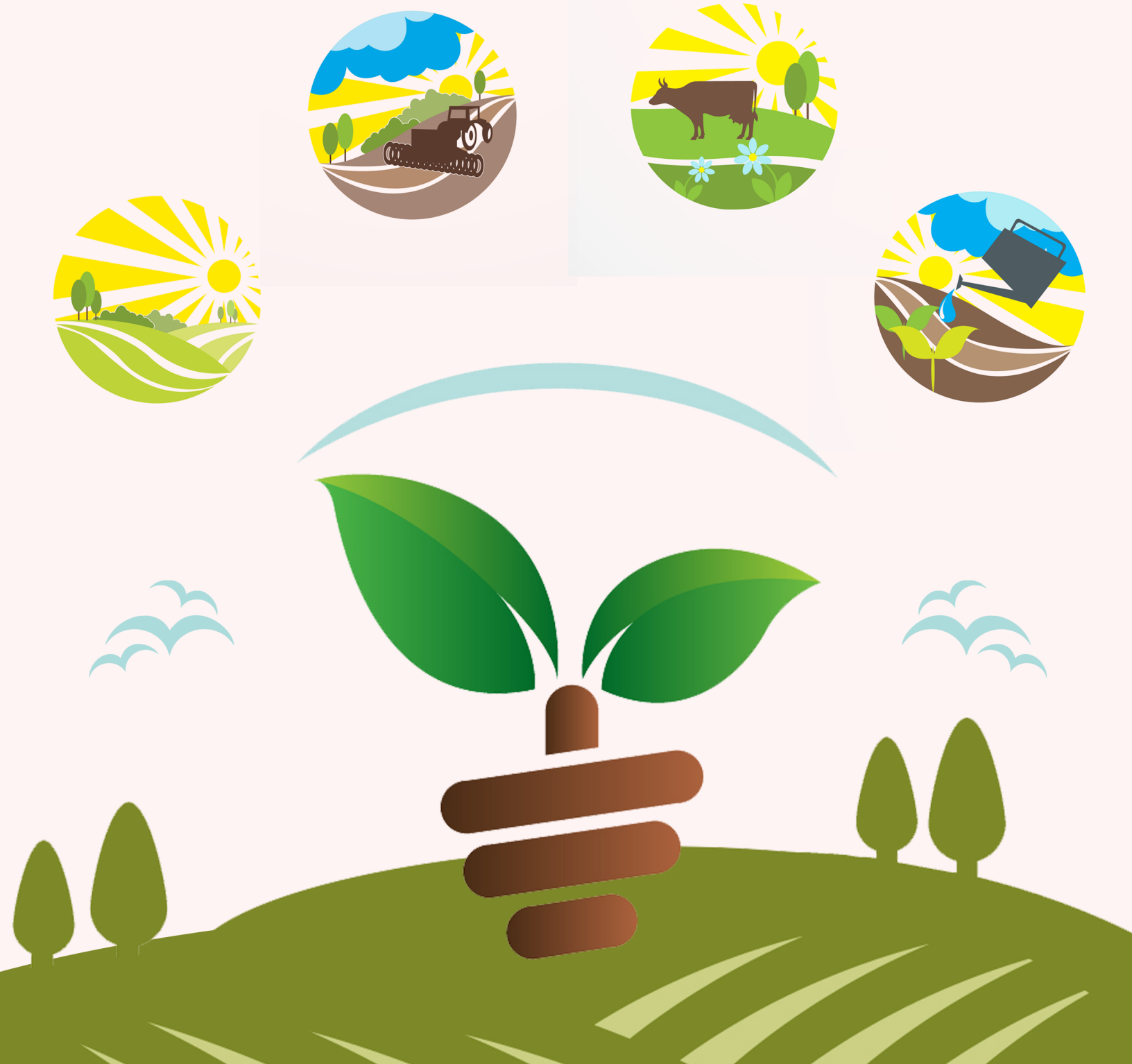

The **UPLB Horizon Magazine** showcases news and feature articles on research and extension, literary pieces, and information of general interest to UPLB and its stakeholders. Please email your contributions to OPR: opr.uplb@up.edu.ph.

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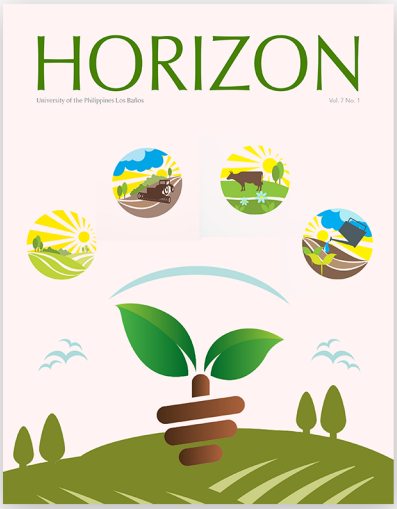

About the cover

Through the years, UPLB has led in technological innovation in agriculture, forestry, veterinary medicine, and in the allied sciences. These innovations are of great value and contribute much toward sustainable and inclusive agro-industrial development.

EDITOR'S NOTE

UPLB has been at the forefront of many research breakthroughs throughout its long history. As mandated in the UP Charter of 2008, UPLB has sought to be a leader in higher education and scientific research, and to contribute to the growth and development of the country's various sectors.

In this latest issue, the Horizon features UPLB technologies that have gone beyond the walls and shelves of the laboratory and are in different stages of commercialization. These technologies, most of them aimed at a better agriculture and food production sector, have produced transformative outputs for its end users and partners.

Aside from telling the success stories of these commercialized technologies, this issue also provides insights into the different paths toward technology commercialization; and is reflective of UPLB's efforts to promote the culture of innovation and entrepreneurship in the university.

This is in line with Chancellor Jose V. Camacho, Jr.'s vision of future-proofing UPLB, which has been the driving force in mainstreaming innovation and entrepreneurship in UPLB.

It envisions to increase invention disclosures, intellectual property applications, and commercialized technologies. These efforts are facilitated by the Technology Transfer and Business Development Office, which has also contributed significantly to this initiative.

As a Public Service University, UPLB continues to establish partnerships with the industry and cultivate a culture of entrepreneurship among UPLB researchers and students as we work together in bringing the fruits of our research to those who need them the most.

IN BROAD STROKES

Future-proofing technologies, future-proofing UPLB

Dr. Jose V. Camacho, Jr.

Future-proofing our research and innovation system is one of our major commitments in future-proofing UPLB since we assumed leadership in November 2020.

As one of the eight constituent universities of the country's national university, UPLB has been fulfilling its mandates as a research university.

Our faculty members, scientists, and researchers have been steadfast in conducting researches that have yielded numerous products and technologies for the Filipino people.

Even before the passage of the UP Charter, UPLB has been at the forefront of researches that brought to life food and non-food products that have reached farmers, communities, and consumers for over a century now.

UPLB's wealth of innovations is the strong foundation that we confidently rest on as we move forward in research and development. Some of these products and technologies are the focus of this latest issue of Horizon Magazine.

These technologies stand out because they have been commercialized, with some of them already licensed to partner and startup companies. The UPLB Technology Transfer and Business Development Office has followed through and is working on their complete commercialization, in collaboration with their inventors and scientists.

Sinta, the country's first papaya hybrid that can resist the papaya ringspot virus, continues to generate abundant harvests for farmers and steady income for the university. Meanwhile, our fungi-based products, such as the Microbial Rennet, a cheaper and efficient milk coagulant for cheese and the Monascus Red, a viable colorant for food, cosmetics, and beverage, surprise our consumers and potential investors with the wonders of microorganisms.

Biofertilizers Nutrio® and Mykovam have become more in-demand in the quest for sustainable and productive farming practices; while the Water Advisory for Irrigation Scheduling System (WAISS) is a promising innovation that has given rise to smart farming in some communities.

Aside from the featured technologies, 18 more are lined up this year for commercialization including biofertilizers, plant growth regulators, food ingredients, and smart agriculture applications and innovations.

Our products and technologies are assets that the university can maximize to generate more resources for the welfare of our constituents, such as new buildings, modern facilities, student support programs, and employee benefits.

We are embarking on new milestones that will strengthen the innovation ecosystem to future-proof UPLB. We have put in place the new UPLB research and extension agenda—the UPLB AGORA, or Accelerating Growth through One Research and Extension in Action—and structural changes to consolidate and strengthen our innovation, entrepreneurship, and business affairs portfolios.

These changes are crucial for us to realize plans for the agro-industrial and information technology parks at our Special Economic Zone, and bolster our efforts to promote synergy among the university, our alumni, and the industry.

By harnessing, promoting, and commercializing our homegrown technologies, we can confidently move forward toward a future-proof UPLB.

There is beauty from waste

KRISTINE E. ARAGUAS

Photo by Christopher V. Labe & Vandolph R. Maningas

The all-natural or organic content is getting a foothold in the beauty industry judging by their increasing visibility in advertisements.

We are not just talking about make up palettes, but also skin care products like lotions, hand sanitizers, liquid soaps, shampoo, and even sunscreens.

This is opportune for a product developed in UPLB to take center stage not only for its value as a natural ingredient but also because it is waste that would otherwise be disposed of.

Just like waste from mango seeds, tons of which are generated from mango processing.

Introducing PhenoFera, a natural antioxidant phenolics powder extracted from mango seeds.

"Phenofera" is a portmanteau of "pheno" from the word phenolics and "fera" from the word mangiferin, the dominant polyphenol in mangoes.

The antioxidant phenolics in PhenoFera is essential to the skin as it provides primary defense against photo-induced damage.

The idea of doing research on the use of mango waste was suggested by Dr. Rene Rafael Espino, then the head of the DA-BAR High Value Crops Development Program, who said that literature on mango waste in other countries were on polyphenols.

Arsenia Sapin, a researcher at the UPLB National Institute of Molecular Biology and Biotechnology (BIOTECH), partnered with another researcher at BIOTECH, Teresita J. Ramirez, to conduct the research.

Sapin worked on the polyphenols while Ramirez handled the development of dietary specialty flours from mango peel and seed.

Phenofera powder is used in cosmetic products and developed in prototype hair and skin care products such as sunscreen lotion, sun shield spray, moisturizer, shampoo, apricot scrub, hand sanitizer, and liquid hand soap.

It has hurdled effectiveness trials on 45 participants who used the PhenoFera-produced body soap, body lotion, and sunblock for 18 days.

It rivals other whitening ingredients in the market such as hydroquinone, corticosteroid, and kojic acid whose long-term use in high concentrations can have side effects including ochronosis, atrophy, carcinogenesis, and other systemic effects.

In January 2020, Sapin and Ramirez, with the help of BIOTECH researcher Fides Marciano Tambalo, presented Phenofera to the cosmetics industry through the Philippine Society for Cosmetic Science, Inc., which encourages the promotion, use, and development of natural products developed by Filipino researchers.

Phenofera is highly competitive, and currently, the team is in the process of looking into its large scale production.

It will also be subjected to safety tests as well as dermal allergenicity test.

PhenoFera is one product which shows that there are resources out there that will spur agro-industrialization if investments are made in the right places and the right people: in this case, on research and the creative minds of UPLB scientists.

A commercialized PhenoFera will benefit the mango industry in terms of providing additional source of income, generating employment, and putting waste to good use.

It will enable the cosmetics industry to use alternative and safe ingredients for the welfare of its customers. It will also help promote a sustainable future through the use of natural products.

PhenoFera is registered with the Intellectual Property Office of the Philippines with registration number 4/2018/00014763 dated January 17, 2019 (with reports from the UPLB National Institute of Molecular Biology and Biotechnology PhenoFera Terminal Report).

Solidifying the local cheese industry

ALBERT GEOFFRED B. PERALTA

Cheese! For many of us, it is a favorite snack, eaten on its own, or with bread.

The key to good cheese lies in rennet —a collection of enzymes found in the stomachs of ruminant animals. Rennet's primary component, chymosin, acts as a dairy coagulant when added to milk, separating it into liquid whey and solid curds. The curds are then further processed into the different cheeses that we all know and love.

Traditionally, rennet is extracted from the stomach linings of young calves, making it a costly and limited resource and prompting the search for alternative sources of chymosin. Over time, substitutes made from plants, or alternative milk coagulants such as vinegar or lemon, have been discovered and used in place of rennet, but with varying results.

The local cheese-making industry accounts for only a small percentage of the country's overall cheese supply as most of our cheese is imported. Local cheesemakers often use one of three milk coagulants: animal rennet, expensive imported rennet, and acid coagulants vinegar or lemon juice.

But now, cheesemakers can rejoice after a research faculty member from the UPLB National Institute of Molecular Biology and Biotechnology (BIOTECH) developed a cheaper, more efficient, and much more effective local alternative: microbial rennet!

Microbial rennet is a milk coagulant produced via solid substrate fermentation using a fungus. It comes in granular and liquid form, and was developed with small- and medium-scale cheese producers in mind.

It is the brainchild of Dr. Susana M. Mercado, who first came up with the idea for her dissertation topic in 1994. As with many great ideas of our time, it was also for a greater cause—Dr. Mercado wished to help cheesemakers find better and more affordable alternatives to the traditional rennet.

Starting from 40 different mold species, she conducted tests to screen them for a specific milk-coagulating enzyme and was able to isolate one particular culture that had 200 times more activity than the others. From there, she further refined the product to granule and liquid forms.

Branded as BIOTECH RENNET™, the microbial rennet has been found to be an excellent replacement for traditional rennet in making *kesong puti*, cream cheese, processed cheese, and blue cheese.

Microbial rennet's high milk clotting activity yields cheese that is of more stable size and weight. The cheese also retains more protein and fat, making it creamier, tastier, and more uniform in texture. Moreover, microbial rennet doubles the shelf life of soft cheeses while maintaining their taste.

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Branded as BIOTECH RENNET™, the microbial rennet has been found to be an excellent replacement for traditional rennet in making *kesong puti*, cream cheese, processed cheese, and blue cheese.

It is also more economical because one does not have to slaughter a young calf to obtain it. Thus, it becomes a cheaper alternative and makes upscale production easier.

BIOTECH RENNET™ is available at UPLB-BIOTECH, and has been designated as one of UPLB's Champion Technologies for Commercialization. Some companies have already expressed their interest to commercialize it. Once fully commercialized, this technology will surely prove instrumental in boosting the local cheese-making industry.

Photo by Christopher V. Labe & Vandolph R. Maningas

Goodbye 'red alert' with Monascus Red!

KRISTINE E. ARAGUAS

Red is the color of fire, energy, and passion. It is said to fuel not only the emotions, but also one's metabolism and appetite, making it an ideal color for food products and advertisements.

But with the enticing hues and shades of red in food products, beverages, and even cosmetics, how safe could these eye candies get if the color is sourced from artificial dyes?

Studies reveal their link to cancer, hormonal disruption, and hyperactivity among children.

Enter Monascus Red, a safe and natural alternative to non-permissible, dangerous, and non-food synthetic colors discovered by UPLB researcher and microbiologist Fides Marciana Tambalo.

Tambalo is project leader of the Enzyme Laboratory at the UPLB National Institute of Molecular Biology and Biotechnology that extracts the main ingredient and produces it in powder and liquid form.

According to Tambalo, who currently serves as assistant to the vice chancellor for research & extension of UPLB, they cultivate and isolate Monascus fungi from a fermented food that is produced in the Philippines. Like other food that are sourced from fungi such as mushroom and blue-veined cheese, Monascus is safe for human consumption.

"Monascus is generally considered and recognized as safe in Asia and has been used for more than a century in Asian cuisine," Tambalo said.

It took more than seven years of research before Tambalo's team released Monascus Red to the public. Funding support from the Department of Science and Technology was crucial to producing and refining this all-natural colorant.

Tambalo is cognizant of the industry demand for food colorants and the absence of local companies that produce natural alternatives. "The feasibility and potentials of the project and of the natural color industry is a booming one," she said.

Monascus Red is homegrown and locally produced, making it competitive with imported and synthetic colorants.

It has been tested on meat products, baked goods, beverages, and personal care products such as soap and lip balm. Tambalo's team has also conducted safety tests and validation for different food and personal care products, and production studies on a pilot scale.

The challenge lies in taking Monascus from laboratory scale to pre-marketing stage while ensuring continuous support from the government.

Commercializing and licensing are equally difficult. As Tambalo pointed out, "it is challenging to find somebody in the Philippines who will invest in biotechnology."

In the meantime, Tambalo is promoting the use of Monascus Red through training activities in order to see more people being informed on the importance of using safe food colorant.

This is despite the observed resistance of stakeholders to shift from using traditional artificial coloring to natural ones.

Tambalo's team's enthusiasm cannot be dampened, however, as they continue to passionately discover more microbes that produce safe colorants.

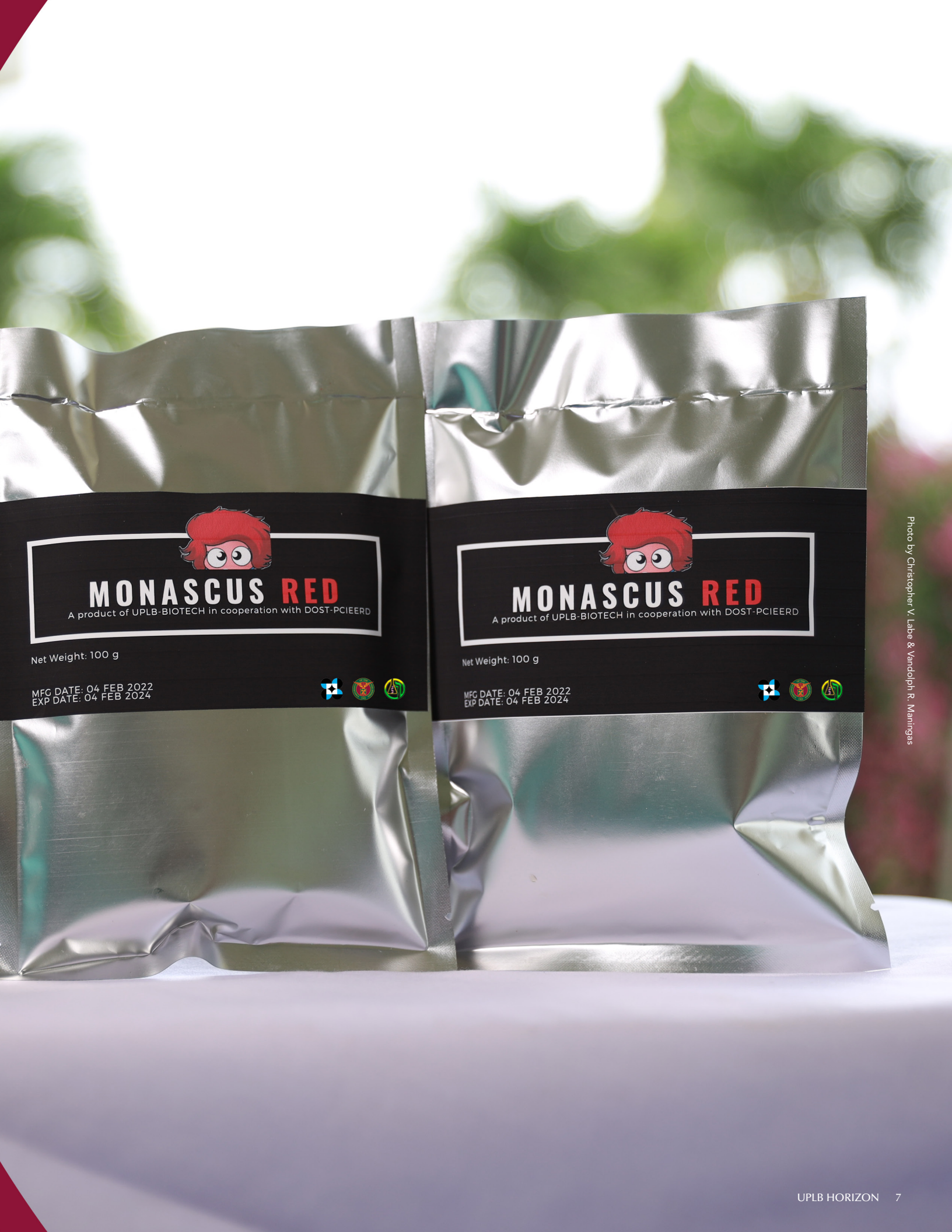
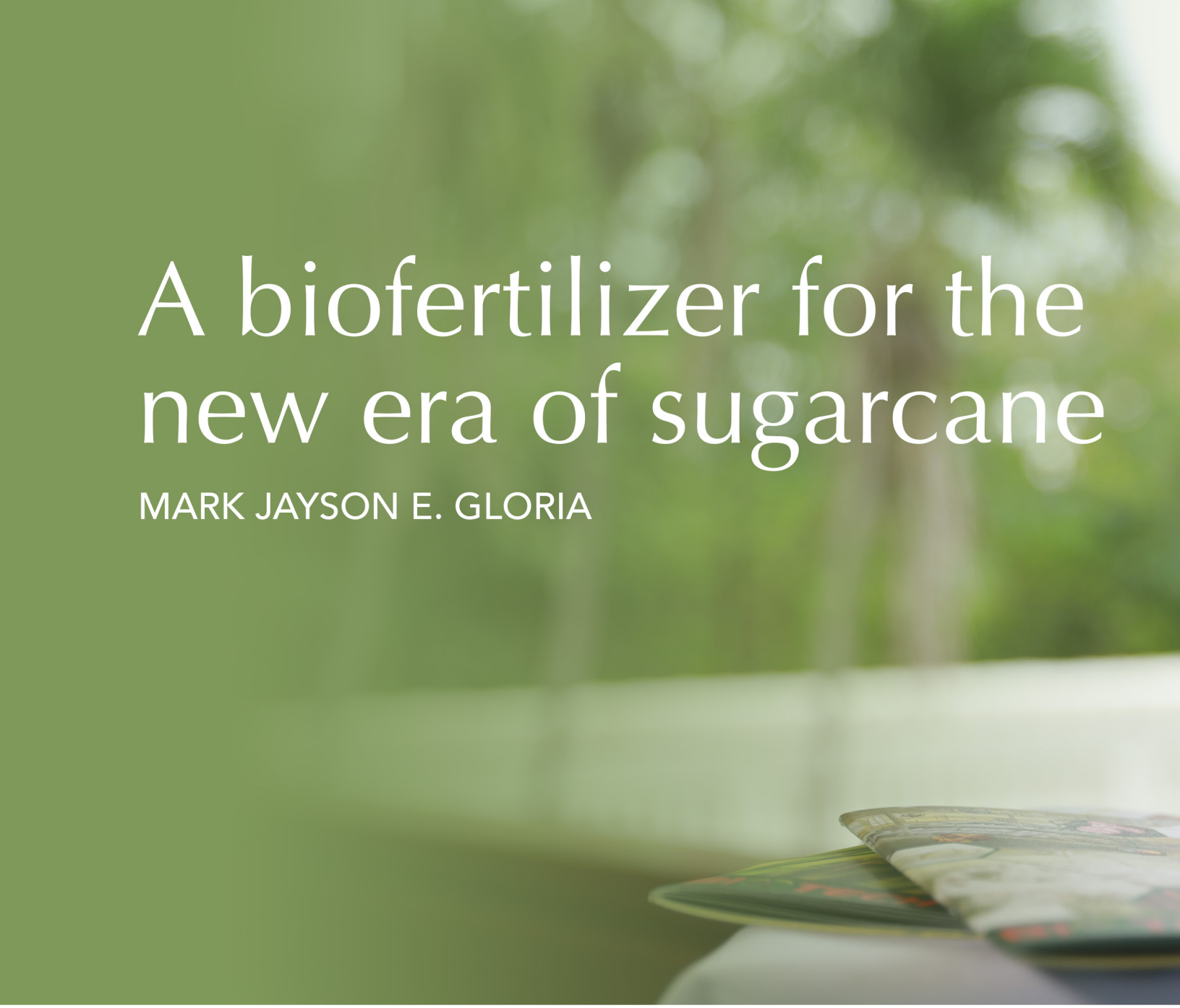


Photo by Christopher V. Labe & Vandolph R. Maningas



A biofertilizer for the new era of sugarcane

MARK JAYSON E. GLORIA

The heydays of the sugar industry in the 1950s to the early 1970s created wealth and defined socio-economic hierarchy and power in the country.

Much has since changed. For one, sugarcane farming is no longer exclusive to the *haciendero*s. The Sugar Regulatory Administration reported in 2017 that 79% of sugarcane farmers in the country are small-scale, with farm sizes less than five hectares.

Sugarcane has also found a new purpose. With the passage of the Biofuels Act of 2006, it was identified as a feedstock for bioethanol production.

Through all sorts of changes in the industry, what remains is its need for inputs such as fertilizer and nitrogen.

At UPLB, a soil scientist developed Nutrio®, a biofertilizer that helps sugarcane absorb nitrogen in the atmosphere. This fertilizer, now available in the market, is eco-friendly and cheaper.

Nutrio® was developed by Dr. Virginia M. Padilla, a retired university researcher of the UPLB National Institute of Molecular Biology and Biotechnology (BIOTECH).

It contains a living microorganism that produces important hormones for plant root and shoot development.

More importantly, the microorganism possesses a gene that facilitates fixation of atmospheric nitrogen, which when converted into available forms and absorbed by the plants, enhances plant growth, producing greener and sturdy plants.

According to Dr. Padilla, nitrogen is one of the three macro elements that are vital for plant growth, development, and reproduction.

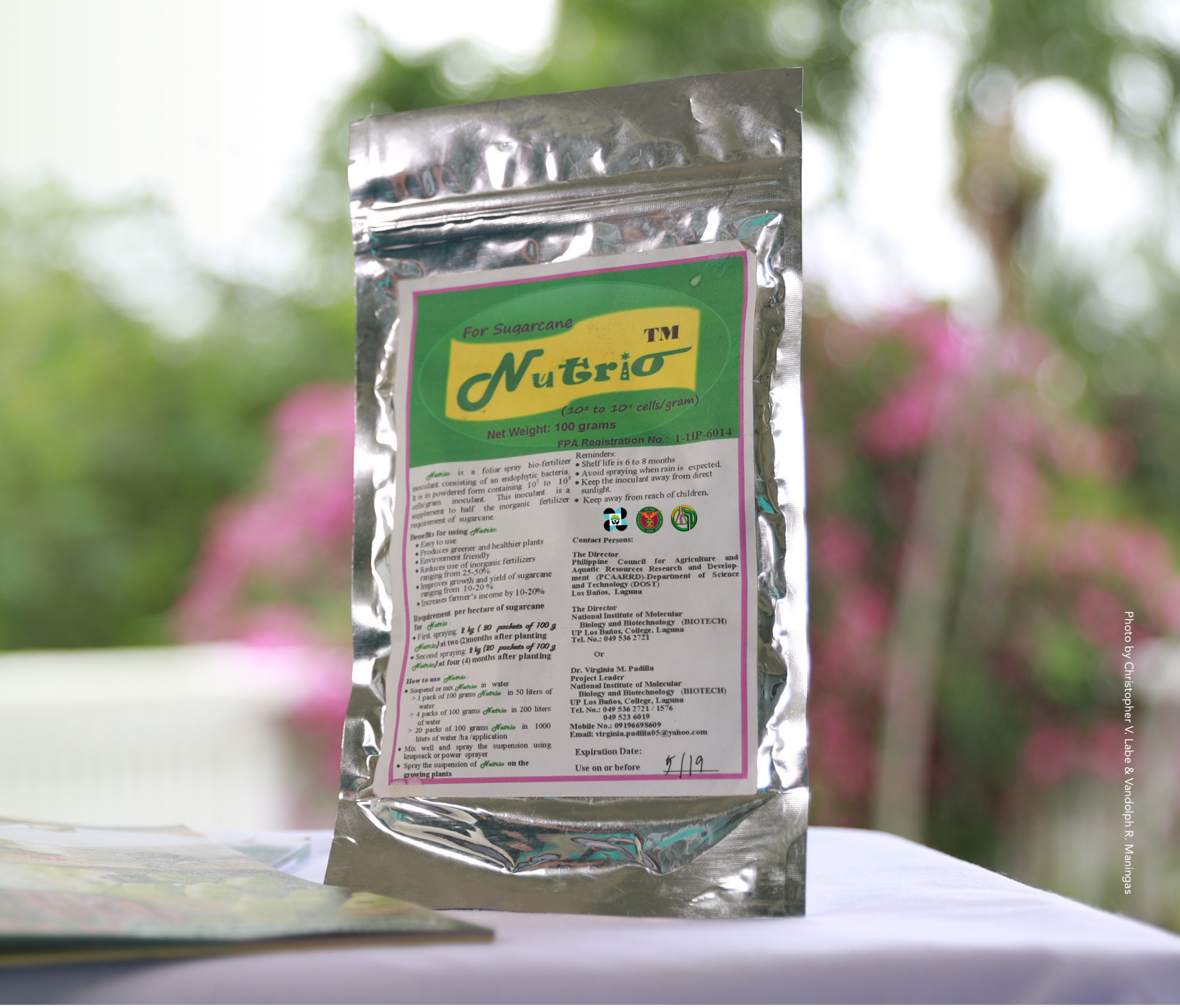


Photo by Christopher V. Labe & Vandolph R. Maningas

Aside from being vital in chlorophyll production, it is also a major component of amino acids, the building blocks of proteins that plants need.

The biofertilizer can also be applied in other crops, including eggplant, rice, corn, papaya, banana, jackfruit, guyabano, rambutan, and various vegetables.

Dr. Padilla developed Nutrio® in 2012 under a research project that was funded by the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development of the Department of Science and Technology, with the aim of increasing sugarcane and eggplant productivity in the country.

Based on her studies in Tarlac, Pampanga, Iloilo, Negros Occidental, and Bukidnon, farmers who used Nutrio® reduced the use of traditional inorganic chemical fertilizer by 50%, while enjoying 10-15% increase in sugarcane yield.

Using Nutrio® reduces the extensive and detrimental effects of inorganic chemical fertilizers such as soil degradation and significant loss of soil fertility.

Dr. Padilla's family oversees the development, production, and distribution of Nutrio® through a recently established family corporation, the Fullmight Agricultural Corp. Fullmight is based in Los Baños, Laguna, Philippines and has a website at www.nutrio-foliar.com.

The golden years of the country's sugar industry may be over, but bringing its production cost low through Nutrio® will help make it retain its position as an important crop in the country.

Smart irrigation advice for the wise

MARK JAYSON E. GLORIA

"A word to the wise is enough," the Roman playwright Plautus once said. This centuries-old saying has persisted through generations, and its very essence now echoes to those who want to become "smart farmers."

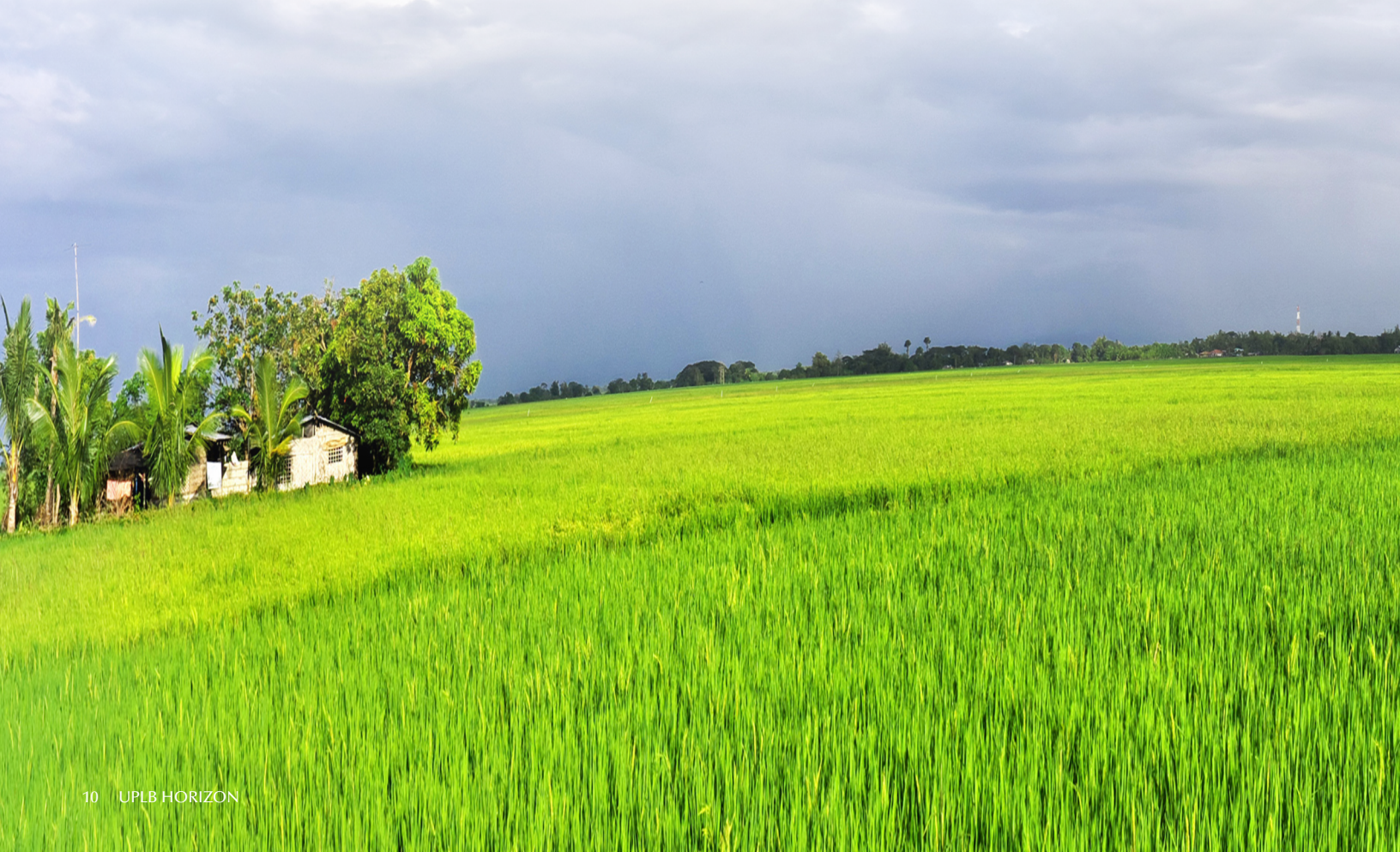
Smart farmers are empowered and trained to use devices like mobile phones as a farming decision support tool. For example, in the comfort of their homes, they are able to receive text messages that tell them that it is time to irrigate their crops.

At Project SARAI, or Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines, smart irrigation – the application of the right amount of water at the right time the crops need them – is now possible. This is through the Water Advisory for Irrigation Scheduling System (WAISS), one of the smart agriculture technologies that SARAI has cascaded to the farming sector.

"With the help of low-cost smart sensors and our knowledge of soil-crop-water-climate relationships, we developed WAISS to help farmers answer the questions when to irrigate, how much, and when to stop irrigation," said Dr. Roger Luyun, Jr., who leads SARAI-Project 2.3 where WAISS is based.

WAISS is equipped with a soil moisture sensor and is able to send information on the amount of moisture to a software based at its headquarters in UPLB.

Proactive smart farmers who wish to know the real-time soil moisture of their farm could also text the word STATUS to the WAISS cellphone number that the team provides them.



WAISS, Dr. Luyun said, is an adaptation of the Colorado State University's Water Irrigation Scheduler for Efficient Application (WISE) that was developed by Dr. Allan A. Andales, a Filipino *Balik-Scientist* of the Department of Science and Technology.

Working with Dr. Luyun and Dr. Saludes in further improving WAISS are fellow agricultural and biosystems engineers in SARAI's Water Management Team, namely: IAE faculty members Erwin Quilloy and Paolo Rommel Sanchez; researchers Toni-An Mae Salcedo and Bryan Baltazar; former researcher Yaminah Mochica Pinca; and research associates Christian Martin Casedo, Jan Albert Atienza, Jay Ann Lomod, and Ginalyn Robel Brazil.

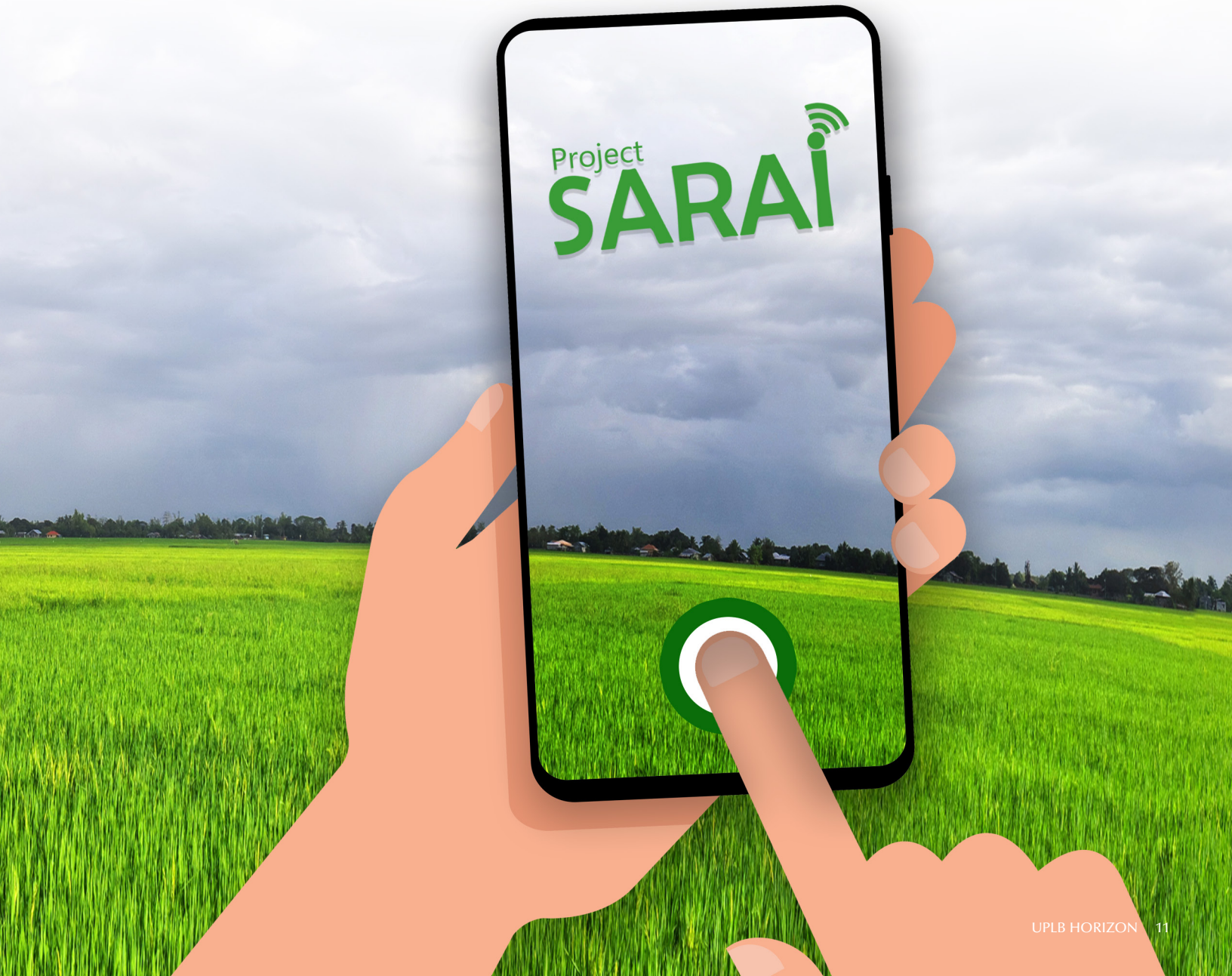
WAISS may be used for upland crop production systems, such as corn, sugarcane, tomato, soybean, banana, and upland rice.

Initially deployed at UPLB and at Mariano Marcos State University, Ilocos Norte, the WAISS network may be expanded through SARAI's nationwide network of 12 state universities and colleges, six government agencies, and numerous local government units and farmer cooperatives.

The research team has been studying options to improve WAISS as SARAI is fine-tuning crop advisory technologies for a better decision support system. SARAI has 15 projects working on developing and disseminating mobile and web applications for smart agriculture, not only for irrigation, but also for crop planting, monitoring, and harvesting, soil fertility, pest and disease identification, and weather forecasting, among others.

"Project SARAI envisions Filipino farmers to have the right information at the right time," said Dr. Ma. Victoria O. Espaldon, program leader of SARAI and professor at UPLB. "[At Project SARAI], information is ready at your fingertips!"

With smart agriculture technologies that Project SARAI has been promoting, accurate, science-based, and real-time information would be enough for the wise Filipino farmers.



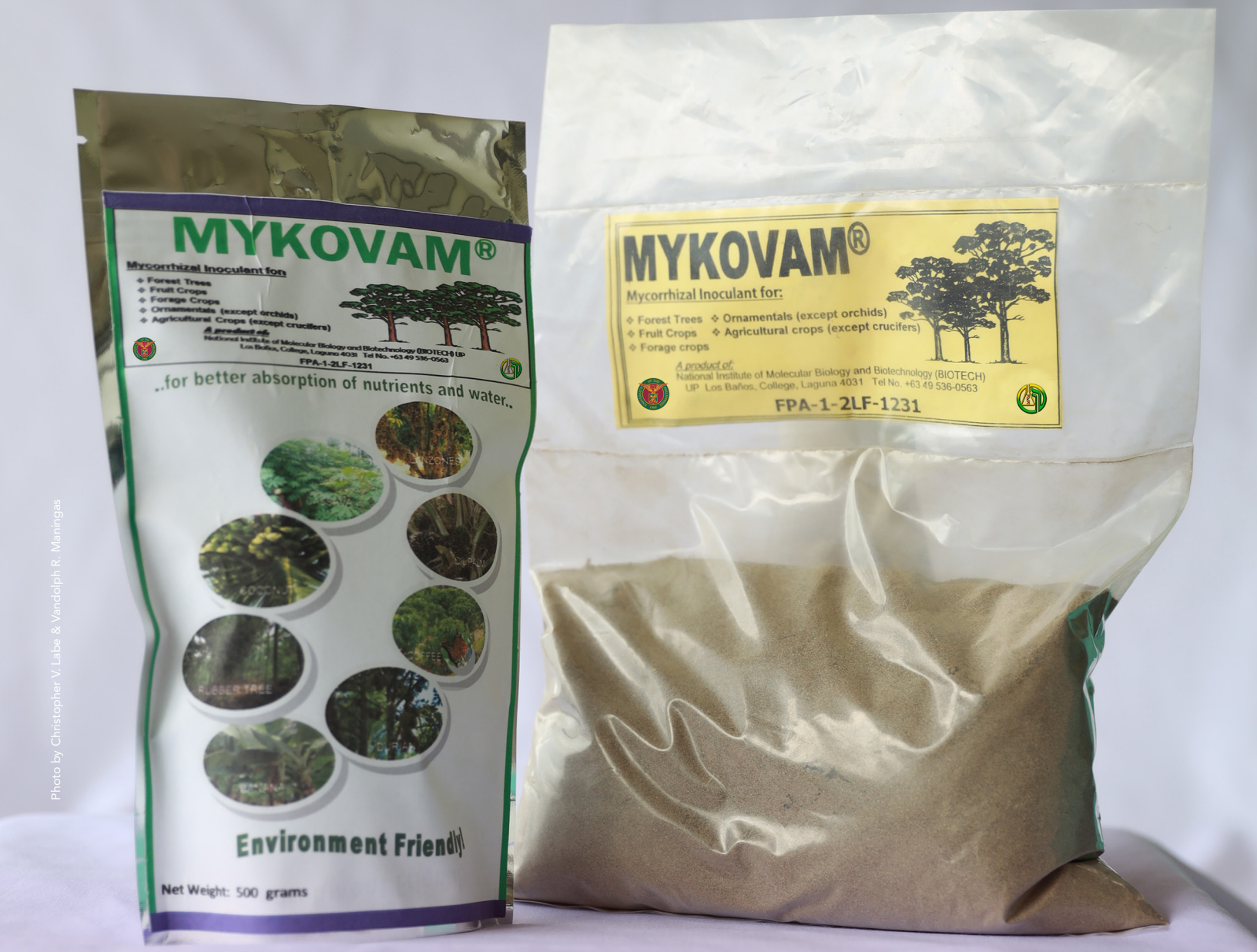


Photo by Christopher V. Labe & Vandolph R. Maningas

IT'S ALIVE!

Mykovam, the hardworking biofertilizer

JESSA JAEL S. ARANA

Imagine that by applying a fertilizer once in a plant's early life, it gets a major upgrade thereafter. Visualize little fungi helpers clinging to the plant's roots to supply additional moisture and nutrients, in exchange for a share of plant sugars.

This is the mechanism by which biofertilizer Mykovam works to make trees, crops, and ornamental plants lusher and healthier.

With 12 strains of mycorrhiza fungi in its present formulation, this biofertilizer has live and working microorganisms that constructively colonize plant roots to help them grow.

These fungi form mycelia, or interwoven threads, which act as root extensions that increase nutrient and water absorption for the plant.

Its developer, 2021 Presidential Lingkod Bayan Awardee Dr. Nelly Aggangan, designed Mykovam to be an effective natural alternative to chemical fertilizers for both forest trees and agricultural crops. It takes advantage of the natural occurrence of fungi in the soil, making this biofertilizer environment friendly. It is also relatively cheaper compared to the fertilizers currently dominating the market.

Dr. Aggangan, a scientist at the UPLB National Institute of Molecular Biology and Biotechnology (BIOTECH), started improving the formulation of Mykovam in the mid-1990s. Her research was an off-shoot of earlier studies on mycorrhiza at BIOTECH by Dr. Reynaldo E. de la Cruz in the 1980s. She then worked with Dr. de la Cruz as his research assistant and witnessed the fertilizer's development from the latter's original concept.

She improved Dr. de la Cruz's formula, beginning with originally three strains. It later rose to five, then eight, and now to 12 species of arbuscular mycorrhizal fungi.

A kilo of Mykovam is enough to fertilize 200-400 seedlings and to replace 60-85% of the plants' chemical fertilizer requirement. This means that farmers can save expenses on fertilizer and earn more profit.

It can be used on fruit trees such as guava, rambutan, papaya, citrus, lanzones, banana, coffee, guyabano, coconut, and mango; and on agricultural crops including, but not limited to corn, tomato, eggplant, onion, garlic, pepper, cassava, and sweet potato. It can be applied to almost all plants except crucifers and a few trees.

Aside from enhancing plant growth, Mykovam can also protect plants from harmful pathogens. BIOTECH reports on its website how the biofertilizer helped a group of farmers in Bohol and in Mindanao overcome Fusarium wilt, a fungal disease that once devastated the banana industry.

Mykovam's effectiveness in growing indigenous forest tree species such as *narra, batino, bani, salago,* and *ipil* was also recognized by the Department of Environment and Natural Resources (DENR).

In 2011, DENR sourced Mykovam for its National Greening Program to fast track seedling growth and increase their chances of survival in harsh soil conditions.

Mykovam has also been proven effective in helping restore forests and soil in areas affected by mining. Applying Mykovam to seedlings can increase their tolerance against drought, high temperature, and heavy metals in denuded forest lands.

Since its commercialization in the 1990s, Mykovam has become widely distributed in the country. It is readily available at the BIOTECH headquarters and from partner merchants and online shops.

Whatever the task, big or small, Mykovam and its little helpers prove that working behind (or beneath) the scenes is essential to a bountiful harvest.

Sinta papaya, the super breed

JESSA JAEL S. ARANA

Since its introduction to the Philippines during the Spanish colonial period, papaya has become a major fruit crop in the country and a common staple in Filipino cuisine, whether used raw in appetizers, or served ripe and sweet as a dessert.

When the papaya ringspot virus (PRSV) entered the country in the 1980s, the papaya industry suffered a major blow. The virus ravaged papaya farms in Southern Luzon and later spread to Visayas and Mindanao.

The UPLB Institute of Plant Breeding (IPB) was not spared. Many of its papaya breeding lines were lost to PRSV which had no cure. Infected plants had to be disposed of to prevent the spread of infection.

Out of this predicament arose an innovation from IPB that pulled back a dying industry from the brink: the *Sinta* papaya variety.

According to its principal breeder, Dr. Violeta Villegas, *Sinta* papaya is the first Philippine-bred hybrid papaya. Aside from producing sweet, firm, and fleshy fruit that is ideal for both fresh consumption and canning, *Sinta* has moderate tolerance against the PRSV, making it a favored choice of many farmers.

Sinta papaya is tolerant to PRSV and can grow to full maturity and bear good marketable fruits.

Years of purification and selection of *Sinta* papaya's parent plants have ensured that their fruits have traits that are ideal for consumers, and that farmers can harvest and earn more from each seedling or seed that they plant.

"There's no need to plant several seedlings per hill because each plant will bear fruits," noted Dr. Villegas, who once served as director of IPB and is now a retired scientist. "All *Sinta* papaya plants are fruit-bearing. They are either female or hermaphrodite, without unproductive male plants."

After its initial commercial release in 1995, *Sinta* papaya helped the papaya industry in the Philippines regain its footing. A partnership with East-West Seed beginning in 1997 spread the said variety to more countries, namely: India, Kenya, Myanmar, Pakistan, Peru, Tanzania, Thailand, and Vietnam. As an official licensee of *Sinta* papaya, East-West Seed pays royalties to UPLB, which are then plowed back into research.

Since surviving the industry's near eradication, papaya has again cemented its place as a major fruit crop and as a lucrative agricultural trade in the Philippines. *Sinta* is one of the seven available commercial papaya varieties in the market as of 2015, according to the Department of Agriculture, and is particularly popular among farmers in Luzon.

The papaya industry in the country is truly a survivor. Thanks to UPLB scientists who developed *Sinta*!

A story of two technology licensing options

ANA MARGARITA S. PALMA

The year 2017 was a banner year for UPLB with 17 of its technologies for commercialization able to qualify for patent approval, the highest number since 2000.

Two of the 17 were Microbial Rennet, a milk coagulant that can substitute for rennet in cheese making and Nutrio®, a microbial-based foliar biofertilizer.

Both technologies were developed by researchers from the UPLB National Institute of Molecular Biology and Biotechnology (BIOTECH), but took different paths in commercialization.

COMMERCIALIZATION THROUGH A PRIVATE COMPANY

Dr. Susan Mercado, developer of Microbial Rennet, chose to commercialize it through a license awarded to Aust-Phil Food Manufacturing Corporation, a food manufacturing company, as according to her, she could not scale up production for lack of human resource, production space, and working equipment.

Negotiations began in 2012, and soon, Dr. Mercado regularly supplied them with small but frequent orders of Microbial Rennet. Eventually, Aust-Phil signified its intent to license the technology so they themselves will be able to manufacture it.

They submitted a Letter of Intent to UPLB in 2014. However, it took three years to finally begin commercialization, facilitated only when the Technology Transfer and Business Development Office (then Center for Technology Transfer and Entrepreneurship) helped with patent application, negotiations with Aust-Phil, and in processing documents required for state-funded technologies to be transferred to a private company.

In 2018, Microbial Rennet was licensed to Aust-Phil for mass production for five years.

Aust-Phil produces Microbial Rennet from a laboratory it built specifically for rennet production and by staff trained by Dr. Mercado. She said that she is happy that she chose this path of commercialization. "I am satisfied with the state of my technology. Something came out of my ideas, my years of research," she added.

COMMERCIALIZATION THROUGH A SPIN-OFF

Aside from licensing technologies to private companies, commercialization can also be done through a spin-off with researchers either acting as consultants or marketing the technology themselves.

Dr. Virginia Padilla chose the latter with Nutrio®, a biofertilizer that promotes plant growth and replaces up to 50 percent of the required chemical fertilizer for eggplant and sugarcane. It also works on mahogany, rambutan, lanzones, durian, cucumber, cassava, and palay.

Armed with a trademark and registration papers from the Fertilizer and Pesticide Authority, Dr. Padilla created Fulmight Agricultural Corporation to market and distribute Nutrio®.

Starting a business was no walk in the park, Dr. Padilla said. She particularly lamented the inefficiency in registering a business – the long queues, vague instructions, and the tedious to and fro government offices to secure documents.

Dr. Padilla put up facilities using her own resources as government agencies required at least three years of business operation for businesses to qualify for a loan.

Despite these difficulties, Dr. Padilla is relentless in finishing what she started, buoyed by support from UPLB TTBDO, Department of Science and Technology, and from farmers who are pleased with the promising results of Nutrio®.

These days, she is conducting field trials in various farms to improve Nutrio®. The trials have been effective in promoting her technology to end-users. She remains steadfast in her goal, taking one step at a time to commercialize her technology.

Dr. Padilla applied for patent in 2017 and has been recently granted one.

SUPPORTING TECH-GENERATING RESEARCH

It is challenging to protect and commercialize a technology. Dr. Mercado and Dr. Padilla can both attest to this, but the outcomes of the hard work may all be worth it.

Aust-Phil paid a licensing fee to UPLB; and in the next few years, they will pay royalties that will go to UPLB, BIOTECH, and Dr. Mercado as the inventor.

The money will serve as additional R&D funds and as an incentive to Dr. Mercado for her work. And because Microbial Rennet is cheaper than existing milk coagulants, the cheese that Aust-Phil produces will become more affordable to consumers. Indeed, what more can a researcher ask for now that something has come out of her ideas.

As for Dr. Padilla, we have yet to see the fruits of her labor. But her technology is gradually gaining traction in the market as she conducts field trials. As long as she maintains her resolve, Nutrio® will serve its purpose—to help Filipino farmers and the sugarcane industry.

Dr. Mercado and Dr. Padilla chose two different paths of commercializing their technologies, but both of them delivered the same meaningful contribution to knowledge and social action. And it became possible because their intellectual properties are protected.

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