
FILIPINO FACES
OF
BIOTECHNOLOGY
2016 – 2022 AWARDEES
ISAAA Inc.
DEPARTMENT OF AGRICULTURE
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FILIPINO FACES OF BIOTECHNOLOGY

2016 – 2022 AWARDEES

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CONTRIBUTORS AND EDITORS

Charizze De Castro is working as a senior research fellow for the Bayan Innovation Group, where she was a former full-time Program Director. Concurrently, she is being tapped as a market researcher, business and marketing consultant, and writer by various enterprises and organizations.

Janine Cyren Escasura is the Project Assistant for the Know the Science project of ISAAA Inc. in collaboration with the Philippine Agriculture and Fisheries Biotechnology Program. She has a Bachelor's degree in Development Communication from the University of the Philippines Los Baños. She develops social media campaigns on Facebook, Instagram, TikTok, and X accounts of Know the Science PH.

Kaymart Gimutao is a science communication practitioner. A former project assistant of ISAAA, he finished his Bachelor's degree in Development Communication (major in Science Communication) at the University of the Philippines Los Baños, where he is also completing his MS in Environmental Science.

Kristine Grace Tome is a Program Officer 2 at ISAAA Inc. She leads the development of education and information materials at ISAAA Inc. and authored over 40 publications on various topics. She was the principal investigator of the study on 17 years of Philippine media reportage of biotech and scicom perspectives of academics and scientists in Southeast Asia. Kristine is a member of Science Communicators Philippines, Inc. and Association of Development Communication Educators and Practitioners (ADCEP) Philippines.

Michaela Jyra Melo is a content writer, freelance editor, and quality analyst with a BS in Development Communication from the University of the Philippines Los Baños. She has effectively created engaging content for diverse organizations, ranging from a climate science institution to an AI internet technology company, showcasing her expertise in SEO, copywriting, and digital marketing.

Mikael Angelo Francisco is a multi-awarded science journalist and the co-founder and editor-in-chief of FlipScience.ph, a Philippine-based science news and features website. He is the host of the Ask Theory podcast, and has written and published books about media literacy, Filipino scientists, and science trivia. He also conducts lectures and workshops on science communication.

Panfilo de Guzman is a Senior Associate Scientist at ISAAA Inc. responsible for the administration, coordination, and management of projects under the DA Biotech Program. He also coordinates activities supported by the US Department of Agriculture. He has authored and co-authored publications on agri-biotechnology and a chapter in a book.

Rhodora Romero-Aldemita, Ph.D. is a leading scientist and public speaker in the Philippines and the region, specializing in agricultural biotechnology. She has extensive experience in research, development, and communication of biotech crops, having led the annual publication of the *Global Status of Commercialized Biotech/GM Crops* since 2016 and coordinated capacity-building activities across numerous organizations. Her achievements include awards for outstanding research, science communication, and service to the nation.

Rona Niña Mae Azucena has been a communications professional for over two decades, specializing in development communications, strategic communications, public relations, and donor communication. Through her involvement in several international non-government organizations within the development sector, she has worked in programs related to rice research, climate change, agriculture, health, shelter/housing, water, sanitation, and hygiene.

Zabrina Bugnosen has a 16-year experience in the Philippines' agri-biotech sector, having spent 8 years with the Bt Eggplant Project as a Project Management Regulatory Associate before transferring to ISAAA Inc. to help oversee administrative coordination as well as assist in written and online communication activities. She has a Bachelor's degree in Development Communication, majoring in Science Communication.

Steph Bravo-Semilla was a former illustrator for the Philippine Daily Inquirer for close to 22 years. She enjoys making cartoons and illustrations so much that she set up her own studio (The Tiny Studio) - with the help and support of her husband, Chris - so she has an excuse to continue creating art. She enjoys spending her days working at her big desk, drawing tablet in hand, while watching compelling trials on the Law and Crime Network.

Eric John Azucena is the Information Management Specialist at ISAAA Inc. With a background in Chemical Engineering and Computer Science, he serves as the database and web applications developer, graphic artist, layout artist, photographer, videographer, and website administrator of ISAAA. With over 20 years of experience in photography, EJ's creative shots have gained significant popularity online and earned recognition as the Photographer of the Year award from the Ayala Alabang Camera Club in 2011 and 2023.

FOREWORD

In the vast tapestry of human achievement, few endeavors hold the power to shape our future as profoundly as biotechnology. It is a realm where innovation converges with compassion, where the boundaries of what is possible are constantly pushed by individuals whose dedication knows no bounds. The *Filipino Faces of Biotechnology* captured within these pages exemplify the spirit of ingenuity and resilience that defines the Filipino commitment to advancing science and technology.

This compilation features the men and women at the forefront of innovation; those who passionately endeavor to make biotech innovations accessible and affordable to all stakeholders. The accolades celebrate not only the intellectual prowess but also the tenacity and commitment of these individuals who have navigated challenges in the fields of agriculture and fisheries, health, environment, information and education, and policy.

The *Filipino Faces of Biotechnology* is about people and their personal stories. It is giving biotechnology, a once-esoteric concept, its human face. It aims to celebrate people and their unwavering dedication to propel biotech forward. It also wishes to inspire as the awardees' personal stories resonate as profound lessons in overcoming obstacles and being passionately part of a cause that is greater than one's self-interest.

As we navigate through the pages of this book, we witness the ongoing journey of the Philippines towards fostering biotechnology and genuine public acceptance for its beneficial utilization, a journey that encompasses both triumphs and challenges. May the *Filipino Faces of Biotechnology* and their personal stories encourage a deeper appreciation for biotechnology's potential to help address societal needs. Their stories are not just a celebration of personal success but a reflection of our collective progress as a nation.

Annalyn L. Lopez
DA Biotech Program Director-Coordinator 2019, 2020-2022
Agriculture Attaché to Bangkok
Philippine Department of Agriculture

INTRODUCTION

In an ever-evolving landscape of agricultural innovations, the Philippines stands at the forefront of biotechnological advancements across the Southeast Asian region. Biotechnological innovations touch upon nearly every aspect of human life. Its implications have positively impacted various facets of our society, addressing critical and pressing concerns in agriculture and offering solutions that may improve the lives of Filipinos.

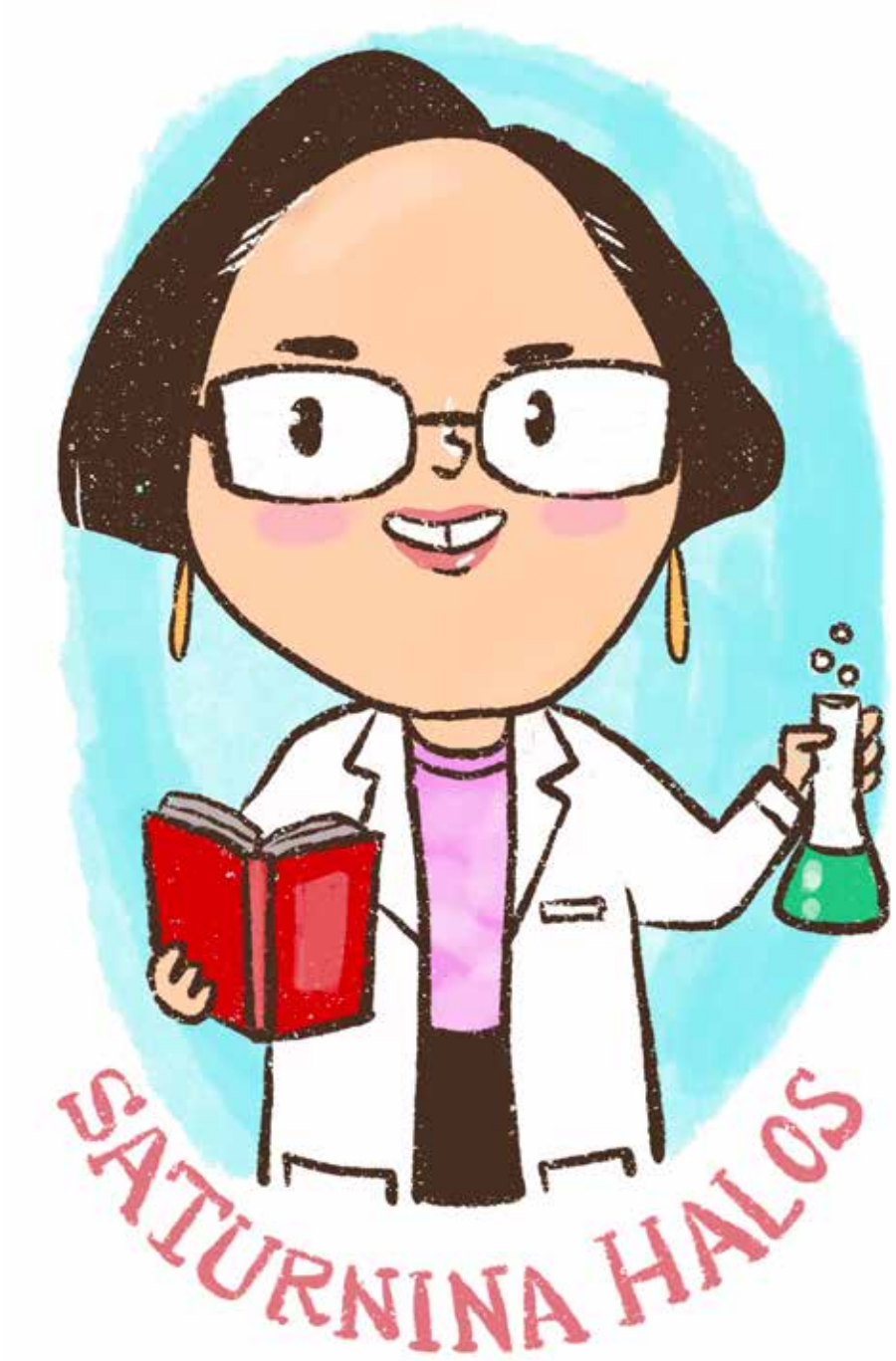
Since 2016, the Philippine Agriculture and Fisheries Biotechnology Program of the Department of Agriculture (DA Biotech) has awarded outstanding Filipino individuals through the *Filipino Faces of Biotechnology*, every year. This is to recognize the exceptional contributions of Filipino researchers, scientists, farmers, fisherfolks, communicators, advocates, journalists, and students in the advancement of biotechnology in the country. This prestigious award encompasses individuals working in various facets of biotechnology–agriculture, health, environment, information and education, and policy.

ISAAA Inc., in collaboration with DA Biotech, compiled the stories and accomplishments of the *Filipino Faces of Biotechnology* awardees from 2016 to 2022 to feature a pictographic account of the awardees' lives, accomplishments, and contributions to biotechnology in the Philippines and abroad. This coffee table book aims to inspire young and aspiring biotechnologists, communicators, and advocates of biotechnology by promoting a greater appreciation of biotechnology through the relatable life stories of the awardees that will resonate with the readers. This publication also hopes to encourage more students to pursue careers in biotechnology and be more appreciative of the technology.

The *Filipino Faces of Biotechnology* awardees exemplify the spirit of Filipino excellence and commitment to the betterment of the nation. These individuals have become the catalysts of positive change in the country, bridging the gap between scientific discovery and practical applications. As we delve into their stories, ISAAA Inc. hopes to bring biotechnology closer to people and accelerate acceptance and support of the use of biotechnological innovations in various aspects of society.


2016
AWARDEES

Photo Source: ISAAA Biotech Updates



DR. SATURNINA C. HALOS

Formulating Biosafety Policies and Advocating Biotechnology Education

Dr. Saturnina C. Halos was selected as recipient of the Award as one of the outstanding pioneer scientists in the development of Pinoy GMOs. Dr. Saturnina is the Chair of the Biotechnology Advisory Team of the Department of Agriculture (DA) and the President of the Biotechnology Coalition of the Philippines (BCP).

Considered as one of the pillars of Philippine biotechnology, Dr. Nina, as she is fondly called, has provided technical advice to the Department of Agriculture in formulating biosafety policies and in developing and overseeing the implementation of its policies and programs in biotechnology.

Dr. Nina participated in drafting the first biosafety policy of the Philippines in 1990. She also participated in the final discussions of the Cartagena Protocol on Biosafety (CPB), served as a technical consultant in the drafting of the National Biosafety Framework of the Philippines, and participated in the national consultations on CPB ratification. She designed and helped implement capacity-building strategies such as training courses, workshops and seminars on risk assessment, living modified organism (LMO) detection, and post-approval monitoring for the DA in implementing biosafety policies.

Moreover, Dr. Nina also actively participated in the drafting of genetically modified (GM) crop regulatory policies and has served as technical consultant to the Philippine Congress in the drafting of the Agriculture and Fisheries Modernization Act of 1997 and in the preparation of various agricultural bills and resolutions to the Congressional Oversight Committee on Agricultural and Fisheries Modernization (COCAFM) 2009-2010. Dr. Nina also established the first functional forensic DNA analysis laboratory in the country. “I believe it

is my duty as a scientist to promote the spread of scientific knowledge so our citizens and policy-makers can make decisions based on sound science," said Dr. Nina.

In 2001, Dr. Nina participated in a Cochran Fellowship Program by the US Department of Agriculture focused on biotechnology and food safety. She has since spent her career advocating on behalf of biotechnology research and education. "When we came home, we were able to set up a capacity-building program in the Department of Agriculture. From there on, I also helped craft a research program on biotechnology and integrate biotechnology in all biology classes in schools," she said. Aside from helping establish biotechnology centers and facilities, Dr. Nina also advocated for the executive order that created an annual biotech week in the Philippines every November.

Dr. Nina obtained her Ph.D. in Genetics from the University of California, Berkeley, California and her Master's degree in Genetics, Biochemistry, and Philosophy from the University of the Philippines Diliman. She has more than 40 years of experience in teaching, research, and extension in molecular biology and biotechnology in various capacities in a number of universities and governmental departments. She also has more than 80 scientific articles and books in biotechnology and biosafety. – **Charizze De Castro**

DR. DESIREE M. HAUTEA

Ushering Biotechnology's Revolutionary Breakthrough in the Philippines

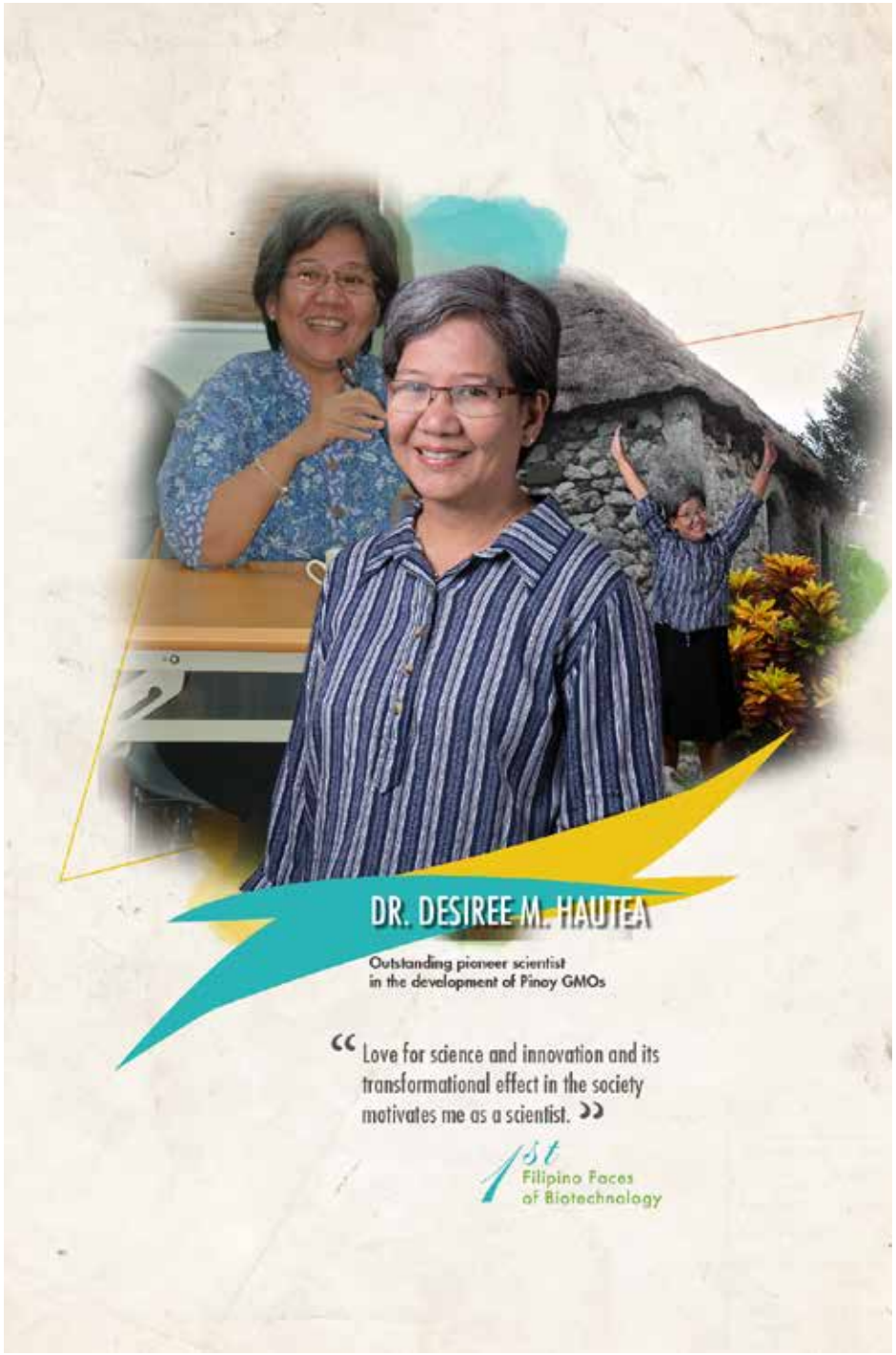
Dr. Desiree M. Hautea was selected as recipient of the Award as one of the outstanding pioneer scientists in the development of Pinoy GMOs. Dr. Desiree Hautea was hailed as one of Asia's most outstanding researchers by the Asian Scientist Magazine in 2021 for her contributions in the research and development towards the adoption of the Bt eggplant in the Philippines.

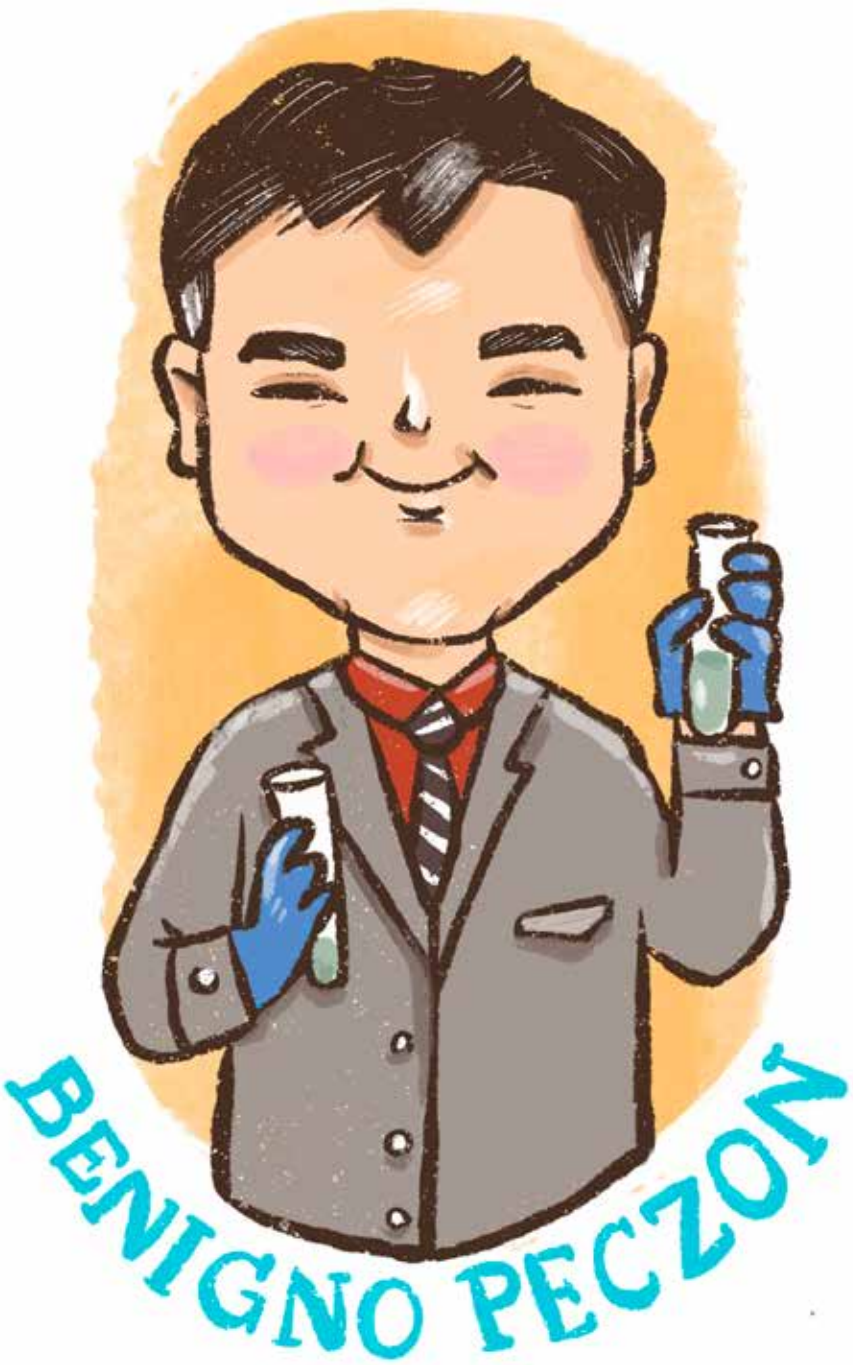
Dr. Des, as she is fondly called, took her Ph.D. in Agriculture from the University of Illinois with the support of Fulbright and Rockefeller scholarships. At that time, biotechnology was not yet mainstream, even in the United States. After graduation, she came back to the Philippines bringing the technology to the country. Dr. Des is now working as a Senior Researcher at the Institute of Plant Breeding's (IPB) Genetics Laboratory where she also previously served as its Director.

While working at the IPB, one of her most notable projects was the introduction of molecular marker technology which was still a relatively new field in the 1980s. Dr. Des applied the technology in the production of genetically modified (GM) crops that ultimately led to Bt eggplant, which is resistant to eggplant fruit and shoot borer. The Bt eggplant became her most revolutionary breakthrough in the field. Her extensive work on Bt eggplant led to the publication of the first-ever publicly available data on the field efficacy of the Bt eggplant and its potential impact on non-target organisms, as well as the development of the first public sector eggplant hybrids in the Philippines. Recognizing her work on the Bt eggplant, Dr. Des was conferred with the Lead Agriculture Award by the Philippine Association for the Advancement of Science and Technology in 2020.

Dr. Des continues to be active in teaching, research, and public service, serving as an Adjunct Professor at the Institute of Crop Science (ICropS) and the University of the Philippines Graduate School (UPLB-GS), as a Research Consultant/Adviser for genetics and biotechnology and biosafety research projects of UPLB and other national government agencies, and as officer or member of various international organizations involved in biotechnology, biosafety, and regulations. She also made significant contributions to the establishment of the UPLB COVID-19 Molecular and Diagnostic Laboratory testing facility when the pandemic hit in 2020. Dr. Des feels hopeful that agricultural biotechnology will benefit from the positive publicity around the use of genetic engineering to develop effective COVID-19 vaccines.

"I believe this technology is the technology of the future," Dr. Des remarked. "Once people can understand its benefits in their lives, with cultural sensitivity, I think it will be embraced, not hated. If we want to be able to survive, we have to embrace science as part of the solutions to our problems."
– **Charizze De Castro**





DR. BENIGNO D. PECZON

Boosting Agri-Biotechnology for Sustainable Rural Development

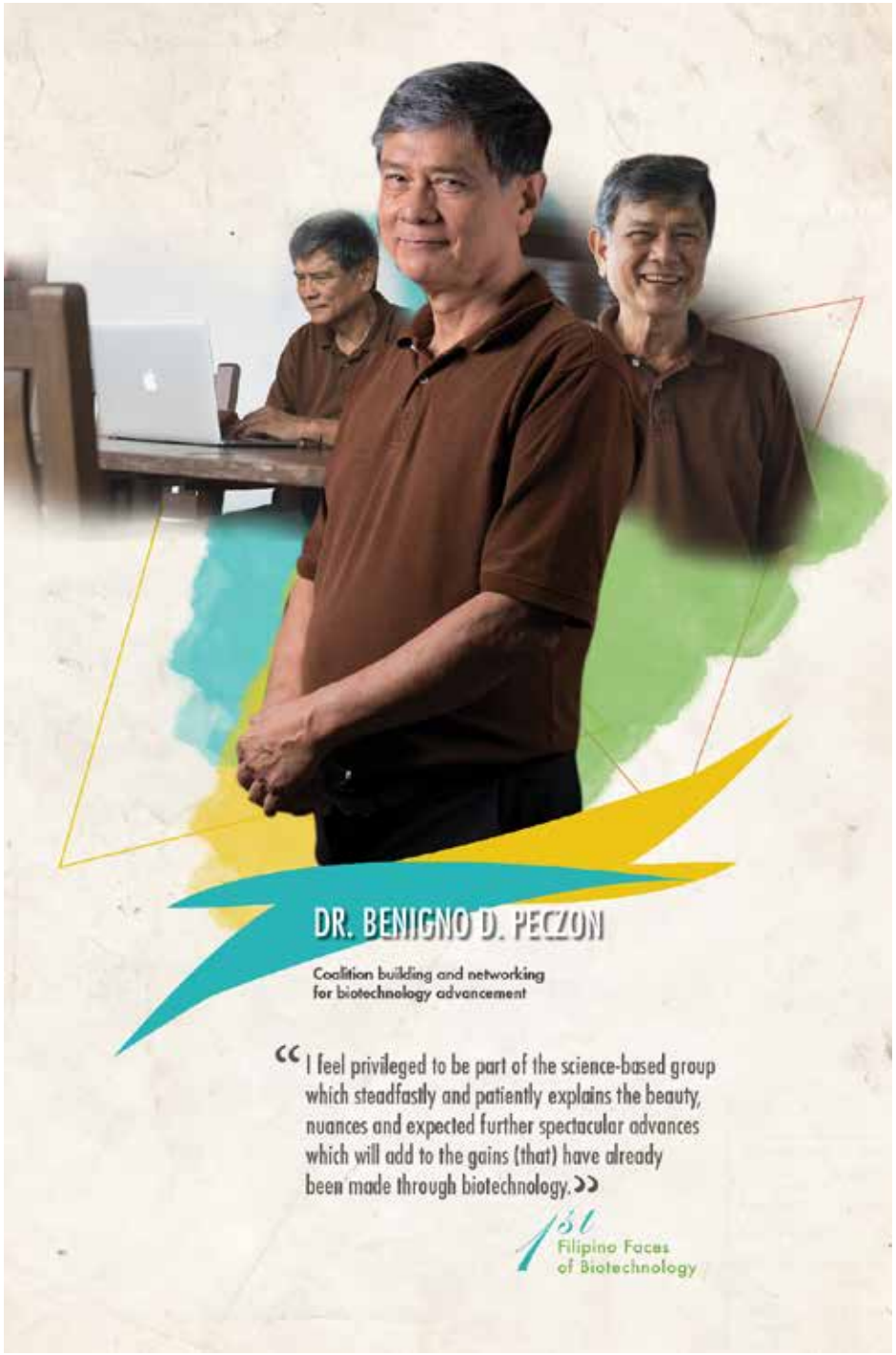
Dr. Benigno D. Peczon was selected as recipient of the Award for leading institutions and furthering a more meaningful development agenda for biotechnology. Dr. Benigno has been instrumental in addressing national development goals by serving as the President and one of the pioneers of the Biotechnology Coalition of the Philippines (BCP) and the Coalition for Agriculture Modernization in the Philippines (CAMP) and Chairman of the Philippine Federation of Chemistry Societies.

Dr. Benigno emphasizes the importance of modernizing the country's agri-sector as he points to the issues besetting the country's agriculture sector, including globalization, sub-optimal farm sizes, credit access, existing policies and practices, and infrastructure. With a strong resolve that advancing modern biotechnology will help reduce hunger and poverty and mitigate the effects of climate change, among other benefits, CAMP, together with like-minded organizations, drafted a bill entitled "An Act to Support Modern Biotechnology for Sustainable Rural Development in the Republic of the Philippines and Appropriating Funds Thereof." The contents of the proposed draft bill include the establishment of a body called the Biotechnology Authority of the Philippines, which will lead the modern biotechnology initiatives in the country. On April 25, 2018, the draft bill was discussed in a seminar on plant breeding innovations organized by the National Academy of Science and Technology (NAST) in Manila.

"Technological advances change cultures and the development of nations. In the same manner that cellular phones and communication devices and networks have opened up a whole new range of possibilities, biotechnology will affect nations," said Dr. Benigno. The draft bill is expected to promote

research and development on biotechnology, give incentives to scientists and educate scientists, especially on agri-biotechnology. It also provides "development boost and, at the same time, carries the cautionary requirement that it supports a safe and responsible use of technology," said Dr. Randy Hautea, former Global Coordinator of ISAAA, during the seminar.

Dr. Peczon obtained a Ph.D. in Chemistry from Purdue University, major in Physical Chemistry, and an undergraduate degree in Sugar Technology from the University of the Philippines Los Baños. Dr. Benigno's expertise are on management as leader or core member of group undertakings (product development, optimization in performance of the chemistry profession, large-scale local and international symposia, ISO certification, and creation of enabling legislation and government instruments); R&D in rapid chemical reactions, enzyme kinetics, basement membranes and basic medical research; and advocacy for safe and responsible use of modern biotechnology and safeguarding of the environment. Prior to his current work, he had past engagements at the Oklahoma State University, the Eye Research Institute in Boston, Harvard Medical School, the University of Kansas School of Medicine and the United Laboratories, Inc. – **Charizze De Castro**



DR. NINA G. GLORIANI

Advancing Medical and Healthcare Biotechnology

Dr. Nina G. Gloriani was selected as recipient of the Award as one of the outstanding advocates and scientists on the advancement of science-based regulation recognizing her contribution in promoting medical and healthcare biotechnology in the Philippines. Dr. Nina was a professor at the UP Manila College of Public Health and former President of the Biotechnology Coalition of the Philippines (BCP).

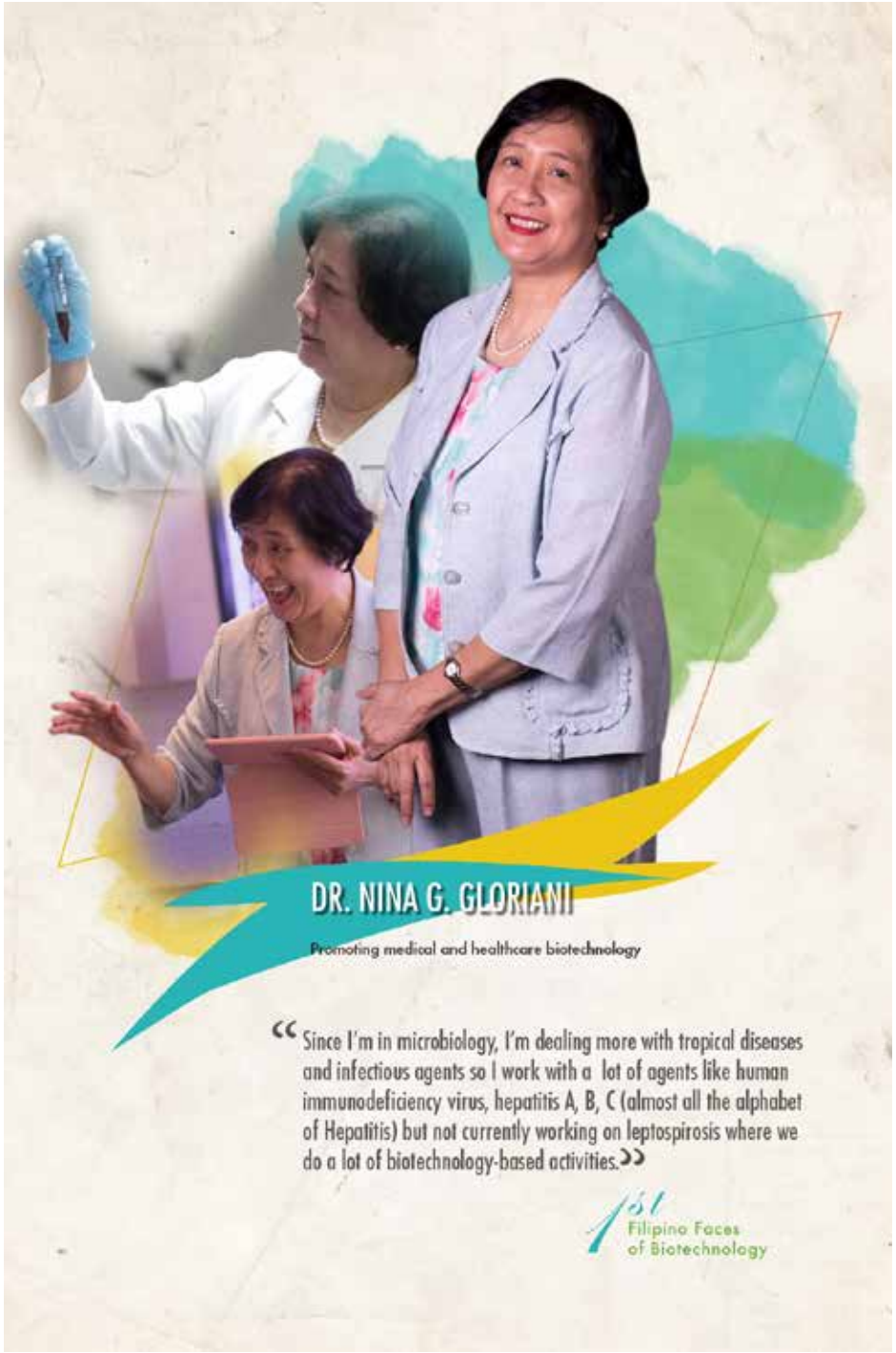
Specializing in immunochemistry and microbial immunology, Dr. Nina served as the Chairperson of the DOST Expert Vaccine Panel on COVID-19 Vaccine Clinical Trials and was also a Member of the WHO Scientific Steering Committee for COVID-19 Solidarity Vaccines Trial. She is currently serving as a Clinical Microbiology Consultant at the Institute of Pathology of the St. Luke's Medical Center.

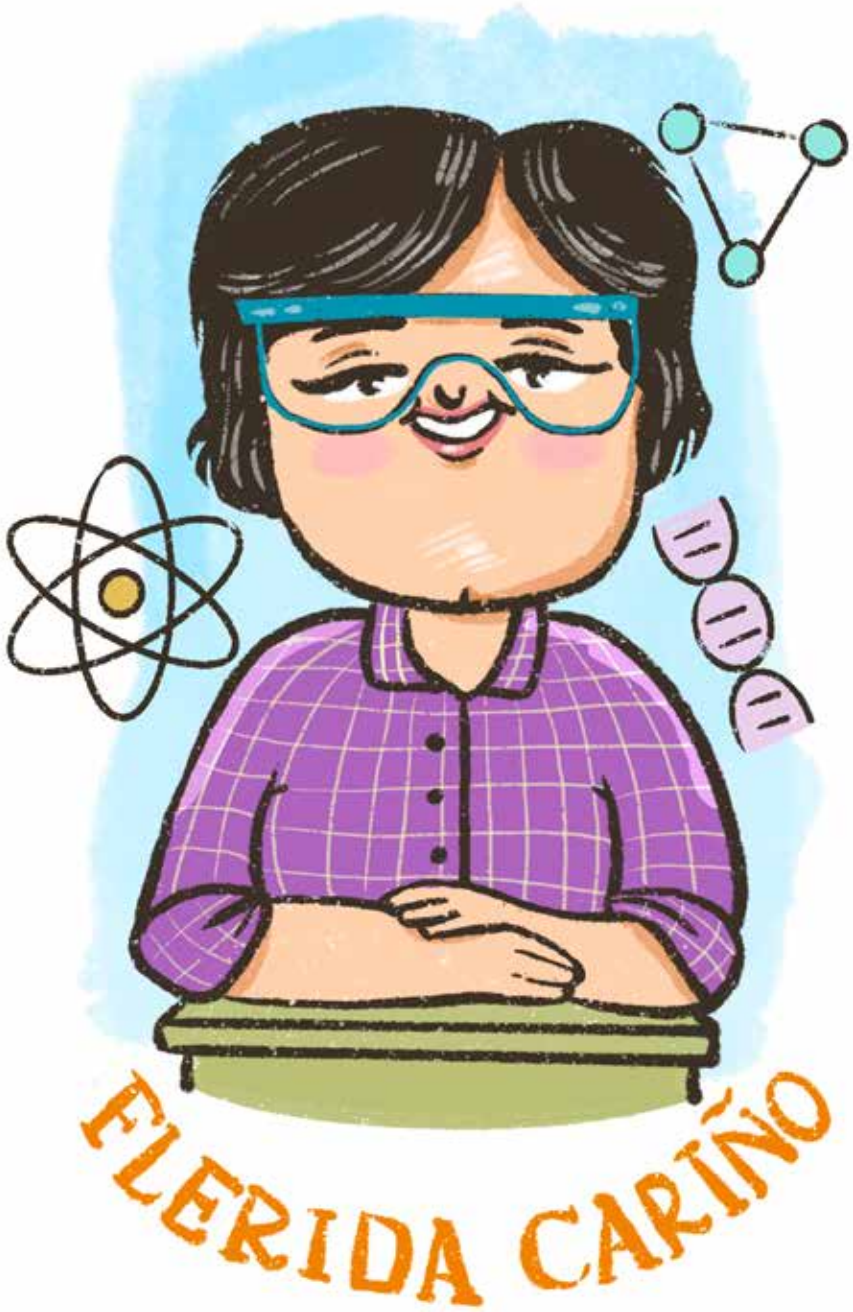
In 2021, Dr. Nina received the 2021 Paulo Campos Award for Health Research, honoring her efforts in national leadership during the COVID-19 pandemic and pioneering research on epidemiology, diagnosis, and vaccine development for infectious diseases ranging from Hantaan virus infection to leptospirosis. "Since I'm in microbiology, I'm dealing more with tropical diseases and infectious agents so I work with a lot of agents like human immunodeficiency virus, hepatitis A, B, C (almost all the alphabet of Hepatitis), where we do a lot of biotechnology-based activities," said Dr. Nina.

In trying to address other pressing health and conservation challenges in the Philippines and other countries, Dr. Nina also tackled the potential of gene drive technology. According to her, gene drive technology could be used to control mosquito populations, the primary vectors of diseases such as

dengue and malaria. She emphasized the potential of bacterial gene drives in addressing the country's problem with anti-microbial resistance. Dr. Gloriani raised her concern about Filipino researchers' reluctance to conduct past genetically modified mosquito studies, emphasizing the need for stakeholder engagement to raise awareness about the benefits of gene drive technology.

Dr. Nina is the former dean of the College of Public Health at the University of the Philippines Manila and a retired professor of Medical Microbiology and Immunology. She was also the Director of SEAMEO-TROPMED Regional Center for Public Health, Hospital Administration, Environmental and Occupational Health and also served as Director of the Institute of Biotechnology and Molecular Biology of the National Institutes of Health-Philippines and Chairman of the Department of Medical Microbiology of CPH. She has a post-graduate degree in Microbial Immunology/Immunochemistry from the University of Melbourne, Australia and a public health degree from the UP College of Medicine. Dr. Nina also had post-doctoral fellowships on HIV/AIDS Immunology and Virology (University of California, Los Angeles, USA), Hepatitis C Molecular Analyses (Kobe School of Medicine, Japan), Sexually Transmitted Diseases (Centers for Disease Control and Prevention - San Francisco Department of Public Health, California, USA), and Clinical Microbiology-Molecular Diagnostics (Georgetown University Medical Center, USA). – **Charizze De Castro**





DR. FLERIDA A. CARIÑO

Future-proofing Biosafety Regulations for Modern Biotechnology

Dr. Flerida A. Cariño was selected as recipient of the Award as one of the outstanding scientists on the advancement of biotechnology. Dr. Bubut, as she is donly called, is a physical scientist, a former professor at the Institute of Chemistry at the University of the Philippines Diliman, and is known for promoting science-based regulations for modern biotechnology.

Known for her extensive work with insecticide resistance genetics, biochemistry, and molecular biology, Dr. Bubut has been involved in drafting policy and regulations for genetically modified organisms (GMOs) since 1994. She is a member of the Department of Science and Technology (DOST) National Committee on Biosafety of the Philippines and was also a government-designated Technical Expert on Biosafety. Currently, Dr. Bubut is also a consultant of the Philippines' Food and Drug Administration, providing guidance on urban pesticides and risk assessments of GMOs and their products. "It is very important to make biotechnology a viable option for the Philippines as well as for the rest of the world. We need to look at it, I think, rationally so that bigger debates on the technology can easily be avoided," said Dr. Bubut.

Dr. Bubut has also served as faculty in several local and international training programs on food safety and environmental risk assessment for several international organizations involved in biosafety capacity building and for various Philippine government institutions involved in the regulation of GMOs. She was a member of the Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons (OPCW) from 2011 to 2017, and has actively represented the Philippine position in the Convention on Biological

Diversity and meetings of parties to the Cartagena Protocol on Biosafety of Living Modified Organisms.

At the onset of the pandemic, Dr. Bubut became part of the Department of Health's COVID Laboratory Expert Panel. She stressed that agri-biotech has a bigger role in countering the COVID-19 crisis than most people realize. In a webinar organized by the University of the Philippines Los Baños, she explained how agri biotech plays a role in COVID-19 vaccine development and disease management. She added that nutritionally enhanced crops, such as vitamin-enriched rice, plantains, and cassava, which are products of agri-biotech, are helpful in boosting people's immune systems, which was crucial to fight off and recover from COVID-19. According to Dr. Bubut, the COVID-19 crisis has opened more possibilities of how agri biotech can further contribute to society.

Dr. Bubut retired in April 2019 as a full professor of biochemistry from the University of the Philippines, Diliman, where she had been teaching biochemistry, molecular biology, environmental toxicology, environmental biotechnology, research on bioremediation agents, natural products, bioresources, biosafety. She was the former Director of two institutes of the university: the Institute of Chemistry and the Institute of Environmental Science and Meteorology. Dr. Bubut holds a Ph.D. in Insecticide Toxicology from Texas A&M University, USA and a MSc in Insecticide Toxicology from UPLB. – **Charizze De Castro**

MS. ROSALIE M. ELLASUS

Inspiring and Empowering Farmers Toward Sustainability

Ms. Rosalie M. Ellasus was selected as recipient of the Award as one of the outstanding biotech farmer-leaders in the Philippines. Known in the Philippine agri-biotech community as the "Queen of Bt corn," Rosalie served as the President of the Philippine Maize Federation and a member of the Truth About Trade and Technology Global Farmer Network. She is currently the Municipal Risk Reduction and Management Officer of her town.

Rosalie is a first-generation farmer, growing corn and rice in San Jacinto, Philippines. After graduating with a degree in medical technology, Rosalie worked as an overseas Filipino worker hoping to provide a better future for her family. In 1995, Rosalie's husband died, prompting her to return to the Philippines and buy a 1.3-hectare rice and corn farm. She was faced with various challenges, which included buyer rejections due to poor quality products brought by pests, weeds, and crop disease. Rosalie still persevered despite having no farm experience and decided to attend the Integrated Pest Management - Farmers Field School (IPM-FFS). Eventually, word about field trials for Bt corn reached her and she volunteered to have the demo trials in her field.

From her first efforts in 2001, yields rose from 3.5 to 7.9 tons per hectare in 2008. In 2006, she earned a 125 percent return from her six-hectare, stacked trait corn farm. By 2009, her then 10-hectare farm had started producing 8.9 tons per hectare. "When I volunteered for the demo trials of Bt corn before, the farmers in my town also observed the big difference and significant benefits of Bt corn. The dream of farmers was instilled in this innovation," Rosalie recalled.

Rosalie became an advocate of biotechnology and has been sharing her inspirational biotech farming experience with farmers, regulators, the media, and even anti-biotech groups of Bt corn through local and international organizations in the Philippines and around the world. In 2007, she was chosen to be the first-ever recipient of the Kleckner Trade and Technology Advancement Award, which was given for her "exemplary leadership, vision and resolve in advancing the rights of farmers to choose the technology and tools that will improve the quality, quantity, and availability of agricultural products around the world."

In 2016, the Department of Agriculture-Biotechnology Program Office named her as one of the *Filipino Faces of Biotechnology* for her contributions to the country's agribiotech sector. According to Rosalie, "The biotechnology method was the major reason why I became passionate in farming. I believe that in my own little way and with no regrets, that I am contributing to food security and sustainability. Along with other people, I was able to help open doors for marginal farmers for them to have a better life." – **Charizze De Castro**

MR. EDWIN Y. PARALUMAN

Professing the Good News of Biotechnology

Mr. Edwin Y. Paraluman was selected as recipient of the Award as one of the outstanding biotech farmer-leaders in the Philippines. Edwin is the Chairman of the Philippine Farmers Advisory Board, the Coordinator of the Asian Farmers Regional Network, and a board member of the Biotechnology Coalition of the Philippines (BCP). As a farmer, Edwin was a pioneer in planting Bt corn in the country.

Edwin came from a family of farmers from General Santos City. He finished a Bachelor of Science in Commerce degree from Southern Island College and decided to continue the family tradition of farming. Edwin had been planting corn with his parents since childhood and continued to do so when he started his own family. He would often get worried of finding his corn field destroyed by corn borer, which is a known destructive pest among corn farmers. When he learned about the genetically modified pest-resistant Bt corn in 2003, he immediately grabbed the opportunity to become among the first farmers to pilot its use in hopes of increasing his corn yields and thereby lifting his family up from poverty. He was amazed that the first time he planted this variety, he did not see any corn borer in the seven-hectare lot where he planted the Bt corn. “There was no more damage to my corn. I planted the corn and it changed my life,” Edwin recalled. “It increased my income and I am now going around telling other farmers that this technology is very good.”

Since then, Edwin had been advocating for the adoption of Bt technology as he himself experienced how it increased his production. From 3.5 tons per hectare, his yield went to a high of 8 tons per hectare. Aside from higher yield, he noticed the significantly lesser use of pesticides and labor. He has also been receiving satisfied comments from feed processors and animal

raisers who buy his corn which has consistently shown low levels of aflatoxin contamination.

As former President of Sarangani and General Santos Irrigators Federation, Inc., President of the Nursery Farmers Irrigators Association in General Santos City, and Chairman of the City Agricultural and Fisheries Council, Edwin inspires fellow farmers with his success story. In 2003, Edwin was assigned as the coordinator of the Asian Farmers Regional Network (ASFARNET), which was tasked to promote the active exchange of experiences and knowledge on alternative modern farming technologies.

From then on, Edwin had been invited to many workshops and fora around the world to share his experiences as a Bt corn farmer, which included a World Summit meeting in South Africa, a workshop in Zamorano University, Honduras, a Biotechnology Industry Organization meeting in San Francisco, California, USA, and a meeting of the Conference of Parties of the Cartagena Protocol on Biosafety in Brazil. His sharing focused on his key message that, "Biotechnology has changed many farmers' lives. Let farmers decide for themselves what crop to plant. It is their choice." – **Charizze De Castro**

DR. EDITA T. BURGOS

Engaging Biotech Stakeholders Through Communication and Education

Dr. Edita T. Burgos was recognized as one of the *Filipino Faces of Biotechnology* for her continuous efforts in network building for biotechnology information, education, and communication. Dr. Edita is an advocate-leader and President of one of the Philippines' most trusted media companies in biotech journalism, J. Burgos Media Services Inc.

Dr. Edita's role in biotech information dissemination started when she joined her late husband, Jose G. Burgos, Jr., in anchoring an agriculture-based radio program in Radyo Veritas, where she discussed women empowerment on peasant-related issues. She recognizes that central to the issue of biotechnology is the crucial question of whether or not biotechnology can stop hunger, especially in developing countries like the Philippines. According to her, "proper communication between scientists and journalists for accurate reporting that would enlighten the general public is essential to counter negative publicity and debunk exaggerations and misinformation promoted by critics."

In 2001, seeing the important role of the media in educating the public on the science and facts of biotechnology, Dr. Edita worked with the International Service for the Acquisition of Agri-biotech Applications (ISAAA) under the Jose G. Burgos Media Services, Inc. to develop a handbook on *Communicating Guidelines for a Better Understanding of Biotechnology Issues: For Journalists, Scientists, and Other Interest Groups* which targets to guide scientists and journalists better communicate biotech information to its audience. She was also actively involved in the conceptualization of a proactive, integrative, and aggressive biotech communication program to increase public understanding and appreciation of biotechnology in

the Philippines in partnership with the Department of Agriculture (DA) Biotechnology Implementation Unit and other key players in biotech communication.

In 2005, Dr. Edita led the establishment of the Biotechnology for Life Media Advocacy and Resource Center (BMARC), a national multi-stakeholder umbrella of biotechnology agencies that "conduct information, education, and communication campaigns in biotechnology" through media and social mobilization. BMARC binds together the government and private sectors dedicated to biotechnology research and communication.

As BMARC's Executive Director, Dr. Edita spearheaded the release of the BioLife Magazine that features news and stories on biotechnology for a general audience. The BMARC consortium also launched the Jose G. Burgos, Jr. Awards for Biotech Journalism Biotechnology, the country's foremost award that recognizes Filipino journalists and establishments popularizing biotechnology through their news reports in an attempt to develop public awareness and understanding of biotech.

"We should also acknowledge the role of broadcast media in effectively influencing the perception of the public on biotechnology. If they will also be informed and conferred, many of them will be encouraged to spread the word of biotechnology," Dr. Edita said. True enough, the Award's vision is being realized as more media practitioners are writing about biotechnology throughout the years. – **Charizze De Castro**

MS. ANGELINA B. RESURRECCION

Mainstreaming Biotechnology Communication Through Science Journalism

Angelina "Lyn" B. Resurreccion stands as a stalwart figure in the field of science journalism in the Philippines, with an impressive career spanning 27 years. Currently a Senior Editor at Business Mirror, her responsibilities extend to the meticulous curation of the newspaper's Science, Biodiversity, and Faith sections.

Prior to pursuing the realm of science journalism, Resurreccion spent nine years of her journalism career as a political reporter. Her journalistic repertoire reflects an affinity for diverse scientific domains such as biotechnology and agriculture, nuclear science, space exploration, and the science and technology programs implemented both by the Philippine government, international, and private agencies.

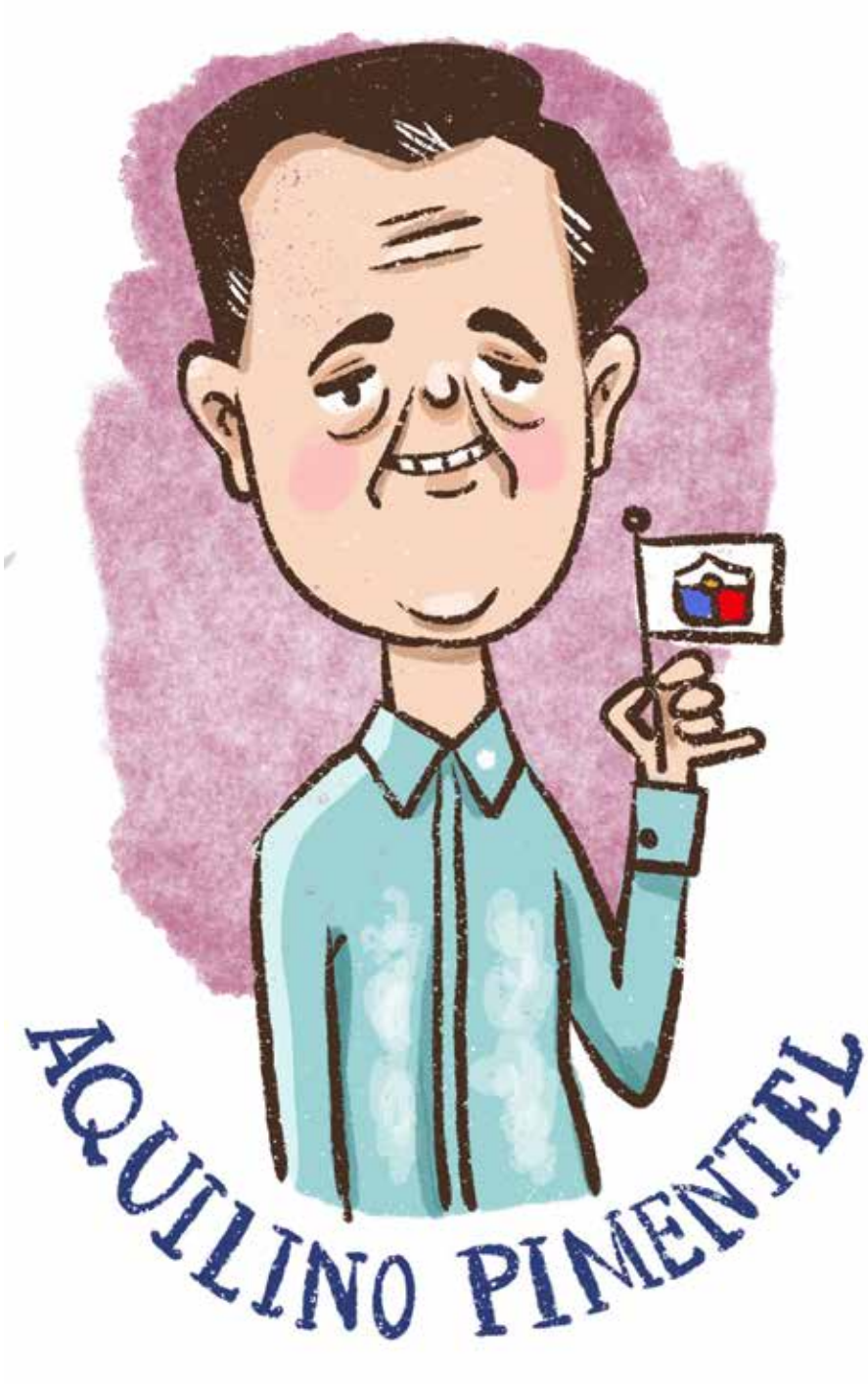
The numerous accolades throughout Resurreccion's career testify to her commitment and excellence in the field. Notably, the *Filipino Faces of Biotechnology* Award, an accolade she earned during the award's inaugural in 2016, sealed her contributions in bridging the information gap between scientists and the public. Her nod from the Jose G. Burgos Biotechnology Award further solidified her status among the notable science journalists in the Philippines, earning her the esteemed Hall of Famer title in 2018. Other awards received by Resurreccion include the DOST's Science for the People Award in Print Media Individual Category, the Ulat Sipag Award for National Print Category by PCAARRD, and the DOST-Science Education Institute Recognition.

Her influence extends to the digital sphere, where Resurreccion became a curator of the Science and She social media campaign in 2018, initiated by the

International Service for the Acquisition of Agri-biotech Applications (ISAAA) and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). This platform served as a testament to her ability to communicate complex scientific concepts to a broader audience, particularly the younger generations.

Beyond personal accolades, Resurreccion's editorial prowess has elevated Business Mirror to acclaim, securing the Bantog Award for Institution Category on September 28, 2018. The publication is also the recipient of the 2014 ASEAN Champion of Biodiversity Award, a milestone achieved under her stewardship as the editor of the newspaper's unique Biodiversity page. The distinction sets Business Mirror apart from the rest as the only newspaper globally with a dedicated page to biodiversity.

Lyn Resurreccion's journey through the realms of journalism and science has not only garnered her an indisputable milestone but has also cemented her status as a beacon in science communication, tirelessly bridging the gap between complex scientific endeavors and the wider public audience. Her enduring legacy continues to inspire budding science journalists and leaves an indelible mark on the ever-evolving landscape of science communication. – **Kaymart Gimutao**



DR. AQUILINO Q. PIMENTEL, JR.

Championing Agri-biotechnology in the Philippines Through Landmark Policies

Promoting biotechnology to the public can be an arduous task given the misconceptions being linked to the technology, but thanks to Former Senator Aquilino Q. Pimentel Jr., the public acceptance of biotechnology in the Philippines has become less challenging.

Pimentel is arguably the most persistent advocate of biotechnology among the prominent political figures in the Philippines. In 2006, when the government started to roll out biofuel programs in the country, Pimentel called for the grant of state incentives to manufacturers of coco-diesel and ethanol to hasten the production of alternative and renewable indigenous sources of fuel and make them competitive in the market and affordable to ordinary motorists.

In 2008, when there was a clamor to suspend the government's biofuels initiative, he was among the key figures to defend the program, citing the need to "develop an alternative, renewable sources of energy that are abundant in the country to further reduce the Philippines' dependence on imported oil which is becoming less and less affordable to Filipinos."

Born into a political family in Cagayan de Oro, Pimentel's political career began when he was elected as a delegate to the Constitutional Convention of 1971. Undeterred, the young and principled lawyer became a vocal opponent of former President Ferdinand Marcos Sr., resulting in his arrest and three months of incarceration at Camp Crame. Despite the adversity, he stood firm, fighting the autocracy of the former dictator.

Pimentel's resilience and dedication to justice bore fruit in 1984 when he won a seat in the Batasan Pambansa elections. However, the Marcos government ousted him, alleging electoral cheating. The Supreme Court's recount vindicated him, reinforcing his reputation as a relentless critic of the dictatorship.

As Senator, he authored and sponsored several key legislations in the country. These include the Local Government Code of 1991, the Cooperative Code, the Philippine Sports Commission Act, the Act Creating the Autonomous Region in Muslim Mindanao, and the People's Small-Scale Mining Act. He also authored and co-sponsored the Generic Drugs Act and the Act Establishing the Philippine Police under a Reorganized Department of Interior and Local Government.

Pimentel retired from politics in 2010 after serving his third and final term as a senator. Even during the last few years of his life, he relentlessly supported different biotechnology programs in the country, attending different public biotechnology events. He also encouraged other stakeholders to help in public awareness campaigns about GM crops guided by scientific knowhow.

Pimentel passed away on October 20, 2019, succumbing to complications arising from lymphoma. He was 85 and just two months away from his 86th birthday. – **Kaymart Gimutao**

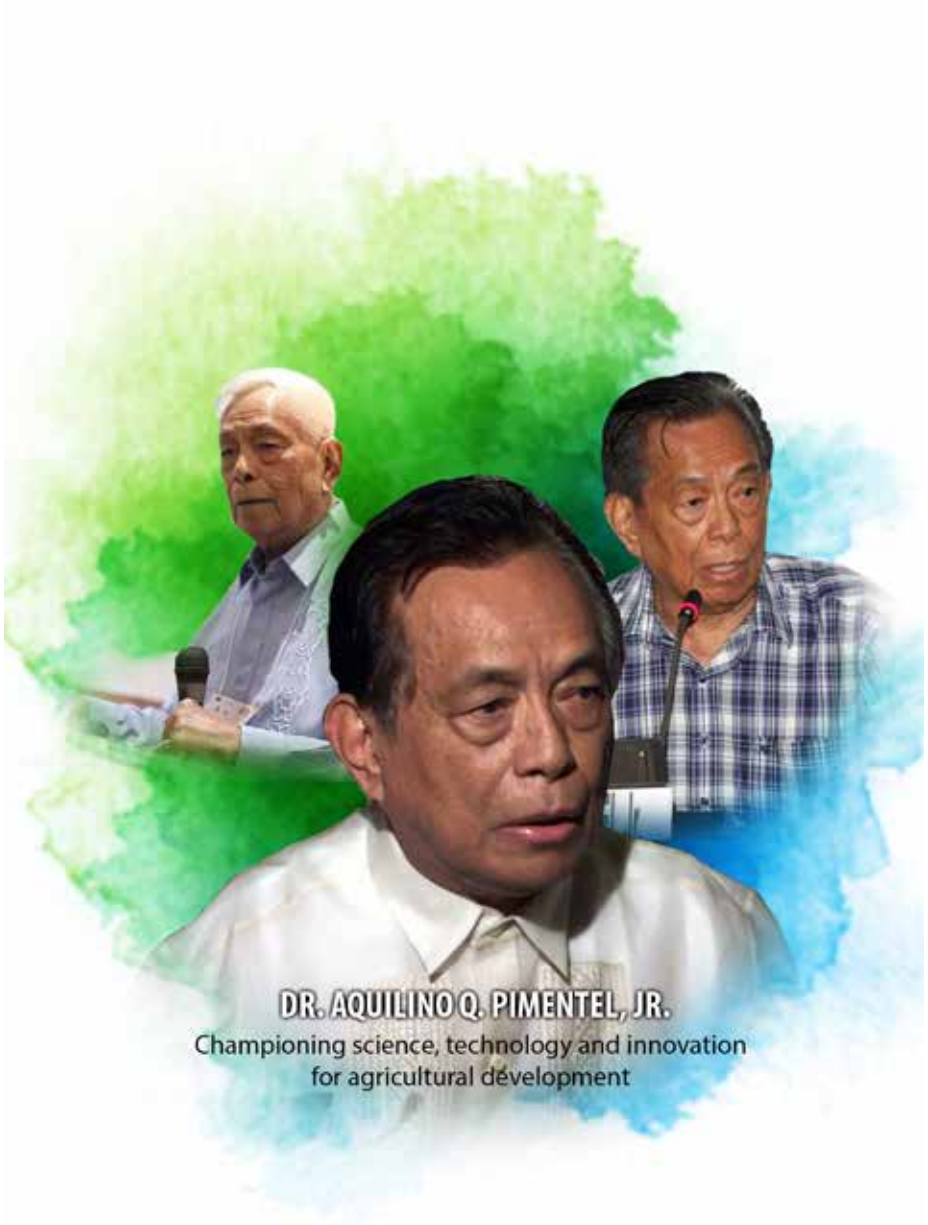


Photo source:
2019 Philippine Press Institute
2019 The New York Times
2011 Albert Calvelo


2017
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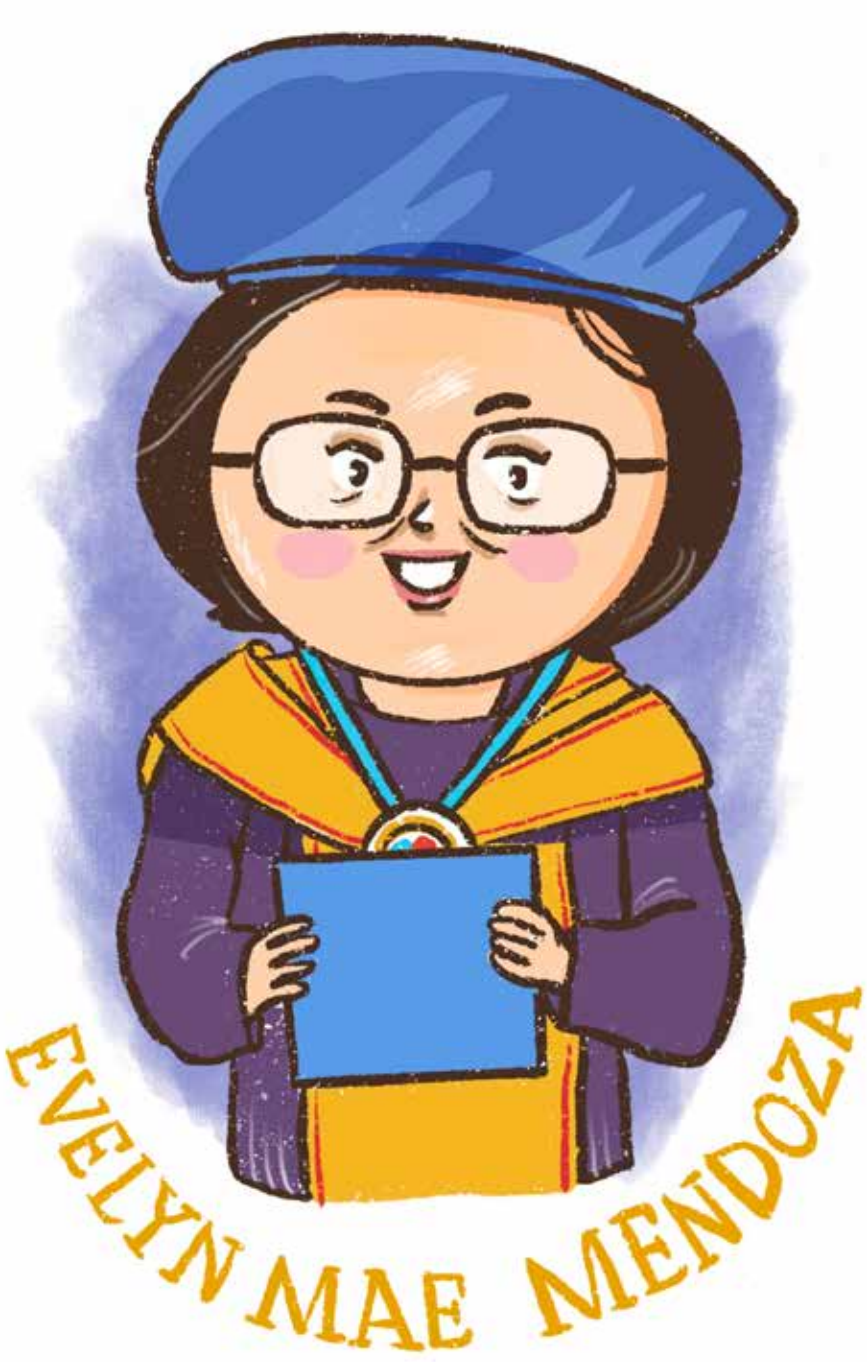
Photo Source: Department of Agriculture



DR. EVELYN MAE TECSON-MENDOZA

Trailblazing Plant Biochemistry and Modern Biotechnology

As one of the leading biochemists in the Philippines, Dr. Evelyn Mae Tecson-Mendoza has played a vital role in advancing plant biochemistry and modern biotechnology in the country. Tecson-Mendoza served as a researcher and research professor at the Institute of Plant Breeding (IPB), College of Agriculture, University of the Philippines Los Baños for more than 35 years.

It all started when she was offered a position at the International Rice Research Institute (IRRI) under the tutelage of National Scientist Bienvenido O. Juliano. While working at IRRI, she received a Fulbright-Hays Grant in 1969 and pursued graduate studies in Biochemistry at the University of Massachusetts Amherst, specializing in plant biochemistry.

Her MS thesis explored peroxidase and catalase activities in a barley mutant, and her PhD research focused on the lysine-sensitive aspartokinase of *Escherichia coli* under the guidance of Prof. Edward W. Westhead. Despite her adviser's desire for her to continue with a postdoctoral fellowship, Dr. Tecson-Mendoza chose to return home after five years abroad.

In 1976, she was invited to head the IPB's Biochemistry Laboratory by its founding director, Dr. Emil Q. Javier. Since then, she has contributed significantly to the discovery of new scientific knowledge, and the development of technologies and methodologies in the fields of biochemistry and biotechnology in the Philippines.

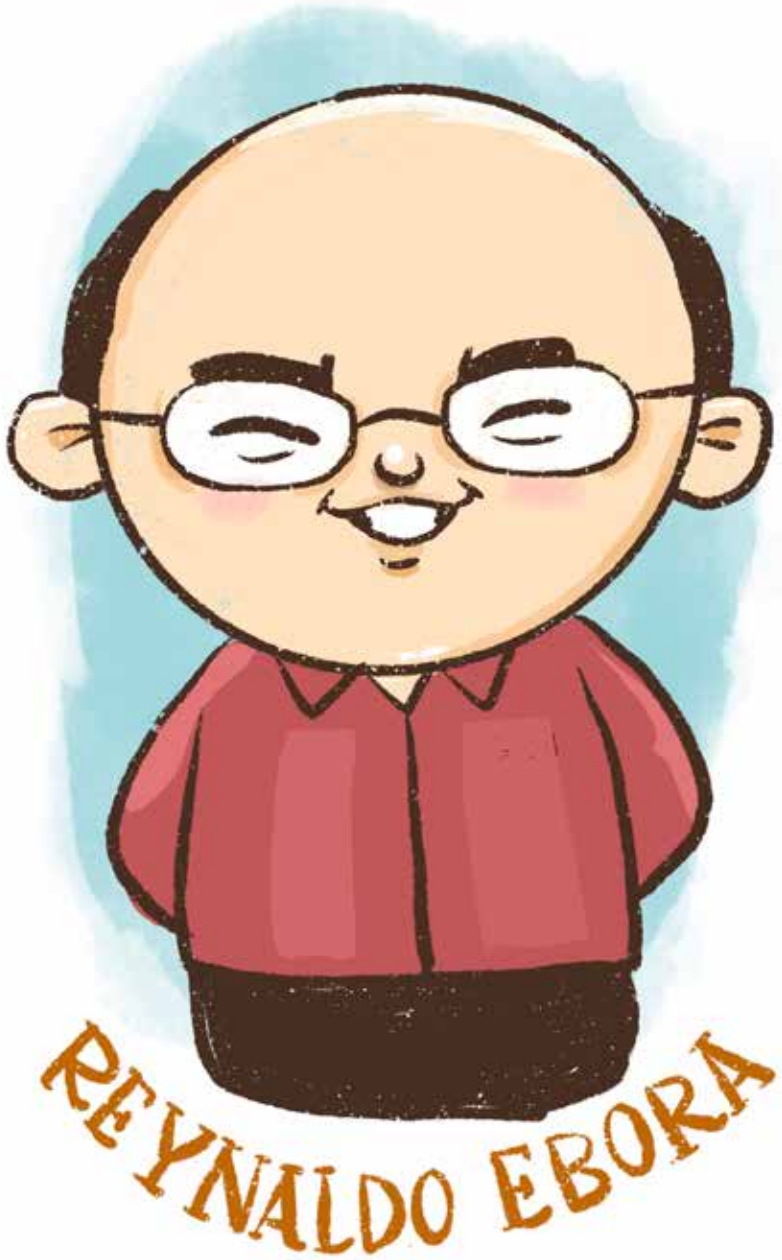
Her research interests include physicochemical and biochemical studies of important Philippine agricultural crops; biochemical mechanisms of plant resistance against selected pests and diseases; biochemical and molecular

tools in studying genetic diversity of plants and pests; physicochemical, functional, molecular studies and engineering of mungbean proteins; and development of papaya with delayed ripening trait by genetic engineering.

She has published and co-published more than 90 technical papers in refereed journals, has co-authored two books, edited/co-edited five books, and has written 12 chapters in various books. As a scientist, Dr. Tecson-Mendoza received numerous national, professional, and institutional awards and research paper awards. These include the Outstanding Young Scientist from National Academy of Science and Technology Philippines (NAST PHL) in 1984, the Outstanding Women in the Nation's Service (TOWNS) in 1992, the Department of Science and Technology (DOST) 50th Anniversary Outstanding Men and Women of Science and the C.D. Dadufalza Achievement Award, both in 2009.

Asked why she decided to return to the Philippines despite a possible greener opportunity abroad, Dr. Tecson-Mendoza emphatically said that it is certainly her love for the country.

"I could have stayed in the US, but I decided to return here to the Philippines. So grab the opportunity, you can go abroad and learn as much as you can, but always come back because we have only one country to serve and it has to be in here," she added. – **Kaymart Gimutao**



DR. REYNALDO V. EBORA

Advancing Biotechnology and Science Administration in the Philippines

Dr. Reynaldo V. Ebora is the epitome of a successful scientist and an effective leader who significantly contributes both in research and development, and in senior leadership for the advancement of science, technology, and innovation in the Philippines.

Dr. Ebora completed his Ph.D. in Entomology from Michigan State University in 1995. He obtained his M.S. in Entomology (Insect Pathology/Microbial Control) and his B.S. in Agriculture (Entomology) degrees at the University of the Philippines Los Baños in 1987 and 1982, respectively. Dr. Ebora is also a postgraduate fellow of the Intellectual Property Management and Technology Transfer Course organized by ISAAA *Ameri*Center (2001) and the International Post Graduate Course in Microbiology at the Osaka University (1988).

Dr. Ebora started his career in biotechnology in 1982 when he was hired by the National Institute of Molecular Biology and Biotechnology (BIOTECH) of UP Los Baños as a research assistant. In 1996, he was appointed as a Deputy Director of the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), and its Acting Director from 1999 to 2000. When he went back to the university, he was designated as the Director of BIOTECH.

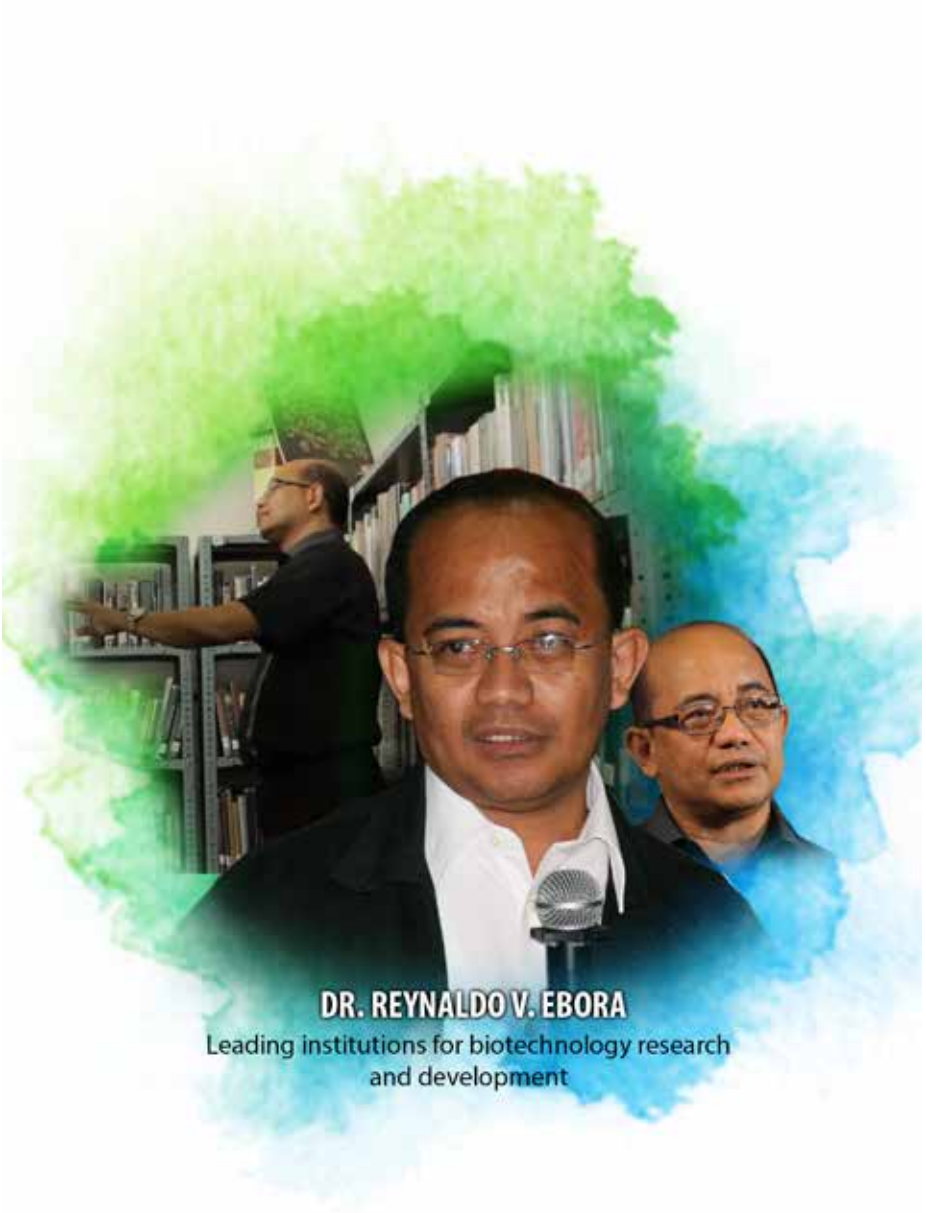
Dr. Ebora played a pivotal role in bringing BIOTECH's products to market and facilitating their widespread adoption. Notably, Bio N, a highly effective biofertilizer, is extensively used by the Department of Agriculture (DA) in its organic farming initiative, while Mykovam TM, another innovative biofertilizer,

was adopted by the Department of Environment and Natural Resources (DENR) in its National Greening Program.

Currently serving as the Executive Director of PCAARRD, Dr. Ebora has safeguarded numerous developed technologies through patents or trademarks. Among these intellectual properties are the *E. coli* DAS kit and the *Salmonella* DAS kit, designed for identifying *E. coli* and *Salmonella* in food, water, beverages, and feeds. He has presented more than 100 scientific and technical papers in the field of biotechnology, with the majority being published in scientific journals and books.

Given his achievements, he has received numerous awards, including the Outstanding Science Administrator Award (Dioscoro Umali Medal) presented by the National Academy of Science and Technology and the Department of Science and Technology (DOST). Additionally, he was honored with the Outstanding Technology Commercialization Award (Gregorio Y. Zara Medal) in 2014 and 2013 during the National Science and Technology Week.

His accolades also include the University of the Philippines President's Awards for Academic Distinction (International Publication Award) in 2003 and the award for Most Outstanding Alumnus in Entomology for the year 2004, bestowed by the Lopez National Comprehensive High School (LNCHS). – **Kaymart Gimutao**



MR. ANGELO B. PALMONES

Translating Crop Biotechnology Advocacy into Legislations

With a diverse professional career of over two decades in both the mass media and legislative spheres, former House Representative Angelo B. Palmones is marking his own legacy, advocating for the intersection of science and societal progress.

Mr. Palmones started his career as a journalist at ABS-CBN, where he ascended to the roles of Director for Special Projects and Station Manager of DZMM. This experience immersed him in multifaceted engagement with various stakeholders within and outside the mass media industry.

In 2010, he transitioned to Congress to represent the Agham Partylist, a national sectoral organization in the Philippines pushing for the participation of the science and technology community in the legislative process. After his tenure in Congress, he moved to the Manila Broadcasting Company (MBC) while also serving as a daily news anchor of Net25.

When biotechnology was introduced in the Philippines, particularly during the advent of Bt corn commercialization in the country, Mr. Palmones was among the first journalists who helped in communicating its benefits through the mass media so that it would be eventually accepted by the public.

In Congress, Palmones realized that only a handful of laws legislated in the Congress push for the advancement of science mainly because no one is advocating for the enhancement of research and development in the country within the Congress.

"A clear manifestation that no one is advocating for science in the Congress is the lack of budget designated for science and technology, far-fetched from the 1% of GDP [Gross Domestic Product] recommendation by UNESCO," Palmones explained.

With this, Palmones and his team started to organize initiatives for the legislators to appreciate science and technology. These include a series of fora for the policymakers that enabled them to understand the science behind biotechnology and debunk the myths that are linked to it.

"If we did not become aggressive in strengthening the social acceptance of biotechnology, it would have taken years for us to realize that we were being left behind. The challenge really is among advocates, how we will strengthen this campaign to develop a new army of advocates, and at the same time, how to convince our policy makers that this [biotechnology] is the future," Palmones added.

Currently, Palmones serves as the Chairman of Science Communicators Philippines, Inc. (SciCommPH), a newly established non-stock, non-profit organization that consists of Filipino science journalists, science communicators, science educators, and science enthusiasts who are passionate about making science accessible and engaging to the public. – **Kaymart Gimutao**

Photo source:
2023 DZRH News Television

DR. WILLIAM G. PADOLINA

Shaping Biotechnology and Science-based Policies in the Philippines Through Visionary Leadership

Dr. William G. Padolina, National Scientist, former President of the National Academy of Science Technology (NAST) Philippines, and former Secretary of the Department of Science and Technology (DOST), has a colorful professional career culminated by his diverse experiences as a scientist, teacher, researcher, administrator, and policy maker. His breakthrough research contributed significantly in the fields of natural products chemistry and biotechnology, while his leadership provided clear directions in terms of management of research and development in the Philippines.

Dr. Padolina's formal involvement with biotechnology started in 1979 when the National Institutes of Biotechnology and Applied Microbiology of the UP Los Baños (BIOTECH-UPLB) was established by the UP Board of Regents.

"I was then an assistant professor in chemistry at UP Los Baños, and at that time, President Marcos [Sr.] was very interested in getting the Philippines involved with biotechnology research," Padolina recalled.

Dr. Padolina eventually served as Director of BIOTECH-UPLB. He also held other administrative positions at the University of the Philippines, including being Director of UPLB's Institute of Chemistry, Vice Chancellor for Academic Affairs of UPLB, and Assistant to the President of the University of the Philippines. In 1994, former President Fidel V. Ramos appointed Padolina as DOST Secretary, a position he held until the last year of Ramos' presidency in 1998 and was extended during the presidency of Joseph E. Estrada.

As DOST Secretary, he advocated for a development agenda that harnessed technological advancements in agriculture, manufacturing, and services,

as well as an educational program aimed at enhancing technological and research management systems. He championed the Science & Technology Agenda for National Development (STAND), outlining specific commodities, products, and services as key export contributors. His focus extended to the advancement of Science and Technology (S&T) human resources through initiatives such as the Engineering and Science Education Project (ESEP), offering support for scholars in science, engineering, science education, and technology management. Dr. Padolina also served as the Deputy Director General for Operations at the International Rice Research Institute (IRRI) until his retirement in 2011.

Dr. Padolina's excellence in various capacities earned him numerous accolades. Among these are the Tree of Life Award for Research in Coconut conferred by the Philippine Coconut Authority, the Award of Excellence in Science and Engineering from the Philippine Development Foundation USA, the Merit Medal from the Socialist Republic of Vietnam, recognizing his contributions to agriculture and rural development, and the ASEAN Meritorious Service Award in Science and Technology. Additionally, he has received the Philippine Legion of Honor (Rank of Officer) from Presidents Fidel V. Ramos and Joseph Estrada and the Outstanding Professional in Chemistry award from the Philippine Professional Regulation Commission (PRC).

Dr. Padolina never gets tired of advocating the crucial role of science and technology in nation building. He firmly believes that science and technology significantly "contribute to national development by providing the country the tools and means to meet the challenges of globalization and empowerment while responding to the needs of the economically disadvantaged." – **Kaymart Gimutao**

DR. EMIL Q. JAVIER

Advocating Agri-biotech Innovations for Resource-poor Farmers

Dr. Emil Q. Javier is one of the pillars of agricultural research in the Philippines. Notable for his works in plant genetics and agronomy, he was awarded the National Scientist rank in recognition of his contributions to the field of agriculture.

Dr. Javier's career spanned over 40 years in the Philippines and abroad. He is the founding Director of the Institute of Plant Breeding of the University of the Philippines Los Baños (UPLB). Moreover, he served as Chancellor of UPLB, President of the University of the Philippines, and President of the National Academy of Science and Technology of the Philippines.

Dr. Javier also held numerous positions internationally. He was the first and only scientist from a developing country to chair the Technical Advisory Committee of the Consultative Group for International Agricultural Research (CGIAR). Furthermore, he served as the Chairman of the Board of the International Rice Research Institute (IRRI), Chair and Acting Director of the Southeast Asia Center for Graduate Study and Research in Agriculture (SEARCA), and Director General of the Asian Vegetable Research and Development Center (Taiwan).

Dr. Javier's most exceptional quality as a scientist is his knack for devising and implementing practical solutions to the challenges faced by tropical agriculture in developing nations.

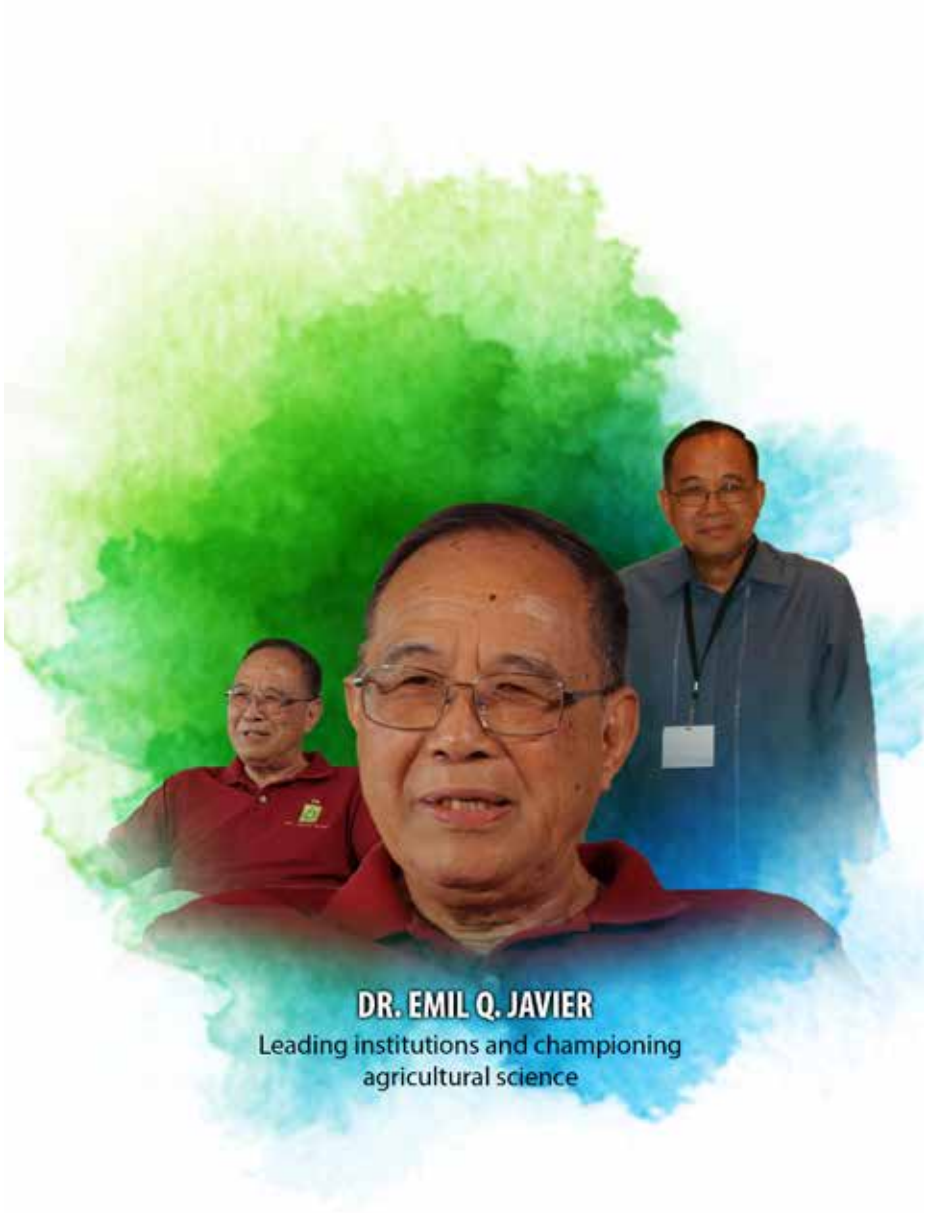
"In 1962, when I went for graduate studies in agronomy at the University of Illinois, that was the [time] when they were beginning to unravel the nature, structure, and function of DNA. At that time, I knew intuitively that as an

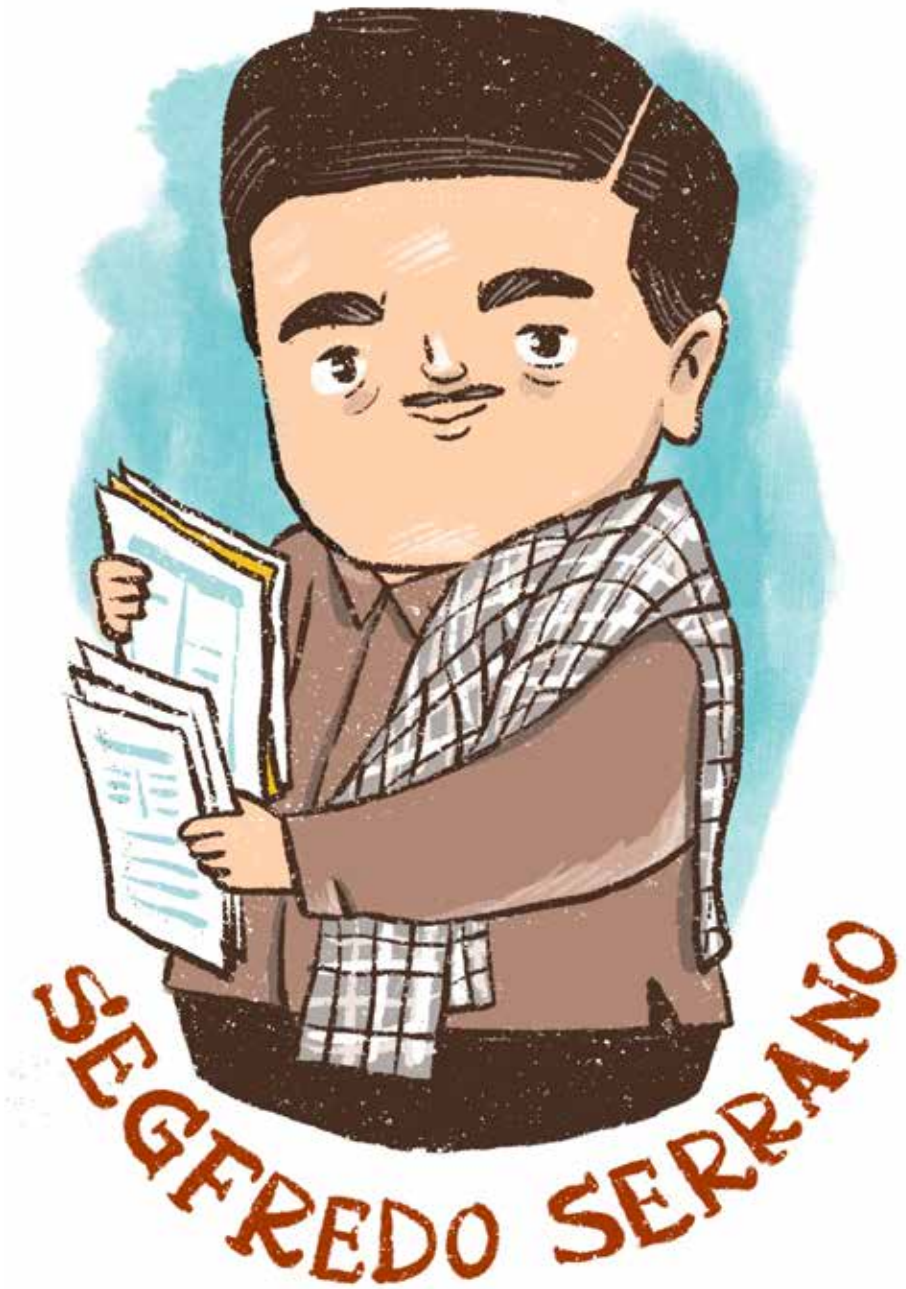
agriculturist, [and] as a plant breeder, this scientific breakthrough will become very, very important," Javier vividly recalled.

When he came back to UPLB, he put up the Institute of Plant Breeding (IPB) in 1975 under a presidential decree by former President Ferdinand Marcos, Sr. In establishing the IPB, he made sure to recruit experts from other related fields, aside from the conventional agricultural scientists, such as biochemists, tissue culture experts, and biologists, to ensure incorporation of these elements in preparation for "real biotechnology in the future."

Beyond research and academic leadership, Javier is acknowledged for advocating for effective agricultural policies and programs. He has actively promoted the adoption of environmentally-friendly and climate-resilient agricultural innovations while also working to enhance governance for the benefit of Filipino farmers and fisherfolk, aiming to improve their livelihoods.

As he acknowledges the limited resources available to small-scale farmers, he consistently directed his research efforts toward devising practical techniques for enhancing crop production using cost-effective, local inputs. His studies and research, such as introducing legumes into native Imperata pastures with minimal or no tillage, led to the initiation of a national pasture development program in 1972. – **Kaymart Gimutao**





DR. SEGFREDO R. SERRANO

Reforming Policies for Inclusive and Innovative Agriculture

Dr. Segfredo R. Serrano, Department of Agriculture's (DA) former Undersecretary for Policy and Planning, has a unique approach in serving his compatriots that is rooted in his inclusive and innovative approach to policy making. Unlike many technocrats in the Philippines, Dr. Serrano actively involves diverse stakeholders, including farmer groups, industry associations, business federations, non-government organizations, civil society, and relevant government institutions in the decision-making process, ensuring a broader and more representative perspective.

Recognizing the wealth of information held by these stakeholders, he adopts a bottom-up approach, strengthening the negotiating position of the Philippines in international forums. This inclusive methodology has not only set him apart as a "Reformist Technocrat" but has also yielded positive outcomes for both the country and abroad.

Furthermore, Dr. Serrano has played a key role in formulating the unified developmental policy framework for the DA's programs. This includes spearheading the Agriculture and Fisheries chapter of the Philippine Development Plan and its accompanying Medium-Term Public Investment Plan, providing a crucial roadmap for the nation's development over the next five years.

Dr. Serrano finished his B.S. in Agriculture (1978), M.S. in Agricultural Economics (1983), and Ph.D. in Agricultural Economics (1992) degrees at the University of the Philippines Los Baños. He earned his Ph.D. through the SEARCA scholarship, specializing in agricultural marketing with economics and policy, as his specialized field. Following the completion of his doctoral

studies, he took on the role of Chief Science Research Specialist at the Social Science & Policy Research Program of the DA - Philippine Rice Research Institute, holding the position until 1998.

Overseas, Dr. Serrano also played a pivotal role as the chief negotiator for agriculture and fisheries in various trade negotiations. These include regional fora such as the World Trade Organization, ASEAN Trade in Goods Agreement (ATIGA), and Trade and Investment Facilitation Agreement (TIFA) with the United States of America. His leadership as DA's World Trade Organization (WTO) Negotiator and Chair of the Task Force on WTO Agriculture Agreement (Re)negotiations (TF-WAR) has been marked by a pragmatic and defensive strategy, safeguarding the interests of developing countries, especially the region's farmers.

Dr. Serrano has also successfully mainstreamed the climate crisis in the context of Philippine agriculture and fisheries. Leading the Philippine Delegation in sessions under the United Nations. Framework Convention on Climate Change (UNFCCC), he has contributed significantly to the integration of climate change considerations into the sector's policies.

With his achievements, Dr. Serrano received different recognitions. These include the Outstanding SEARCA Scholarship Alumni in 2016, SEARCA Outstanding Alumnus in 2006, and UP Los Baños Alumni Association's Most Outstanding Kapampangan for Agriculture in 2006. – **Kaymart Gimutao**

ATTY. EDGARDO J. ANGARA

Transforming Agricultural Policy With Biotechnology

Atty. Edgardo J. Angara, a distinguished figure in Philippine politics, law, and education, was a paragon of multifaceted leadership and advocacy for agricultural development. His legacy spanned agriculture, finance, and the arts, leaving a lasting mark on the nation.

Beginning his political journey in 1971, Angara emerged as one of the youngest delegates to the Constitutional Convention, signaling the start of a career marked by unwavering commitment. As a founding partner of ACCRA Law Offices in 1972, he demonstrated prowess in the legal arena, eventually becoming the president of the Integrated Bar of the Philippines.

Angara's leadership extended beyond national borders, earning him the distinction of founding president of the Association of Southeast Asian Nations (ASEAN) Law Association in 1980. His international influence continued to grow, showcasing his dedication to fostering legal cooperation in the ASEAN region.

A pivotal chapter in Angara's career unfolded from 1981 to 1987 when he served as the president of the University of the Philippines (UP). He fortified the general education program, elevated medical curriculum standards, invigorated the arts and basic sciences, and established a multi-campus university structure during his tenure.

As Senate President from 1993 to 1995, he steered the passage of groundbreaking legislation, leaving an indomitable mark on the country's legislative landscape. Key achievements include laws on education, health, agriculture, financial reforms, and social welfare.

In his role as Secretary of Agriculture, Angara spearheaded the implementation of the Agriculture and Fisheries Modernization Act (AFMA) in response to the pressing need for agricultural reform. Recognizing the potential of biotechnology, he embraced advancements like genetically modified Bt corn, introducing a pivotal technology that could revolutionize agricultural productivity.

Angara's determination to ensure the safety of genetically modified organisms (GMOs) was evident in his initiative to establish an office within the Department of Agriculture. This office served as a critical checkpoint where scientists rigorously assessed the safety of GMOs, affirming their suitability for consumption.

Upon returning to the Senate in 2001, Angara perceived a gap in prioritizing science and technology. He took decisive action by creating the Commission on Science, Technology, and Engineering (COMSTE). This innovative move consolidated the House and the Senate's science and technology committees, streamlining legislative processes for faster and more efficient decision-making. Angara's advocacy for science, mathematics, technology, and engineering was rooted in the belief that these disciplines were integral to the nation's progress.

In championing biotechnology, Atty. Edgardo J. Angara envisioned a brighter future for the Philippines, where innovative solutions pave the way for increased agricultural yields and improved food security. Though he passed away in 2018, his legacy as a staunch supporter of science and technology remains a testament to his foresight and enduring impact on the nation's development. – **Michaela Jyra Melo**

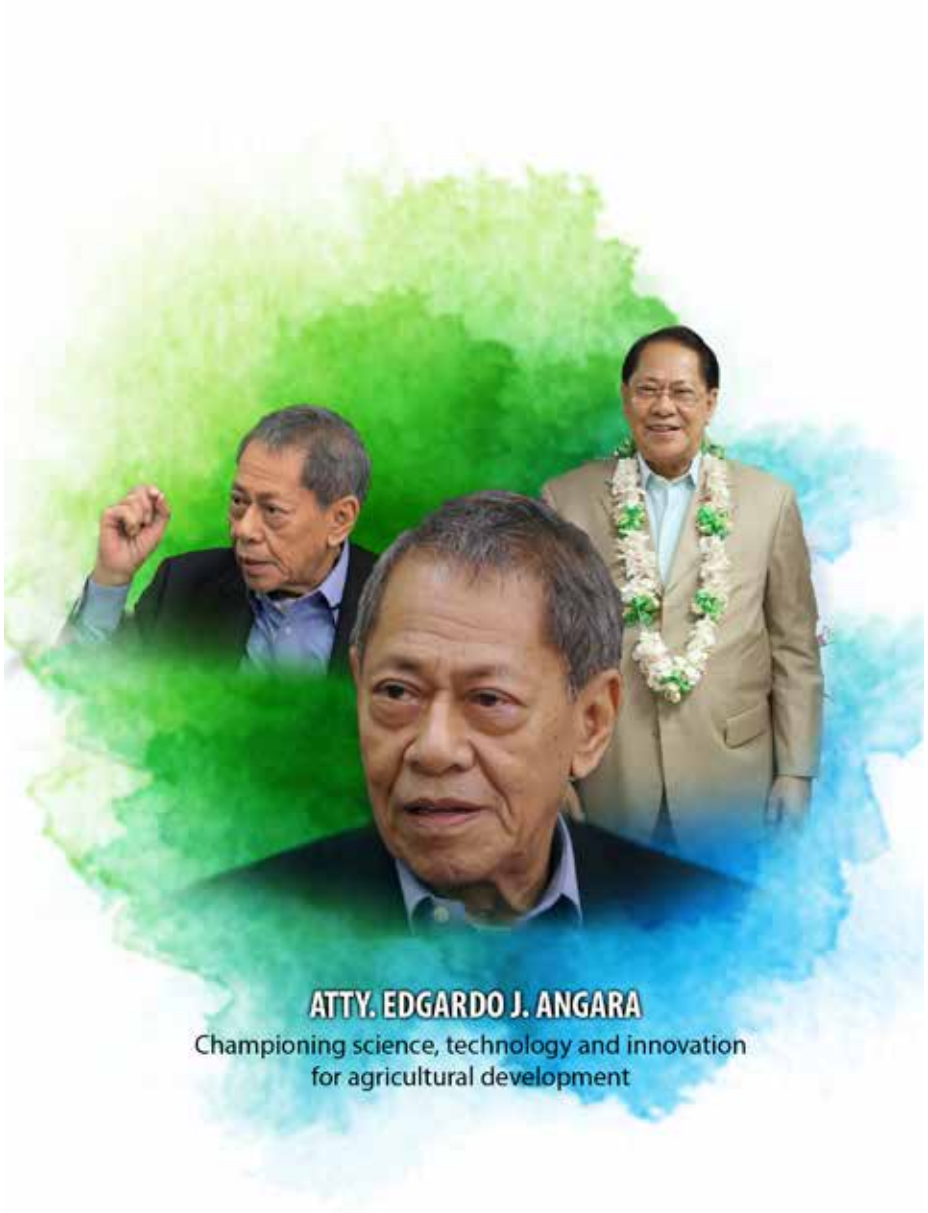



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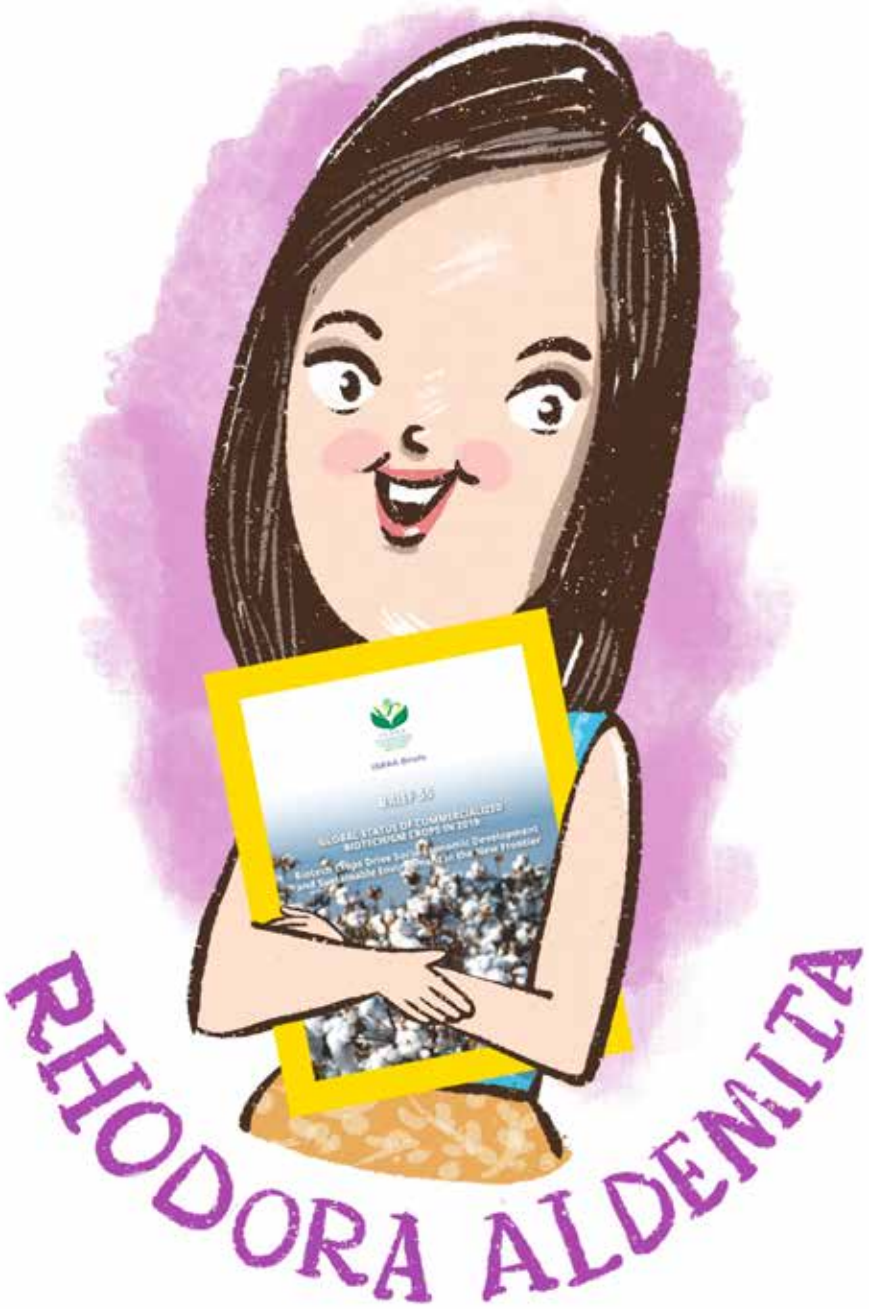
Photo Source: Business Mirror



DR. RHODORA ROMERO-ALDEMITA

Sowing the Seeds of Understanding for Biotech Adoption

Dr. Rhodora Romero-Aldemita did not expect to be a well-known science advocate and researcher, let alone to be recognized as one of the *Filipino Faces of Biotechnology*, among the many awards she had received.

Popularly known as "Doc Olah" in the global biotech community, she was also hailed as one of the Ten Outstanding Women in the Nations' Service for Excellence in the Field of Science, Ten Outstanding Young Scientist in the Philippines, the Science Prize in Biology by the National Academy of Science and Technology, Philippines, and The World Academy of Sciences, Italy. She was also awarded the Gregorio Y Zara award for outstanding basic research, the Crop Science Society of the Philippines Honorary Fellow Award and the Clara Sylianco-Lim award by the Philippine Society of Biotechnology and Molecular Biology for leading biotechnology promotion and initiatives in the country. Her inherent love for her family and her desire to improve their living conditions motivated her to study and work hard.

"To succeed in our field, we have to realize our potential and use them to the fullest. I developed my abilities through studying, training, conducting research, and publishing. Although the outputs of my rice genetic engineering work were not immediately available to help consumers and farmers, I knew that they would make a difference in the future, and they did!" Dr. Aldemita says.

In 2018, Doc Olah was selected as one of the *Filipino Faces of Biotechnology* because of her contributions as an outstanding agricultural biotechnologist and science communicator in the country. Her knowledge and experience as a crop biotechnologist have accumulated over the years on agriculture-

related topics such as plant pathology, plant physiology, molecular biology, and rice biochemistry. Currently, she is the Executive Director of the International Service for the Acquisition of Agri-biotech Applications (ISAAA) Inc., where she leads various initiatives on biosciences globally. She was also recognized by the UPLB College of Agriculture and Food Science Alumni Association as the 2020 Distinguished Alumna Award for International Service and Cooperation.

Dr. Aldemita holds a Ph.D. in Botany from Purdue University, USA, under a Rockefeller Foundation scholarship, and a Post-doctoral Fellowship on Golden Rice at Albert-Ludwigs University (AUF), Germany. She has served as Chief Science Research Specialist and the Biotechnology Coordinator at the Philippine Rice Research Institute (PhilRice) and was formerly a researcher at the International Rice Research Institute. She is a member of the Technical Advisory Team of the Applied Biotechnology Committee of the Philippine Agriculture and Fisheries Biotechnology Program of the Department of Agriculture (DA Biotech) and a board member of the Biotechnology Coalition of the Philippines. She is the editor-in-chief of the Philippine Journal of Crop Science. She has published 34 papers, two book chapters on biotechnology, convened numerous fora and a much sought after resource person on crop biotechnology.

"As a scientist, I was able to develop a rice genetic transformation technology used by researchers to this day. I am confident that biotechnology is used by scientists like me to help improve lives. By communicating about the benefits of biotechnology, I am hopeful that the time will come when more people will acknowledge its importance. This will lead to more countries planting biotech crops and more mouths fed. When that time comes, all my hard work, together with the efforts of other scientists, will be worth it," Doc Olah says. – **Kristine Grace N. Tome** and **Janine Cyren Escasura**

FR. EMMANUEL C. ALPARCE

Bridging Spirituality and Biotechnology for Sustainable Progress

Father Emmanuel C. Alparce, affectionately known as Father Noli, is an illuminating figure at the crossroads of spirituality and scientific innovation. In his years of devoted priesthood, Father Noli has not merely confined himself to the conventional duties of sacramental work but has emerged as an advocate, communicator, and network builder for biotechnology.

Upon his ordination, Father Noli assumed a pivotal role as the Executive Director of his diocese's Social Action Center, an arm of the Catholic Church in the Philippines dedicated to tackling real-world concerns such as poverty, hunger, human rights, and sustainable agriculture. Here, he encountered the profound potential of biotechnology to address the plight of impoverished farmers, a revelation that ignited his enthusiasm for the continued development of agricultural biotechnology.

Crucially, Father Noli has assured that there is no incongruence between the use of biotechnology and the tenets of the Catholic Church. With a nuanced understanding of both realms, he navigates the intersection of science and spirituality, emphasizing that the pursuit of agricultural biotechnology aligns seamlessly with the Church's beliefs. His enlightened perspective bridges these seemingly disparate worlds, emphasizing the compatibility of technological progress and religious values.

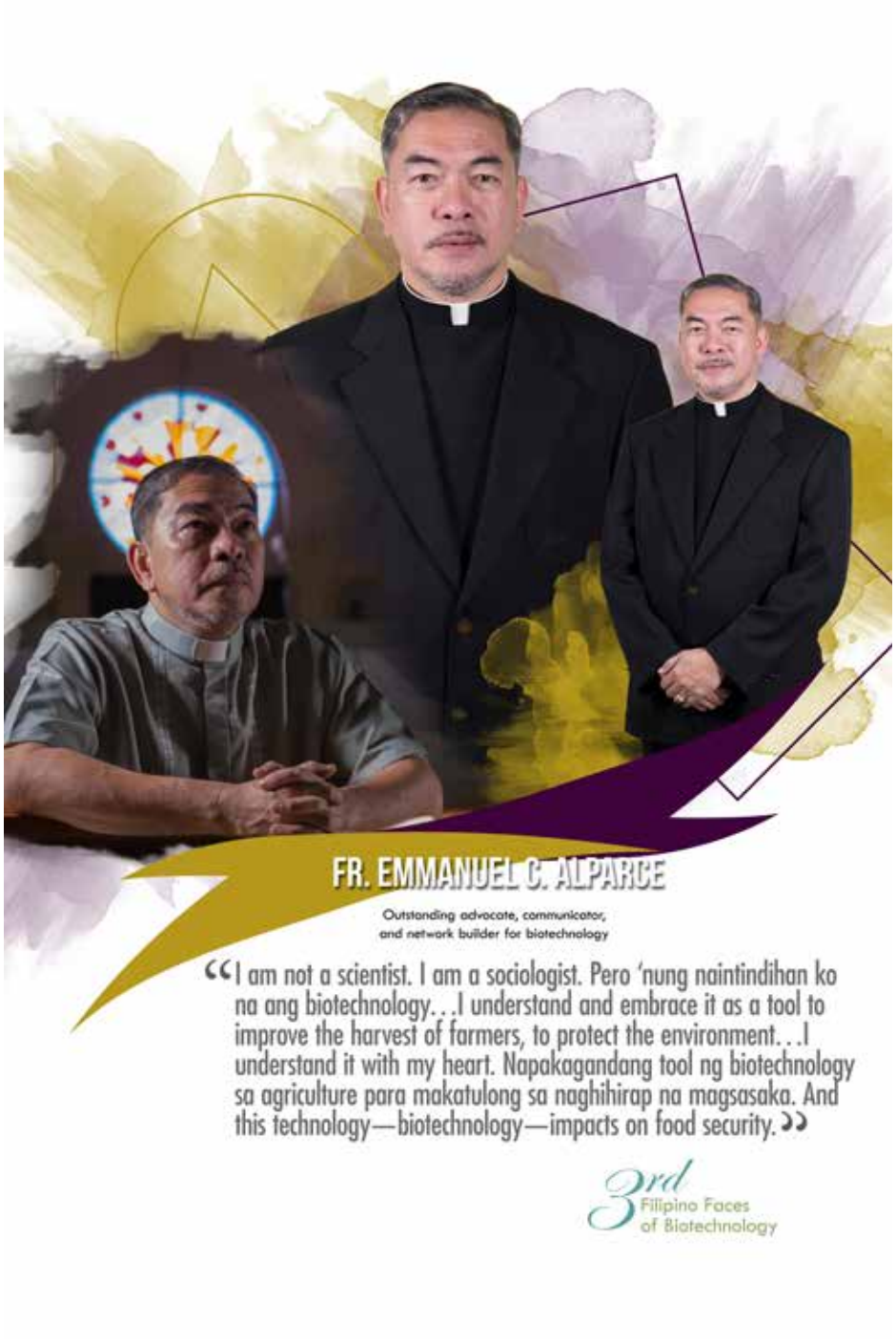
His journey led to critical appointments, including his key roles within the Department of Agriculture's Biotechnology Program on Agriculture and Fisheries. His involvement as a Member and Chairman of the Technical Committee on Information, Education, and Communication underscores his

determination to advocate for biotechnology and actively contribute to its responsible implementation.

In 2001, Father Noli's dedication reached global proportions when the U.S. State Department selected him for the International Visitor Program. This prestigious opportunity allowed him to delve into the intricacies of biotechnology, food safety, and agriculture in the United States, further enriching his perspective and contributing to his role as a global leader.

A "late-vocation" priest, Father Noli's journey encompasses a Bachelor's degree in sociology from the University of the Philippines at Los Baños, coupled with a successful career as a journalist and deputy chief of staff to a congressman. His multifaceted personality, evident in his love for raising dogs and birds and his exceptional "green thumb," adds depth to his character.

Father Emmanuel C. Alparce emerged as a beacon of harmony, integrating spirituality and scientific progress in the vibrant tapestry of *Filipino Faces of Biotechnology*. His advocacy for agricultural biotechnology, coupled with his assurance of unity with the Church's beliefs, paints a portrait of a visionary leader dedicated to improving the lives of farmers and bridging the gap between tradition and innovation. – **Michaela Jyra Melo**



DR. LIBERTADO C. CRUZ

Leading Animal Biotechnology Research for Sustainable Agriculture

Dr. Libertado C. Cruz, the former Executive Director of the Philippine Carabao Center (PCC), stands as a beacon in the field of reproductive biotechnology, earning him the prestigious title of "Outstanding Leader on Animal Biotechnology" in the 2018 *Filipino Faces of Biotechnology* Awards.

Dr. Cruz helmed the PCC for over two decades, pivotal in its establishment and evolution. His vision and dedication were instrumental in transforming the carabao, often seen as a symbol of backwardness, into a tool for progress.

Dr. Cruz's influence extends beyond the PCC's walls; it permeates the fabric of Philippine agriculture. His relentless pursuit of excellence is evident in his impassioned belief in the carabao as a catalyst for improved nutrition, poverty alleviation, and employment opportunities.

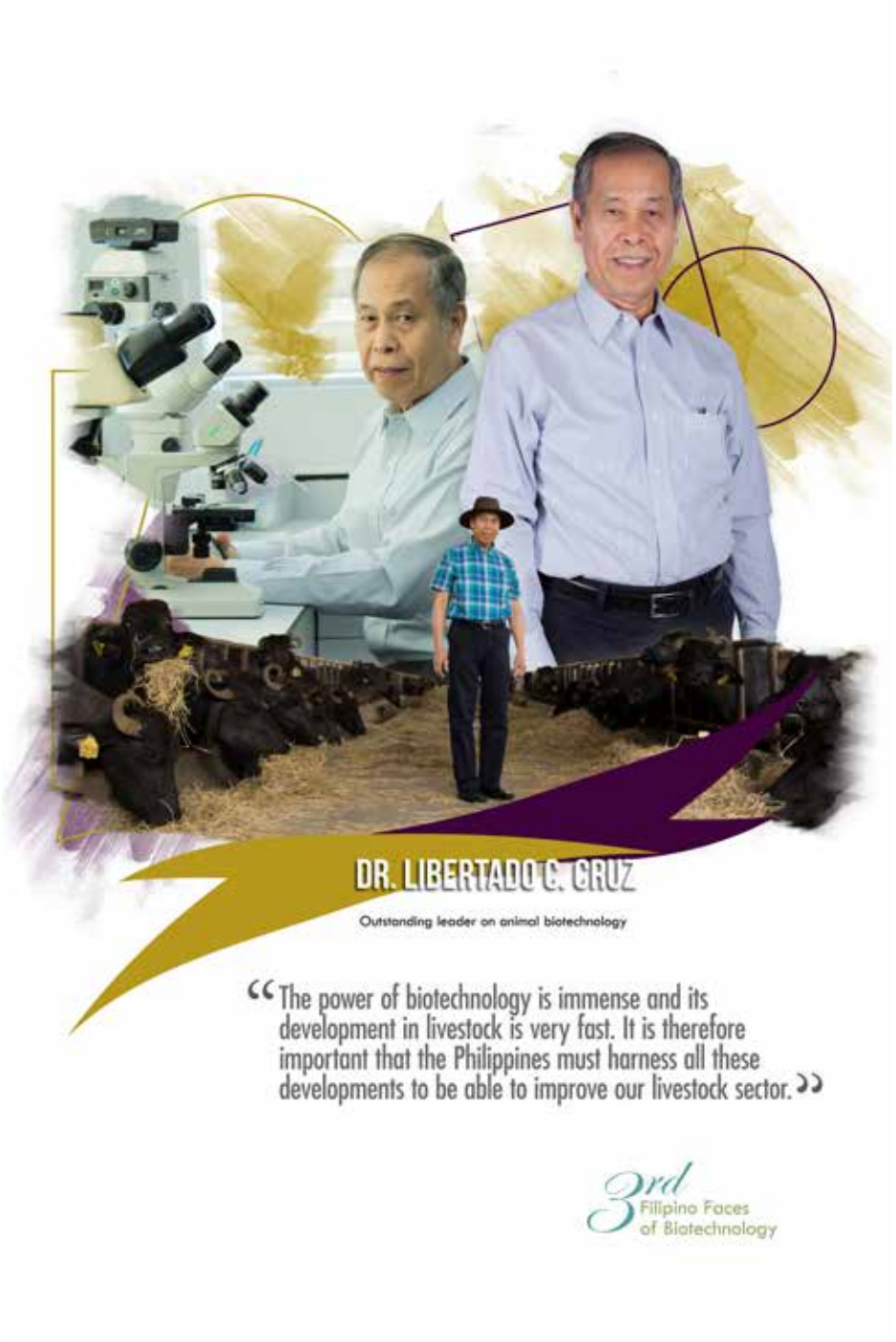
Dr. Cruz's leadership prowess also played a significant role in the success of Republic Act No. 7307, the formal establishment of the PCC. Under his guidance, the PCC achieved remarkable milestones. He is acknowledged for successfully operationalizing the PCC and its 13 regional centers, leading the institutionalization of the Carabao Development Program. The establishment of the National Impact Zone (NIZ) and Regional Impact Zones (RIZs), coupled with the creation of a national gene pool and world-class research facilities, represented notable advancements in the promotion of carabao-based agriculture.

Dr. Cruz's accolades speak volumes about his contributions. The Pantas Award by DOST-PCAARRD acknowledged his pioneering work on in-vitro maturation/fertilization and embryo transfer in buffaloes, leading to the

first ET Murrah buffalo offspring from a Philippine carabao surrogate dam. The Pro-Patria Award from the Department of Agriculture and Office of the President recognized his efforts in improving estrus synchronization and artificial insemination (AI), uplifting the Philippine carabao for meat and milk.

Furthermore, he received the PSAS-InPhilco Distinguished Animal Scientist Award for his numerous contributions to the field of reproduction, benefiting both young scientists and society at large. He was recognized as an academician by the National Academy of Science and Technology, as an Excellence Awardee for Research Administration by the Prime Minister of the Islamic Republic of Pakistan, and as the G. Zara Awardee for Applied Science by the Philippine Association for Advancement of Science and Technology underscores his multidimensional impact.

Dr. Cruz's legacy is not just etched in awards and recognition but embedded in the lives of farmers, researchers, and the entire nation. His commitment to advancing animal biotechnology has left an enduring influence, ensuring a sustainable source of meat and milk for Filipino farmers and contributing significantly to the nation's agricultural progress. – **Michaela Jyra Melo**



DR. CUSTER C. DEOCARIS

Advancing Biotechnology Communication and Advocacy

Dr. Custer C. Deocaris, a luminary in the realm of biotechnology, stands as a distinguished journalist recognized for his exceptional contributions in promoting public understanding of this dynamic field. With an illustrious career spanning diverse domains, Dr. Deocaris has seamlessly blended science, research, and advocacy to shape a narrative that resonates with the masses.

As a Senior Science Research Specialist at the DOST - Philippine Nuclear Research Institute, Dr. Deocaris has left a mark on the molecular understanding of aging and immortalization. His groundbreaking work on mortalin/mtHsp70 has illuminated the intricacies of these processes, contributing significantly to the scientific community's knowledge.

At the helm of the Zoonotic Disease Integrated Action (ZODIAC), an International Atomic Energy Agency (IAEA) program, Dr. Deocaris spearheads a country team with a mission to establish an international pathogen surveillance network. This initiative, crucial in preventing future pandemics, showcases his determination to global health and collaborative efforts.

Dr. Deocaris's leadership as the former Research Chief of the Commission on Higher Education (CHEd) underscores his dedication to advancing research excellence in Philippine higher education. Managing substantial R&D grants and shaping national policies, he has played a pivotal role in fostering a culture of innovation and inquiry.

Beyond traditional science, Dr. Deocaris emerged as an environmental activist and NGO BAN Toxics board member. His endeavors address

ecological concerns, child labor issues, and the impact of toxic chemicals on marginalized small-scale gold mining communities. Initiating the Luntiang Lunes movement in 2012, he partnered with Johns Hopkins University's global Meatless Monday campaign to promote awareness of the Planetary Health Diet in the Philippines.

Dr. Deocaris's multifaceted contributions extend to the realm of media, where he has excelled as an internationally awarded S&T broadcast journalist. Hosting the longest-running nationwide S&T radio program, Pinoy Scientist, at DZEC 1062-Radyo Agila, he has bridged the gap between science and the public. Over the past decade, he has skillfully translated complex scientific issues into accessible narratives, sharing inspiring stories of Filipino scientists with ordinary people.

His campaigns have been featured prominently in major radio and TV programs, newspapers, and the esteemed Huffington Post. Dr. Custer C. Deocaris's unique ability to communicate science with passion and clarity has not only enriched public understanding. It has also elevated him to the ranks of the *Filipino Faces of Biotechnology* Awardees, a testament to his exceptional role as a distinguished journalist and advocate for the sciences. – **Michaela Jyra Melo**

DR. JOCELYN E. EUSEBIO

Cultivating Leadership in Agricultural Biotechnology Research and Development

Dr. Jocelyn E. Eusebio, a luminary in the realm of agricultural research and development, is fondly remembered as an extraordinary leader whose influence transcends time. As the Former Director of the Crops Research Division at the Philippine Council for Agriculture and Aquatic Resources Research and Development (PCAARRD), Dr. Eusebio's legacy is an awe-inspiring testament to her passion for advancing agricultural technologies.

Her expertise spanned a spectrum of roles, from being a beacon of Research Management and Coordination to a trailblazer in Integrated Pest Management and a virtuoso in formulating and packaging project proposals. However, Dr. Eusebio's influence extended far beyond the national borders, as evidenced by her significant positions and designations in various international collaborative programs.

In her role as the Chief Science Research Specialist at the Crops Research Division, Dr. Eusebio orchestrated the harmonious coordination of research and development activities, displaying a visionary approach to formulating, developing, and packaging agricultural crop commodities. Her leadership was characterized by an unyielding commitment to systematically addressing major problems affecting crop research, establishing priorities, and continually updating research and development programs.

On the international stage, she not only served as the Chairman of the Steering Committee of the Cereals and Legumes Asia Network (CLAN) at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) but also contributed significantly as the National Principal Investigator for projects with the Asian Vegetable Research and Development Center (AVRDC).

Dr. Eusebio's influence reached even further, encompassing the Australian Centre for International Agricultural Research (ACIAR) and Plant Resources for South-East Asia (PROSEA), among other prestigious institutions. Her leadership extended to National Programs and Committees, where she shaped agricultural education, industry strategic plans, and innovative fruit fly management programs.

Throughout her illustrious career, Dr. Jocelyn E. Eusebio showcased exceptional expertise and a dedication to advancing agricultural technologies. Her strategic planning, collaborative initiatives, and adept management of research programs left an enduring mark, setting an example that continues to inspire future leaders in the field.

In 2018, Dr. Jocelyn E. Eusebio was recognized as a Filipino Face of Biotechnology Awardee, a title that aptly captures the essence of her outstanding leadership in research and development. This accolade is a profound tribute to Dr. Eusebio's enduring contributions, underscoring her lasting impact on the agricultural community. Her legacy is a perpetual source of inspiration, motivating a new generation to follow in her footsteps and contribute to the ongoing evolution of impactful agricultural technologies. – **Michaela Jyra Melo**

DR. LEONARDO A. GONZALES

Pioneering Research in Biotechnology and Agricultural Economics

Dr. Leonardo A. Gonzales is a towering figure in agricultural economics and biotechnology, leaving an indelible mark on the *Filipino Faces of Biotechnology* awardees. Armed with a Ph.D. in Agricultural Economics from the University of Tennessee, courtesy of a prestigious Fulbright-Hays Scholarship, Dr. Gonzales has been a trailblazer in his field.

His illustrious career boasts significant roles, including that of a former Liaison Scientist for Asia and Research Fellow at the International Food Policy Research Institute, USA, and Agricultural Economist at the International Rice Research Institute. Beyond his rich academic background, Dr. Gonzales has authored eight rice and corn policy books and penned over 180 technical articles covering agricultural policy, agribusiness, and agribiotechnology.

Notably, his expertise extends to the socioeconomic impacts of living modified organisms (LMOs), showcasing a deep understanding of the complex issues surrounding biotechnology. His commitment to biosafety is evident in his roles as the Community Representative of the National Committee on Biosafety of the Philippines and the DOST-Biosafety Committee.

Dr. Gonzales, the founding President and Chairman of the Board of Trustees of the Society Towards Reinforcing Inherent Viability for Enrichment (Strive) Inc., encapsulates his determination to foster sustainable livelihoods for farmers. Strive, a non-profit organization, delves into the intricate relationship between emerging issues and agricultural policy. Their multifaceted approach includes expanding farmers' access to resources by providing techno-managerial assistance to local organizations, advocating for economic

policies through research, and building a knowledge base for effective agricultural development.

Beyond accolades, Dr. Gonzales is a pioneer in researching genetically modified technologies' socio-economic, cultural, and ethical impacts. His vast expertise encompasses crops, livestock, fisheries, and agribusiness economics, from biotechnology research and policy to market analysis and development. As the lead author of the acclaimed book, "Buffalo Meat Imports and the Philippine Livestock Industry: An Impact Assessment," he received the coveted Outstanding Book Award from the National Academy of Science and Technology (NAST).

In addition to his illustrious career, Dr. Gonzales has been a stalwart contributor to training programs and research initiatives since 1976, engaging with Philippine government agencies, international entities, and the Department of Agriculture. His impact transcends borders, demonstrating the transformative power of one individual in shaping the landscape of biotechnology and agricultural economics in the Philippines.

Dr. Leonardo A. Gonzales' journey is a testament to the profound influence that dedicated individuals can have on shaping the future of biotechnology and agricultural policy. Being honored as the Filipino Face of Biotechnology, he serves as a source of inspiration, impacting the historical, current, and future landscape of agricultural development in the Philippines. – **Michaela Jyra Melo**

DR. RANDY A. HAUTEA

Championing Responsible Adoption of Biotech Crops and Crop Improvement

Dr. Randy A. Hautea, an esteemed figure in the field of plant breeding, left an enduring legacy on the landscape of agricultural science, dedicating his professional career to the betterment of small farmers, particularly in developing nations.

As a plant breeder and the Global Coordinator of the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and Director of ISAAA *SEAsia*Center, Dr. Hautea was resolute in his commitment to utilizing biotechnology for the benefit of smallholder farmers. He envisioned a future where biotech crops were pivotal in ensuring food security and prosperity for farmers operating on limited land. He advocated for a scientific approach to regulatory reviews and approvals, recognizing the importance of responsible and informed adoption of biotech crops.

Globally recognized for his substantial contributions to crop improvement, particularly in the realms of field legumes and fibers, Dr. Hautea's research focused on breeding crops resilient to various stresses, adapted to intensive cropping systems, and with enhanced seed quality. His dedication and excellence earned him the "Outstanding Young Scientist" prize in plant breeding from the National Academy of Science and Technology of the Philippines in 1995.

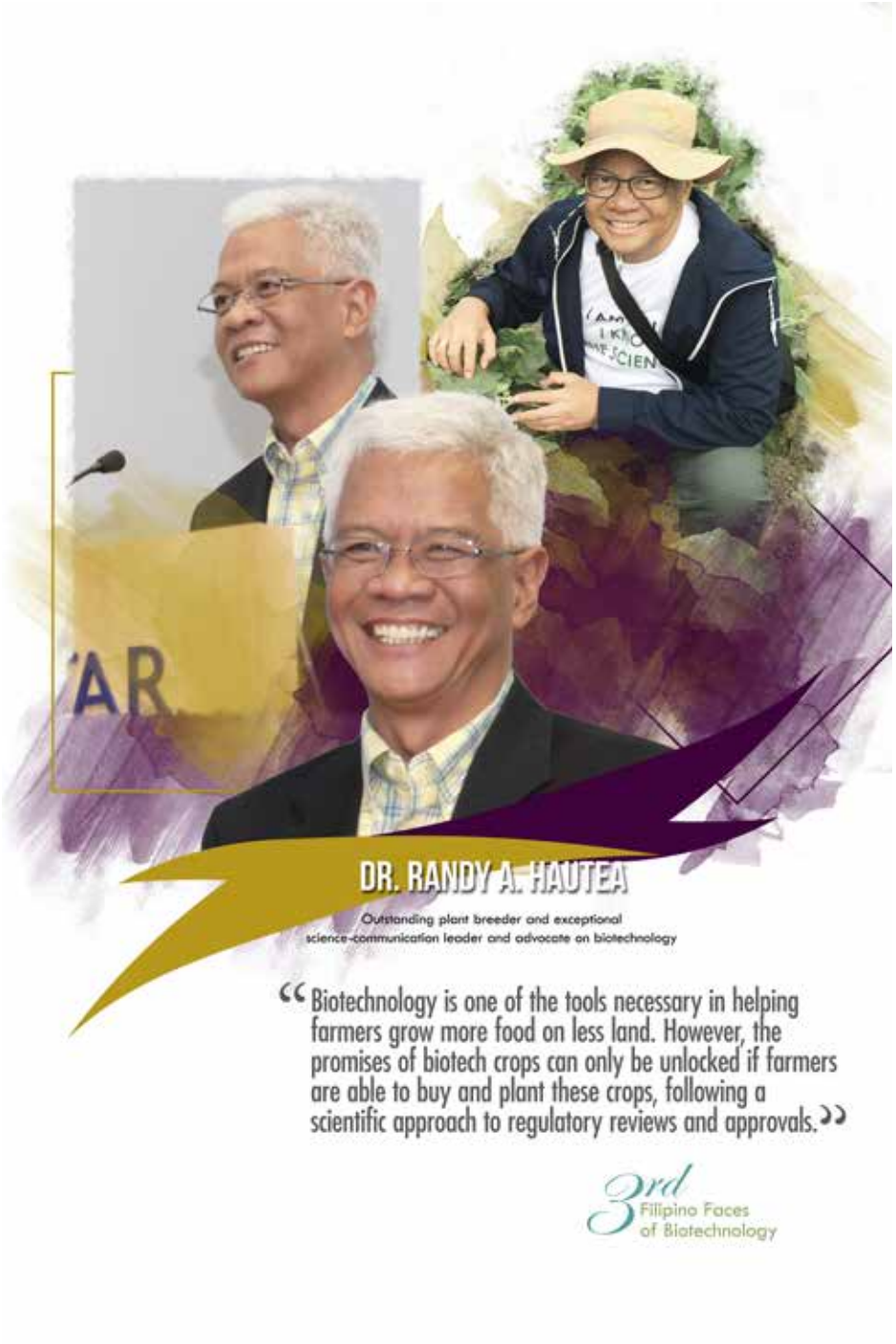
Professionally, Dr. Hautea held pivotal roles, serving as the Director of the Institute of Plant Breeding at the University of the Philippines Los Baños and leading the Philippines' national commodity research and development teams for legumes, vegetables, and root crops. His leadership journey continued as he assumed the helm of ISAAA's South East Asia Center in 1998,

where he played a crucial role in assessing international agricultural research centers within the Consultative Group on International Agricultural Research (CGIAR).

Later appointed as the Global Coordinator of ISAAA, Dr. Hautea steered the organization's efforts in facilitating the assessment, acquisition, transfer, and management of biotechnology applications for the benefit of developing countries. Operating predominantly in Southeast Asia and East Africa, ISAAA, under Dr. Hautea's guidance, became instrumental in monitoring the global cultivation of biotech crops, releasing annual reports documenting their adoption by farmers, especially in developing nations.

A fervent advocate for biotechnology, Dr. Hautea served on the Cornell Alliance for Science advisory board, contributing to a global initiative promoting access to scientific innovation for enhanced food security, improved environmental sustainability, and an elevated quality of life.

For over two decades, Dr. Hautea devoted his life to fulfilling ISAAA's mission, contributing to alleviating poverty and hunger by sharing scientific knowledge globally and facilitating the transfer of technologies to developing countries. His unwavering efforts continue to resonate, shaping the biotechnology landscape and leaving an enduring impact on global agriculture. – **Michaela Jyra Melo**



DR. DOLORES A. RAMIREZ

Innovating Research in Biochemical Genetics and Shaping Biotechnology Regulation

Dr. Dolores A. Ramirez, a distinguished geneticist, is a pillar of scientific achievement in biochemical genetics and cytogenetics. Fueled by a Rockefeller Foundation scholarship, Dr. DR, as she is fondly called, ventured to the University of Minnesota in the United States to study under renowned cytogeneticist Charles Burnham. In 1958, she earned her Master's in cytogenetics, a stepping stone that led her to Purdue University. There, under the guidance of geneticist Mark L. Tomes, she achieved her Ph.D. in biochemical genetics in 1963, with minors in plant pathology and plant physiology.

Returning to the University of the Philippines, Dr. DR began a prolific career as a researcher and educator. Rising through the academic ranks, she became an associate professor in 1969, a full professor in 1974, and ultimately a full University Professor in 1995. Her research, focused on plants crucial to Philippine agriculture, significantly contributed to understanding genetic resistance factors against *Cercospora* kex leaf spot and the cytogenetics of rice hybrids with wild species.

Going beyond the laboratory, her commitment to the scientific community manifested in editorial responsibilities for esteemed journals and her service on the Board of Trustees of the International Maize and Wheat Improvement Center. From 1974 to 1976, she held the SEARCA Professorial Chair for Genetics, reinforcing her lasting influence on agricultural research.

Dr. DR's accolades include the Gregorio Y. Zara Award in basic research (1976), the Rizal Pro Patria Award for outstanding scientific achievement (biochemical

genetics) in 1981, and the UP Professorial Achievement Award in agriculture in 1985. Her invaluable contributions were honored with the distinction of National Scientist of the Philippines in 1998.

Her lifetime achievements are symbolized by the flowers named in her honor, including *Hibiscus rosa-sinensis* 'Dolores Ramirez.' This recognition attests to her enduring legacy as a trailblazer in plant biochemical genetics and cytogenetics.

Despite her myriad achievements, Dr. DR remains a humble educator, emphasizing the role of the environment in nurturing talent. Passionate about mathematics education, she stresses the importance of effective teaching in shaping aptitude. She says, "The genetic component in one's aptitude for mathematics is only 12 percent. That means the gene contributes only 12 percent, and 88 percent comes from the environment."

An emblematic figure in genetics, Dr. Dolores A. Ramirez's journey epitomizes the symbiotic relationship between individual excellence, mentorship, and the relentless pursuit of knowledge. Her contributions, both direct and indirect, continue to resonate in the scientific community, exemplifying a legacy that transcends generations. – **Michaela Jyra Melo**

BISHOP JESUS Y. VARELA

Communicating Development Through Faith and Action

Bishop Jesus Y. Varela, affectionately known as "Bishop Jes" or "Lolo Bishop," was born on December 18, 1927 in Bacolod, Negros Occidental. He was the third child among nine siblings. Remarkably, four of the Varela siblings, including Bishop Jes, dedicated themselves to religious service.

Bishop Jes' educational journey included studying at the Sorsogon National High School from 1946 to 1949, followed by three years at the Our Lady of Peñafrancia Minor Seminary. In 1952, he earned his Licentiate in Philosophy (Ph.L.) from the University of Santo Tomas in Manila. Ordained on March 17, 1956 in Cebu City, he joined the Society of Jesus. Later, he pursued further studies at the University of the Angelicum in Rome as a scholar of the Archdiocese of Caceres.

Beyond his religious life, Bishop Jes was involved in broadcasting. In 1972, during a period of media censorship, he served as Vice President of UNDA, a Catholic radio and television organization, using his platform to critique the government. He would eventually serve as president of UNDA. Bishop Jes actively contributed to the Catholic Media Network's mission, advocating for broadcasting that is pro-life, pro-people, pro-poor, and community-oriented.

His commitment to broadcasting reached beyond national boundaries, as he actively participated in international meetings and collaborations.

Additionally, he chaired the Episcopal Commission on Family and Life within the Catholic Bishops' Conference of the Philippines and was a member of its permanent council.

In 1981, he courageously accepted a transfer to Sorsogon during a crisis, focusing on healing the diocese. He collaborated with dedicated young women to form the Sister Servants of the Divine Healer in 1984.

After the devastating Typhoon Sisang in 1987, his Sorsogon radio station mobilized millions in aid for relief and rehabilitation. He also built the El Retiro complex in Cabid-an Sorsogon for spiritual retreats and served as a home for priests seeking rest and recuperation.

Through his work in broadcasting, Bishop Jes advocated for the release of captured military personnel. The two officers were successfully released.

Bishop Jesus Varela passed away at the venerable age of 90 in February 2018, leaving behind a rich heritage of service, leadership, and compassion. His strong commitment to faith and family exemplifies a remarkable life dedicated to serving others. It is no surprise that he is awarded as an outstanding leader of the Christian church and recognized as one of the *Filipino Faces of Biotechnology*, for his legacy beyond pastoral work extends to his impact in media and communication. – **Rona Niña Mae Azucena**

2019 AWARDEES

Photo Source: Business Mirror

Photo Source: DA Biotech Program

DR. CYNTHIA T. HEDREYDA

Imprinting an Indelible Mark in Microbiology Education and Research

Prof. Hedreyda is recognized for her unwavering support and involvement in promoting and enhancing biotechnology education in the Philippines. A scholar and academic all throughout her professional career, she has left an indelible mark as one of the nation's strongest advocates in streamlining biotechnology in colleges and universities.

In a previous feature published in a Philippine news daily, Prof. Hedreyda was eager to encourage the youth to take up microbiology. She explained the crucial role microbiologists play in dealing with "very small organisms" and laid out various ways in how students can become microbiologists—should they aspire to.

As a leading Filipino expert in biotechnology, Prof. Hedreyda lent her voice in countering misinformation and unsubstantiated fears surrounding Bt talong, a special variety of eggplant capable of making a bacterial protein (*Bacillus thuringiensis*, hence the 'Bt') that is resistant to a destructive insect pest—the eggplant fruit and shoot borer. Bt talong has undergone extensive and rigorous research, particularly in risk procedures and assessments, to ensure its safety and utility. Prof. Hedreyda went on to state that the plant has undergone the same procedures as previously approved genetically modified corn, cotton, and soybean.

Prof. Hedreyda completed her B.S. Biology and M.S. Genetics degrees from the University of the Philippines Los Baños and her Ph.D. in Microbiology from the University of Georgia, USA. She joined the National Institute of Molecular Biology and Biotechnology faculty in 1996 until her retirement in December 2020. She was the Institute's Director from 2003 to 2012.

Prof. Hedreyda was a Fellow of the Philippine Academy of Microbiology. Her contributions to the field of microbiology surely did not go unnoticed as she received the Outstanding Microbiologist Award from the Philippine Society for Microbiology, Inc., the Achievement Award in Biological Sciences from the National Research Council of the Philippines, and a 2019 *Filipino Faces of Biotechnology* Award from the Department of Agriculture.

She chaired a project aimed at instituting a General Education course in Biotechnology in colleges and universities and spearheaded the annual conduct of the National Biotechnology Education Conference for Teachers and the National Biotechnology Quiz Contest for High Schools. These activities were in addition to her regular teaching and research mentoring roles in molecular microbiology.

In July 2021, barely a year after her retirement, Prof. Hedreyda passed on. She will be fondly remembered by numerous colleagues and students, especially from the Institute, who have learned from her expertise, leadership, and friendship. – **Rona Niña Mae Azucena**

DR. MILAGROS M. GREIF

Combating Diseases Through Sound Science and Technology

According to the Philippine Department of Health, the Philippines has recorded more than 72,000 dengue cases. The dengue virus is transmitted to humans through the bite of an infected female *Aedes aegypti* mosquito. Although the majority of the cases could range from asymptomatic to mild, there have been more than a hundred deaths from dengue this year.

Mosquito-borne diseases, such as dengue and malaria, continue to wreak havoc in the Philippines, where climate change has brought on a number of diseases.

Hence, Dr. Milagros M. Greif, a biologist, was motivated to study these pests and find an appropriate solution to combat dengue and related mosquito-borne diseases. "I think mosquitoes are very interesting insects because they're very small, but the negative impact that they bring to humankind is huge," said Dr. Greif.

Dr. Greif was recognized as one of the *Filipino Faces of Biotechnology* for her outstanding contributions to alleviating dengue and other mosquito-related diseases through biotechnology. Her Master's degree in biology specialized in the study of insects, and her doctorate studies focused further on the biochemical, molecular, and microscopic studies of mosquitoes.

After she obtained her Ph.D. in Germany, Dr. Greif worked in biological control using a certain bacteria to kill mosquitoes without the use of disruptive chemicals that affect biodiversity. She was able to replicate the technique in the Philippines and had it modified to adapt to suit the country's tropical environment. The biological mosquito control method was piloted in the

municipality of Balamban, Cebu, as part of Dr. Greif's extension project– though no plans to commercialize it have been made as of this writing.

In 2019, Dr. Greif was the Dean of the College of Arts and Sciences at Cebu Normal University (CNU) when she was awarded as one of the *Filipino Faces of Biotechnology* for her outstanding research works on urban pest control through biotechnology.

During the early days of the pandemic in 2020, Dr. Greif leveraged the CNU's biology to make a disinfectant alcohol enriched with mosquito repellant. The 70% ethyl alcohol solution was distributed to CNU personnel at a time when fears brought by COVID-19 affected the normal supply of ethyl alcohol.

She said that she applied what she learned in her Ph.D. studies and to make an alcohol concoction not just to prevent the spread of COVID-19 but also to protect people against mosquitoes that carry deadly diseases. Dr. Greif's CNU colleagues saw this, as yet another way of Dr. Greif's way of translating her knowledge into 'an act of care.' – **Rona Niña Mae Azucena**

DR. NATHANIEL P. DUGOS

Working Toward Proper Medical Care

Dr. Nathaniel P. Dugos is a distinguished Professor and Chair of the Chemical Engineering Department at the De La Salle University in Manila, Philippines. He completed both his Master's and Doctorate degrees in Chemical Engineering from the same institution.

Dr. Dugos has made significant contributions to the field of bioengineering and has been recognized for his outstanding research efforts. His advocacy to help those who are not able to afford and access proper medical care motivated him to pursue research that offers a "feasible alternative to human kidneys in response to the increasing demand for kidney organ transplant." His collaboration with the National Kidney and Transplant Institute could someday provide a low-cost solution to chronic kidney disease, which is one of the Philippines' prevalent health problems.

Dr. Dugos has high hopes that his bioengineering research will make a significant dent in informing and formulating health policies related to organ transplants in the Philippines.

In 2016, Dr. Dugos was recognized by De La Salle University (DLSU) for his valuable contribution to the development of competent chemical engineers through education. He has since received several awards as an outstanding chemical engineer from the Philippine Institute of Chemical Engineers and the Philippines' Professional Regulation Commission. He was also conferred the Tan Yan Kee Foundation Professorial Chair and the Carlos Palanca Professorial Chair in 2018.

In 2023, he started serving as the National President of the Philippine Institute of Chemical Engineers. He was also conferred the title of ASEAN Engineer by the Governing Board of the ASEAN Federation of Engineering Organizations.

Despite his prolific research work, Dr. Dugos continues to mentor the next generation of chemical engineers. He has been a faculty member at DLSU for more than 12 years, teaching undergraduate and graduate courses.

Truly, Dr. Dugos' dedication to advancing scientific knowledge and education is commendable, and his impact extends beyond academia. It is of no surprise to those who are familiar with his remarkable and groundbreaking work that he is recognized as one of the *Filipino Faces of Biotechnology* award in the domain of health bioengineering R&D implementation and administration in the Philippines. – **Rona Niña Mae Azucena**

DR. ERNELEA P. CAO

Educating the Next-generation Biotechnologists

Dr. Ernelea P. Cao, a distinguished biology professor from the University of the Philippines Diliman, was recognized as one of the *Filipino Faces of Biotechnology* for her impactful contributions to teaching, research, and science-based policy development for agricultural biotechnology.

Dr. Cao's work in educating the next generation of scientists led her to be awarded the Metrobank Foundation Outstanding Teacher in 2016. Dr. Cao, who at that time was also the director of the Institute of Biology at UP Diliman, said that she hopes to serve as an inspiration to junior faculty members at the Institute and the entire UP community. She shared that the recognition was a great honor and a boost for her to continue teaching with self-fulfillment.

She also served as the interim director of the Institute for Health Innovation and Translational Medicine, Philippine-California Advanced Research Institutes. She served as the deputy executive director of the Philippine Genome Center from May 2011 to July 2014 and as the director of the UP Natural Sciences Research Institute until March 2012. She headed the Philippine delegation to several Codex Alimentarius Intergovernmental Task Force meetings in Japan and in the US, helping build the backbone of Philippine food safety regulation.

Among the many hats that Dr. Cao has worn, being a mother to four children is one she also wears with pride. She was just in her 40s when her husband, Hernando, passed away and she had to take on the task of raising their young children. In a Philippine news daily that featured Dr. Cao, she admitted that

raising her family after her husband's passing was a "combined effort," where she had the full support of her parents, siblings, and in-laws.

"I was very strict; a disciplinarian because I had to act as both mother and father… but it did not work," Dr. Cao recalled, adding: "I had to evolve."

"They taught me that I have to trust them, that we should support each other," said Dr. Cao. The rapid maturity of her children also played a role in this transformation.

Dr. Cao also acknowledged her husband's pivotal role in her professional growth. When she contemplated giving up on her biology doctorate, he encouraged her to persevere, emphasizing that it was an investment in her own professional development. Despite having two children, he even supported her decision to spend a year in the United States to complete her dissertation.

Her Doctorate degree has opened numerous opportunities in her field, not only providing financial stability but also keeping her engaged and focused after Hernando's passing.

Currently, Cao's research focuses on cyanobacteria—blue-green algae that derive energy through photosynthesis—to remediate metal pollution in environments like mining sites. Additionally, she assists Filipino farmers by identifying coffee varieties with optimal aroma, disease resistance, and yield.

Despite her busy schedule, Cao practices effective time management to ensure she dedicates quality time to her family. Dr. Cao continues to change lives not only as a mother, but also as an outstanding educator, researcher, and advocate of biotechnology. – **Rona Niña Mae Azucena**

DR. GISELA P. CONCEPCION

Pursuing the Right Solutions to Biomedical Challenges

Dr. Gisela P. Concepcion was selected as one of the *Filipino Faces of Biotechnology* for her exceptional work in using biotechnology for therapeutic, diagnostics, and vaccine preventive applications.

Dr. Concepcion is a Professor Emeritus at the University of the Philippines in Diliman, retiring in 2019 as Professor of the Marine Science Institute (MSI) of the university. She played a pivotal role in establishing advanced laboratory infrastructure at UP MSI and the Institute of Chemistry. This allowed researchers and students alike to conduct cutting-edge experimentation in chemical, biomolecular, and neurochemical sciences.

As a faculty member of UP, she taught graduate courses and led research programs on marine biodiversity, natural products, drug discovery, and related biomedical research.

Her impressive body of work has earned her the prestigious title of National Scientist, the highest honor bestowed upon Filipino scientists by the Philippine government. Dr. Concepcion's groundbreaking research led to the discovery of numerous bioactive marine compounds with properties such as anti-cancer, anti-infective, anti-pain, and other neuroactive effects. Some of these compounds are now being actively pursued as potential drug leads.

She has authored numerous publications in international scientific literature and has generated several patents and intellectual property assets for the University of the Philippines (UP). Dr. Concepcion curated a valuable biobank known as the Marine National Products Legacy (MNPL) Collection, which

houses over 6,000 microbial symbiont isolates accumulated through various research programs over the years.

Her scientific lineage traces back to esteemed mentors, including National Scientist Lourdes J. Cruz and Distinguished Professor Baldomero M. Olivera. Dr. Concepcion has also mentored numerous young faculty, researchers, and students, ensuring that her legacy continues through their capable leadership.

Dr. Concepcion's academic journey began as an NSDB scholar during challenging times. She obtained a Bachelor's degree in Chemistry cum laude from UP Diliman, held teaching positions, pursued her Master's degree in Biochemistry, and completed her Ph.D. in Chemistry as the Most Outstanding Ph.D. Graduate.

When she was elected as a Fellow of The World Academy of Sciences in 2015, Dr. Concepcion brought honor and prestige to the Philippines and further cemented her as an internationally respected and recognized scholar. Recognized for her work on bioactive marine natural products, she is the lone Fellow from the Philippines and one of only ten women who were selected. Her impact extends beyond academia, shaping not only science but also the Philippines as a nation. – **Rona Niña Mae Azucena**

DR. CLARO N. MINGALA

Vetting Livestock for Improved Public Health

Dr. Claro N. Mingala was recognized as one of the *Filipino Faces of Biotechnology* for his accomplishments in the field of livestock biotechnology that facilitated the improvement of animal breeding and the development of detection tools for animal pests and diseases.

On his way to becoming an outstanding livestock biotechnologist, he started out as a farm superintendent at the Department of Agriculture's Philippine Carabao Center, specializing in pathology and infectious diseases of ruminants.

Dr. Mingala completed his Master of Veterinary Studies degree at Central Luzon State University, focusing on preventive veterinary medicine. His Ph.D. studies was on infectious diseases – molecular immunology and microbiology. Through the DA Biotechnology Program, he became a Senior Research Fellow.

He steadily gained recognition as an animal health expert because of his significant studies on immunology of water buffaloes, results of which are currently being used in the production of vaccines, diagnostic tools, and therapeutic agents. Dr. Mingala's pioneering researches earned him the National Academy of Science and Technology's Outstanding Young Scientist Award in 2011 and the Most Outstanding Veterinarian in Government Service award by the Philippine Veterinary Medical Association in 2010. His dedication to animal health and welfare has been commendable.

Several of his noteworthy research studies include brucellosis control and eradication. It focused on the prevention and management of brucellosis, a bacterial infection that affects livestock and can be transmitted to humans.

His research on zoonotic diseases–those that can be transmitted between animals and humans–delves into the ways to prevent, diagnose, and control diseases such as leptospirosis, Q fever, and brucellosis. Dr. Mingala's body of scientific studies further contribute to the application of biotechnology in veterinary medicine. Developing drugs and vaccines for livestock diseases, molecular diagnostics, and genetic markers are some of his significant contributions. During the International Conference on Science and Technology Education and the 64th Annual Convention of the Philippine Association for the Advancement of Science and Technology, he was conferred the Gregory Y. Zara Award in the Applied Science Research category for his positive impact on the advancement of applied science.

In 2023, Dr. Mingala was designated as Director of the DA-Biotechnology Program Office, and leads the technical drafting team of the GM Animal Biotech regulation. Concurrently, he is also the officer-in-charge as the Deputy Executive Director of the DA-Philippine Carabao Center. Through his various roles and research work, Dr. Mingala advances veterinary science for a lasting impact on animal welfare, agriculture, and public health. – **Rona Niña Mae Azucena**

DR. CANDIDA B. ADALLA

From Studying Small Insects to Making a Big Impact in Biotechnology

In an article featuring Dr. Candida B. Adalla, it was suggested that her interest in entomology, the study of insects, may have been sparked by the "grace of dragonflies, the social structure of honeybees, and the colorful patterns of butterflies' wings." Dr. Adalla is a leading expert in entomology in the Philippines and is recognized as one of the *Filipino Faces of Biotechnology* for her outstanding leadership and contributions in the implementation of various stewardship activities and her leadership in pioneering developmental projects for biotechnology.

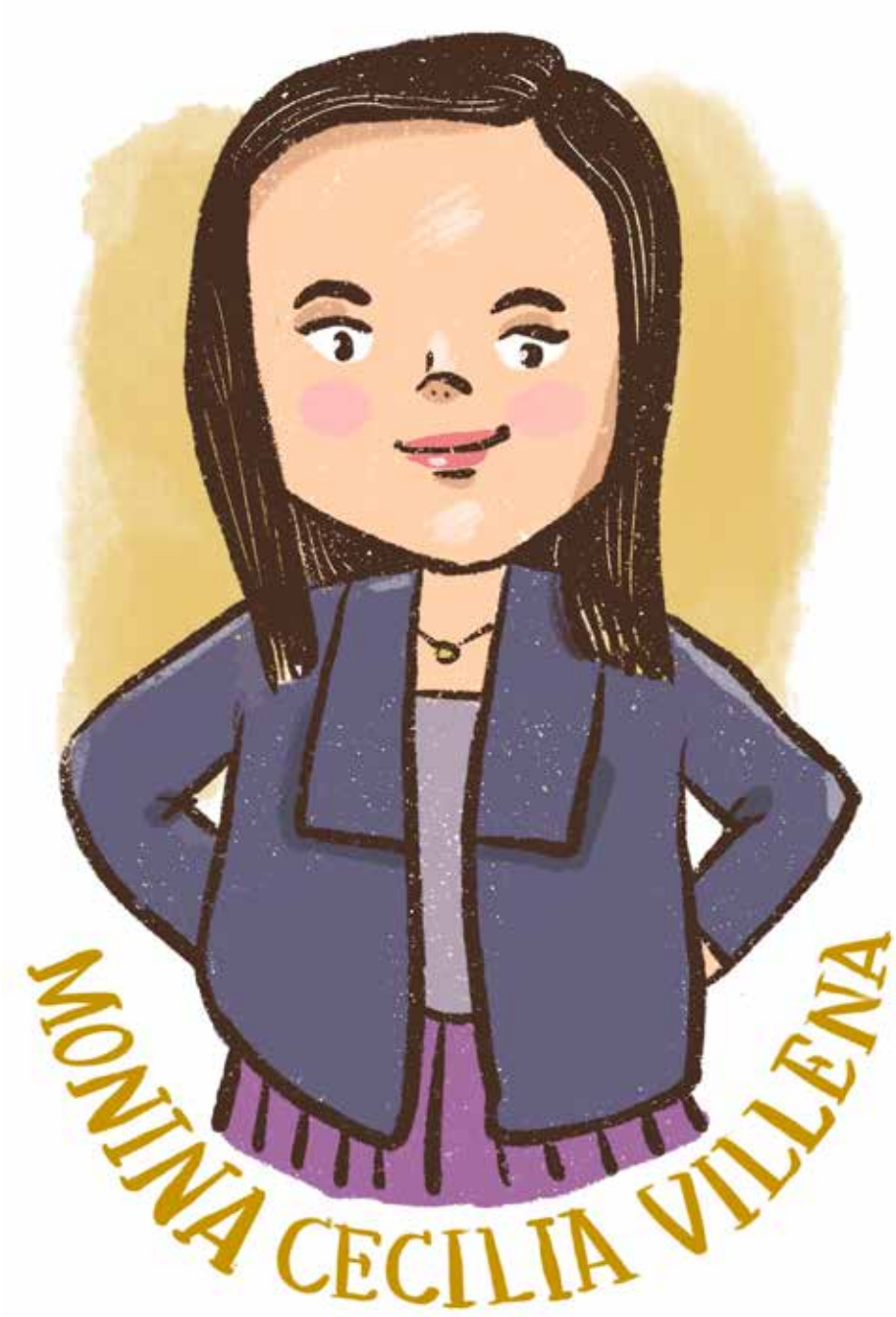
Dr. Adalla earned her undergraduate and graduate degrees in Entomology from the University of the Philippines Los Baños, where she later taught and eventually became the Dean of the College of Agriculture. Her primary objective is to help farmers deal with pests that affect their crop yields. While pesticides are commonly used to control pests, Dr. Adalla takes a more comprehensive approach by identifying which crop varieties possess natural resistance to specific insect species. By doing so, she helps plant breeders develop hybrids of important crops that are resistant to various pests. Her research has contributed to the breeding of pest-resistant corn, legumes, and cotton varieties. These findings were then integrated into the farming of rice, mungbean, soybean, cowpea, peanut, and wheat.

Dr. Adalla's contributions to entomology have not gone unnoticed. She was awarded by the National Academy of Science and Technology as one of the Outstanding Young Scientist (OYS) in 1989, and was the first female Dean of the College of Agriculture and Food Science (CAFS) at UPLB. Beyond research, Dr. Adalla actively contributes to education by teaching courses in basic entomology, crop protection, and plant breeding.

Currently, she serves as an academic member in the Technical Panel for Agriculture (TPA), providing technical expertise to the Commission on Higher Education (CHED), particularly in the development and standardization of curricula for degree programs in agriculture.

Dr. Adalla was active in sharing the current program standard of the Bachelor of Science in Agriculture program, which is an essential contribution of the TPA for a sustainable and productive agriculture curriculum. She highlighted that this curriculum has incorporated significant educational reforms that have been issued in the last decade, including the K-12 program, the general education curriculum, paradigm shift to outcomes-based-education (OBE), and the Philippine Qualification Framework (PQF) institutionalization. She added that the said reforms were intended to make the program globally comparable to ensure that B.S. Agriculture graduates are treated equally in the global market.

Dr. Adalla explained that the development of the new curriculum did not happen overnight. It went through a long period of gestation, starting in 2005 and finally being approved by the Commission en banc (CEB), the legal and legislative body of CHED, in 2018. Dr. Adalla's research and dedication to advancing entomology in agriculture have significantly impacted the field of entomology, benefiting both academia and practical agricultural practices. – **Rona Niña Mae Azucena**



DR. MARIA MONINA CECILIA A. VILLENA

Fostering Change Through Science Communication

In a field that is constantly hounded by controversies and false information, very few are able to stand out and shed bright light to the truth. One of these few is Dr. Maria Monina Cecilia Arcelo-Villena, a science communicator by heart who made it her mission to bring biotechnology closer to the Filipino public.

"Destiny is not by chance. It is a choice. I chose to study communication because I want to tell stories and influence people. Communicating science enables me to change the existing narrative and touch people's lives," she said in 2018 when she was featured in the Science and She campaign by ISAAA.

Dr. Villena was a science communicator through and through, having earned her B.S., M.S., and Ph.D. in various branches of communication from the University of the Philippines Los Baños and the University of the Philippines Diliman. Her work initially involved editorial and market research. As her career took off, she expanded her expertise to public relations, public advocacy, and knowledge management. She later on became an expert in the fields of science communication, specifically on biotechnology, climate change, and food security and nutrition.

In 2014, Dr. Villena led the Southeast Asian Regional Center for Graduate Study and Research in Agriculture Biotechnology Information Center (SEARCA BIC) in the Philippines. SEARCA writes, "(She) was instrumental in initiating and facilitating discussions on biotechnology with the government's legislative and judicial branches as well as other key stakeholders in the country. Through various projects to create public awareness and to reach out

to farmers, consumers, students, and policymakers, Dr. Villena hoped to help Filipinos make informed decisions regarding biotechnology."

Her accomplishments undeniably made an impact to the agbiotech sector, and this led her to becoming a posthumous recipient of the *Filipino Faces of Biotechnology* in 2019. "[The] award that was given to Dr. Villena is also a recognition of the importance of science communication in creating an enabling environment for biotechnology in the country," said Mr. Jerome Cayton C. Barradas, who succeeded Dr. Villena in SEARCA BIC. "This inspires us to continue the work she has initiated, and to do more to help our stakeholders gain a better understanding of biotech and how they can reap its benefits," he added.

Dr. Villena is remembered for her passion and dedication in communicating biotechnology to the public despite the challenges she faced. "Science communication is difficult when done in an environment where there is a low appreciation for science. But when people begin to listen, that's when all efforts are made worthwhile," she said. – **Zabrina Bugnosen**

DR. GABRIEL O. ROMERO

Uplifting Farmers by Sowing the Seeds of Change

"Four hundred thousand corn farmers reaped the benefits of Dr. Romero's stewardship in the campaign against the proliferation of low quality and counterfeit biotech corn seeds," said journalist Gary P. Hernal about Dr. Gabriel O. Romero, one of the recipients of the 2019 *Filipino Faces of Biotechnology* award. Dr. Romero has probably helped 400,000 farmers, and growing— probably a whole generation of Filipino corn farmers.

Dr. Romero was raised in San Pablo City, Laguna by his mother, a public school teacher. She helped him understand the importance of having a good education. "Good grades will attract support and eventually help one rise from poverty. "I was truly blessed to have sponsors, all the way," he said (World Vision, 2019). Dr. Romero obtained his Master of Philosophy from Cambridge University, UK, his PhD from University of California Davis, and postdoctoral studies at Rutgers University, all under the Rockefeller Foundation fellowship and the later, with Waksman institute, as well.

He is now a respected crop biotechnologist and seed conservationist duly recognized internationally. As a researcher and later on Deputy Director for Research at the Philippine Rice Research Institute (PhilRice) from 1989 to 2010, Dr. Romero helped bridge the gap between the government and various agricultural stakeholders by promoting partnership and networking. He used his expertise in rice gene bank management and molecular genetics to excel in the cloning and characterization of the rice glucanase gene family and the molecular mapping of tungro resistance. His efforts helped bring elite rice lines resistant to disease and insect infestation into farmers' hands.

He is also an advocate of biotechnology and the seed industry. Dr. Romero's time in Monsanto Philippines, Inc. provided him a unique vantage point on biotechnology regulations and international trade and commerce. It was here that he understood the huge loss that farmers experienced due to counterfeit biotech corn seeds in the market. He successfully led a campaign to halt the problem. When he became the Executive Director of the Philippine Seed Industry Association in 2020, Dr. Romero pursued the same advocacy to ensure that farmers received high-quality planting seeds. For this, he was recognized by UPLB as its Outstanding Alumni Award in 2021. His other notable awards are the Outstanding Young Scientist Award from the National Academy of Science and Technology in 2002, and The Outstanding Young Men of the Philippines in 2004. In recent years, Dr. Romero has been tapped as an expert on the importance of plant breeding innovations and crop biotechnology by various stakeholders.

Dr. Romero's story tells us that education is key, learning does not stop, knowledge expands, and passion to help is innate. These are what motivates a person to become a true vanguard of change. – **Zabrina Bugnosen**


2020
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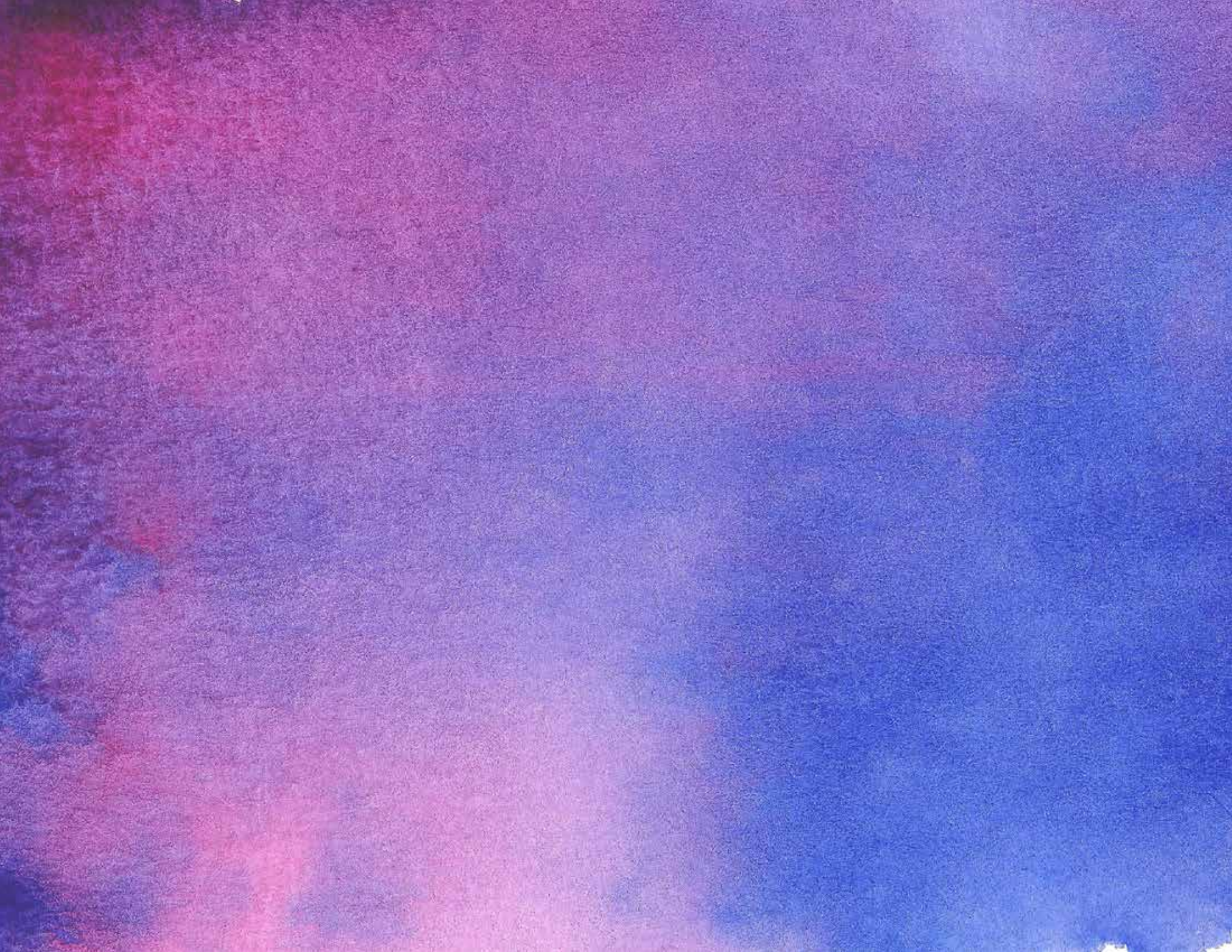
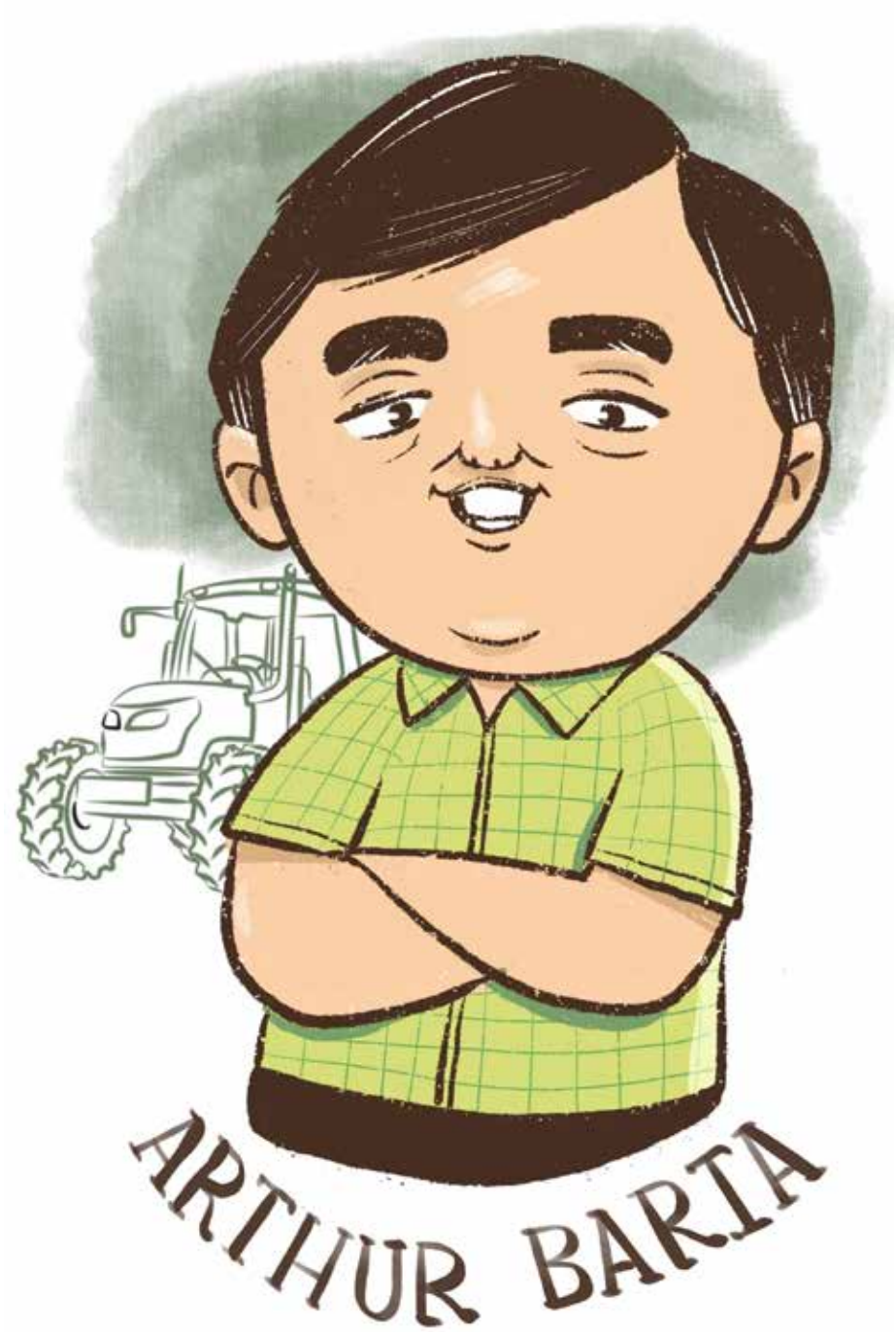




MR. ARTHUR R. BARIA

Roadmapping the Future of Philippine Agriculture

"All commercially released biotech plants and plant products have undergone and passed rigid food and feed safety tests." This is what Mr. Arthur R. Baria told the press in 2002, when Bt corn MON810, the first commercial biotech product in the Philippines and Asia, was in its field trials. More than 20 years later, the statement still holds true for all biotech products in the country. These products are the outcome of the roadmap for biotechnology in the Philippines that was drafted and developed by a pool of scientific and legal experts, to which Mr. Baria was a part of.

At that time, Mr. Baria was Monsanto Philippines' head of regulatory affairs for agricultural research. "We helped draft and develop the roadmap for biotech (in the Philippines). It was not a matter of choice, it was a matter of necessity," he said during an interview for DA Biotech Program in 2020. His make-or-break moment at Monsanto was in 2001 when the Bt corn trials were destroyed by groups opposed to biotechnology. He had to make a decision on whether to halt or proceed with the trials. "But I was thinking that if we stopped, the future of biotech might be affected not just in the Philippines but in Asia," he explained. "I recommended that we continue." And it was that decision that changed the course of the corn of livestock industries of the Philippines. As of 2018, Bt corn has benefited 470,500 farmers in the Philippines.

Mr. Baria then transferred to Nestlé Philippines Inc. where he helped develop another roadmap, but for coffee this time. In partnership with the Department of Agriculture, the coffee roadmap in the Philippines focused on making sure that Filipino coffee growers receive continuous technical assistance on coffee production. As of 2020, his team developed 11 new

clones for coffee, and 16 million seedlings have been distributed to the farmers in the last 5 years. They have also capacitated 40,000 coffee farmers using their own training modules to increace productivity.

When asked about the future of biotechnology, Mr. Baria replied, "There is so much to explore in the field (of biotechnology). We have learned a lot from the first level of commercialized biotech products. We just need to make sure that our objective in doing such is very focused and has an impact on society, especially to our small holder farmers, fisherfolks, and the rest in the C-D-E classes."

Mr. Baria's achievements in biotechnology research and development and regulation earned him a *Filipino Faces of Biotechnology* award in 2020. – **Zabrina Bugnosen**

DR. TERESITA M. ESPINO

Harnessing Science to Serve the Filipino Public

Dr. Teresita M. Espino is famously known for her production of virgin coconut oil. But there is much more to her than that. She is a strong-willed public servant who dedicated her career to the promotion of biotechnology in the country. It earned her the honor of becoming one of the *Filipino Faces of Biotechnology* in 2020.

Dr. Espino graduated from the University of the Philippines Diliman in 1963 with a Bachelor's degree in Chemistry. She worked at the University of the Philippines Los Baños (UPLB) before being admitted to the North Carolina State University where she earned her Doctor of Philosophy in Food Science and Biochemistry. Despite a stable and promising career abroad, Dr. Espino decided to come back to the Philippines in 1982 as part of DOST's Balik Scientist program.

With her new set of skills, she joined the National Institute for Molecular Biology and Biotechnology (BIOTECH) in UPLB. BIOTECH, the first institute of its kind in the Philippines and Southeast Asia, aims to utilize the disciplines in engineering, chemistry, and applied microbiology to conduct research, training, and extension in biotechnology. It was here that Dr. Espino decided to focus on studying enzymes to convert raw materials into a variety of useful products. She developed 12 enzymes, along with other products using monoclonal anti-body technology that are now being used by several sectors in the Philippine industry. She also has notable work on banana and abaca bunchy top control and rehabilitation programs, and production of disease-free planting materials that aid the agricultural productivity of small farmers.

Dr. Espino also made sure that her institute's capability to conduct research grew. She was able to obtain funds from the Senate to put up the National Immunological Testing Laboratory, which now produces test kits to detect plant diseases. These proved to be useful to farmers and plant growers. She also served as Director of BIOTECH and personally made sure that the institute's projects were fully funded and continued without delay despite challenges and natural calamities.

Now retired, Dr. Espino remains in close contact with researchers and government officials to contribute where she can, especially when experts considered the use of virgin coconut oil to treat COVID-19. To foster biotechnology and biochemistry research in the Philippines, she says, "Let us be open-minded so that researchers are not hindered from developing new technologies. I also encourage students to (take) science-based courses like food science, food technology, bio-chemistry, agricultural bio-chemistry, and biotechnology. And I hope you all can be far better scientists than we are." – **Zabrina Bugnosen**

DR. MA. CARMEN A. LAGMAN

Advancing Marine Science Through Modern Interdisciplinary Approaches

In a field where marine ecology was more favored, Dr. Ma. Carmen Ablan-Lagman did not shy away from exploring the potentials of biotechnology to tackle challenges that marine scientists like her commonly encountered. "Biotech research was something different in where I was (back then)," she recalled. "It was new, it was exciting. But what I realized from biotechnology is it can do a lot of things in a shorter period of time for problems in the world that could not be normally (accomplished) using traditional science."

Dr. Lagman is now a Full Professor at De La Salle University (DLSU). She has over 30 years of research experience and has provided expertise in population genetics and molecular ecology of marine organisms. After getting her Ph.D. in Marine Science from UP Diliman, she worked for international organizations and projects that focused on sustainable aquatic foods and food system transformation. She started her work looking into DNA tags of organisms, and this led to using biotechnology to enhance marine species. Some of Dr. Lagman's projects are establishing brooding stocks for the domestication of giant clams in the Philippines, the development of the genetically improved farm tilapia (GIFT), and the Population Interdependencies in the South China Sea (PISCES).

Her instincts to directly address problems related to marine science gave her a unique attitude on research. She understood the importance of having a multidisciplinary approach and brought together new techniques like GIS mapping, image analysis, and mobile computing with DNA markers for fisheries and aquaculture. "I realized that the research I did required a multidisciplinary expertise to resolve multidisciplinary issues," Dr. Lagman said. "You start to move into places that you are not very confident with,

but with partnerships and by working with other people as well and bright students, we can come up with researches that are very interesting and fun."

Dr. Lagman also established the Practical Genomics Laboratory in DLSU, where her team's research on RNA and DNA marker-based technologies are put into practical use for the improvement of fisheries, aquaculture, and agriculture. It also allows students to appreciate the purpose of their research which will hopefully encourage them to further engage in marine science. "As professors and educators, our job is to make our work known in a language that can be understood by the younger generation to inspire them to engage in this line of work. There is a very, very bright future for that in the Philippines," she said.

Dr. Lagman is the recipient of the 2020 *Filipino Faces of Biotechnology* for her contribution in science teaching and research and development in marine biotechnology. – **Zabrina Bugnosen**

DR. MARY BETH B. MANINGAS

Rising Up to Meet the Challenges of Aquaculture

For a country that is rich in marine resources, one would expect that the Philippines has a lot of experts on fisheries and aquatic science. However, there are more scientists and researchers working on agriculture and terrestrial animal science. There is a lack of knowledge and expertise to take on the challenges that the common Filipino fisherfolk face. The need was immediate, and Dr. Mary Beth B. Maningas was more than ready to take on the task.

Dr. Maningas earned her Ph.D. from the Tokyo University of Marine Science and Technology in 2007. When she returned to the Philippines, she immediately got to work. "As a new fisheries graduate, I went to Bureau of Fisheries and Aquatic Resources (BFAR) and I asked them what are the research gaps and the problems in the (fishing) industry, and where I could contribute as a scientist with my expertise," Dr. Maningas recalled. At the Research Center for the Natural and Applied Sciences of the University of Sto. Tomas (UST), she began to investigate how biotechnology can be applied to aquatics. "After studying, I came back to the country to ask the government to fund our research project on shrimp biotechnology," she said. That fund was granted by the Department of Science and Technology. Dr. Maningas and her team were given PhP 15 million to conduct their research. It also benefited more than 100 undergraduate and graduate students in the university who were taking aquatic research. UST itself began to branch out its network, having collaborated with BFAR, UP Visayas, and the Tokyo University of Marine Science and Technology since then.

Dr. Maningas shares her accomplishments in aquaculture and aquatic biotechnology research with her team and colleagues. To date, they have

been able to develop quick, affordable, user-friendly, and accurate testing technologies to detect bacteria- and virus-causing diseases that are deadly to shrimps. The Juan Amplification and JAmp detection kits are for detecting White Spot Syndrome Virus, while a prototype diagnostic kit and heat block for detecting acute hepatopancreatic necrosis disease is under development. It is through the team's hard work and accomplishments that Dr. Maningas is able to acquire continuous funding to maintain the operations of her laboratory.

Dr. Maningas, now a multi-awardee, widely recognized in her field and recipient of the 2020 *Filipino Faces of Biotechnology* award, also reminds young researchers of the importance of making unique contributions to the scientific body of knowledge. "To anyone who aspires a scientist track: build your niche, build your expertise so when people talk about your field, they will remember your name," she said. – **Zabrina Bugnosen**

2021 AWARDEES

Photo Source: Business Mirror

DR. RAMON C. BARBA

Revolutionizing the Philippine Mango Industry

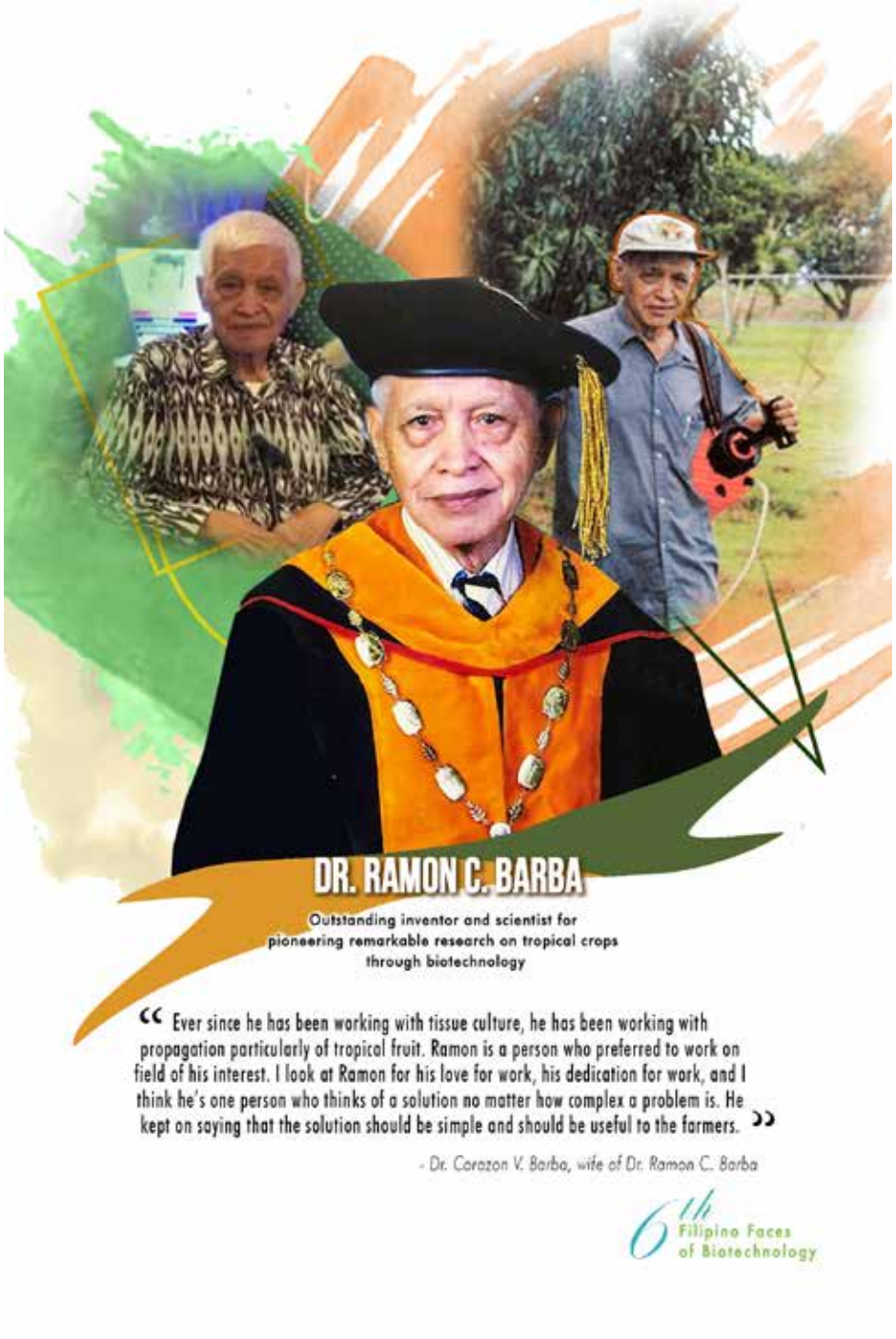
Mango used to be a neglected commercial fruit due to its erratic fruiting habits. But one invention changed this and established the Philippines as one of its top producers in the world, and we have National Scientist Ramon C. Barba to thank for it.

Dr. Barba's name is synonymous to mango production in the field of plant breeding, and it is because of his invention–spraying dissolved potassium nitrate on mango plants to induce flowering. It allowed farmers to harvest mangoes three times a year as opposed to doing it only once in the summer. The discovery also tripled fruit yield. A later study found that the trees sprayed with potassium nitrate for more than 30 years were still able to bear fruits. The invention revolutionized the Philippine mango industry. "I am very proud of having invented the potassium nitrate technology," according to Dr. Barba in an interview with the World Intellectual Property Organization in 2008. "As a scientist, I feel that one technology that has a positive impact on agriculture justifies a lifetime of research.

After receiving the patent for his invention, Dr. Barba decided not to collect any royalty from it. The National Academy of Science and Technology (NAST) writes, "His willingness to share his discovery to the greatest number of beneficiaries is shown by his noble decision of not enforcing his patents so that anybody could freely use the technology. He is selflessly committed to serve the industry in disseminating the technology through lectures, seminars and production guides without material reward." His ingenuity and selflessness earned him numerous awards. NAST elected Dr. Barba as an Academician in 2004. Three years later, he was conferred the prestigious rank of National Scientist by former President Benigno S. Aquino III.

In 2021, Dr. Barba was posthumously recognized as one of the *Filipino Faces of Biotechnology*. The award highlighted his impact on the mango industry along with his contributions in advancing research on various tropical crops. These include breakthroughs in banana micropropagation and tissue culture of sugarcane and calamansi, and the development of micropropagation protocols for more than 40 important species of fruit crops, ornamental plants, plantation crops, aquarium plants, and forest trees.

During his lifetime, Dr. Barba believed that fostering creative instincts is important. "I think creativity is a natural talent. Creativity leads to invention. An inventor may have some instincts that are different, but it is important to learn how to follow those instincts," he remarked. We honor Dr. Barba's legacy by continuing the pursuit to push the boundaries of science to help improve the lives of Filipino farmers. – **Zabrina Bugnosen**



DR. GLENN B. GREGORIO

Empowering Farmers with Cutting-Edge Technologies

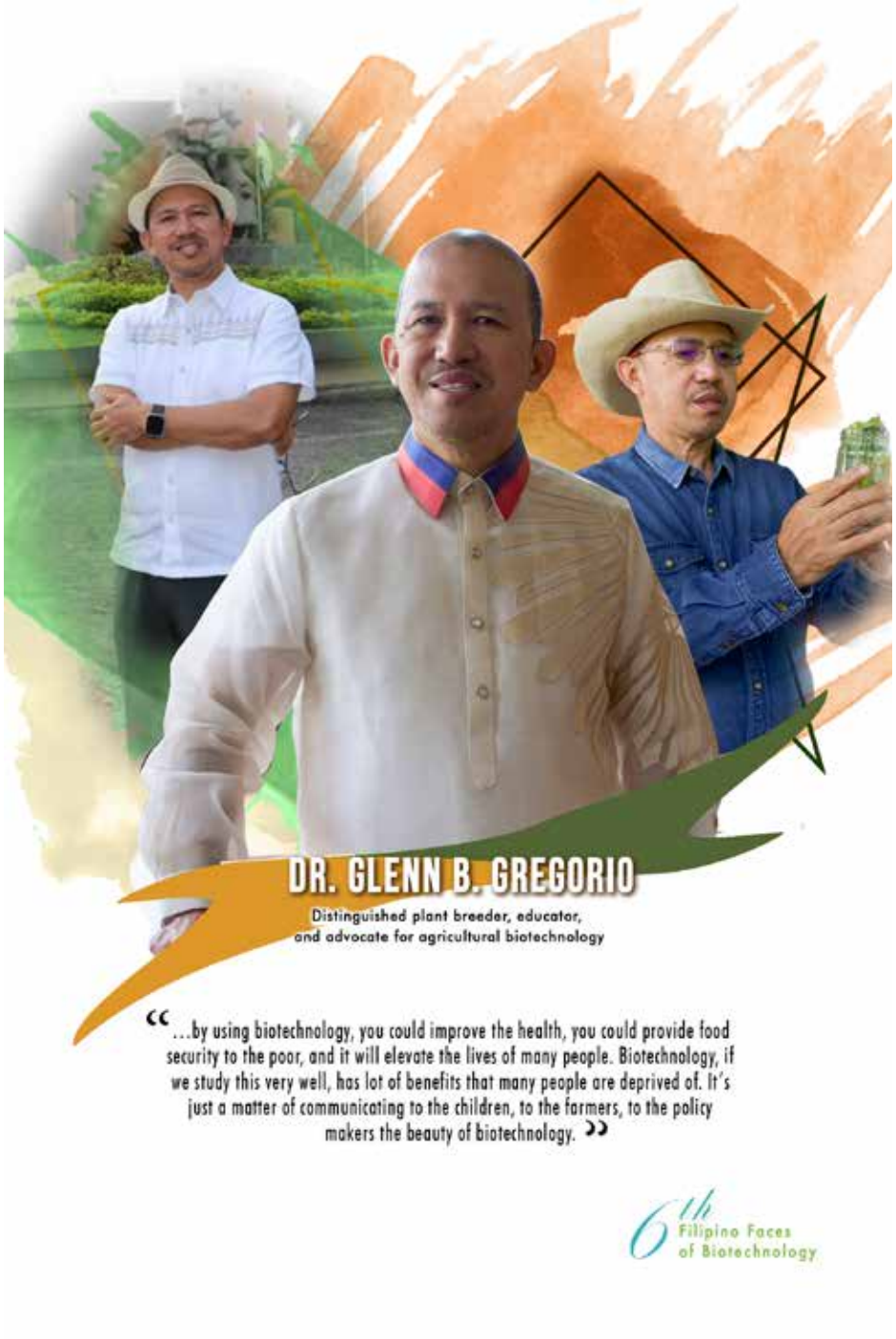
Dr. Glenn B. Gregorio is a distinguished plant breeder, educator, and advocate of agricultural biotechnology. These, along with many other accomplishments, are the reasons why he was recognized as one of the *Filipino Faces of Biotechnology* in 2021.

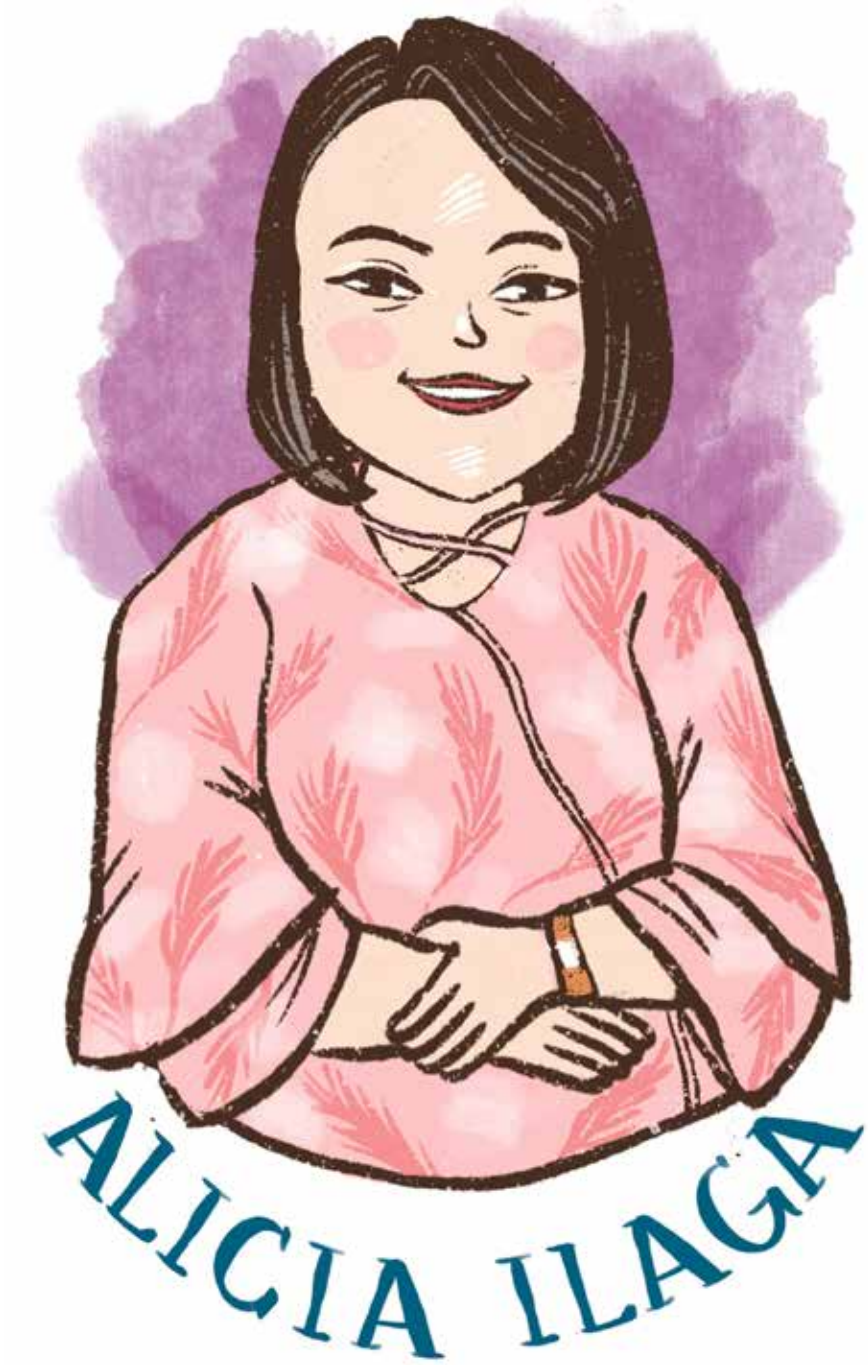
After obtaining his Bachelor's degree in Agriculture in 1986 and Master's degree in Plant Breeding in 1991 from the University of the Philippines Los Baños (UPLB), Dr. Gregorio joined the International Rice Research Institute (IRRI) as a DOST scholar to earn his Ph.D. in Genetics in 1997. In IRRI, he led efforts to develop more than 15 rice varieties for Asian countries. His expertise in genetics and molecular mapping was crucial in the production of salt-tolerant rice varieties in the Philippines, India, and Bangladesh. His team developed superior germplasm with the combined traits of saline-tolerance and high yield, and with tolerance to iron toxicity and drought. However, Dr. Gregorio knew that a superior crop is only one component of technology adoption. He found it equally important that farmers gain access to new technologies. "Due attention must be given to our resource-poor farmers by providing them unbiased access to information, best practices, and new technologies that empower them," he said during his *Filipino Faces of Biotechnology* acceptance speech.

As his career flourished, he was named one of the Ten Outstanding Young Scientists in 1980, and among The Outstanding Young Men in 2004. He was given the Honorary Foreign Scientist Award by the Rural Development Administration of Korea for 2002-2005. In 2012, he received the Ho Chi Minh Medal for contributing to the cause of agriculture and rural development in Vietnam. The National Academy of Science and Technology recognized him

as an Academician in 2018. In 2019, the UPLB Alumni Association selected Dr. Gregorio as its Distinguished Alumni, and he became an Honorary Fellow of the Crop Science Society of the Philippines. He was also appointed as Champion of the United Nations (UN) Food Systems Summit in 2021. And in October 2023, Dr. Gregorio was hailed as among the top 2% researchers in all disciplines, based on a database maintained in Stanford University.

Dr. Gregorio is an inspiration to young researchers. He leaves them this message from his 2019 CSSP acceptance speech: "Continue to explore and enjoy; to try and to be ready to fail and learn from it. We tried it; succeed or fail, we always learn. Explore, dare, be different and take risks for the sake of science. But, at the same time, be patient. Perseverance is the key." – **Zabrina Bugnosen**





MS. ALICIA G. ILAGA

Advocating the Commercialization of Agricultural Biotechnology

Ms. Alicia G. Ilaga stands as a beacon of innovation, tireless advocacy, and impactful research when it comes to the field of agricultural biotechnology. Recognized with the prestigious 2021 Award for her unwavering commitment to pushing the frontiers of biotechnology, she has been at the forefront of consistently transforming challenges into opportunities in the Philippines.

Her passion for biotechnology is not merely a professional endeavor, but a personal commitment that has grown since she assumed the first leadership of the Biotechnology Program at the Department of Agriculture. Her dedication is admirable as she navigates through challenges, from combating anti-GMO sentiments to overcoming budget constraints and addressing the general negative perception of biotechnology in the Philippines.

"I must say that the experience of pursuing such a government program is all worth it. Now, we are pursuing the commercialization of biotechnology more than simply popularizing genetically modified organisms. Indeed, biotechnology opens up a lot of opportunities. Opportunities that do not knock once, but as many times as the products and technologies that have been researched, developed, and discovered in science laboratories," she discusses.

In 2020, she was appointed as the Director of the *Da-Balik Probinsya, Bagong Pag-asa* Program while holding her responsibilities as Director-Coordinator of the Climate Resilient Agriculture Office. Beyond accolades, Ms. Ilaga is deeply involved in transformative projects like the Department of Agriculture's Adaptation and Mitigation Initiative in Agriculture (AMIA), where

she envisions scaling up the livelihood of Filipino farmer beneficiaries into enterprises.

"What we want is for local communities to be able to manage climate risks while pursuing sustainable livelihoods. We look at models which have been initiated by NGOs, CSO, and LGU partners and document what are good practices and then we scale these out in different parts of the country where these are applicable," she shares.

Furthermore, Ms. Alicia G. Ilaga's influence extends beyond the Department of Agriculture, reaching both national and international levels as she actively contributes to positioning the Philippines as a leader in global agricultural biotechnology. A trailblazer on the international stage, she played a pivotal role in hosting the 9th Asia-Pacific Economic Cooperation (APEC) Agricultural Technical Cooperation Working Group, Sub-group on Research, Development and Extension of Agricultural Biotechnology (RDEAB) meeting in Chile. Her efforts resonated as participants united to harmonize biosafety policies, a testament to her dedication to fostering economic cooperation.

Additionally, Ms. Ilaga's journey reflects a commitment to more than just popularizing genetically modified organisms; she envisions the commercialization of biotechnology, opening avenues for new opportunities. Her global engagement, notably her experience in Beijing back in 2003, forged partnerships to advance agricultural practices with superior cotton production. – **Mikael Angelo Francisco**

MR. JUANITO T. RAMA

Harvesting Innovation With Biotech Farming

Hailing from San Manuel, Tarlac, Juanito T. Rama was a pragmatic pioneer in agriculture recognized for his leadership in biotech farming and staunch advocacy for agricultural biotechnology. His journey began in 2006 when he adopted Bt corn, an initiative met with initial skepticism. Despite the doubts, Mr. Rama, alongside his group, tenaciously pursued their vision. Their commitment bore fruit, revealing the positive outcomes of their advanced farming endeavors.

The turning point arrived in 2012, marking a watershed moment in Mr. Rama's career. That year, he achieved what was celebrated as a "record-breaking harvest" of nearly 200,000 kilograms of yellow corn per hectare. This substantial yield not only silenced doubters, but also highlighted the practical success of embracing biotechnology in agriculture. His pragmatic approach and hands-on experience became a guiding light for those navigating the uncharted territory of agricultural biotechnology. With this breakthrough, he received the national Gawad Saka award in 2013 for his ground-breaking work on corn farming.

In May 2020, Mr. Rama was one of the seven individuals to receive a certificate during the annual Farmers' and Fisherfolk's Month celebration, along with launching the Plant, Plant, Plant Program. With the theme, "Saluting Our Farmers and Fishermen Towards Sustainable Food Production," he has been acknowledged for his resilience and dedication despite the challenges posed by the COVID-19 pandemic. Moreover, this recognition highlighted his significant contributions and hard work in the agriculture sector, symbolizing the commitment of farmers and fisherfolk to ensuring sufficient food production for the nation.

By 2021, he was recognized by the Department of Agriculture Biotechnology Program Office (DA-BPO) with a prestigious *Filipino Faces of Biotechnology* Award alongside eight other Filipino experts. This award serves to bridge the gap between biotechnology and the public by showcasing impactful, real-life stories. These narratives not only inspire, but also motivate others to actively contribute to the widespread dissemination of biotechnological benefits to further support its use in agriculture, health, environment, information, education, and policy.

The posthumous recognition of Juanito T. Rama is more than an acknowledgment of individual success; it serves as a tribute to his lasting impact on the agricultural landscape. His legacy lies in breaking barriers, dispelling doubts, and contributing to the advancement of farming practices in the Philippines. The recognition honors not just his achievements, but his role as a pioneer who laid the groundwork for a more sustainable and innovative future in agricultural biotechnology. – **Mikael Angelo Francisco**

2022 AWARDEES

Photo Source: Business Mirror

Photo Source: DA Biotech Program

DR. MARIECHEL J. NAVARRO

Championing Science Communication in the Philippines

Dr. Mariechel J. Navarro, the former Director of ISAAA Global Knowledge Center on Crop Biotechnology (KC), has been an essential figure since the center's establishment in September 2000. Her career in biotechnology communication began with an internship at CAB International in the United Kingdom, where she developed the weekly e-newsletter Crop Biotech Update (now Biotech Updates), showcasing her adeptness in disseminating essential information.

Her contributions extend to several influential publications, including "Communicating Challenges and Convergence in Crop Biotechnology," "From Monologue to Stakeholder Engagement: The Evolution of Biotech Communication," "Communicating Crop Biotechnology: Stories from Stakeholders," and "Bridging the Knowledge Divide: Experiences in Communicating Crop Biotechnology." These publications reflect her deep understanding of biotech communication.

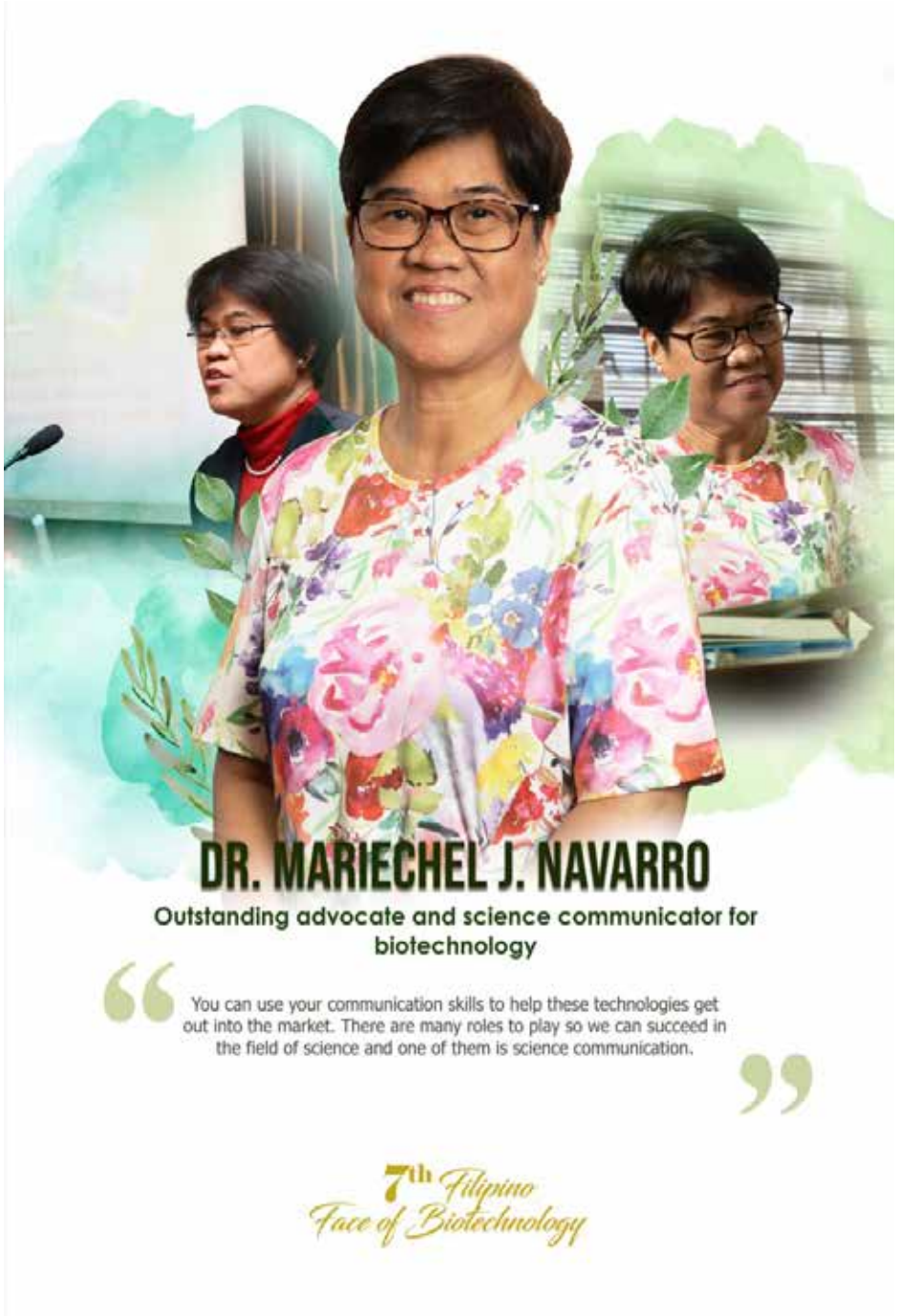
Dr. Mariechel is among the 2014 University of the Philippines Alumni Association (UPAA) Distinguished Alumni Awardees for Educational Innovation for the understanding of crop biotechnology through science communication. In 2022, she was one of the six individuals awarded by The Philippine Agriculture and Fisheries Biotechnology Program (DA Biotech Program) as the *Filipino Faces of Biotechnology* for her outstanding contributions as an advocate and communicator in the field. With a Ph.D. in Development Communication from the University of the Philippines Los Baños, Dr. Mariechel attributes her current identity and accomplishments to the enriching experiences gained in a diverse educational environment.

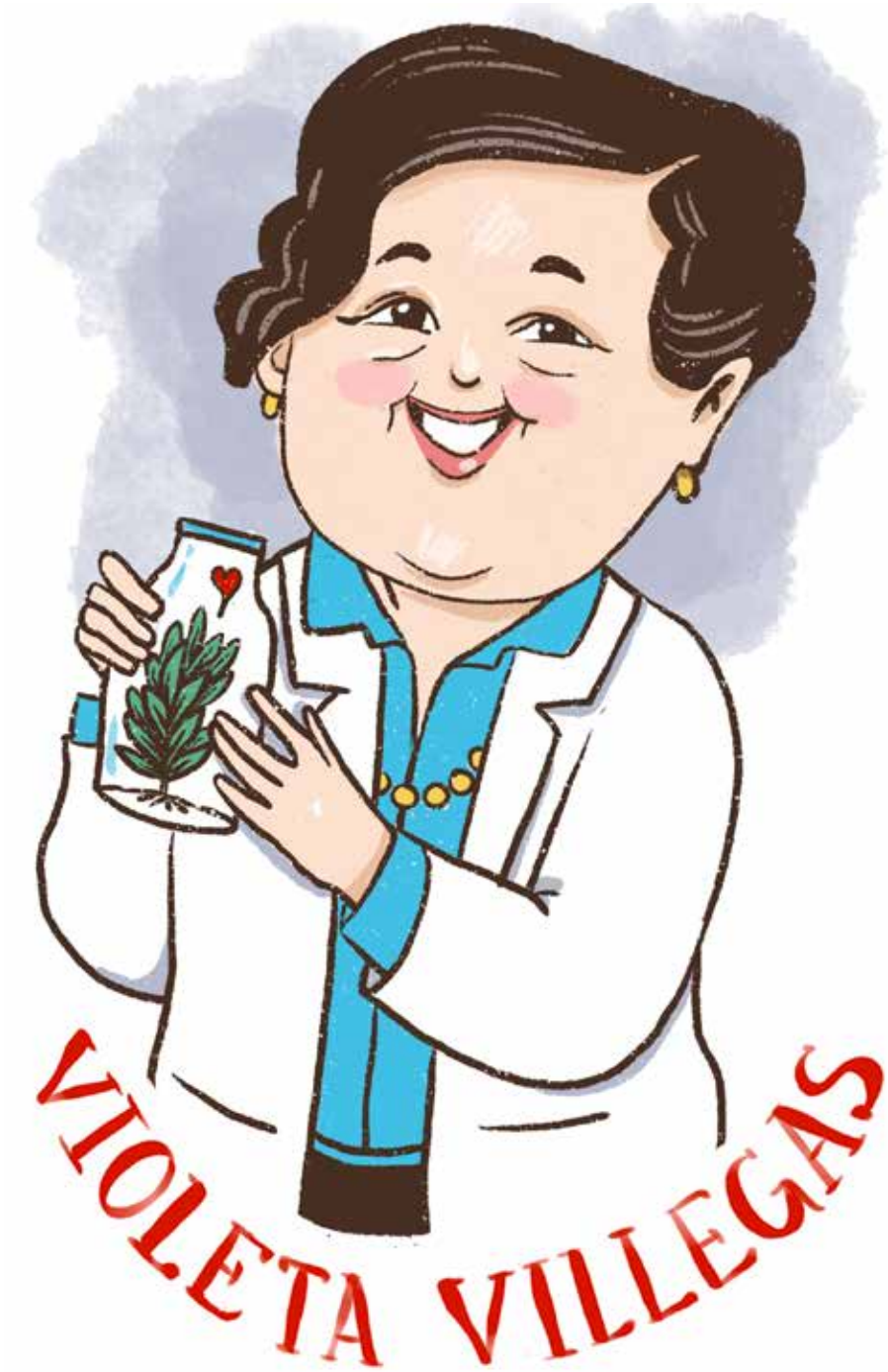
“You’ll blend with people who are rich, poor, middle class; those who have

strange ideas and academic ideas - all sorts. And this diversity made me what I am because I'm open to new ideas, cultural differences, even regional differences, and I think that made me what I am today. I had the opportunity to blend in and out with different people and situations that have made me more open, more creative, and more inventive," she explains.

Moreover, she has pursued additional training in communication and biotech in the United Kingdom, Austria, the USA, and Australia. In line with this, she has been featured in the international book, "Communicating Science: A Global Perspective" recently published by the Australian National University. The chapter titled "Philippines: From Science Then Communication to Science Communication" traces the historical evolution of science communication (SciCom) in the country from the pre-colonial times up to the modern period, shedding light on the pivotal role played by institutions like the Department of Science and Technology (DOST).

Dr. Navarro stands out as one of the authors of this comprehensive exploration of Science Communication in the Philippines. The recognition of the Philippines' efforts in Science Communication, as documented in the book, emphasizes the collective dedication of practitioners like her in bridging the gap between scientific advancements and public understanding.
– **Mikael Angelo Francisco**





DR. VIOLETA N. VILLEGAS

Nurturing Biotech Stewardship from Golden Rice to Coconut Hybridization

Dr. Violeta N. Villegas is a consultant at the University of the Philippines Los Baños' Institute of Plant Breeding (IPB), where she previously worked as a research professor and university researcher. Holding a Bachelor's degree in Horticulture and a Master's degree in Plant Breeding and Genetics, she furthered her academic pursuits by earning a Ph.D. in Horticulture at Louisiana State University, with additional focus areas in Plant Pathology and Entomology.

Before undertaking her current position at the institute, she worked as a Senior Scientist at the International Rice Research Institute. Her research not only enhances our understanding of plant genetics, but also contributes to the ongoing efforts to develop resilient and genetically diverse plant varieties. As the Golden Rice project coordinator for the International Rice Research Institute (IRRI), she has played a crucial role in the development of Golden Rice, a potential solution to combat vitamin A deficiency (VAD), a prevalent form of hidden hunger affecting over two billion people worldwide.

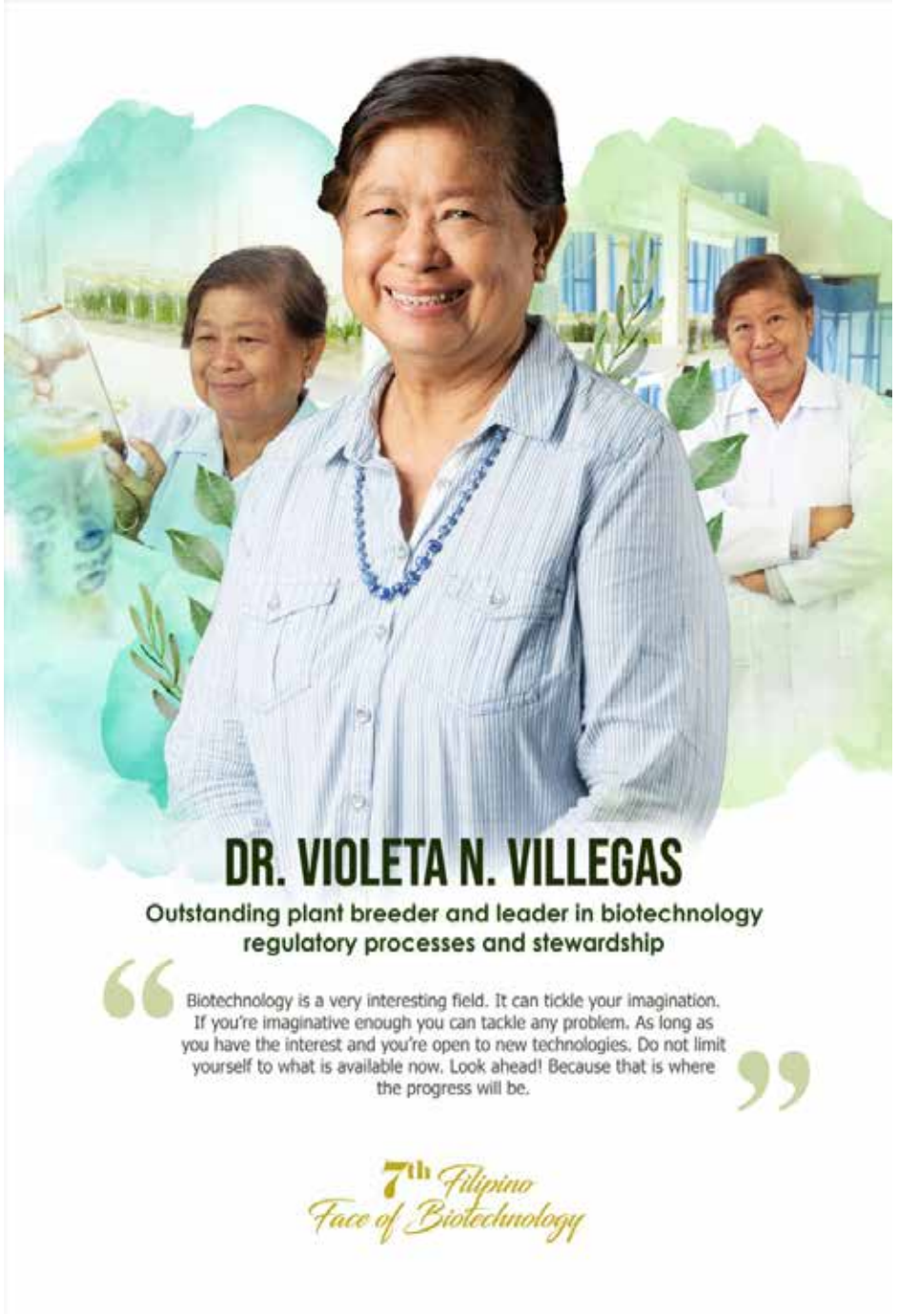
"As a breeder myself, it gives me pride and joy to be part of a humanitarian project that seeks to address a major public health problem. I always say yes, there are interventions like diversifying diet, breast-feeding, fortification, and so on. They're working, but the fact remains that there's still a sizable portion of our population not reached by these interventions," Villegas discusses.

In 2021, she served as the Science and Technology Consultant for the coconut hybridization project funded by the DOST Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development. She highlighted the significance of replanting old and senile palms, foreseeing an

enhancement in the country's coconut production and an improvement in farm income. Under this initiative, over 8,000 planting materials of a coconut hybrid have been harvested from sites in Quezon province and subsequently distributed to farmers in Quezon, Cavite, and Laguna.

Additionally, her notable contributions include co-authoring publications that delve into the intricate aspects of plant hybridization and genetic characteristics. Driven by a commitment to scientific excellence and societal impact, Dr. Violeta Villegas' work as a plant breeder and leader in biotechnology regulatory processes continues to inspire aspiring Filipino scientists.

"As the saying goes, accept the past without regret, handle the present with confidence and the future without fear. At IPB, we learn lessons from the past, we are a confident 'chosen breed,' and we take calculated risks to achieve our goals as a team," she shares. – **Mikael Angelo Francisco**



DR. LOURDES D. TAYLO

Leading the Charge in Pinoy GMO Development With Bt Eggplant

Dr. Lourdes D. Taylo stands at the forefront of agricultural innovation, serving as the dedicated Project Leader of Bt Eggplant-Philippines since 2021. Before assuming her current leadership position, she worked as the Study Leader for the Efficacy of the Bt Eggplant and Insect Resistance Management (IRM).

Throughout her career, she has undergone numerous training programs on regulation, both from local regulatory agencies and internationally renowned institutions such as Michigan State University. Her dedication to staying up-to-date with biosafety practices is further highlighted by her short-term fellowship at the Department of Entomology, University of Minnesota, where she collaborated with Dr. William D. Hutchison on IRM of Bt corn from August 2015 to January 2016.

That being said, her pursuit of scientific excellence is not confined to her leadership role; she also imparts her knowledge and expertise as an Affiliate Professor at the UPLB Graduate School-Institute of Weed Science, Entomology, and Plant Pathology, shaping the minds of future scientists in the field of agriculture.

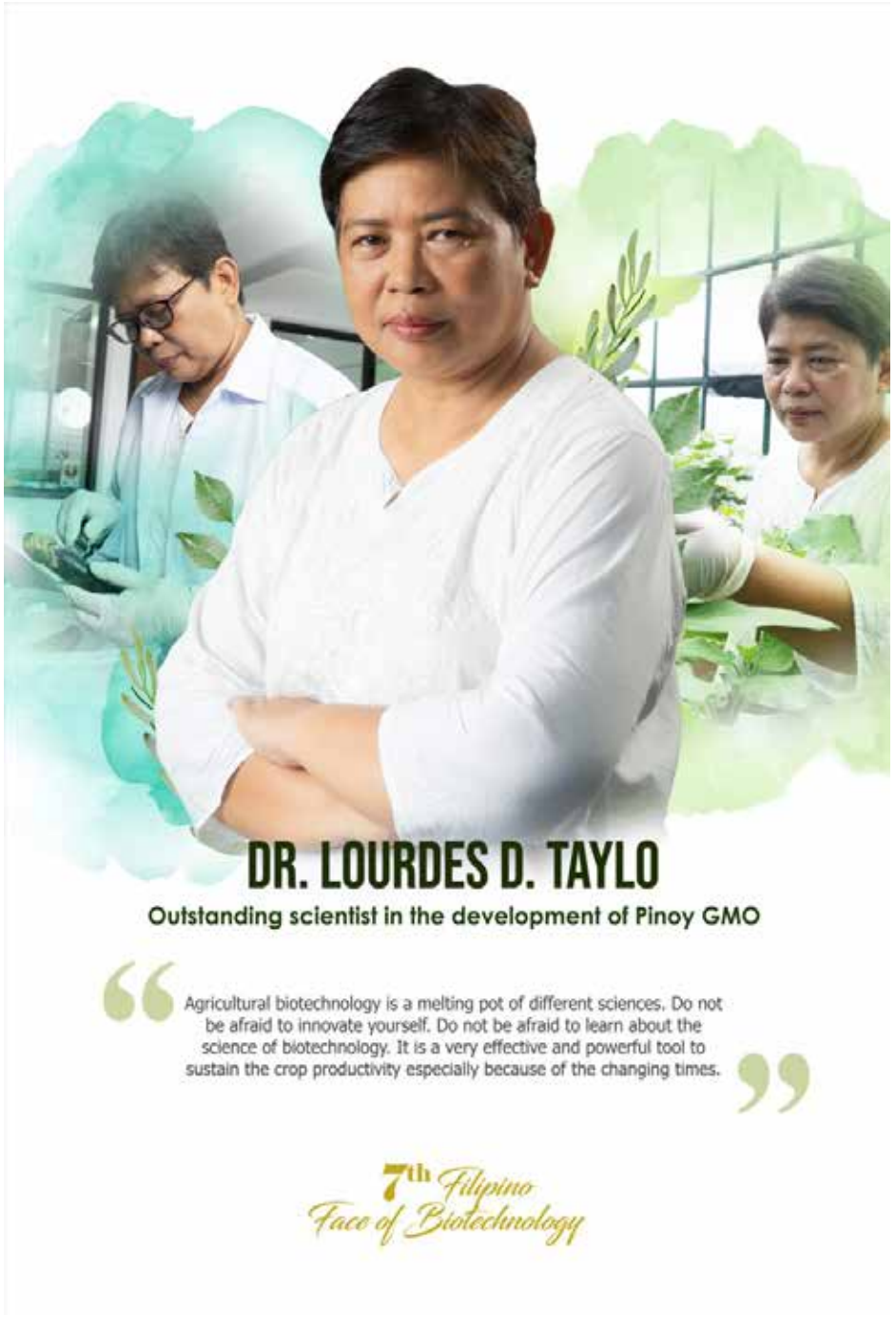
In November 2022, the Department of Agriculture-Biotechnology Program Office (DA-BPO) recognized her as one of the *Filipino Faces of Biotechnology*, an honor that reflects her impactful contributions. Earlier that year, she was also one of the six selected university researchers who were appointed to Scientist positions under the country's Scientific Career System (SCS).

Beyond her research and academic roles, she serves as a key spokesperson for the Bt eggplant, participating in public briefings, dialogues, symposia,

and seminars sponsored by influential organizations such as the International Service for the Acquisition of Agribiotech Applications (ISAAA), Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), and the DA-BPO.

When asked if she has succeeded in fulfilling her role as one of the Champions of Biotech in the country, she responds, "In my 28 years of research experience, I can truly say that there are many benefits from the Bt talong. I believe that our product can help farmers, and when I converse with them, they share that they appreciate the technology very well. Hopefully, this discussion can inspire and answer the current issue of eggplant fruit and shoot borers from their harvests."

To acknowledge her distinguished career, the Department of Science & Technology-Civil Service Commission conferred upon Dr. Taylo the prestigious title of Career Scientist I in 2022. With this, there is no denying that her exceptional contributions and leadership have significantly propelled the advancement of biotechnology in the Philippines, especially in the development of Pinoy GMO. – **Mikael Angelo Francisco**



DR. LENY C. GALVEZ

Pioneering Crop Improvement in the Abaca Industry

Dr. Leny C. Galvez, holding the position of Scientist I at the Philippine Fiber Industry Development Authority (PhilFIDA) within the Department of Agriculture, focuses her research efforts on tackling a critical issue within the abaca industry: the widespread prevalence of virus diseases. Consequently, the Department of Agriculture Biotechnology Program Office (DA BPO) conferred the *Filipino Faces of Biotechnology* Awards to six outstanding individuals, including Dr. Galvez, for her work on crop improvement through biotechnology.

"One of the mandates of the Philippine Fiber Industry and Development Authority or FIDA is to conduct research. We have a regulatory function, a division that regulates fiber. We also have utilization, a division in charge of technical assistance that handles extension work and training," Dr. Galvez shares about her current role.

Over the years, she has devised diagnostic protocols for identifying four distinct abaca viruses, employing both serological and nucleic acid techniques. Additionally, she played a pioneering role in formulating and packaging Loop-Mediated Isothermal Amplification (LAMP) assays, revolutionizing the abaca industry's virus detection capabilities with rapid and point-of-care diagnostics.

"Abaca is very significant, not just for our culture. It's ours, it's endemic to the Philippines. Its fiber has many uses, and the Philippines has the biggest share in the global requirements for fiber, covering 84.7% of production. Other than this, we have more or less 150,000 farmers who benefit from planting abaca

on top of hundreds of thousands of hectares dedicated to planting the fiber. It really is one of the dollar-earners of the country."

During a recent meeting held in September of 2023, Dr. Galvez was appointed as one of three new R&D leaders by the NRCP Evaluation Committee (NEC). These leaders constitute the inaugural batch under the Enhanced Research and Development Leadership to Foster an Inclusive Research Ecosystem (RDLead FIRE).

In line with this, her impact reaches far beyond the scope of her current role, preparing to support researchers and personnel at Catanduanes State University (CatSU) in Region V. Using her leadership and expertise, she will guide CatSU in developing technologies for the abaca industry, focusing on plant diseases affecting production in Catanduanes, known as the Abaca Capital of the Philippines.

Assigned to strengthen linkages between CatSU and stakeholders, she also aims to foster collaborations supporting abaca industry players, especially the Abacaleros. This initiative reflects Dr. Galvez's commitment to advancing scientific knowledge and contributing practically to the abaca industry's enhancement and sustainability. – **Mikael Angelo Francisco**

DR. CAMILA FLOR Y. LOBARBIO

Breaking Boundaries in Sustainability With Enzyme Engineering

Dr. Camila Flor Y. Lobarbio serves as the Chair of the University of San Carlos Department of Chemical Engineering, leading research initiatives in enzymes and bioprocessing. She earned her B.S. in Chemical Engineering in 2004 and went on to complete her M.S. in Chemical Engineering in 2006, both from the University of San Carlos. Driven by her passion for advancing her field, she pursued a Ph.D. in Chemical and Biological Engineering at Seoul National University, successfully obtaining her Doctoral degree in 2015.

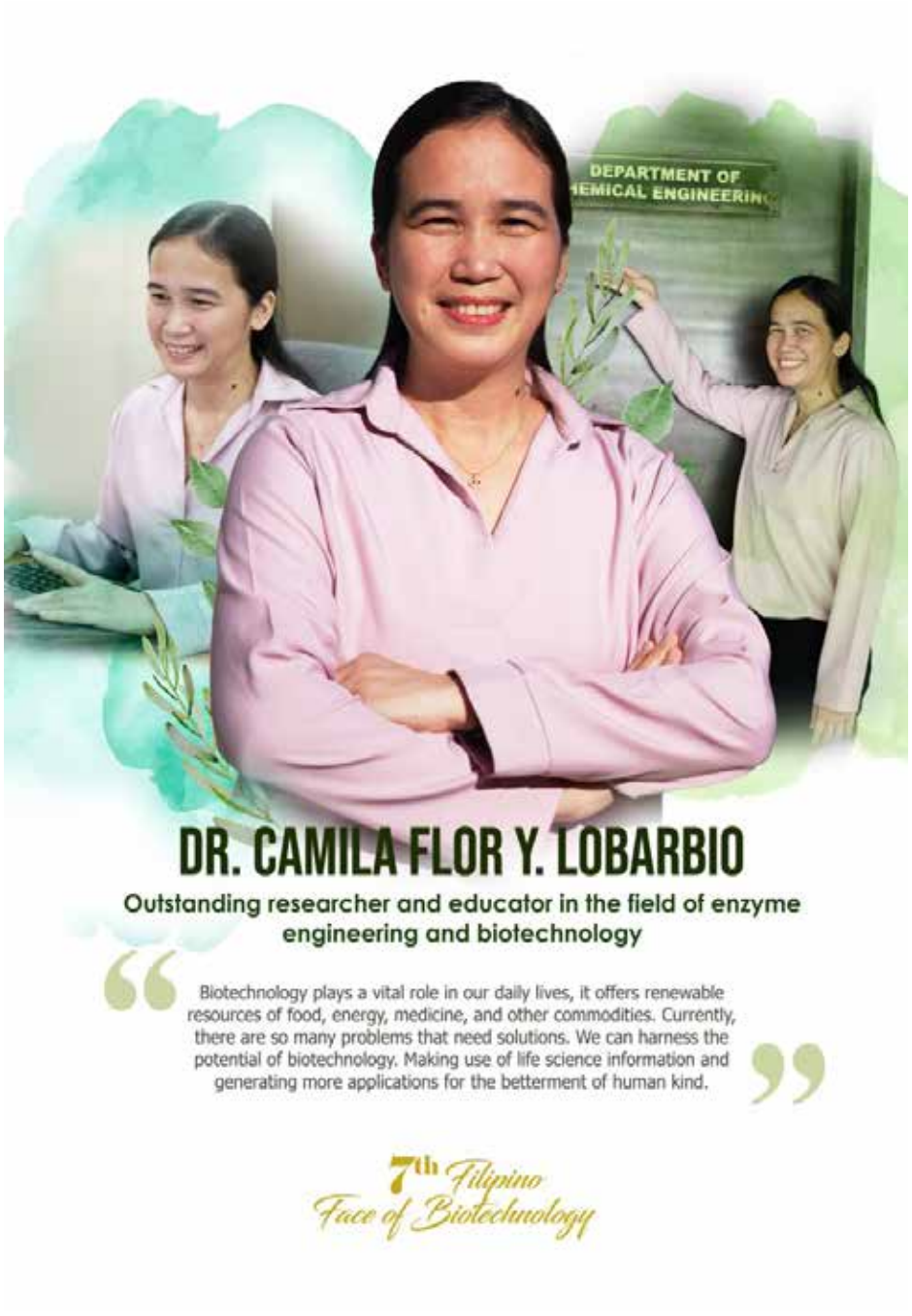
Her research interests center on enzyme engineering and biomolecular processes, reflecting a commitment to exploring the field of chemical and biological advancements. Her dedication to pushing these limits can be seen in the findings of her recent publication, "Extraction and characterization of polyphenol oxidase from plant materials: A review," featured in the Journal of Applied Biotechnology Reports. These studies provide practical insights, such as optimizing extraction methods, which shows that Dr. Lobarbio's work is not just about innovation, but also addresses environmental concerns. Moreover, this is extremely relevant for industries looking for eco-friendly solutions and contributing to the ongoing conversation about sustainability in biotechnology.

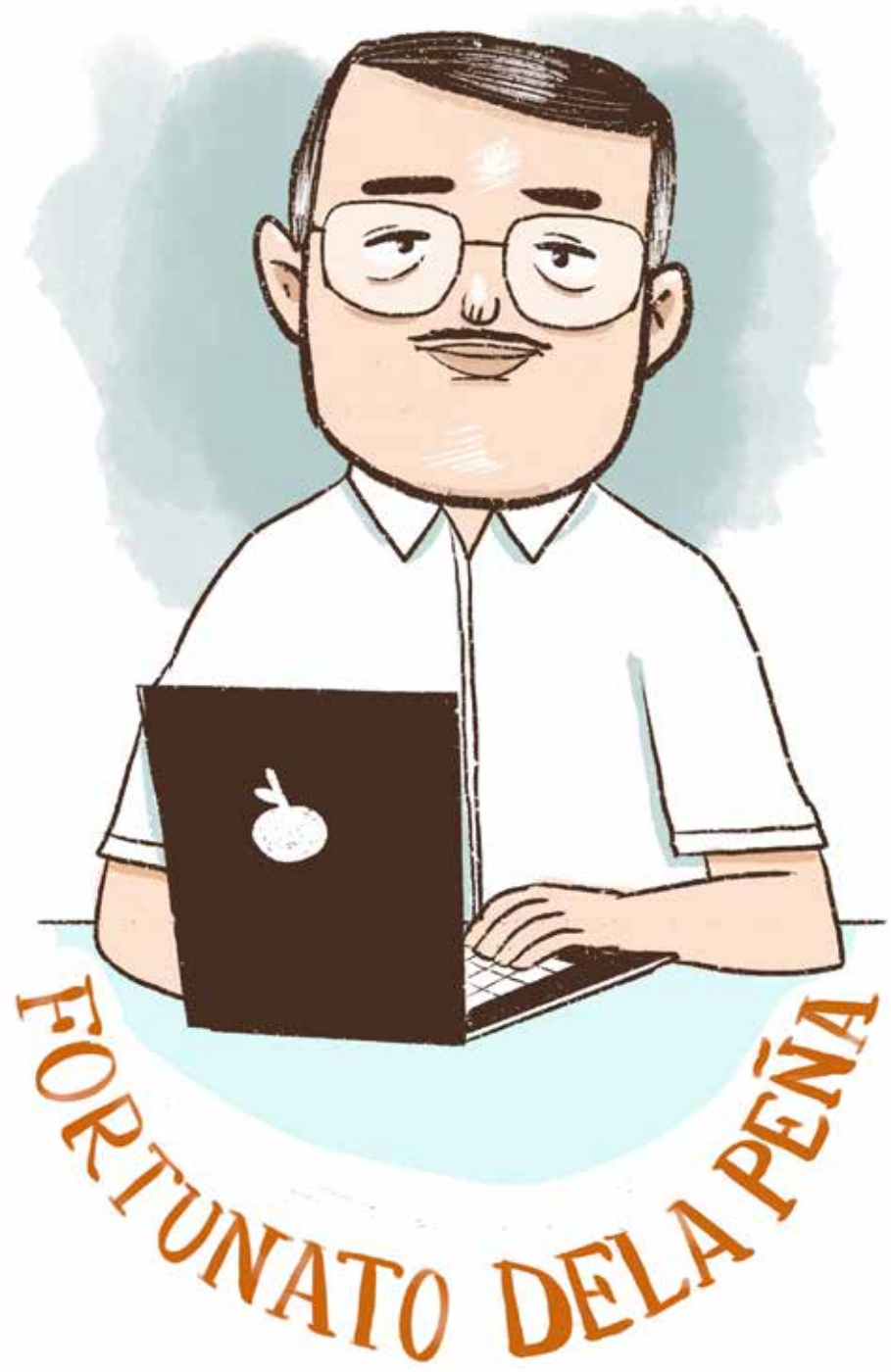
Committed to extending her influence beyond the borders of Cebu, her extensive years of study and research have yielded international acclaim, notably with the publication of "Fundamentals of Enzyme Engineering" in 2017 by Springer International. With this, she was named as one of the *Filipino Faces of Biotechnology* in 2022 for her academic achievements and contributions to the field.

Currently, Dr. Lobarbio's focus is on extracting high-value bioactive compounds from local agricultural waste biomass. She also generously imparts her wealth of experiences and insights to both undergraduate and graduate students, shaping the future of biotechnology and bioprocessing in the Philippines.

In 2021, she emerged as one of the 10 distinguished Cebuana leaders featured during a virtual talk organized by the Ramon Aboitiz Foundation Inc. (Rafi) in collaboration with the Embassy of Canada. The event, named "WomEnPower," aimed to underscore the pivotal role of women across various sectors, showcasing the accomplishments of Cebuana leaders who have excelled in their respective fields.

Dr. Lobarbio's recognition aligns with the Philippines' remarkable standing in the Global Gender Gap Report of 2020, where the country is positioned as the top in Asia and 16th globally. This acknowledgment not only highlights her contributions to biotechnology but also emphasizes the broader narrative of women empowerment and gender equality, as championed by events like "WomEnPower." – **Mikael Angelo Francisco**





DR. FORTUNATO T. DELA PEÑA

Shaping a Promising Future for Filipinos in Science and Technology

Dr. Fortunato "Boy" T. Dela Peña is a Filipino engineer and professor who served as the former Secretary of Science and Technology at the Department of Science and Technology (DOST) in the Philippines. A graduate in Chemical Engineering from the University of the Philippines, Diliman, Dr. Dela Peña began his career as an Operations Engineer for ESSO Philippines (now Petron) immediately after college.

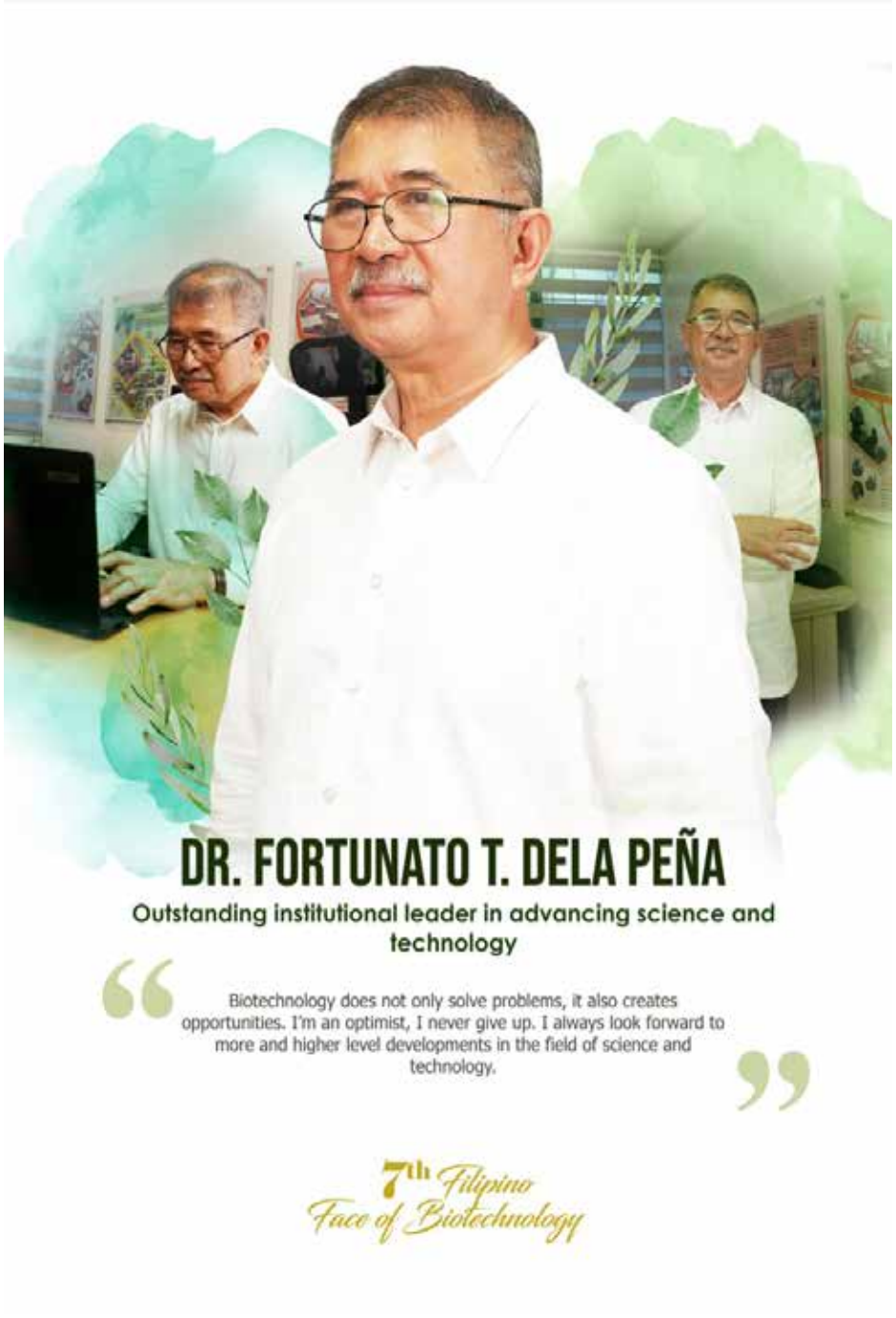
Over the years, he held key positions, including Chair of the United Nations Commission on Science and Technology for Development and Director of the Department of Science and Technology's Technology Application and Promotion Institute. His roles extended to vice president for planning and development at UP Diliman and interim Executive Director at the APEC Center for Technology Exchange and Training for Small and Medium Enterprises.

Prior to assuming leadership of DOST, he served as the Undersecretary for Science and Technology Services from 2001 to 2014. With the exception of a brief retirement period from 2014 to 2016, he has been an integral part of the department since 1982. In addition to his role as Secretary, Dela Peña has contributed significantly to the scientific community, serving as the president of the Philippine Association for the Advancement of Science and Technology (PhilAAST) and as a former chairman of the United Nations Commission on Science and Technology for Development.

Demonstrating both expertise and a commitment to public service, he has earned prestigious awards, including the *Dangal ng Bayan* Award from the Civil Service Commission, the UP Alumni Association Award for Public Service, and the Ateneo Government Service Award.

Furthermore, his extensive knowledge has opened doors for active participation and paper presentations in both local and international conferences, focusing on e-governance, technology management, small and medium enterprises, and regional cooperation. His contributions notably extend to organizations such as the Association of Southeast Asian Nations, Asia Pacific Economic Cooperation, and the United Nations Educational, Scientific, and Cultural Organization. Additionally, he has authored articles on critical subjects such as technology transfer, small and medium enterprises, policy development, and quality management practices.

"My top priorities will always be on R&D to address pressing concerns in health, agriculture, and the process industries. There will be many investors in this area if the economic climate is good, if the industry-academe-government linkages are strong and effective, and if we have enough human resources in advanced S&T areas which the industry can tap," he shares. – **Mikael Angelo Francisco**



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Who are the front liners of biotechnology in the Philippines?

The Philippine journey in biotechnology has been nothing short of revolutionary. Aside from enabling technologies that benefit thousands of Filipinos, the journey has been filled with a rich assemblage of individual stories that led to scientific breakthroughs. This book provides a glimpse into the stories of the Filipino Faces of Biotechnology Awardees from 2016 to 2022, who brought pride to the nation and ignited passions for science and innovation. Read their stories and discover the men and women who pushed the boundaries of what's possible, driven by a shared passion—making advancements in biotechnology accessible and impactful for all.

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