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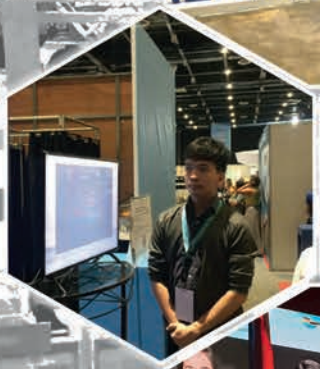

ENABLING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

2019 NSTW & RSTW

science for the people

Disruptive technologies enabling science for the people

A few years back, the phrase “emerging technologies” became a buzzword for techies and scientists. Of late, we now hear of the phrase “disruptive technologies” as prescription to the advent of the so-called FiRE or the Fourth Industrial Revolution.

For the Department of Science and Technology (DOST), this is no longer something to watch out for because it is already a reality.

This 3rd Quarter issue of the S&T Post primarily focuses on the so-called enabling technologies that the DOST has developed and implemented in the fields of agriculture, health, industry, and enterprise, among others.

Featured here are stories of personal triumphs and successes using science, technology, and innovation that were also showcased during the National Science and Technology Week and the Regional Science and Technology Week celebrations that carried the theme “Enabling Technologies for Sustainable Development”.

This issue is also a testament to several “wow” stories about institutions or organizations and individuals that defied the odds by embracing advance technologies and came out winners.

The story on “nuLab”, a rolling laboratory on wheels of the Science Education Institute, tells us how science education can be revolutionized to inspire future scientists and engineers.

The creation of “smart packaging” by the Industrial Technology Development Institute proves that packaging solutions are possible to level up Filipino made products to international standards.

Then there is a story on how artificial intelligence can help in the rehabilitation of post-stroke patients through the Agapay Project, which was developed by experts from the De La Salle University Institute of Biomedical Engineering and Health Technologies.

There are other inspiring stories that included National Scientist and agriculture champion Dr. Emil Q. Javier; the pioneering veterinary scientist Dr. Teodulo M. Topacio Jr.; a multi-purpose cooperative composed of fishermen, boat operators, traders, and ambulant vendors that was awarded as Best SETUP Adoptor for 2018; and Luke Deogracias D. Macababbad who tasted sweet success with his Dielle’s Honey Wine.

Even our very own Secretary Professor Fortunato T. de la Peña is featured here for being recognized by the University of the Philippines Alumni Association with a Lifetime Distinguished Achievement Award for his staunch advocacy of promoting science, technology, and innovation.

Thus, in giving space to inspiring stories, we encourage more to value what science, disruptive technologies, and innovation can do to better our lives. By communicating the many benefits of science, we also show that success mirrors triumph over adversities and contributes to fostering a culture of science for the people.

Richard P. Burgos

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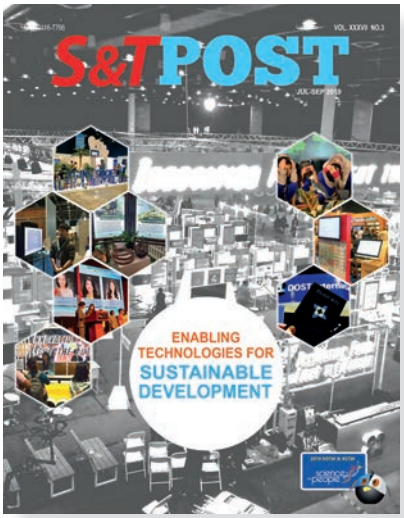


ABOUT THE COVER

As a tip of the hat to this year's celebration of the National Science and Technology Week (NSTW), this issue features how local technologies, innovations, and programs of the Department of Science and Technology can help in achieving the country's commitment to the United Nations' Sustainable Development Goals. Represented by the hexagons, the S&T exhibits were showcased in eight clusters—(1) Food Security, Energy, and Environment; (2) Aging Society, Health, and Medical Care; (3) S&T Human Resource Development; (4) Equity and Growth in the Countryside; (5) Biodiversity and Sustainable Use of Biological Resources; (6) Sustainable Cities and Communities; (7) Resilience and Innovation; and (8) International Linkages.

PH now officially a spacefaring nation

By Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

DOST Secretary Fortunato T. de la Peña (middle) discusses to the media the contents of the Philippine Space Act, which was signed by President Rodrigo Roa Duterte on 08 August 2019. With the DOST Secretary are Director Dr. Joel Joseph S. Marciano Jr. (left) of the DOST-Advanced Science and Technology Institute, and Director Dr. Enrico C. Paringit (right) of the DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development.

ON 08 August 2019, the Philippines officially became the newest country to join other spacefaring nations that have the ability to access space capabilities, and independently build and launch craft into space.

This was after President Rodrigo Roa Duterte signed into law Republic Act No. 11363, "An Act Establishing the Philippine Space Development and Utilization Policy and Creating the Philippine Space Agency, and For Other Purposes" or the Philippine Space Act.

In a press conference following the announcement of the approval of the Philippine Space Act, Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña expressed his gratitude to the President and said that the law will pave the way for the Philippines to join other nations that have their own space agencies.

"We would like to thank the legislators who spearheaded the passage of the Philippine Space Act and we acknowledge their efforts in tirelessly working for its passage," said Sec. de la Peña.

"This piece of legislation will bear fruits that generations to come will enjoy. It will bring the Philippines closer to the goals of development that we have been aspiring for," added the Secretary.

DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development (PCIEERD) Director Dr. Enrico C. Paringit sees the passage of the law as a victory for scientists and engineers who have worked very hard to make the bill happen. The DOST-PCIEERD funds and monitors some of the DOST's space technology projects.

"We see this as a tacit recognition of the government in prioritizing space, and science and technology (S&T) in general and its role in the country's welfare," said Dir. Paringit. "We also see this as a recognition by our lawmakers of the clear case and need for the development areas that we need to pursue that can only be met through developments in space capabilities," he added.

Framework of the Philippine Space Policy

In order to fully realize the nation's space capabilities, the Act establishes the Philippine Space Development and Utilization Policy or Philippine Space Policy, for short.

The Philippine Space Policy will serve as the primary strategic roadmap for the country's space development, and will focus on six key development areas (KDAs).

The six KDAs are the following: national security and development, hazard management and climate studies, space research and development, space industry capacity building, education and awareness, and international cooperation.

For national security and development, the focus will be on space applications that can preserve and enhance the country's national security and promote development for all Filipinos.

In terms of hazard management and climate studies, the Space Policy will pave the way for the development and utilization of space S&T applications to enhance hazard management and disaster mitigation strategy to ensure that the country will be resilient to climate change.

Meanwhile, the conduct of research and development (R&D) endeavors in space science, technology, and allied fields will be the focus of space research and development.

To spur space industry capacity building, the Act calls for the creation of a robust and thriving space industry that will support the country's space program, with the involvement and cooperation of the private sector.

For space education and awareness, the focus will be on the establishment of a sustainable pool of trained space scientists, engineers, and communicators for the country's future space program and to communicate its value and benefits.

Finally, through international cooperation, the country hopes to become a key player in the global space community, providing space capabilities and significant contributions on space S&T applications.

Establishing the Philippine Space Agency

By virtue of the Act, the Philippine Space Agency (PhilSA) will also be established as the government agency that will address all issues and activities related to space S&T applications.

To finally see through the establishment of the PhilSA and the full enactment of the Philippine Space Act, a committee will be formed to formulate the Implementing Rules and Regulations (IRR) within 60 days upon the signing of the law.

Sec. de la Peña said that the DOST will take the initiative of requesting the formation of the IRR group, but will leave it to the Office of the President or the Executive Secretary to give the instructions.

This is because under the newly signed law, the PhilSA will operate as an attached agency directly under the Office of the President and not under the DOST. It will be headed by a Director General who has the rank of Cabinet Secretary.

The DOST chief said that it was not hard for them to accept that PhilSA won't be directly under the DOST. "We were the initiators of the legislation but from the discussions at the Senate and at the Congress, it was obvious that other agencies have a stake, whether in terms of provisions or utilization. And I think it is best on our part to have them in the whole structure and operations of the space agency," said Sec. de la Peña.

With the creation of the PhilSA, a policy making body—the Philippine Space Council, will also be established to oversee its operations. The Council will be composed of the President of the Philippines as the Chairperson, with the DOST Secretary and the Secretary of the Department of National Defense (DND) as vice chairs.

Also included in the Council are members that will include the Senate Committee Chair on S&T, House Committee Chair on S&T, the Director General of the National Economic Development Authority (NEDA), and the Secretaries of the Department of Finance (DOF), Department of Foreign Affairs (DFA), Department of Environment and Natural Resources (DENR), Department of Trade and Industry (DTI), and the Department of Information and Communications Technology (DICT). The Secretariat function of the Council will be with the PhilSA.

If everything is set in order after the setting of the IRR, the PhilSA—a facility that will house R&D on space S&T and all of the country's space technology products or space assets, will rise somewhere in the Clark Special Economic Zone in Pampanga and Tarlac, in about three years' time, according to the DOST Secretary.

Practical applications of having a space agency

"With the DND Secretary as co-vice chair of the Philippine Space Council, you can already conclude that there will be a lot activities related to security," pointed Sec. de la Peña. He added that even from the start, national security and development has always been a priority area for research and development.

"You can also conclude that the DA, DTI, DENR, and DICT will be users (of data and information). DOF and DFA will be facilitators—DOF in terms of financing and DFA in terms of international collaboration and linkages. And NEDA is included in the Council because it is the caretaker of the national land use plan, it is responsible for that," explained the Secretary.

Another possible application of PhilSA in security is the monitoring of vessels out in the sea, said Dir. Paringit. "Even if it can be done on the ground, it will be much more efficient and more accurate if we deploy our space-based monitoring systems," he explained.

Dir. Paringit further enumerated the various practical applications of a space agency that include support to fisherfolk to monitor where they are at sea and where to efficiently fish; support to farmers to monitor agricultural productivity; monitoring of forest lands to see where deforestations and degradations are taking place; and for hazard assessment to monitor where and what the situations are in disaster-stricken areas.

On the other hand, DOST-Advanced Science and Technology Institute Director Dr. Joel Joseph S. Marciano Jr. revealed that the DOST is doing Project DIME, which stands for Digital Imaging for Monitoring and Evaluation. The project is in partnership with the Department of Budget and Management.

"We use satellite images to track the progress of big ticket government projects—the status of road constructions, bridges, airport runways all over the Philippines," said Dir. Marciano.

Sec. de la Peña added, "If our data scientists will work on the data that we are able to collect, there will be new knowledge that can be generated and models that can be presented, and that can be a contribution of our country to the body of knowledge globally."

DOST initiatives in developing space S&T applications

As the primary government agency that spearheaded efforts on space S&T, the DOST has heavily invested on R&D for the development of space S&T applications in the country.

According to the DOST, since 2010, some PhP 7.48-billion worth of investment was allotted from the Department's budget particularly in terms of R&D.

"We are still investing some more as we have 15 space technology related projects that are ongoing and are being implemented not only by our own PCIEERD and ASTI, but also in different universities and agencies across the country," said Sec. de la Peña.

In terms of growing the country's future science, technology, engineering and mathematics (STEM) professionals, the DOST has so far supported some 5,489 STEM scholars from 2008 to 2018. The DOST Chief was happy to report further that a specialization in space engineering is now being offered at the Masters in Electrical Engineering program in University of the Philippines Diliman. The specialization course started with eight scholars in January this year.

The DOST chief also reported that there are now 1,000-plus experts in space science in the country who can readily serve in the space industry, as well as in the PhilSA.

Also part of DOST's investment in space development is the 25 space R&D facilities that are operational nationwide, including two operational ground receiving stations and a new facility, the University Laboratory for Small Satellites in Space Engineering Systems, which is housed at UP Diliman.

But perhaps the most tangible product of DOST's efforts in the development of the country's space science and technology applications are the Philippine-made satellites that have been launched in space: the Diwata-1 and Diwata-2 microsatellites—launched in April 2018 and October 2018, respectively, and Maya-1, a cube satellite launched in August 2018.

Sec. de la Peña, Dir. Paringit, and Dir. Marciano are joined in the press conference by experts from the University of the Philippines (UP), some of whom were involved in the development of the Philippine-made satellites, and the current DOST scholars who are taking the specialized course in space engineering in UP.

Secretary Fortunato T. de la Peña reports on the contributions of the DOST in the Philippines' rise in the 2019 Global Innovation Index.

www.pcoogov.ph

PH jumps to 54th in 2019 from 73rd in 2018 in the Global Innovation Index that covered 129 economies worldwide.

Innovation spurs PH's forward jump in global index, science chief says

Text and photo by Rodolfo P. de Guzman, *DOST-STII*

DEPARTMENT OF Science and Technology Secretary Fortunato T. de la Peña bannered the Philippines' innovation strengths as contributing factor to the Philippines' notable jump to 54th from last year's 73rd in the Global Innovation Index (GII). The index covered 129 economies worldwide.

Philippines also placed 42nd this year in terms of innovation outputs, referring to the impact of innovation initiatives. Further, the country ranked as number 1, along with six other nations, in the category of High-tech Net Exports Percentage Total Trade, which the science chief attributed to the 60 percent increase in semiconductors manufacturing.

Moreover, Sec. de la Peña said that the Philippines ranked sixth worldwide in terms of Research Talent Percentage in Business Enterprises, showing that the country is able to translate research initiatives into tangible benefits for business.

Further, the country ranked eighth worldwide in the field of Creative Goods Export Percentage Total Trade because of the increasing presence of Filipinos in the creative arts business involving animation, gaming, and other related fields.

With the much improved performance of the country as recognized by international organizations, Sec. de la Peña heralded DOST's completed and ongoing programs on innovative technologies.

In support of the micro, small, and medium enterprises (MSMEs), the DOST chief said, "Our Small Enterprises Technology Upgrading Program or SETUP has helped many MSMEs improve their productivity and competitiveness that address the GII criteria on technology absorption and technology diffusion."

He further said that the program has components that support MSMEs like oneSTore, an electronic ordering system, where SETUP beneficiaries can market their products online.

He also mentioned OneLab in which the DOST provides laboratory testing and analysis of MSMEs' products through a network of laboratories nationwide.

"With the OneLab project we are able to provide testing and analysis services to our MSMEs in the regions without them going to Manila because DOST will take care of forwarding the material to laboratories that are capable of testing the desired parameters," explained Sec. de la Peña. "After the testing, the results are forwarded to the clients. They no longer have to make follow ups."

The science chief cited that the laboratories of the Department of Health plus some 10 private laboratories are already part of the network, including two laboratories in Thailand and one in Vietnam.

To strengthen the R&D efforts of the Department, Sec. de la Peña said that the Science for Change Program was created with close collaboration with state universities and colleges (SUCs) based in the regions.

"The program has four component projects called NICER, RD Lead, CRADLE, and BIST," said Sec. de la Peña. "Through this program, we are able to conduct researches in different areas like white potato by the Benguet State University, tamarind by the Pampanga State Agricultural University, and on renewable energy by the Ateneo de Davao University."

NICER stands for Niche Centers in the Regions, a project that aims to establish R&D centers in the regions to spur regional development. To date there are 14 NICER Centers all over the country and the number is still growing.

Sec. de la Peña showcased the many innovative products that the DOST developed through extensive R&D, such as the Hybrid Electric Train that is now adopted by the Philippine National Railways; Biotek-M Dengue Aqua Kit for early detection of dengue; the Space Technology Program that resulted in the creation of the Diwata satellites; and carrageenan as plant food supplement developed by the DOST-Philippine Nuclear Research Institute using irradiation technology.

Other initiatives include the Universal Structural Health Evaluation and Recording (USHER) System, a cost-effective 24/7 health monitoring system; the Contactless Apprehension of Traffic Violators on a 24-Hour Basis and All-Vehicle Detection System (CATCH-ALL) software that monitors traffic situations and track violators; the Eco-Sep Vigormin Organo Mineral for septic waste water treatment; and the Hazard Hunter app, a software application developed by DOST-PHIVOLCS to identify, assess, and provide action recommendations for both geological and hydro-meteorological hazards like earthquake, tsunami, landslide, flood, etc.

The GII 2019, in its 12th edition this year, is co-published by Cornell University, INSEAD, and the World Intellectual Property Organization a specialized agency of the United Nations. The main focus of the GII Report consists of the ranking of world economies' innovation capabilities and results.

IP Protection and Commercialization Program enters Year 2

By Muriel B. Dizon and Rizalina K. Araral, *DOST-FPRDI*

The participants of the IP Master Class during one of the lectures on invention spotting. (Photo from DOST-FPRDI)

KEY PEOPLE from 14 state universities and colleges and two research and development institutes from various parts of the country have recently learned how to correctly protect their organizations' intellectual property and commercialize their technologies.

This is after finishing one year of implementation of the program "Developing the Intellectual Property and Technology Business Management (IP-TBM) Operations in Consortia Member Agencies-Batch 2".

The program is funded by the Department of Science and Technology (DOST)-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development. Heading the program is Grecelda A. Eusebio of the DOST-Forest Products Research and Development Institute, the lead implementing agency.

"The program seeks to strengthen and capacitate the IP-TBM operations of the agencies involved, making sure they are sustainable to help contribute to the country's social and economic competitiveness in the global rankings," Eusebio explained.

Intellectual property refers to creations of the mind that have commercial or moral value and includes copyrights, patents, and trademarks. Artistic works like music and literature, as well as some discoveries, inventions, words, phrases, symbols, and designs, can all be protected as intellectual property.

Protecting intellectual property rights boosts economic growth by encouraging the creation of a wide variety of intellectual goods. It can be achieved by giving people and businesses legal rights to their creative output.

Technology commercialization, on the other hand, is the process of moving technologies from the research laboratories to the market. One way to do this is to ensure that inventions are converted into products and services that benefit the public.

Since the IP-TBM program started in July 2018, it has already trained 69 people under the Intellectual Property Master Class and Technology Commercialization Mentorship Series, a 12-module intensive seminar on intellectual property rights protection and technology commercialization.

Exceeding its expected outputs for Year 1, the program has so far facilitated 254 IPR applications at the Intellectual Property Office of the Philippines, the establishment of IP-TBM offices, and the conduct of a Technology Pitch Day.

71 Pisay studes, teachers hurdle trainors' training at DOST Invent School

By Pierre Sonia S. Dela Corte, *DOST-TAPI*

SEVENTY-ONE SELECTED faculty members and students of the Department of Science and Technology-Philippine Science High School System (DOST-PSHSS) graduated from the Invent School's Trainors' Training on 5 July 2019 at the Makati Diamond Residences, Makati City.

The trainors' training is a joint collaboration of the DOST-Technology Application and Promotion Institute (DOST-TAPI), DOST-Human Resource Development Program, and DOST-PSHSS through the project "Capacity Building for PSHSS for the Invent School Implementation."

Invent School is one of the premier programs of DOST-TAPI in propagating the necessary interests, skills, and capacities for creativeness and inventiveness among elementary, high school, and college students.

Invent School serves as a starting ground for young Filipino inventors to stimulate their potentials and awaken their ingenuity in invention and innovation development.

"The project was conceived to address DOST-TAPI's shortage of in-house experts for the implementation of the Invent School and DOST-PSHSS' need for intellectual property (IP) awareness relevant in crafting its IP policy," said Atty. Marion Ivy D. Decena, division chief of DOST-TAPI's Invention Development Division.

The year-long training that started in May 2018 has provided learning and development through lectures on training and presentation skills and on-the-job trainings allowing future trainers to connect and interact with the student-participants.

"Trainers are indispensable part of the Invent School's activity and hence, the success of the program lies in the intervention provided by a skilled trainer, dynamic, and creative individuals who organize learning activities to elementary, high school, and college students," said DOST-TAPI Director Edgar I. Garcia.

The collaboration was able to produce two convergences—one in Baguio City on 27 to 29 August 2018 for the Northern and Southern Luzon clusters and in Iloilo City on 18 to 19 October 2018 for the Visayas and Mindanao clusters.

"The increasing demand for the conduct of Invent School has proved that the program continues to flourish in stirring the youth's ingenuity by stimulating their interests and techniques in developing creative and inventive knowledge that is crucial in invention and prototype development," said Dr. Carol M. Yorobe, former DOST Undersecretary for Scientific and Technical Services.

Former DOST Undersecretary for Scientific and Technical Services Carol M. Yorobe (seventh from left) with DOST-TAPI Director Engr. Edgar I. Garcia (eight from left), PSHSS Chief Administrative Officer Ms. Maria Concepcion B. Sakai (sixth from left), and TAPI-IDD Chief Atty. Marion Ivy D. Decena (ninth from left) with Invent School trainors.

Pisay boot camp trains educators on teaching and learning innovations

By Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Gerardo G. Palad

SELECTED SECONDARY school teachers from the National Capital Region (NCR) and Southern Luzon, including participants from the Bicol Region, participated in a four-day boot camp that trained them on innovations in teaching STEM or science, technology, engineering, and mathematics.

The boot camp, dubbed as #TALINO, which stands for Teaching and Learning Innovations, was hosted by the Philippine Science High School System (PSHSS) or Pisay, and was held 20-24 June 2019 at the Pisay main campus in Quezon City.

The boot camp was a product of a 2018 training of 144 educators from the Philippines at the Nanyang Polytechnic International in Singapore. The training program at Nanyang was called Innovations in Teaching and Learning STEM. The said training was done in partnership with Temasek Foundation, and in cooperation with the Department of Education (DepEd) and the Department of Science and Technology (DOST).

As part of the Filipino teachers' commitment, they were expected to pass on what they learned in the training in Nanyang to other educators and find ways to improve teaching and learning in their own institutions.

PSHSS Executive Director Lilia T. Habacon called on those who attended the training program in Nanyang to consolidate their efforts and design the TALINO program.

"The objective of TALINO boot camp is to reach out to more public school teachers in the country and cascade to them the latest breakthroughs and innovations in science, technology, engineering, and mathematics or STEM education," said Dir. Habacon.

She added that it is their aim at Pisay not only to increase the number of STEM professionals in the country but also to enhance their capabilities and be at par with global standards.

At the boot camp, Pisay administrators and teachers transferred their knowledge to the teacher participants. Through the TALINO boot camp, the trained educators from Nanyang and the organizers hope that the participants will also be able to share their learning to other teachers in their areas and in their own classrooms.

Dir. Habacon also encouraged the teacher participants to craft ways on how to implement strategic policies and sustainable methods in teaching STEM to their students.

Left photo: Philippine Science High School System Executive Director Lilia T. Habacon calls on the teacher participants to share their learnings to other teachers in their areas. Right photo: Henry Heng, CEO of Nanyang Polytechnic International encourages Filipino teachers to explore academe-industry partnerships.

"Let us offer not only our time and expertise but also our experience in improving STEM education in the country," she said.

"The Filipino youth, the future leaders of this country deserve a premier education that will harness them to their full potentials and soar at the same pace with the rest of the world," ended Dir. Habacon.

At the opening program of the boot camp, Henry Heng, the CEO of the Nanyang Polytechnic International, talked about academe-industry partnership and the importance of working with the industry sector in solving real-world problems.

"At Nanyang Polytechnic, STEM educators seek out industry problems, product challenges, and production issues which we bring back into the campus as projects for our young students to work on," said Heng.

He said that through such projects, their students at Nanyang are able to apply the theoretical concepts they have learned in mathematics, science, information technology, and engineering into solving problems and delivering real-world solutions back to the industry.

Heng also emphasized that such kind of collaboration with industries is something that Filipino educators should think about. He said that educators should be able to convince the industry sector that the academe can contribute to delivering real-world solutions to many industry problems.

"Educators like you and I have to be more than just educators. We should be able to work with industry and collaborate with them," stressed Heng.

Meanwhile, Gerald Yeo, programme director at Temasek Foundation expressed his happiness with the fruits of the collaboration between the Philippines and Nanyang Polytechnic in what he called as a "sharing of innovations in teaching and learning."

Also invited during the opening program of the boot camp were Pisay's industry partners, Unilab and Maynilad, and representatives from government partners, the DOST and DepEd.

The boot camps run from 21 June to 8 July in four clusters, namely: Southern Luzon and NCR, Northern Luzon, Visayas, and Mindanao.

Science chief bats for research-based techs to address dengue problem

By Jwynne Gwyneth Macan, *DOST-PCHRD*

IN THE wake of the mounting reported cases of dengue in the country, Secretary Fortunato T. de la Peña of the Department of Science and Technology (DOST) pushes for the use of DOST innovations and products that help address this problem.

"Dengue research and development has always been one of the priority research areas in the country. This is stated in the Harmonized National Research and Development Agenda led by the DOST," said Sec. de la Peña.

"Through the DOST-Philippine Council for Health Research and Development, we have funded a number of research projects and programs consistent with the multi-pronged approach to control dengue that address diagnosis and treatment," he added.

In the area of diagnosis, the development of a rapid diagnostic test for dengue is one of the researches supported by DOST. The kit, called Biotek-M™, can detect dengue as early as two to three days after the onset of illness.

"This will be very helpful in making the early diagnosis of dengue so that prompt management can be done to prevent complications," the secretary explained. "This will also help decongest the hospitals that are constrained to keep patients suspected to have dengue confined in the hospital for monitoring until the diagnosis is established."

Further, early detection can lessen the stress of patients and their relatives, he said.

This diagnostic kit is already available in a number of public hospitals. "We have asked the technology developer to make it available to the affected areas of dengue in cooperation with our regional offices and the Department of Health," Sec. de la Peña informed.

Aside from the diagnostic kit, the DOST is also funding the clinical trials for the evaluation of a possible herbal medicine for dengue. Said herbal medicine has shown multiple mechanisms of action, such as anti-viral activity against the dengue virus. It can also elevate the platelet levels which is very crucial. As observed in the complicated cases of dengue, low platelet count causes bleeding and reduction of plasma leakage which contributes to the lowering of blood pressure among the dengue patients.

The Phase I clinical trial is upcoming. When the clinical trial has completed up to Phase 3, it is ready to be certified and approved by the Food and Drug Administration (FDA). To date, there is yet no available therapeutic medicine for dengue anywhere else in the world.

According to Sec. de la Peña, the DOST has also supported the "development of herbal supplements that can help patients affected with dengue."

Said herbal supplements that include single and combination herbal preparations are already ready for submission to the FDA, he said.

"These herbs are derived from folkloric use and have passed safety and toxicity studies," he informed. "We have requested the technology developers to make this available at the soonest time possible after satisfying all the regulatory requirements. We are also coordinating with the FDA regarding this."

Biotek-M dengue kit. (Photo from DOST-TAPI)

DOST, PayMaya partnership a win-win for oneSTore.ph clients, merchants

By Sheila Marie Anne J. de Luna, *DOST-STII*
Photo by Henry A. de Leon, *DOST-STII*

A PAYMENT solution that will make online purchases easier and more convenient for both customers and merchants has been added to oneSTore.ph, the Department of Science and Technology's (DOST) e-commerce platform for all DOST-assisted products.

The DOST signed up online payment solutions provider PayMaya to be its newest payment channel partner. The partnership is expected to enhance oneSTore.ph's online market platform to accept payments for credit, debit, and with a prepaid card or e-wallet like PayMaya.

With the partnership, PayMaya will provide end-to-end payment solutions for oneSTore through online store gateway checkout.

"PayMaya does the end-to-end acquiring service for DOST—we process the payment, we do fraud management, and we provide the resettlement solution for DOST," said Ma. Rocielo B. Nunez, digital portfolio manager of PayMaya Business.

Another advantage of the PayMaya's integration in oneSTore is that merchants receive settlement for their products faster—just a day after purchase. Currently, it takes about two months to disburse the sales from oneSTore.ph to their over 500 merchants. With PayMaya Checkout, settlement of payment for merchants can be shortened to next day after the transaction.

"What we are doing right now is we are providing them with a disbursement solution so that DOST can receive the settlement [for the transaction] and process the settlement for its merchants in real-time the next day so that they do no longer have to wait for two months," added Nunez.

Launched in 2017 and developed together with the Department of Trade and Industry, oneSTore is the DOST's marketing platform that helps micro, small, and medium enterprises (MSMEs) expand their market reach through presence in the digital space.

Products featured at oneSTore are from MSMEs that were assisted by the DOST through its Small Enterprises Technology Upgrading Program or SETUP.

"We have been helping micro, small, and medium enterprises to enable them to adopt technological improvements mainly by improving the technology that they use, by giving them access to new equipment, hardware, and software. This has significantly improved their productivity, remarkably expanded their market, grew their employment figures, and of course, increased their incomes," said DOST Secretary Fortunato T. de la Peña.

The DOST chief further explained that even with well-established marketing platforms, the DOST has decided to put up its own e-commerce platform for the MSMEs that they have been assisting.

"Definitely, the payment system (PayMaya) will help a lot. It will help our clients—the merchants—and even the buyers do their purchases more conveniently," added Sec. de la Peña.

PayMaya's Founder and CEO Orlando B. Vea hailed the partnership with DOST and expressed hope that it will really enable DOST to bring technology to MSMEs.

"Being partners with DOST confers a certain validation on the technology that we offer. We think that we can enable not only government but the private sector in the payments processing space," said Vea.

The PayMaya partnership also opens up other avenues for the two organizations to work together as PayMaya also offers to provide disbursement solutions for OneLab and oneSTore hubs.

OneLab is a digital platform for a network of laboratories to provide a referral system for convenient and easy access to laboratory testing and calibration services. Meanwhile, oneSTore hubs are the physical stores for oneSTore.ph merchandise, which are currently located in 21 sites nationwide.

"For OneLab we are also offering payment gateway checkout and for oneSTore hubs we're offering our POS (point-of-sale) terminals that are portable, wi-fi enabled, and have their own SIM cards for data," explained Nunez. This will enable oneSTore hubs to accept card payments instead of just cash.

Aside from that, Nunez added that PayMaya would also like to provide QR codes to oneSTore hubs so they can accept QR payments. A QR code (Quick Response code) is a machine-readable code that can be read by the camera on a smart phone, while a QR payment is done by scanning a QR code from a mobile application.

Another area for partnership between DOST and PayMaya is the possible application of PayMaya payment systems for the Hybrid Electric Train and for disbursing allowances to DOST scholars.

PayMaya now joins other third party solutions for oneSTore.ph that include 2GO, AIR21, Shopinas.com, Landbank of the Philippines, Dragonpay, and Black Arrow.

The Memorandum of Understanding ceremonial signing and partnership launching was held 13 August 2019 at the Launchpad Building in Mandaluyong City.

The Department of Science and Technology adds another online payment solution provider to its payment channel partners for oneSTore.ph as it signs a partnership agreement with PayMaya. The Memorandum of Understanding signing is led by DOST Secretary Fortunato T. de la Peña (third from right) and PayMaya Founder and CEO Orlando B. Vea (third from left). Witnesses include (from left to right) Mar Lazaro, director and head of PayMaya Business, PayMaya President Shailesh Baidwan, DOST Undersecretary for Regional Operations Brenda L. Nazareth-Manzano, and DOST Region II Director Engr. Sancho A. Mabborang.

DOST-PAGASA weather station to rise in Siquijor

By Framelia V. Anonas, *DOST-STII*
Photo by Gerardo G. Palad, *DOST-STII*

DOST Sec. de la Peña (middle) leads the installation of the time capsule at the groundbreaking ceremony of the DOST-PAGASA Synoptic Station in Brgy. Caipilan, Siquijor, Siquijor. The synoptic station is crucial in the establishment of the Siquijor airport which is being fast-tracked to meet the almost 10 percent influx of tourists in the island-province. Joining the groundbreaking are (from left to right) PAGASA Chief Administrative Officer Catalino L. Davis, DOST-VII Regional Director Edilberto L. Paradela, Siquijor town Mayor Richard C. Quezon, Siquijor Provincial Governor Zaldy S. Villa, DOST-PAGASA Administrator Vicente B. Malano, PAGASA Regional Services OIC Engr. Alfredo F. Quiblat, and DOST-Negros Oriental Provincial Director Atty. Gilbert R. Arbon.

THE DEPARTMENT of Science and Technology-PAGASA will soon set up a synoptic weather station in Brgy. Caipilan, Siquijor town, and Siquijor Governor Zaldy S. Villa is ecstatic.

"The setting up of this station is crucial in the operation of our would-be airport in Siquijor," he announced during the groundbreaking. "The establishment of the airport has been approved in 2016. Hopefully, there will be no more hindrance after the synoptic station is set up."

The DOST-PAGASA synoptic weather station is vital in the island-province's push for the speedy completion of its airport. Its groundbreaking was held as part of the celebration of the Regional Science and Technology Week held 15-17 August at Capital Square in Siquijor, Siquijor.

Airports are required to have their synoptic stations where all meteorological elements are made and transmitted to the Central Office, Secretary Fortunato T. de la Peña said.

DOST-PAGASA Administrator Dr. Vicente B. Malano told that synoptic stations enable the dissemination of public weather forecasts, tropical cyclone bulletins, warnings and advisories and other related information that protect the lives and property of the general populace.

The completion of Siquijor airport is very crucial in addressing the spurt of tourist arrivals in the province, which reached its peak in 2018 with a 48.8 percent growth, according to the Philippine Statistics Authority.

Siquijor's airport is about 5 km west of Siquijor town. In 2017, construction began to expand it into a full airport with international flights. However, it is still up for completion.

According to a report, the terminal is expected to hold 120 passengers per hour. It will also have a power house building and vehicle parking area with an 80-car capacity. Meanwhile, it will have a 1.2km x 30 meter concrete runway.

Gov. Villa said that the budget for the Siquijor airport was directly given by President Rodrigo Roa Duterte himself.

The President gave PhP 500M for the airport extension plus additional PhP 200M," he said.

Innovation fellows pitch biz propositions to investors

By Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

Top photo: The fifteen fellows of the Leaders in Innovation Fellowship (LIF) Programme with (from 8th to 11th from left): Roselle L. Martonito, Supervising Science Research Specialist, DOST-Philippine Council for Health Research and Development; Professor Paul P. Rodriguez, LIF Programme Director at the Asian Institute of Management; Ruselle M. Pili, Chief of the Research Information and Technology Transfer Division, DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development; and Karen Ann Hipol, Strategic Manager-Newton Agham Programme, British Embassy Manila.

FIFTEEN FELLOWS of the Leaders in Innovation Fellowship (LIF) Programme delivered their pitches and presented their research outputs and business propositions to possible investors and end-users during a "Demo Day" that was held at the Fuller Hall of the Asian Institute of Management (AIM) Building in Makati City on 5 September 2019.

Said fellows, part of the fifth batch of the LIF Programme, are currently in the process of developing business propositions for their innovations. At the opening program prior to the presentation, Department of Science and Technology (DOST) Assistant Secretary for International Cooperation Dr. Leah J. Buendia encouraged researchers and innovators to commercialize their research outputs and innovations for maximum benefit.

"I encourage each and every one of you to continue the good work and bring your precious projects to the target beneficiaries. We are here to fund your research projects, to assist you in the pre- and commercialization activities, to capacitate you not only in developing the technologies but also in delivering these to the people," said Asec. Buendia.

A range of applications

This year's batch of innovators came up with solutions to some of the country's current problems.

One of these pressing problems, addressed by three technologies, is the Metro's traffic woes. One of these traffic-response technologies is the Hybrid Electric Road Train, an alternative mass transport system powered by a diesel-electric generator set and battery power system. There's also CATCH-ALL, an artificial intelligence software that aims to quickly catch and identify traffic violators, and monitor traffic situation. Lastly, PUBFIX aims to address traffic congestion with a bus dispatch scheduling system.

Meanwhile, two innovations focused on hazard management: LAWIN drones and Geo-CAMP. LAWIN or Low-altitude Aircraft for Widefield Imaging and Navigation are affordable, durable, and medium-range drones that can be used for post-disaster assessment and response. On the other hand, Geo-CAMP proposes the use of geohazard maps and other hazard data to help local government units (LGUs) in urban planning and reduce climate-related risks.

In the fields of agriculture, animal raising, and aquaculture, four innovations proposed solutions to various problems in the industry. MangifeTek introduced three products that can be used in different stages of mango production, from reducing pests to harvesting and post-harvest. CropXpro, meanwhile, has

Michelle S. Carbonell, project leader of QPtech or Queen Pineapple Technologies, presents the three products that resulted from their project that converted agricultural wastes from pineapple.

The BTBox or BioTech in a Box comes in two variants: the DNA Visualight Kit and the Crime Scene Investigation Kit.

Dr. Elmer Jose P. Dadios, CATCH-ALL project leader, presents how the technology accurately detects vehicles' plate numbers.

seven machines for the mechanical processing of large volume of fibrous and leafy crops. Then there's the Greenhouse Solar Dryer with Biomass Furnace, which allows farmers to dry coffee and other agricultural products even during the rainy harvest season. Lastly, PECM or protein enriched copra meal, is a protein feed ingredient that can be used as a source of quality protein meal in swine, poultry, and aquaculture diets.

For the health sector, the Agapay Project introduced an exoskeleton device that can be used in the rehabilitation of post-stroke and injured patients.

There were also several innovative products that were introduced. One of these is BTBox or BioTech in a Box, which is literally like a laboratory in a box that STEM (science, technology, engineering, and mathematics) teachers can conveniently use to enhance science literacy among their students. Meanwhile, QPtech or Queen Pineapple Technologies converted agricultural wastes from pineapples into three products, namely: Queen's Coal (charcoal briquettes), Queen Pineapple Bran (feed supplement for native chickens), and Queen Pineapple Instant Multi-use Marinade Mix (liquid marinade).

Two other innovations that were presented were COARE and MAPX. COARE, which stands for Computing and Archiving Research Environment, offers a high-performance computing facility for researchers to do modeling and simulation of their products and technologies, and for analyzing test scenarios. MAPX, on the other hand, offers LGUs a web-based geographic information system or GIS for tax mapping, assessment, valuation, and collection for real property classification, zoning, and other tax mapping activities.

Lastly, the DLSU IMPACT (Intellectual Property Management Program for Commercializing Technologies) program of the De La Salle University offers services that will help in the commercialization of technologies developed in universities and other research institutions.

The Hybrid Electric Road Train is an alternative mass transport system that was developed by the DOST-Metals Industry Research and Development Center.

PH-UK collaboration

The LIF is a postgraduate certificate program supported by the United Kingdom and Philippine governments through the Newton Agham Programme, in partnership with the DOST and the AIM.

"I am proud to say that this collaboration between the UK government and the Philippine government has become truly successful in achieving the goal of building the entrepreneurial capabilities of Filipino researchers to help commercialize their technologies and innovation," Asec. Buendia said.

The LIF Programme has been going on for the past five years and has already produced 75 (including the current batch) Filipino researchers and technology transfer officers trained through the program.

Past recipients of the fellowship have already gone on to establish their own start-up companies from their research and development projects, started with pilot scale production, have generated interests from third party investors, and have remarkably improved their technologies based on market research.

Weapons from local materials?

DOST-FPRDI checks the possibilities

By Rizalina K. Araral, *DOST-FPRDI*
Photos from DOST-FPRDI

DID YOU know that the *sawali* (woven bamboo mat) is a possible material for making body armors?

The Department of Science and Technology's Forest Products Research and Development Institute (DOST-FPRDI) recently found that the woven bamboo mat paired with a stainless steel plate can be used for making bullet-resistant vest. The vest was light enough for use in combat and 700 percent cheaper than most imported body armors.

"This was an initial study in support of the Department of National Defense's (DND) Self-Reliant Defense Posture (SRDP) program. SRDP seeks to help the country become self-sufficient in its basic military needs by producing its own weapons such as small arms, ammunitions, and tactical communications equipment, among others," said DOST-FPRDI's Director Romulo T. Aggangan.

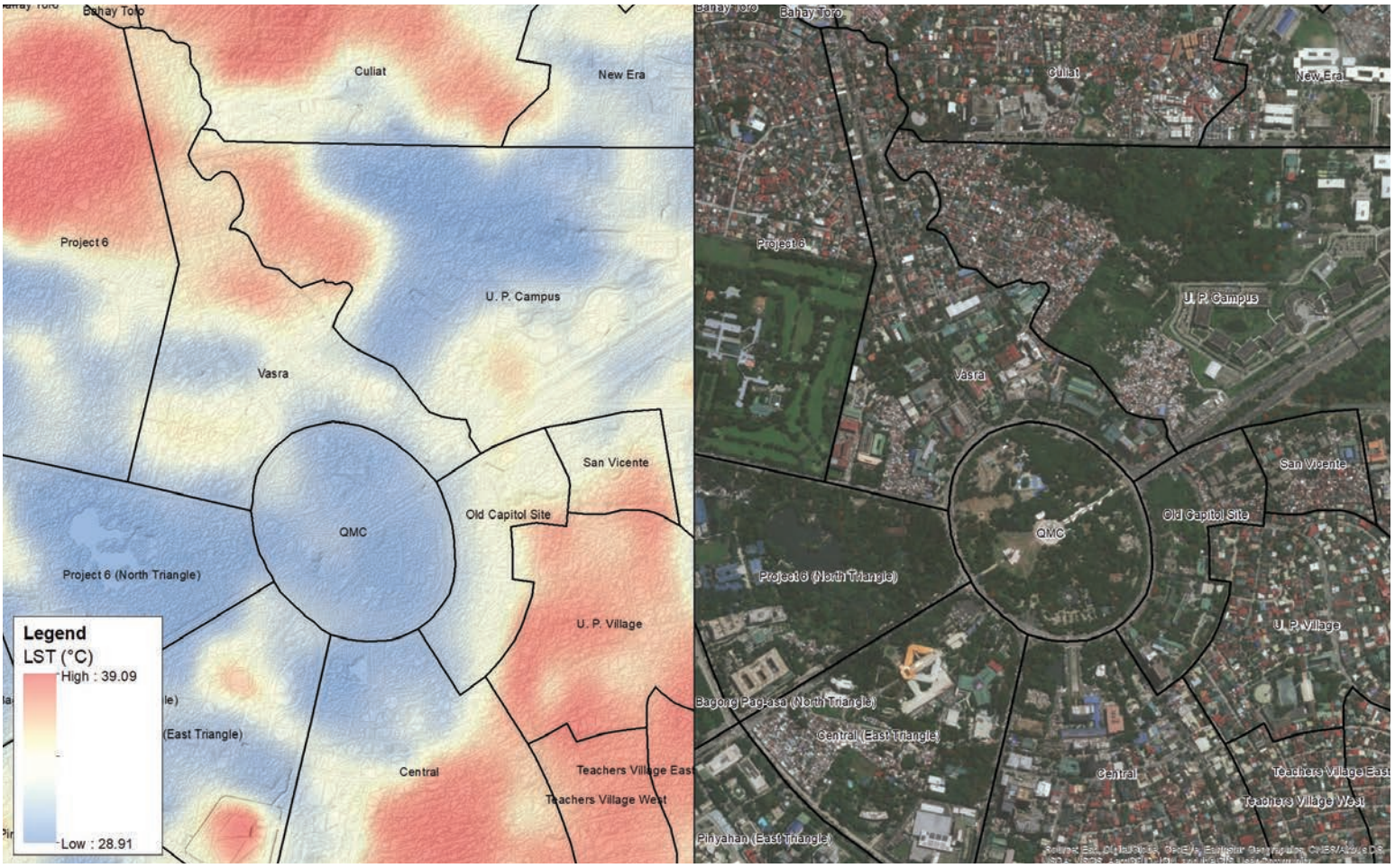
The DOST and DND signed a memorandum of understanding in January 2018, providing a framework for their scientific and technical cooperation for the SRDP program.

Under the DND-DOST partnership, DOST-FPRDI committed to develop explosives and propellants using local materials such as abaca, and gums and resins from native forest tree species.

"After research and development, we will be piloting promising production processes to see if they are technically and financially viable as well as environmentally and socially acceptable," said Aggangan.

The experimental bamboo mat is tested as possible material for body armors at the Philippine Army R&D Center.

Bleached abaca pulp will be converted into cellulose nitrate, a main ingredient of propellants.



Land surface temperature map from the GUHeat Project showing that establishment-filled areas are hotter. (Photo from DOST-PCIEERD)

DOST-PCIEERD, UP Diliman assess urban heat islands in PH

By Raissa Jean C. Ancheta, *DOST-PCIEERD*

TO FIND ways to mitigate the harmful effects of the rising temperatures in urban areas, the Department of Science and Technology (DOST) and partners are currently assessing the development of urban heat islands in rapidly urbanizing and highly urbanized cities in the Philippines. The assessment involves the use of satellites and modeling-simulation techniques.

Partnering with DOST in this project are the DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development (PCIEERD), and the University of the Philippines-Training Center for Applied Geodesy and Photogrammetry.

Dr. Ariel Blanco, project leader of Project GUHeat or "Geospatial Assessment and Modelling of Urban Heat Islands in Philippine Cities", said they will harness the power of thermal images from satellites to help the government "minimize the warming of urban areas or urban heat islands (UHIs), and even reverse it to decrease electricity consumption and air pollution, and reduce health risks and diseases, that will result in greater livability of our cities."

Project GUHeat will develop geographic information system (GIS)-based methods and tools to map, model, and characterize UHIs that can be easily used by local government units. The system can be accessed through a web-based GIS.

To date, researchers are studying and evaluating the land surface temperature of cities such as Quezon, Baguio, Cebu, and Mandaue, Iloilo, Zamboanga, and Davao using satellite imageries in order to assess the effect of urban heat islands.

The project also aims to build and enhance the capacity of LGUs in incorporating thermal environment conditions in planning and development toward the attainment of the United Nations' Sustainable Development Goals (particularly Goal 11: Make cities inclusive, safe, resilient, and sustainable).

"I'm happy to share that these local government units are very enthusiastic and supportive, and shall utilize the project outputs in revising plans and shall implement measures to reduce urban heat islands," Dr. Blanco shared.

A city experiences UHI effect when it has warmer temperatures than nearby rural areas. The materials used in the construction of buildings and establishments and the lack of trees and vegetation affect the distribution and persistence of heat in a city. Warmer temperatures increase energy consumption, emissions of air pollutants and greenhouse gases, impair water quality, and compromise human health and comfort.

DOST-PCIEERD Deputy Executive Director Engr. Raul C. Sabularse expressed hope that the project will positively contribute toward climate change adaptation.

"It is imperative that local government units plan and strategize using the GIS-based maps and models that will be developed through Project GUHeat for the thermal comfort of Filipinos. We at the DOST will continue to support the project and eventually launch more space technology applications," Engr. Sabularse said.

Dr. Blanco said they intend to use unmanned aerial systems that have thermal cameras to thoroughly map and determine the changes of land surface temperature over time. His team will also laser-scan the cities involved in their project to produce 3D models for simulation. Through simulation, they will be able to explore possible scenarios and be ready with urban heat mitigating measures.

Pisay's Science Research Summit kicks off in Subic

By Rodolfo P. de Guzman, *DOST-STII*

Coinciding with the 2019 Science Research Summit (SRS) is the Community Fair that featured an exhibit of some 48 research project posters of students from different campuses of the Philippine Science High School System (PSHSS) on 30 August 2019 at the Subic Bay Travelers Hotel and Convention Center in Subic, Zambales. Shown leading the ceremony is Department of Science and Technology Undersecretary for Disaster Risk Reduction and Climate Change Dr. Renato U. Solidum Jr. (center, with coat), PSHSS Executive Director Lilia T. Habacon (third from left); Science Supervisor for the Department of Education School Division of Pampanga Paz Canlas (third from right), and the regional campus directors of PSHSS. (Photo by Rodolfo P. de Guzman, DOST-STII)

SOME 226 students from all 16 regional campuses of the Philippine Science High School System (PSHSS) bannered their research studies at the 2019 Science Research Summit, which kicked off 28 August in Subic, Zambales.

In her welcome remarks, PSHSS Executive Director Lilia T. Habacon encouraged all participants to work hard and remember the milestones in their lives as "Pisay" students.

"This is a milestone [in the life of a] Pisay student," said Dir. Habacon. She said that the first milestone in a Pisay student's life is when a student first enrolled in Pisay, followed by completion of the Grade 8 level. The third and fourth milestone is completion of the 10th Grade and the junior/senior prom, respectively. "The fifth milestone in your Pisay life is finishing your research project," said Dir. Habacon.

"The last [milestone], is when you graduate, and we hope that after you graduate you will remember that you were developed and enhanced to be the STEM (science, technology, engineering, and mathematics) leaders of the country," concluded Dir. Habacon.

The Pisay director added that she, together with the administration and teaching staff of the PSHSS, take pride in how they were able to enhance the students' 4Cs required in the 21st century, namely critical thinking, communication, collaboration, and creativity.

On the other hand, Dr. Renato U. Solidum Jr., officer-in-charge of the Department of Science and Technology's (DOST) Office of the Undersecretary for Scientific and Technical Services and concurrently Undersecretary for Disaster Risk Reduction and Climate Change, urged the young students to persevere and work hard to do research that has practical application and benefits.

"The Philippine Science High School System's 2019 Science Research Summit, which has very key and strategic themes like the strengthening regional research and development capabilities, develop science and technology human resources, build a strong science, technology, and innovation (STI) culture, and expand STI assistance to communities, are very important," said Usec. Solidum.

The DOST Undersecretary further said that the PSHSS continues to play an important role in developing science, technology, and innovation human resources by inculcating strong STI culture among its students.

Student-presenters explain the significance of their study to one of the guests of the research summit. (Photo by Gerardo G. Palad, DOST-STII)

A student-presenter discusses his group's research to fellow students. (Photo by Gerardo G. Palad, DOST-STII)

Other guest speakers shared their experiences on how they became successful in their own chosen fields of expertise by embracing STI. Lope Doromal, chief technology officer of IBM Philippines, talked about the importance of information technology and automation that can be instruments of development. He cited the "5 in 5" strategy of IBM Philippines that focuses on research studies that will benefit consumers by harnessing the power of science and technology in agriculture, food supply chain, blockchain, environment friendly packaging, and recycling.

The other two plenary speakers who shared their experiences, challenges, and dreams were Maria Antonia Odelia Arroyo, chief executive officer of Hybridigm Consulting and Ma. Aurora D. Geotina-Garcia, chairperson of the Philippine Women's Economic Network.

There were 130 research papers submitted that came from 13 PSHS campuses. The highest number of papers submitted came from the Main Campus with 23 entries, 17 from SOCCSKSARGEN, and 13 each from Central Luzon, Central Mindanao, and the Cordillera Administrative Region.

The research works were represented in poster format, with two versions: one with the technical and scientific information and the other in simple and graphically appealing presentation for the appreciation of elementary students and the general public who visited the exhibits during the Community Fair on 30 August 2019.

Research on genotyping of rice. *One of the research studies that caught the attention of Usec. Solidum (third from right), is the research of Djoey Bianca C. Medilla (fourth from right) from the PSHS Main Campus, on genotyping of 12 rice varieties to determine which is resistant to rice tungro disease. Accompanying Usec. Solidum is PSHSS Executive Director Habacon (second from right). (Photo by Rodolfo P. de Guzman, DOST-STII)*

Science research summit banners innovative researches by Pisay scholars

By Rodolfo P. de Guzman, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

Participants roam around the exhibit area to check the research posters presented by their fellow students.

FINDING SOLUTIONS to some of the most pressing health problems like dengue and cancer was the research inspiration of some students from the Philippine Science High School System (PSHSS) who participated in the 2019 Science Research Summit.

This year's summit that carries the theme, "Breaking Gender Barriers through Science, Technology, and Innovation" is an annual event for the country's top scholars to present their research papers on various fields like biology, chemistry, computational science, materials science, engineering, and environmental science.

During the technical poster presentation on 29 August, subject matter experts and judges were given the opportunity to ask the student-researchers further questions about their research. The poster presentations also served as an exhibit of innovative ideas of students from different campuses of the PSHS, which is also known as Pisay.

PSHS-Cordillera Administrative Region (CAR) Campus Grade 12 students Bryne Benedict C. Fawayan, Enna Gabrielle Marie A. Joven, and Patricia Bea E. Palaroan, who are all residents of Baguio City, presented their research using one of the most abundant trees in the summer capital—the pine tree.

The title of their research project was, "The Efficiency of *Pinus kesiya* Needles in repelling *Aedes aegypti* Mosquitoes". Their theory revolved on the idea that pine needles have certain substances or properties that can be used as potential mosquito repellent.

"When we were in elementary, we also had a research using pine needles, but it's toward cockroaches, so naisip namin po na mas relevant naman po ngayon pag mosquitoes kasi tumataas ang dengue cases," said Palaroan. She added that based on the reports from the Department of Health (DOH), the incidence of dengue in the CAR increased by 100 percent, which resulted in some casualties and may potentially become a bigger problem in the area.

The student-researchers were lucky enough to push through with their research without much hindrance since the material they were working on can be found everywhere in Baguio City. Further, they said that their advisers and the DOH, where they got their supplies, were very helpful.

"For the pine needles, we collected both dried and fresh; the dried ones we just picked from the ground and the fresh ones we got from the trees," said Fawayan.

On the other hand, Grade 12 students from the PSHS-Cagayan Valley Region campus, namely Hermogenes B. Chioco IV, Shantal D. Uy, and Shanelle Rio Andrea T. Sadama presented their research study about the possible pharmaceutical use of the *Kudit* or the Split Gill mushroom *(Schizophyllum commune)* for breast cancer.

According to the students, the said mushroom species that is abundant in Sanchez Mira, Cagayan province in Northern Luzon is known to have antioxidant and anti-diabetic properties.

"Yung mga studies na nakita po namin ay nagsasabi na mayroon silang (mushrooms) antioxidant, anti-breast cancer property, so why not na gawin siyang potential na anti-breast cancer agent. So we tested yung

anti-breast cancer activity niya…nakita po namin sa results na nag-shrink siya (the tumor) gamit yung extract namin," said Sadama.

If the research is proven successful, it offers a great relief to cancer patients, and offers great potential for increased agricultural productivity that will encourage farmers to grow mushrooms as another source of income.

Meanwhile, in the field of materials science, a research project practically addressed two basic problems when it comes to the use of plastics: pollution and food safety, especially when plastic is used for food packaging.

Student-researchers Mikaela Andrea Paula Aquino, Patricia Nicole Aquino, and Erica Nicole Saljay from the PSHS-Southern Mindanao Campus in Davao conducted their experiment on potato to solve the problems connected with the use of plastics.

Their research work titled, "Characterization of (*Solanun tuberosum*) Potato – Red Cabbage (*Brassica* var. *oleracea* F. rubra) Composite Film for Intelligent Packaging Applications" is one of the 48 research papers that passed the screening and made the final cut.

Dr. Solidum listens intently to one of the students explaining her group's research.

One of the groups showcase their research output during the research summit.

"The primary problem we want to address is the issue of plastic pollution and aside from that we want to tackle the issue of food spoilage brought about by food infection or more of the ingestion of spoiled food. With this packaging, we want to make it easier for people to see if the food is already spoiled without actually having to be in contact with it. For food packaging po talaga ang goal namin," said Aquino.

The three-day event was held from 28 to 30 August 2019 at the Subic Bay Travelers Hotel and Convention Center inside the Subic Bay Freeport Zone in Subic, Zambales. The annual event is being conducted to encourage students in the science, technology, engineering, and mathematics or STEM strand to actively work on research studies and strengthen their skills and acumen in doing basic research that will address specific problems of society.

The Philippine Science High School System is under the wings of the Department of Science and Technology. The campuses represented were those in Quezon City (Main campus); Ilocos Region in San Ildefonso, Ilocos Sur; Cagayan Valley Region in Bayombong, Nueva Vizcaya; Cordillera Administrative Region in Irisan, Baguio City; Central Luzon Region in Clark Freeport Zone, Angeles, Pampanga; CALABARZON Region in Sampaga, Batangas City; MIMAROPA Region in Odiongan, Romblon; Bicol Region in Goa, Camarines Sur; Western Visayas Region in Jaro District, Iloilo; Central Visayas Region in Argao, Cebu; Eastern Visayas Region in Palo, Leyte; Central Mindanao Region in Balo-I Lanao, del Norte; Southern Mindanao Region in Tugbok District, Davao City; SOCCSKSARGEN Region in Koronadal, South Cotabato; Caraga Region in Butuan City, Agusan del Norte; and Zamboanga Peninsula Region in Dipolog City, Zamboanga del Norte.

Experts urge on solutions to protect the environment

By Sheila Marie Anne J. de Luna, *DOST-STII*

THE 41ST Annual Scientific Meeting (ASM) of the National Academy of Science and Technology, Philippines (NAST PHL) addressed ways on how science and technology can contribute to efforts to care for the country's environment and natural resources, particularly the nation's carrying capacity.

Carrying capacity, which is defined as the "supply of biological products and services that can be provided by the natural environment so that renewable resources are not depleted faster than they can be regenerated and that ecological systems remain viable," is a concept that is implicit in the Sustainable Development Goals (SDGs).

The 41st ASM highlighted efforts toward the attainment of the country's commitment to the United Nations' (UN) SDGs, particularly Goal 4: Quality Education, Goal 12: Responsible Consumption and Production, and Goal 14: Life Below Water.

Specifically, the scientific meeting zeroed in on issues and the basic scientific principles relating to plastic wastes, sustainable marine food security, and sustainable education, talent development, and retention.

Combatting the plastic waste problem

At the plenary session on plastic waste, NAST PHL Vice President and Academician Dr. Fabian M. Dayrit discussed the plastic waste problem and strategies on waste management.

"The key to reducing environmental impact is to re-use," stressed Dr. Dayrit, which he said is part of the commitment following the fourth session of the UN Environment Assembly or UNEA-4.

"Minimizing single-use plastics should only be a first step, we should not stop there," Dayrit said. "From the 3Rs (reduce, reuse, recycle), we would like to move to the 4Rs or the Circular Economy approach to plastic waste management," he added.

The fourth "R" in this formula refers to "redesign". Dr. Dayrit stressed on including the redesign of plastics for other uses, gearing toward the circular economy.

A related topic that was also discussed in the plenary session is the biodegradation of plastic wastes. Academician Dr. Ernesto J. del Rosario presented approaches to address the problem of plastic wastes, one of which is the use of biodegradable plastics instead of non-biodegradable ones.

Meanwhile, Academician Dr. Agnes C. Rola's talk on the challenges in governance and implementation of solid waste management programs focused on institutional arrangements for solid waste management at the local level and the challenges in the implementation of the law.

Lastly, Dr. Lyn Crisanta R. Panganiban of the University of the Philippines College of Medicine tackled the health impacts of plastic pollution.

"At the end of the day, the usage and how we dispose of plastics have offered now a big risk, and offers the question of whether the use of plastics outweigh the risks," said Dr. Panganiban.

Her lecture centered on available information with regard to chemicals in plastics that possess potential toxic effects to humans. She also discussed gaps in data that should be addressed for proper risk assessment in relation to the health impacts of plastic pollution.

Sustainable management of marine food sources

Meanwhile, the plenary session on sustainable marine and food security centered on recent trends in sustainability in the Philippine

The impact of plastic wastes on people's health and on other living creatures, like marine animals, was discussed in the plenary session on combatting the plastic waste problem during the 41st NAST Annual Scientific Meeting.

seaweed industry, the challenges in regaining sustainability in Philippine culture fisheries, and the challenges facing the sustainability of Philippine marine food security.

The discussion on the sustainability of the seaweed industry focused on the move to reinstate carrageenan as an organic ingredient in the United States (US).

Academician Dr. Marco Nemesio E. Montaño presented the rebuttal submitted by the Philippines to the National Organic Standards Board (NOSB) Division of the US Department of Agriculture (DA) with regard to the delisting of carrageenan from the list of allowed substances under The Organic Foods Production Act of the United States of America.

The Philippine government and the other Asian member states were able to convince the US DA to maintain the Organic Status

industry.gov.pg

The Philippines was successful in convincing the United States Department of Agriculture to maintain carrageenan's organic status classification after it was removed from the list of allowed substances under The Organic Foods Production Act of the United States of America.

classification of carrageenan for the next five years before the next review of the NOSB.

Another topic discussed is how capture fisheries in the country can regain its sustainability. Dr. Wilfredo L. Campos of the UP Visayas campus in Miag-ao, Iloilo presented statistics showing that about 80 percent of the country's major fishing grounds are already overfished beyond their carrying capacities.

There were also discussions on the challenges of implementing measures that would help stem the continuing deterioration of resources, and to allow stocks to recover.

On the topic of the challenges facing the sustainability of Philippine marine food security, Academician Dr. Cesar L. Villanoy highlighted the status, challenges, and opportunities facing the capture and mariculture industries. He presented the Philippine Fisheries Production data 2002-2018, and reported that there is a 40 percent shortfall in fish production.

Efforts to train and retain scientists and engineers

Lastly, the plenary session on sustainable education, talent development, and retention highlighted the capacity of our country to train, retain, and effectively utilize the country's scientists and engineers.

Academician Dr. William G. Padolina assessed current efforts in the country to develop, attract, and retain the critical mass of talents in science, technology, engineering, and mathematics or STEM.

He gave a holistic view of how investing in the interdisciplinary science can contribute to sustainable development. He pointed that in spite of the large number of STEM graduates, the country's number of researchers is still very small compared with our neighboring countries. In 2016, the percentage of graduates from STEM programs in tertiary education was 28.7 percent compared to 29.9 percent for Republic of Korea and 34.5 percent for Singapore. Meanwhile the number of researchers, full-time equivalent per million population in 2013 was only 188 for the Philippines, compared to 674 for Vietnam, 791 for Thailand, 1,073 for China, and more than 6,000 for Republic of Korea and Singapore.

He also mentioned the continuous decline in the number of faculties with higher education (HE) degrees in higher education institutions (HEIs) and state universities and colleges. Dr. Padolina cited data from the Office of Planning, Research, and Knowledge Management of the Commission on Higher Education, which showed that the National Capital Region has the highest number of faculty members with doctoral degrees (1,521 or 18.25% of 8,335 HE faculty). On the other hand, the Davao Region experienced the highest decrease in number

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Despite the large number of STEM graduates, the country's number of researchers is still very small compared to our neighboring countries, according to Academician Dr. William G. Padolina.

of faculties with HE degrees (a decrease of 85 from 172 in Academic Year (AY) 2017-2018). Meanwhile, the country's SUCs experienced an overall difference of -3,279 in the number of faculty from AY 2015-2016 to 2017-2018, with +560 of which are faculty members with doctoral degrees.

Dr. Padolina suggested to strengthen basic science and mathematics departments, upgrade STEM instructional laboratories and equipment; re-envision and reform graduate education programs; establish a highly-efficient research management system; institute programs to upskill workforce; and establish an industrial extension network among HEIs.

Meanwhile, on the topic of brain drain and the inbreeding in the training of future Filipino scientists Academician Dr. Cesar A. Saloma highlighted the fact that the number of researchers, scientists, and engineers (RSEs) per million of Philippine population is currently below the UNESCO benchmark of 380. According to World Bank data, there were only 188 RSEs in the country in 2013.

Dr. Saloma stressed that reaching the UNESCO benchmark depends on the steadily increasing supply of STEM PhD and MS students, and also on the expanding pool of mentors who will successfully train them.

Two other topics were presented in the session: "Education Development and Talent Retention" delivered by Dr. Jose Ramon G. Albert, senior research fellow of the Philippine Institute for Development Studies, and "The Challenge of Retaining Talents: The MSU-IIT experience" by Dr. Franco G. Teves, vice Chancellor for academic affairs, Mindanao State University-Iligan Institute of Technology.

The 41st ASM was held 10-11 July 2019 at the EDSA Shangri-La in Mandaluyong City.

NAST PHL is an attached agency to the DOST that is mandated to recognize outstanding achievements and advise the President and the Cabinet on matters related to science and technology.

NAST PHL honors outstanding scientists, researches, new members

By Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

NAST PHL welcomes new corresponding members and Academicians (left to right): Dr. Michael D. Purugganan, Dr. Romel. D. Gomez, Dr. Rex Victor O. Cruz, Dr. Benito M. Pacheco, Dr. Rody G. Sy, and Dr. Juan M. Pulhin.

IN LINE with the celebration of its 41st Annual Scientific Meeting (ASM), the National Academy of Science and Technology, Philippines (NAST PHL) recognized outstanding young scientists, researchers and their researches, outstanding books and authors, and likewise welcomed new Academicians as members.

Four new members were inducted to the NAST PHL, namely: Dr. Rex Victor O. Cruz, Dr. Benito M. Pacheco, Dr. Rody G. Sy, and Dr. Juan M. Pulhin.

Dr. Cruz was inducted as member for his contributions to watershed management in the country. He was also credited for pioneering the application of geographic information system or GIS in planning and watershed management.

Dr. Pacheco, on the other hand, was recognized for his research works in engineering science and technology, and disaster risk management. He also played an important role in the formulation of a new legislative proposal on the Philippine Building Act. The proposal aims to reform the legal framework and set the stage for periodic updating of administrative rules and regulations and technical reference standards for buildings in the Philippines.

A practicing cardiologist, Dr. Sy was recognized for his pioneering work on cardiogenomics that helped in the understanding of the genetic basis of cardiovascular conditions among Filipinos. He also initiated the Nationwide Survey on Cardiovascular Risk Factors, which has become a regular component of the National Nutrition and Health Survey of the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI).

The fourth newest member inducted to NAST PHL is Dr. Pulhin for his pioneering work on the development of participatory approaches to climate risk, vulnerability, and adaptation. He was also recognized for his groundbreaking research in social forestry governance, which helped steer policy reforms in community-based forest management and forest rehabilitation programs in the country.

Meanwhile, the two new corresponding members were Dr. Michael D. Purugganan and Dr. Romel D. Gomez.

Dr. Alonzo A. Gabriel (center) is the recipient of the 2018 Third World Academy of Sciences Prize for Young Scientist in the Philippines. He received the award from NAST PHL President Dr. Rhodora V. Azanza and Secretary Fortunato T. de la Peña.

Dr. Purugganan was recognized for his contributions in the fields of plant genomics and plant evolutionary biology, specifically in the study of rice genomics and the evolution of rice varieties/variants; while Dr. Gomez, whose contributions in the fields of magnetism, nanoelectronics, surface science and biochemical sensors, earned him the recognition by NAST PHL.

2018 TWAS Prize for Young Scientist in the Philippines

The NAST PHL and the Third World Academy of Sciences or TWAS, award one scientist every year with a plaque and US$2,000 for outstanding contributions in any of the following fields: biology, chemistry, mathematics, and physics.

For 2018, the award went to Dr. Alonzo A. Gabriel for the field of biology, specifically for his significant works in predictive microbiology and their applications in food processing.

Dr. Gabriel coined the term "precision food processing" that involves the simultaneous use of models that estimate the inactivation of disease-causing microorganisms and quality deterioration rates. His researches help address consumer demands for food safety and quality.

Outstanding Young Scientists

This year, NAST PHL chose 12 researchers as recipients of its Outstanding Young Scientists award. The following were the awardees:

Dr. Frolan A. Aya of Southeast Asian Fisheries Development Center, Dr. Patricia Ann A. Jaranilla-Sanchez of the University of the Philippines (UP) Los Baños, Dr. Pia D. Bagamasbad of UP Diliman, Dr. Michael C. Velarde of UP Diliman, Dr. Marla M. Redillas of De La Salle University (DLSU), Dr. Ryan Rhay P. Vicerra of DLSU; Dr. Raymond Francis R. Sarmiento of UP Manila, Dr. Nathaniel S. Orillaza Jr. of UP Manila, Dr. Michael Francis Ian G. Vega II of UP Diliman, Dr. Lilibeth A. Salvador-Reyes of UP Diliman, Dr. Rico C. Ancog of UP Los Baños (UPLB), and Dr. Maria Guadalupe C. Salanga of DLSU.

2019 NAST Talent Search for Young Scientists

This award is presented by NAST PHL to young researchers (not more than 35 years old) to

The winners of the various awards and recognitions from NAST PHL took center stage during the awarding ceremony of the 41st Annual Scientific Meeting. Among them were the recipients of the Outstanding Book Award (top left), Outstanding Young Scientists (bottom left), Outstanding Scientific Papers (bottom right), and 2019 NAST Talent Search for Young Scientists (top right).

encourage more young people to pursue a career in science.

Trophies and cash prizes are awarded yearly to the best three scientific paper presenters, be it an applied or basic research.

This year, the first prize went to Dr. Darwin B. Putungan of UPLB, second prize was given to Dr. Lillian Jennifer V. Rodriguez of UP Diliman, and third prize was awarded to Dr. Deo Florence L. Onda of UP Diliman.

Aside from the three winners, two others were given a special citation for their outstanding researches: Dr. Gladys L. Pascual of Southern Leyte State University and Dr. Neil Stephen A. Lopez of DLSU.

2018 Magsaysay Future Engineers/ Technologists Award

The Magsaysay Future Engineers/Technologists Award recognizes outstanding research outputs on engineering and technology at the collegiate level, with finalists coming from different academic institutions.

First prize was received by Peter Nicholas S. Onglao of UP Diliman, second prize went to John Christopher A. Dañez from UPLB, and third prize went to Renzes Anne Gaerelle M. Gualberto of UP Diliman.

Special citations were also awarded to Jayne Lois G. San Juan of DLSU and Berenice Dophnie C. Ruiz of the University of Science and Technology of Southern Philippines.

2019 Outstanding Book Award

Two outstanding books received the distinction of receiving the 2019 Outstanding Book Award from NAST PHL:

"Kasaysayan at Vulnerabilidad: Ang Lipunang Pilipino sa Harap ng Pananalanta ng Pesteng Balang, 1569-1949" by Ma. Florina Orillos-Juan, published by the DLSU Publishing House; and "PDRI 2015: Philippine Dietary Reference Intakes" by the DOST-FNRI Technical Working Group, published by the DOST-FNRI.

2019 Outstanding Scientific Paper Award

Four outstanding research papers received the coveted Outstanding Scientific Paper Award. These are the following:

"Cytogenetics of *Solanum aethiopicum* L., *S. melongena* L. and Their F1 Hybrids and the Mechanism of Hybrid Sterility and Breakdown" by Khris June L. Callano, Visitacion C. Huelgas, and Merlyn S. Mendioro, published at the Philippine Journal of Crop Science 40 (2): 33-44, 2015.

"An Enhanced Root System Developmental Responses to Drought by Inoculation of Rhizobacteria (*Streptomyces mutabilis*) Contributed to the Improvement of Growth in Rice" by Roel R. Suralta, Ma. Ysabera T. Batungbakal, Justine Camille T. Bello, Lance M. Caparas, Vincent H. Lagunilla, Katreen Mae D. Lucas, Joeffrey U. Patungan, Angela Joyce O. Siping, Jayvee A. Cruz, Maria Corazon J. Cabral, and Jonathan M. Niones, published in the Philippine Journal of Science 147 (1): 113-122, 2018.

"Pathology and DNA Analysis of Exhumed Human Remains Three-Years Post-mortem" by Gayvelline C. Calacal, Jazelyn M. Salvador, Minerva S. Sagum, Raquel D. Fortun, and Maria Corazon A. De Ungria, published in the Philippine Journal of Science 147 (1): 9-16, 2018.

"The Ecology of an Incipient Marine Biological Invasion: The Charru Mussel *Mytella charruana* d'Orbignyi, 1846 (Bivalvia: Mytilidae) in Manila Bay, Luzon, Philippines" by Benjamin Vallejo Jr., Jennifer Conejar-Espedido, and Leanna Manubag, published in the Philippine Journal of Science 146 (4): 483-492, 2017.

The awarding was held at the closing ceremonies of the 41st ASM on 11 July 2019 at the EDSA Shangri-La Hotel in Mandaluyong City.

Academicians push for resolutions in aid of policy development, legislation

By Sheila Marie Anne J. de Luna, *DOST-STII*

ACADEMICIANS AND members of the National Academy of Science and Technology Philippines (NAST PHL) recently endorsed resolutions that address current concerns in the areas of plastic pollution, sustainable marine food security, and sustainable education, talent development, and retention.

The resolutions, consolidated from the regional scientific meetings and the 41st Annual Scientific Meeting (ASM) held on 10-11 July 2019, will be transmitted to the Office of the President, the Cabinet, and the Congress for appropriate action and consideration, according to NAST PHL.

Prior to the conduct of the 41st ASM, regional scientific meetings in Luzon, Visayas, and Mindanao were conducted in partnership with Department of Science and Technology (DOST) regional offices. It was during the regional scientific meetings that several partnership resolutions were formed.

In her report of the past year's ASM, NAST PHL President Dr. Rhodora V. Azanza said that various government agencies have acted upon the resolutions and recommendations of the 40th ASM and have met with NAST PHL officers to discuss them.

Among these was the office of Senator Juan Edgardo "Sonny" Angara. The meeting discussed talent retention, amendments to the procurement law, and the blue economy. This has since resulted in the filing of the Senate resolution that called for an inquiry on the country's blue economy.

The said resolutions are as follows:

41st ASM Resolutions

Whereas, sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs";

Whereas, the Brundtland Report on Sustainable Development (1987) emphasizes "the concept of needs in particular the essential needs of the world's poor;" and the "idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs";

Whereas, in 2015, following the completion of the Millennium Development Goals, the United Nations Member States adopted the 2030 Agenda for Sustainable Development that "provides a shared blueprint for peace and prosperity for people and the planet, now and into the future";

Whereas, the 17 Sustainable Development Goals (SDGs) recognize that "ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests";

Whereas, the Philippines, guided by the Philippine Development Plan (2017-2022) and the Ambisyon Natin 2040, through its various government agencies, endeavors to achieve the 17 SDGs;

Whereas, Republic Act 8425, also known as Social Reform and Poverty Alleviation Act defines minimum basic needs as "needs of a Filipino Family pertaining to survival (food and nutrition; health; water and sanitation; clothing), security (shelter; peace and order; public safety; income and livelihood) and enabling (basic education and literacy; participation in community development; family and psycho-social care)";

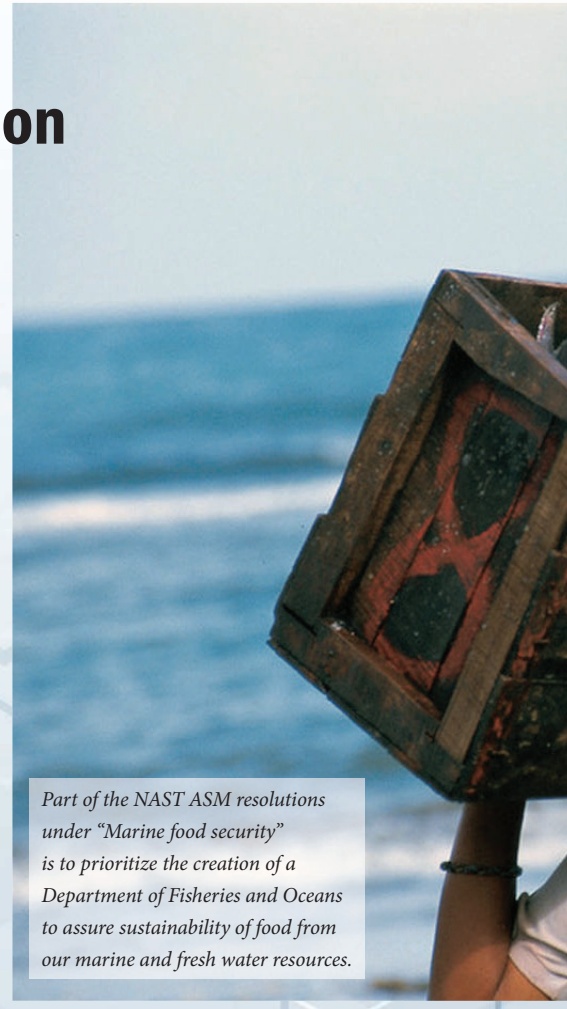
Whereas, we recognize technology as the key to expanding carrying capacity to match population growth in combination with a vigorous implementation of the Reproductive Health Law (Republic Act 10354), and with raising living standards;

Whereas, the National Academy of Science and Technology, Philippines (NAST PHL), recognizes the importance of transformation of science-based knowledge into goods and services for the Philippines' path towards sustainability and resiliency as focused in the three SDGs: Goal 4 – Quality Education, Goal 12 – Responsible Consumption and Production, and Goal 14 – Life Below Water, among others;

Whereas, the theme of the NAST 41st Annual Scientific Meeting, "Caring for the Country's Carrying Capacity" focuses on achieving SDG numbers 4, 12, and 14, which includes (a) talent development and retention, (b) elimination of plastic waste, and (c) sustainable marine food security, among others;

Whereas, investing in talent development and retention will secure adequate numbers of highly trained and skilled citizens for the nation's advancement;

Whereas, plastic waste has been shown to adversely impact human health and the environment, in particular marine organisms;



Part of the NAST ASM resolutions under "Marine food security" is to prioritize the creation of a Department of Fisheries and Oceans to assure sustainability of food from our marine and fresh water resources.

"Whereas, imposing guidelines on the reduce, reuse, recycle, and redesign (4Rs) of plastics will help in reduction of plastic pollution";

Whereas, addressing the adverse effects of climate change will positively impact the security of marine food resources;

"Whereas, addressing these concerns will significantly improve the country's carrying capacity";

Now, therefore, it is hereby resolved that the following actions be recommended:

Part 1: Talent development and retention

- Enhance activities that will increase awareness and appreciation of the value and impact of S&T in society in general and in the K to 12 STEM curriculum in particular;
- Increase support for the development of STEM faculty and facilities in K to 12;
- Increase support for graduate education scholarships for study in the Philippines and abroad;
- Participate in global initiatives on the environment; and

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The Academicians propose the consolidation, passage, implementation, and funding of proposed legislation on the phase out of non-biodegradable single-use plastic materials.

whyy-org

- Promote acquisition of talents by providing incentives for high-level Filipino and foreign professionals to work in the Philippines.

Part 2: Reform the R&D Ecosystem

- Eliminate dysfunctionalities in the research and development ecosystem such as the lack of regular items for high level R&D staff, restrictions to avail [of] opportunities for training abroad, uncompetitive compensation packages;
- Reform the procurement and fund disbursement system in STEM research, development and extension (RDE) activities; and;
- Increase public and private investments in the emerging technologies.

Part 3: Management of plastic waste

- Support zero waste initiatives at the national, regional, and local levels;
- Consolidate, pass, faithfully implement, and adequately fund proposed legislation at the local and national levels on the phase out of non-biodegradable single-use plastic materials;
- Accelerate research and development on single use biodegradable packaging materials;
- Accelerate research and development to re-design plastics and chemical additives to make them more recyclable and safer;
- Accelerate research and development to safely recycle plastic waste;
- Craft more systematic collection, reuse and disposal of recyclable materials at the local and national levels;
- Reduce the use of plastic materials in products and services (e.g. straw, utensils); and
- Conduct comparative analyses of incineration, waste-to-energy, and other alternative approaches as possible solutions to plastic waste disposal.

Part 4: Marine food security

- Increase investments on research and development in site-specific science-based management of aquatic resources, such as scheduling closed and open fishing seasons and marine protected areas;
- Increase investments in research and development of new integrated technologies in aquaculture;
- Prioritize the creation of a Department of Fisheries and Oceans to assure sustainability of food from our marine and fresh water resources;
- Train fisherfolk to adopt sustainable mariculture practices specifically on feed quality, feeding practice, and water quality monitoring;
- Pass and implement the National Land Use Act to rationalize the use of land and water resources for food security, industrial development, and human settlements; and
- Revitalize the seaweed industry by providing support to (a) scientific and technical personnel and (b) social, economic, and seaweed biodiversity studies.

Part 5: Sustainable Halal Ecosystem

- Advocate for the passage of a law to define the standards of a robust Philippine Halal industry.

Under the resolutions on "Talent development and retention", the Academicians propose to actively promote talent acquisitions by providing incentives for high-level Filipino and foreign professionals to work in the Philippines.

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Phil Journal of Science papers win awards

By David Matthew C. Gopilan, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

DOST Secretary Fortunato T. de la Peña (rightmost) and DOST-NAST PHL President Academician Rhodora V. Azanza (leftmost) are joined by authors of the paper on post-mortem DNA analysis (L-R:) Jazelyn M. Salvador, Gayvelline C. Calacal, Minerva S. Sagum from UP Diliman, and Raquel D. Fortun from UP Manila.

THREE OUT of the four papers that bagged the 2019 Outstanding Scientific Papers award by the National Academy of Science and Technology, Philippines (NAST PHL) were published at the Philippine Journal of Science (PJS), a publication of the Department of Science and Technology (DOST).

The first paper entitled "The Ecology of an Incipient Marine Biological Invasion: The Charru Mussel *Mytella charruana* d'Orbignyi, 1846 (Bivalvia: Mytilidae) in Manila Bay, Luzon, Philippines" discusses the initial colonization of the charru mussel, a non-native mollusk, in Manila Bay. It was published in the December 2017 issue of PJS. The authors are Benjamin M. Vallejo Jr. from University of the Philippines (UP) Diliman, Jeniffer Conejar-Espedido from UP Los Baños, and Leanna Manubag from Biodiversity Management Bureau.

The authors argued that charru mussel has a potential to become an invasive species because they can quickly reproduce themselves and adapt to coastal conditions. A non-native organism can be considered as invasive if it threatens the environment and economic activities, and harms human health.

Meanwhile, the recovery of DNA profiles from exhumed human remains three years after the person's death was reported in the paper entitled, "Pathology and DNA Analysis of Exhumed Human Remains Three-years Post-mortem" that appeared in 24 March 2018 issue of PJS.

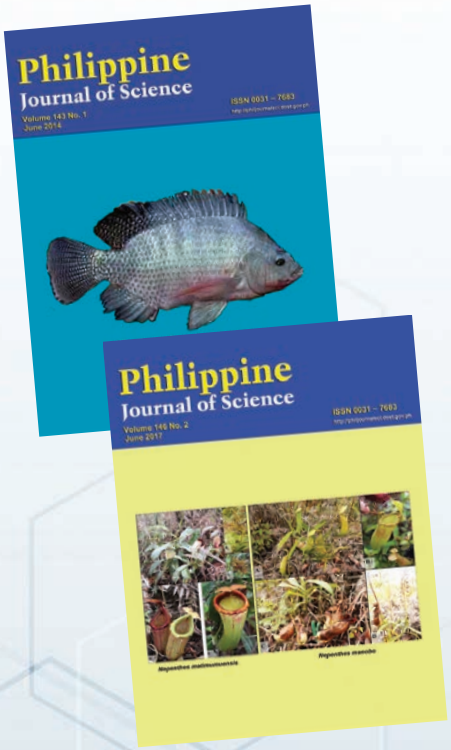
The paper was authored by Gayvelline C. Calacal, Jazelyn M. Salvador, Minerva S. Sagum, Maria Corazon A. de Ungria from UP Diliman; and Raquel D. Fortun from UP Manila. Methods explained in the paper helped solved a case in which a claimant of an estate of the deceased woman was found not a biological child and hence not entitled to any inheritance from the departed.

Lastly, the paper "An Enhanced Root System Developmental Responses to Drought by Inoculation of Rhizobacteria *(Streptomyces mutabilis)* Contributed to the Improvement of Growth in Rice" showed that inoculating a particular microbe can improve the root system of rice plant, thereby making the plant more responsive to a drought environment.

Authors of the paper are Roel R. Suralta, Jayvee A. Cruz, Maria Corazon J. Cabral, and Jonathan M. Niones from the Philippine Rice Research Institute; and Ma. Ysabera T. Batungbakal, Justine Camille T. Bello, Lance M. Caparas, Vincent H. Lagunilla, Katreen Mae D. Lucas, Joeffrey U. Patungan, and Angela Joyce O. Siping from Muñoz National High School.

The authors wrote that an improved root system of rice—more root hairs and longer roots—can maximize absorption of water from the soil, which leads to plant growth. Their goal is to use their findings in growing rice in water-deficient high-ground rice paddies. The paper was published in the March 2018 issue of the PJS.

According to NAST PHL, the papers were chosen for their quality of content, overall presentation, thoroughness of documentation, and contribution to science and technology.



The Philippine Journal of Science, the country's oldest scientific journal, publishes research papers on natural and applied sciences, engineering and technology, mathematics, and social sciences. All papers undergo a peer review, a process in which other experts check the technical merit of a paper before being published.

The papers considered for the award should have been published five years prior to the awarding and must have been published in local journals that are listed in Scopus or Thompson Reuters.

The awarding was held at the Annual Scientific Meeting of NAST PHL on 11 July 2019 at the Shangri-La Hotel, Mandaluyong City.

NAST PHL is an attached agency of the Department of Science and Technology. It provides science and technology related advice to the country's President and Cabinet members.

The three papers are publicly available at PJS website (philjournalsci.dost.gov.ph).

The PJS publishes research papers on natural and applied sciences, engineering and technology, mathematics, and social sciences. All papers undergo peer review, a process in which other experts check the technical merit of a paper before being published. Researchers publish their papers in a journal to contribute to knowledge, present their work to other scientists, and grow their career.

Dr. Roel R. Suralta (sixth from left) from the Philippine Rice Research Institute (PhilRice) in the Science City of Muñoz, Nueva Ecija receives the award with some of his co-authors from PhilRice and Muñoz National High School. Also with them are Sec. de la Peña and Dr. Azanza.

Awardees (from left to right) Dr. Benjamin M. Vallejo Jr. from University of the Philippines (UP) Diliman, Jeniffer Conejar-Espedido from UP Los Baños, and Leanna Manubag from the Biodiversity Management Bureau are joined by Sec. de la Peña and Dr. Azanza.

The other winners of the 2019 Outstanding Scientific Paper Award are Khris June L. Callano, Visitacion C. Huelgas, and Merlyn S. Mendioro for the paper entitled, "Cytogenetics of Solanum aethiopicum L., S. melongena L. and Their F1 Hybrids and the Mechanism of Hybrid Sterility and Breakdown." The paper was published in the Philippine Journal of Crop Science.

DOST's S&T week focuses on SDGs attainment thru technologies, innovation

by Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

The 2019 National Science and Technology Week (NSTW), an annual celebration of the Department of Science and Technology (DOST), focused on how developments in science, technology, and innovations will help achieve the Philippines' commitment to the United Nations' Sustainable Development Goals (SDGs).

At the opening of the 2019 NSTW, DOST Secretary Fortunato T. de la Peña talked about the SDGs and how innovations and technologies are paving the way for the attainment of the country's SDG goals.

"This year's NSTW focuses on how science and technology are helping us achieve the Sustainable Development Goals," said Sec. de la Peña. "With our NSTW experience, I can say that there is hope in the Philippines because of science and technology."

The Secretary described the eight clusters in the exhibit area at the NSTW which displays the latest technologies and innovations, programs, and advocacies of the different agencies of the DOST.

President Rodrigo Roa Duterte, the keynote speaker for the NSTW, was represented by Department of Education Secretary Leonor M. Briones, who commended the President for his support to the establishment of the Senior High School program. Sec. Briones believes that the integration of STEM education in the senior high school program will provide a strong science and technology (S&T) foundation among the youth who will be scientists, researchers, engineers, and mathematicians in the future.

Sec. Briones also acknowledged how S&T has helped improved the way science is being taught these days. "Science and technology developments are helping our teachers improve the way we teach," she said.

Incoming chair of the Science and Technology (S&T) Committee at the Senate, Senator Francis N. Tolentino, also graced the opening of the NSTW and shared how excited he is to chair the S&T Committee and learn new things about science and technology and how it can help improve the lives of Filipinos.

The event also saw the launch of Chris Tiu as DOST's brand ambassador to help spread awareness

DepEd Secretary Leonor M. Briones believes that integrating STEM in the senior high school program will help buld a storng S&T foundation among the youth and encourage them to be future STEM professionals.

Department of Science and Technology Secretary Fortunato T. de la Peña (3rd from left), together with Senator Francis N. Tolentino (4th from left), Department of Education Secretary Leonor M. Briones (2nd from right), and Chris Tiu (leftmost), DOST Brand Ambassador, led the ribbon cutting of the 2019 National Science and Technology Week, held 17-21 July at the World Trade Center in Pasay City.

on science and technology especially among the youth.

"My role is to help encourage the youth to love science or to pursue a career in science, or at least consider it," said Tiu. He added that with his following, especially in social media, he can help encourage the youth to love science or go into science.

"Hopefully, the youth can also channel their interest in social media and incorporate science in their content," Tiu said. He added that he himself hopes to create content on social media focused on S&T to help change the minds of the youth about the field.

The 2019 NSTW was held 17-21 July at the World Trade Center in Pasay City.

NSTW moved to November

by Marshall Louie M. Asis, *DOST-STII*

The National Science and Technology Week (NSTW) will now be held in November every year.

This was after President Rodrigo Roa Duterte signed Proclamation 780 on 2 August, thereby officially changing the NSTW celebration from the third week of July to the fourth week of November every year.

Proclamation 780 was issued upon the request and recommendation of the Department of Science and Technology (DOST) which spearheads the annual event. This is in line with the recent changes in the academic calendar of many universities, which shifted to August as the start of the school year. Changing the schedule of NSTW is expected to increase students' attendance in the week-long event.

DOST Secretary Fortunato T. de la Peña said that the NSTW and its regional equivalents, the Regional Science and Technology Week, are opportunities for DOST to showcase its programs and projects on research and development, technology transfer, productivity and technology interventions, as well as its contributions to human resources development activities in the country.

Through the Proclamation, the President called upon all government agencies and encouraged local government units and private groups to give support and assistance to the DOST in celebrating the NSTW.

Chris Tiu named as DOST ambassador

by **Sheila Marie Anne J. de Luna**, *DOST-STII*

Photo by **Henry A. de Leon**, *DOST-STII*

Photo by **Kimverlyn C. Sayson**, *DOST-STII*

Chris Tiu, the first Brand Ambassador of the Department of Science and Technology, says that his role is to "help encourage the youth to love science or to pursue a career in science, or at least consider it." With him are the winners in the #HulaWHO contest of the 2019 National Science and Technology Week (2019 NSTW) Facebook page. John Michael Bricia, Marron Payosalan, and Angela Nalda were the first to comment the correct answer that Chris Tiu is the DOST's Brand Ambassador, earning the three students a special time with Chris Tiu on the NSTW opening day.

The Department of Science and Technology (DOST) has found a new ally in promoting science, technology, and innovation.

Television host, entrepreneur, and former basketball player Chris Tiu is now the DOST's brand ambassador, bringing with him his many achievements, credentials, and positive influence, especially among the youth.

Tiu was launched as Brand Ambassador of the DOST during the opening program of the 2019 National Science and Technology Week (NSTW) on 17 July at the World Trade Center in Pasay City.

At the press conference for the NSTW, Tiu thanked the DOST for choosing him to be the Department's brand ambassador. "I hope that I can help you out in your advocacies in promoting science and technology especially among the youth," Tiu said.

"My role is to help encourage the youth to love science or to pursue a career in science, or at least consider it," added Tiu.

He also expressed hope that the youth can channel their interest in social media in creating content related to science. "I want to help the youth to realize that science is cool and it is for everyone and benefits us all," Tiu explained.

Secretary Fortunato T. de la Peña also expressed hope that with Tiu on board as the DOST ambassador, more people will be aware of how science and technology can help them.

"We had a long list of names to choose from as DOST ambassador and I am very glad that we eventually chose Chris Tiu to be the face of DOST. His interest and knowledge on science will be beneficial for all us," the Secretary said.

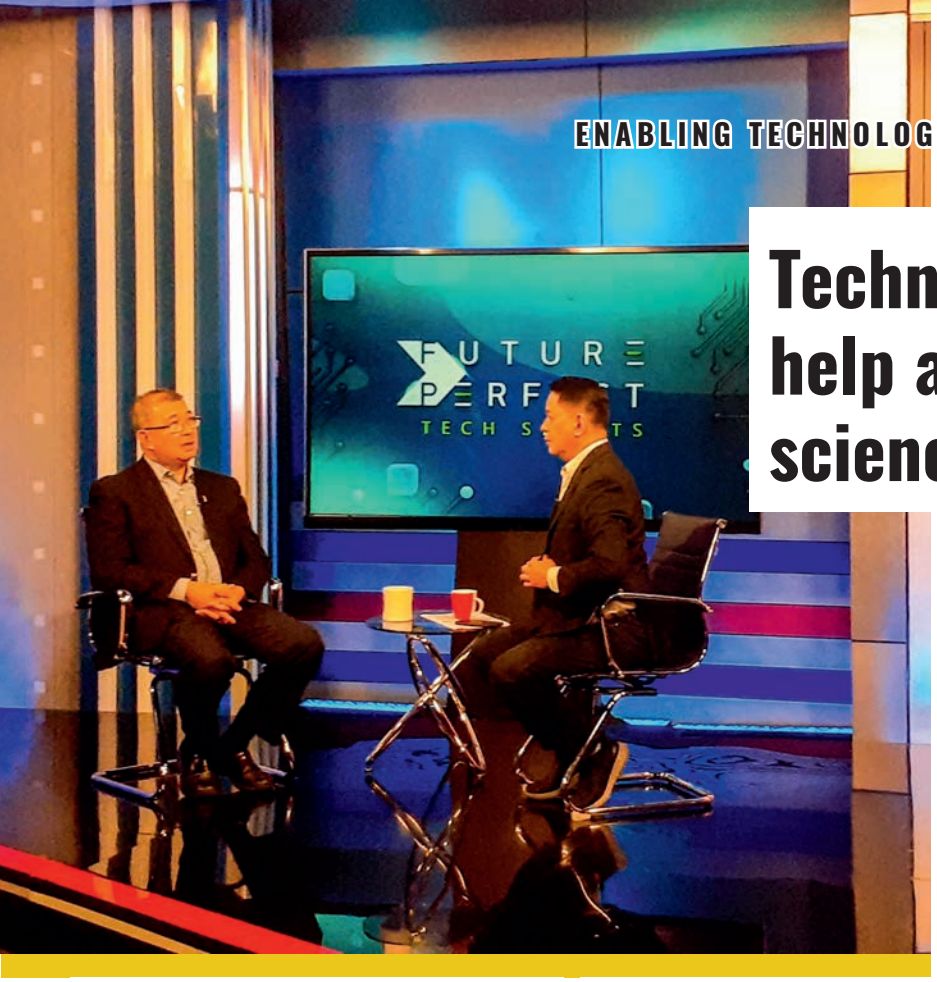
Chris Tiu or Christopher John Alandy-Dy Tiu graduated with a degree in Management Engineering from the Ateneo de Manuila University. He first made a name for himself when he played for the Ateneo Blue Eagles basketball team in the UAAP. From there, he went on to play professionally for the Philippines' national team and the Philippine Basketball Association.

After retiring from professional basketball, Tiu explored the world of show business as television host for several shows, including his current show, iBilib on GMA 7. The show features scientific experiments and explores scientific facts and theories surrounding everyday events.

Aside from hosting, he is also a commercial model and products endorser, and has also served as Sangguniang Kabataan Chair of Barangay Urdaneta in Makati City. At 33, he owns or partly owns and manages several business enterprises.

With all his achievements so far, he has been awarded with several recognitions including the Ten Outstanding Young Men Award in 2013.

Tiu was one of the top choices among several celebrities that were identified as possible endorsers or influencers for the DOST in a commissioned survey done in the last quarter of 2018.



Technology innovations help achieve UN dev't goals, science chief says

by **Marshall Louie M. Asis,** *DOST-STII*

In an interview with ANC's "Future Perfect" TV program hosted by Tony Velasquez (right), DOST Secretary Fortunato T. de la Peña (left) highlights the important role of the country's technological innovations in achieving UN development goals.

The Philippine government marked the achievements of Filipino scientists and science experts as the country celebrated this year's National Science and Technology Week (NSTW). With the Department of Science and Technology (DOST) at the lead, activities highlighted how the country's technological innovations are helping to achieve the sustainable development goals (SDGs) mandated by the United Nations.

According to Secretary Fortunato T. de la Peña, the DOST decided to focus on the sustainable development goals because the time to reach 2030, the deadline for achieving the SDGs, is not too far from now. "Looking at the 17 SDGs, it is very easy to see that in many of these, science and technology can play a very significant role in the achievement of these goals," explained the DOST chief.

At the 2019 NSTW exhibit area, the 17 SDGs were clustered into eight exhibit areas namely: food security, energy, and environment; aging society, health, and medical care; S&T human resource development; equity and growth in the countryside; biodiversity and sustainable use of biological resources; sustainable cities and communities; disaster resilience and innovation; and international linkages.

"One cluster was on food security and the environment. There was also something on health and wellness, where aging and nutrition were included," Sec. de la Peña added. "There was a cluster on sustainable and smart cities, and also on disaster resilience where most of the technologies of PHIVOLCS like the Hazard Hunter app, were included, as well as PAGASA modernization and improvements."

Another cluster showcased equity and growth in the countryside which focused more on enterprises in the countryside to encourage value-adding activities and employ more people. Technology interventions that help uplift marginalized communities from their present situation were exhibited. A cluster on peace and justice, intervening more on the human resource side, was also showcased.

"Since the sustainable development goal talks about partnership and collaboration, we also have a cluster that showed our collaboration in science and technology with our bilateral partners (international linkages)," said the DOST chief.

Sec. de la Peña explained that the clusters were not arranged in order of priority, rather it was based on DOST's organizational structure that includes councils that deal with agriculture and forestry sector; aquaculture and marine sector; industry, energy, and emerging technologies sector; health and nutrition sector, which fits on the previously mentioned clusters.

There were many technologies of the agriculture and food security side, and also on the sustainability of marine environment and terrestrial resources, followed by those related to industry and manufacturing, which includes innovations developed by young scientists and inventors through DOST-supported start-ups.

DOST awards outstanding innovators, researchers, science administrator

by Sheila Marie Anne J. de Luna, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

The innovators behind Dragonpay, an online payment gateway and Vigormin, a technology that can be used for water remediation and treatment, were recently recognized for the successful commercialization of their technologies. The awarding was held during the opening ceremonies of the just concluded National Science and Technology Week (NSTW), an annual event organized by the Department of Science and Technology.

Robertson S. Chiang, chief operations officer of Dragonpay Corporation and Dr. Merlinda A. Palencia, who developed Vigormin, both received the Gregorio Y. Zara Medal or the Outstanding Technology Commercialization Award.

Chiang, chief operations officer of Dragonpay Corporation, was recognized for the successful commercialization of Dragonpay, an online payment gateway that gives merchants an alternative payment solution to help them expand their market reach.

Meanwhile, Dr. Palencia was recognized for the successful commercialization of Vigormin, a mixture of naturally-occurring organo minerals. Vigormin is seen as an effective water remediation/ treatment technology because it significantly stimulates growth of the indigenous aerobic microorganisms in wastewater and boosts the removal rate of organic pollutants.

Moreover, a special citation for the Gregorio Y. Zara Medal was awarded to Soil Scientist Dr. Erlinda S. Paterno of the National Institute of Molecular Biology and Biotechnology at the University of the Philippines (UP) Los Baños. The citation was given for the successful commercialization of BioGroe®, a solid-based microbial plant growth promoter. BioGroe® contains plant growth promoting bacteria that effectively enhances root growth and development, increases productivity of crops, and reduces the use of toxic or environmentally-damaging chemical fertilizers and pesticides.

Chiang and Dr. Palencia each received the Gregorio Y. Zara Medal, plaque, and PhP 100,000 cash prize, while Dr. Paterno received a plaque for special citation.

Aside from the technology commercialization awards, two outstanding research and development (R&D) awards were also given out.

This year's awardee for the Outstanding Research and Development Award for Applied Research, also called the Julian A. Banzon Medal, is Dr. Mary Donnabelle L. Balela, associate professor at the Department of Mining, Metallurgical and Materials Engineering at UP Diliman.

Dr. Balela was recognized for her outstanding scientific

(From left to right) National Academy of Science and Technology, Philippines (NAST PHL) President Rhodora V. Azanza, Senator Francis N. Tolentino, Department of Education (DepEd) Secretary Leonor M. Briones, Robertson S. Chiang, Merlinda A. Palencia, Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña, Erlinda S. Paterno, Ricardo P. Babaran, Mary Donabelle L. Balela, Dr. Alonzo A. Gabriel, National Scientist Lourdes J. Cruz, chair of the Board of Judges, and DOST-Technology Application and Promotion Institute (DOST-TAPI) Director Engr. Edgar I. Garcia.

Dr. Ricardo P. Babaran, chancellor of the University of the Philippines Visayas, receives the Dioscoro L. Umali Medal or the Outstanding Science Administrator Award.

Robertson Chiang of Dragonpay Corporation (left) receives the Gregorio Y. Zara Medal or the Outstanding Technology Commercialization Award at the 2019 National Science and Technology Week from Secretary Fortunato T. de la Peña (center) and DOST-TAPI Director Engr. Edgar I. Garcia (right).

research that demonstrated several approaches to further improve the quality of silver nanowires prepared by electroless deposition.

As a method of obtaining a desired coating, electroless deposition chemically reduces the metal ion or its complex on a base material. Meanwhile, nanowires are very thin structures that are only a few billionths of a meter in diameter but many thousands or even millions of times longer. These structures are currently being developed for use in electronics, optics and chemical sensing, and other fields.

Another R&D award is the Eduardo A. Quisumbing Medal or Outstanding Research and Development Award for Basic Research, which was given to Dr. Alonzo A. Gabriel of the Department of Food Science and Nutrition, College of Home Economics at UP Diliman.

Dr. Gabriel was recognized for his outstanding scientific research that has importance in the establishment of processes for product safety. Dr. Gabriel's research provides insights on how various tested variables influence *Salmonella enterica* inactivation in simulated fruit juices and eventually the process schedules for specific products with unique compositional properties.

Dr. Balela and Dr. Gabriel each received a plaque, medal, and PhP 200,000 cash prize.

Dr. Erlinda S. Paterno (third from right) receives a special citation for the Gregorio Y. Zara Medal or the Outstanding Technology Commercialization Award from Secretary Fortunato T. de la Peña (second from right), with (from left to right) NAST PHL President Rhodora V. Azanza, Senator Francis N. Tolentino, DepEd Secretary Leonor M. Briones, and DOST-TAPI Director Engr. Edgar I. Garcia.

Lastly, an outstanding administrator received the Dioscoro L. Umali Medal or Outstanding Science Administrator Award.

UP Visayas (UPV) Chancellor Ricardo P. Babaran received the award in recognition of his accomplishments as Vice Chancellor for Research and Extension and Chancellor of the UPV. His citation mentioned his achievements in laying a strong groundwork in advancing science and technology through R&D not only in UPV but also among other state universities and colleges all throughout the country and in some international institutions.

Dr. Babaran also conceptualized multiple plans and innovations with regard to the implementation of processes in research transactions, and advocated for the increase in the regular appropriations that gave way to more innovations and interventions to improve research capacity in science and technology.

He received a plaque, medal, and PhP 200,000 cash prize.

All the awards were named after National Scientists, namely: Dr. Dioscoro L. Umali, scientist, educator, research organizer, development administrator, and science statesman, who is recognized as the Father of Plant Breeding; Gregorio Y. Zara, a renowned engineer, educator, scientist, and inventor; Dr. Julian A. Banzon, an outstanding chemist whose studies were focused on the Philippine coconut as a primary renewable source of chemicals and fuels; and Dr. Eduardo A. Quisumbing, an outstanding botanist, orchidologist (recognized as the Father of Orchidology), administrator, conservationist, curator, science writer, and educator.

Dr. Alonzo A. Gabriel from the Department of Food Science and Nutrition at the University of the Philippines Diliman (center) receives the Eduardo A. Quisumbing Medal or the Outstanding Research and Development Award for Basic Research at the 2019 National Science and Technology Week from DOST Secretary Fortunato T. de la Peña, and DepEd Secretary Leonor M. Briones.

Dr. Mary Donnabelle L. Balela from the Department of Mining, Metallurgical and Materials Engineering at the University of the Philippines Diliman (second from right) receives the Julian A. Banzon Medal or the Outstanding Research and Development Award for Applied Research from DOST Secretary Fortunato T. de la Peña (rightmost), with (from left) NAST PHL President Dr. Rhodora V. Azanza, Senator Francis N. Tolentino, and DepEd Secretary Leonor M. Briones.

Dr. Merlinda A. Palencia (second from right) who developed Vigormin receives the Gregorio Y. Zara Medal or the Outstanding Technology Commercialization Award at the 2019 National Science and Technology Week. With her are (from left to right) Senator Francis N. Tolentino, DepEd Secretary Leonor M. Briones, and DOST Secretary Fortunato T. de la Peña.

Photo from DOST-SEI

Science learning on-the-go:

DOST launches 'nuLab' to discover future scientists, innovators

by Allan Mauro V. Marfal, *DOST-STII*

"By the bus." This is the Department of Science and Technology-Science Education Institute's (DOST-SEI) latest strategy in discovering the next breed of Filipino scientists and innovators.

Called 'nuLab', this customized bus was launched 17 July, at the World Trade Center in Pasay City during the opening of the 2019 National Science and Technology Week celebration.

Installed inside the nuLab are modern audio-visual and educational tools and equipment, laboratory facilities, and various learning materials useful in introducing concepts and developing skills. It can accommodate 24 students in one session and can hold two sessions per day.

The bus, according to DOST-SEI, would allow the Filipino youth to discover their potential in the various fields of science, technology, education, and mathematics or STEM and eventually pursue courses and careers along these lines.

At the end of every session, students are encouraged to apply for the undergraduate scholarship program through a strategic campaign called "#Push4science: Maging DOST Scholar Ka!"

Candy Sicad-Ilaw of the Department of Science and Technology (DOST) explains to DOST Brand Ambassador Chris Tiu the different training modules of nuLab. (Photo from DOST-SEI facebook page)

Astrophysicist Dr. Rogel Mari D. Sese gives a lecture on space technology inside the nuLab. (Photo by Allan Mauro V. Marfal, DOST-STII)

DOST-SEI Director Dr. Josette T. Biyo said that 98 percent of the municipalities all over the country have already at least one DOST scholar. This is a testament that many young Filipinos are interested in pursuing science and technology careers, she said.

"As the nuLab hits the road, it is our way of reaching out to every young Filipino in different sides of the country. It is also our way of providing them access to various advanced learning tools in the fields of Science and Technology," said DOST Secretary Fortunato T. de la Peña.

The nuLab is the second mobile learning facility of the DOST-SEI after the success of the Science Explorer project which has served 32,000 students in more than 100 municipalities.

Scientists and former DOST scholars, namely astrophysicist Dr. Rogel Mari Sese, marine biologist Dr. Aletta Yñiguez, entomologist Dr. Aimee Lynn Dupo, Engr. Myra Ruth Poblete, Engr. Angelo Javier, Charmaine Villanueva-Villamil, Pamela Tolentino, Ana Jamille Restubog, Dr. Jomar Rabajante, Gilbert Zamora, Nico Mendoza, Garry Jay Montemayor, Seymour Sanchez, Timothy James Dimacali, Shaira Panela, among others, designed the modules for the nuLab sessions.

Building multi-stakeholder partnerships key to achieving SDGs

by Angelica Marie Paz, *DOST-STII*

The United Nations Development Programme (UNDP) has set a target to achieve the Sustainable Development Goals (SDGs) by 2030, with the vision to "Leave No One Behind".

At a forum entitled "SDG 17: Cracking the Code for Sustainable Development" held during the National Science and Technology Week (NSTW), discussions centered on the importance of engaging in partnerships to achieve the SDGs.

Department of Science and Technology (DOST) Undersecretary for Regional Operations Brenda L. Nazareth-Manzano said that inequalities present in different systems make it hard for a nation to achieve the SDGs alone. That is why "the Philippines needs to participate more in collaborations with different stakeholders," said Usec. Manzano.

But at the same time, she also stressed the importance of indigenous knowledge and grassroots innovations in the country. "We also need to invest more on indigenous knowledge by supporting market-oriented SMEs (small and medium-size enterprises) and local innovations," she said.

Aside from building partnerships, Usec. Manzano believes that one way to help achieve the SDGs is through organizing a framework for science and technology (S&T) in the Philippines. "A national comprehensive STI (science, technology, and innovation) roadmap for SDGs will ensure that research and development (R&D) undertakings will complement each other, not be duplicated," she emphasized.

The Department of Science and Technology (DOST) and Department of Trade and Industry (DTI), represented by DOST Undersecretary for Research and Development Dr. Rowena Cristina L. Guevara (seventh from right) and DTI Secretary Ramon M. Lopez (fourth from right), both recognized USAID for its continuous support to further the country's innovation efforts. During the 2018 Inclusive Innovation Conference, USAID announced that they will be extending their assistance to DOST and DTI for the next three years through its STRIDE program, which aims to help in growing the Regional Inclusive Innovation Centers in the country. (Photo from www.stride.org.ph)

DOST's international linkages

DOST continuously builds linkages to improve the government's capacity for innovation. One of these partnerships is with the United States Agency for International Development (USAID), through its Science, Technology, Research and Innovation for Development (STRIDE) Program.

The partnership aims to foster innovation in the country to serve as tools for economic development. Specifically, DOST and STRIDE's main project, the Knowledge and Technology Transfer Office (KTTO), is focused on speeding up the innovation process in educational institutions, so that technologies are mobilized and applied.

KTTO aims to assist public state universities in their technology transfer process, making sure that innovations are used and developed. STRIDE Chief of Party Dr. Richard Abendan

stressed how the process of translating ideas or inventions is vital in this day and age.

"Establishing KTTO in universities and R&D institutions is a first step in aligning government's innovations with the needs of the stakeholders," Dr. Abendan explained.

Another worthwhile collaboration to implement innovations, this time in the field of agriculture, was made between the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) and the Australian Centre for International Agriculture (ACIAR). ACIAR is an international agricultural agency that funds research partnerships between Australian scientists and their partners in developing countries.

Dr. Peter Horne, general manager for Country Programs of ACIAR, emphasized the vital role of forging partnerships in improving policies in agriculture. Thus, the ACIAR-PCAARRD partnership aims to expand agricultural research in the Philippines and make it inclusive to all sectors.

One program by ACIAR-PCAARRD discussed during the forum was the "Development of Mixed Method Approach to Impact Assessment of Philippine Research Projects." It was developed from an observation that R&D projects are becoming complex, that is why there is a need to devise a more holistic and standardized approach to assess the projects' impact. The project was created to improve quantitative and qualitative approaches in data collection, analysis, and interpretation of R&D undertakings.

During the forum, Dr. Horne also pointed out that food systems are central to meeting the SDGs. "Developing economies need to accelerate their efforts in SDG implementation, and investing in agriculture is the most effective way of addressing poverty,'' he said.

The ACIAR-PCAARRD partnership also aims to promote and recognize long-term multi-disciplinary collaboration to address shared goals through encouraging other R&D institutions to partner with local government units.

Meanwhile, the DOST also established a partnership with the Japan International Cooperation Agency (JICA) for disaster risk reduction in the country. The JICA-DOST collaboration is geared towards a disaster-resilient Philippines.

According to Yoshio Wada, chief director of JICA Philippines, investing in human resources is an overlooked approach in making a country resilient to calamities.

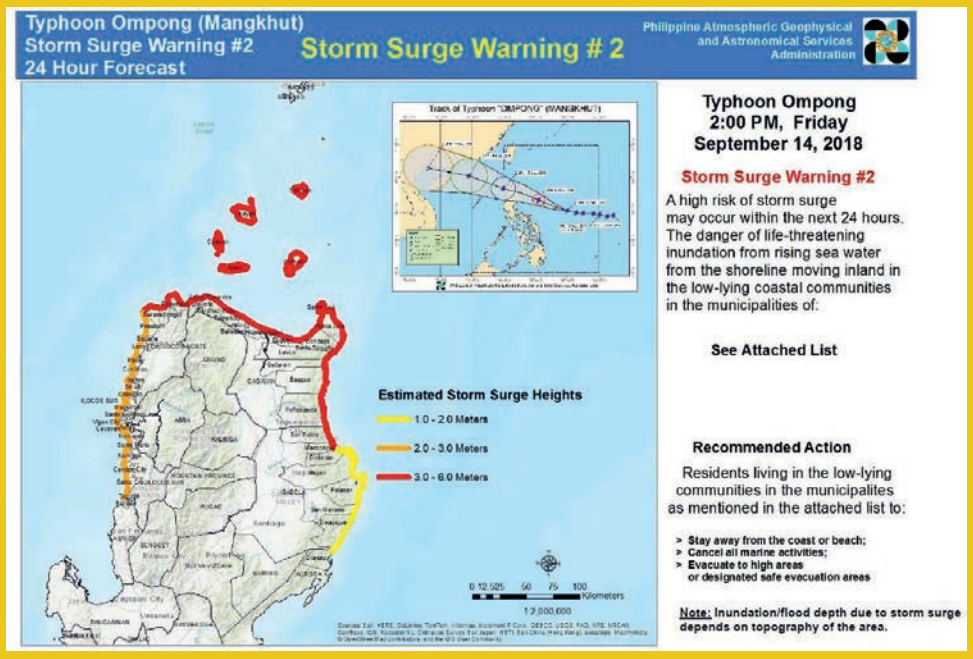
Thus, the Engineering and Science Education Project by DOST-JICA focuses on students, teachers, and professionals across the country. The project, which now runs for almost ten years, has already created over 6,000 study abroad opportunities for students. It has also raised funds for research and equipment for 19 major universities and 110 high schools across the country.

The forum was held 18 July 2019 during the NSTW, which was held from 17 to 19 July at the World Trade Center, Pasay City.

One of the activities previously conducted under the DOST-PCAARRD and ACIAR partnership is the conduct of the Partnership Brokering Workshop in 2018. (Photo from DOST-PCAARRD Facebook page)

DOST-PAGASA develops forecasting and warning system for storm surge

by **Jasmin Joyce P. Sevilla,** *DOST-STII*



The actual Storm Surge Warning that the DOST-PAGASA released in 2018 during Typhoon Ompong. (Screenshot from DOST-PAGASA)

> *People now want what the weather will do, not what the weather will be,*
>
> *Lorenzo A. Moron*
> *weather specialist, DOST-PAGASA*

In order to create an impact-based forecast and warning on storm surges in the country, the Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA) designed the Storm Surge Forecasting and Warning System (SSFW).

The SSFW aims to provide a new way to present the storm surge forecasts in easy-to-understand visuals to a wider audience.

Storm surge or *daluyong* in Filipino is defined as the "rising of the sea as a result of atmospheric pressure changes and wind associated with a storm." Without better knowledge on its risks and without enough preparation, the occurrence of a storm surge is extremely dangerous.

According to DOST-PAGASA, Typhoon Yolanda (Haiyan)—the fatal storm surge that hit the Philippines in 2013—left 6,201 dead; 28,626 injured; and 1,785 missing. It also incurred more than PhP 43 billion worth of damages in infrastructure and agriculture.

"[During that time in 2013], accurate warnings were issued by DOST-PAGASA, and the potentials for heavy rainfall, severe wind, and storm surges were explicitly stated for the regions that are most likely to be affected," explained Lorenzo A. Moron, weather specialist of DOST-PAGASA.

Moron discussed the weather bureau's SSFW system during the Disaster Risk Summit for Stakeholders on 19 July 2019 at the World Trade Center.

"But were the warnings enough? Or were the impacts not properly considered and/or underestimated, which was why the [affected area's] response was inadequate?" he continued.

This led them to give utmost importance on creating a forecasting and warning system that includes the expected impacts brought by the expected storm surge. "People now want what the weather will do, not what the weather will be," Moron emphasized.

How does it work?

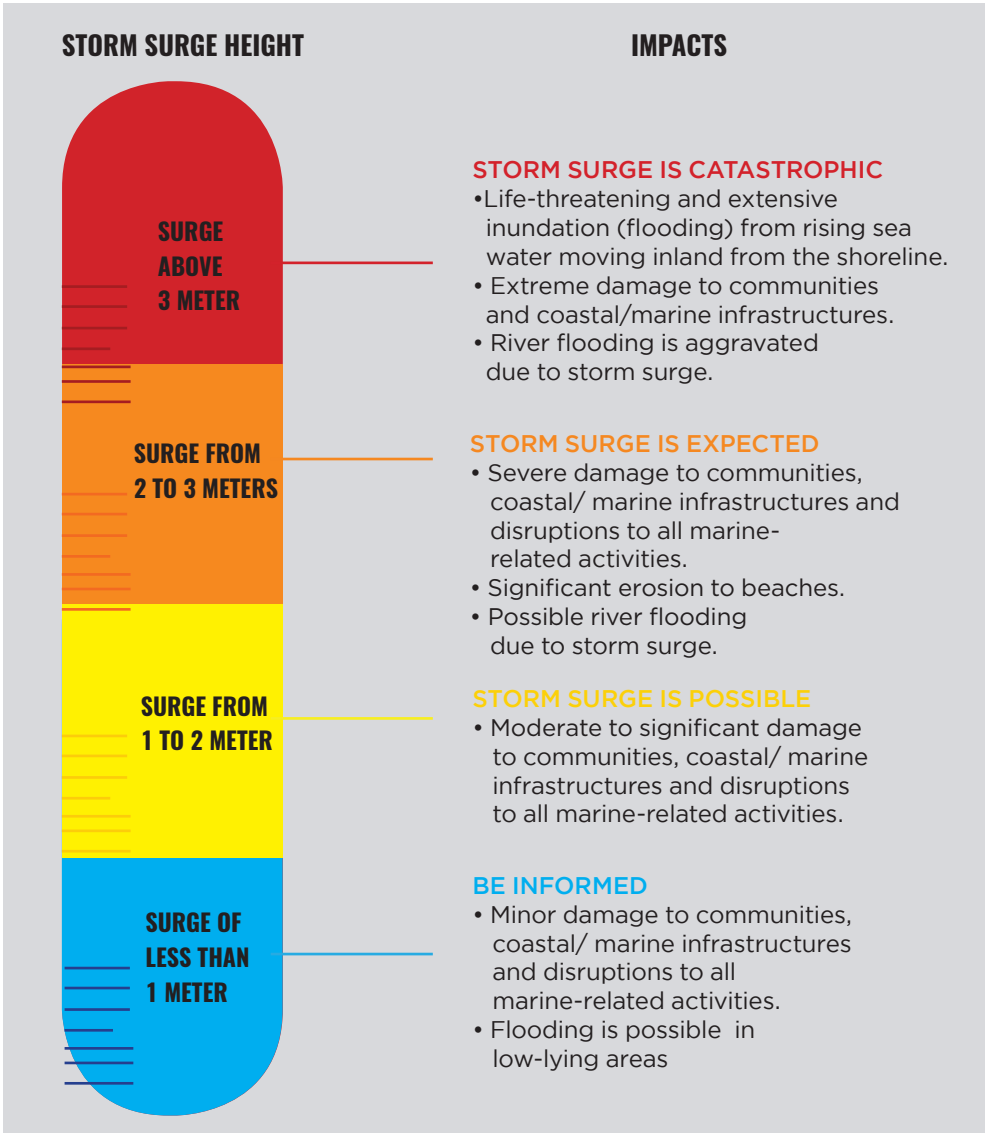
The SSFW system consists of two categories—the Storm Surge Watch and the Storm Surge Warning. Under the Storm Surge Watch, the public will be informed that a moderate to a high risk storm surge may occur within the next 48 hours, and of the possibility of a life-threatening flood to coastal

communities. Within that timeframe, the public will be updated every six hours before its landfall, giving decision makers in the affected areas more lead time to plan and prepare.

Under the Storm Surge Warning, the public will be informed of a high risk storm surge within the next 24 hours and the dangers of life-threatening flooding to coastal communities. Twenty-four hours before the typhoon's landfall, Storm Surge Warnings will be disseminated to affected areas every six hours along with Severe Weather Bulletin issuances, which emphasizes the risks and dangers of the expected storm surge.

Moron also explained that both categories of the SSFW system come with a map that shows which area has a threat for storm surge. He also mentioned that the storm surge heights (measurement of the rise in sea level) are plotted into the map in color coding assignments depending on the severity (e.g., yellow- one to two meters; orange- two to three meters; and red- three meters or more). According to Moron, three meters is almost equivalent to the height of a one-story building.

In addition, the SSFW system also contains the corresponding impacts of each storm surge height warning, as indicated in the chart below.



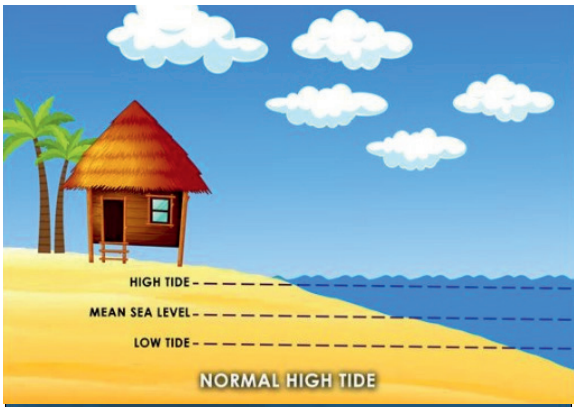
(Infographics from DOST-PAGASA)

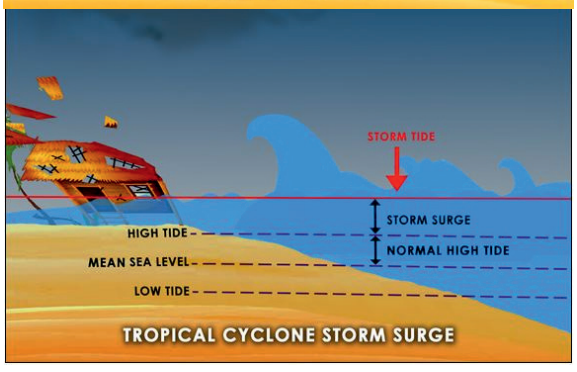
In the event of an upcoming storm surge, DOST-PAGASA sends the Storm Surge Watch and Warnings through e-mails and also posts the updates on its website at http://bagong.pagasa.dost.gov.ph/tropical-cyclone/forecast-storm-surge.

"Impact forecast and warning services complement the traditional role of meteorological and hydrological forecasting services by translating technical knowledge into information of direct relevance to those affected to provide more actionable warnings," Moron emphasized.

He also said that the ability to understand and respond effectively to warnings is central to a resilient community.

Spearheaded by the DOST-PAGASA together with the DOST-Philippine Institute of Volcanology and Seismology, the Disaster Risk Summit for Stakeholders was the last leg of the Resilience Summit held during the 2019 National Science and Technology Week at the World Trade Center, Pasay City from 17-21 July 2019. The first Disaster Risk Summit catered to students and discussed ways on how they can prepare before, during, and after a typhoon or an earthquake.





Dance instructors from the UP Manila Indayog Dance Varsity teach the participants a rhythmic dance routine during the Hataw Agham 5.0. (Photo from DOST-PCHRD Facebook page)

Studes get the groove in "Hataw-Agham"

by Marshall Louie M. Asis, *DOST-STII*

Elementary, high school, college, and alternative learning system (ALS) students from all over the country danced to the beat in this year's "Hataw Agham", a regular dance activity feature of the National Science and Technology Week celebration. "Hataw Agham", now on its fifth year, is led by the Department of Science and Technology–Philippine Council for Health Research and Development (DOST-PCHRD).

Hataw Agham 5.0's theme is anchored on the NSTW's theme this year, which is focused on the significant contributions of science and technology in the attainment of the country's commitment to the United Nations' Sustainable Development Goals.

Dr. Jaime C. Montoya, executive director of DOST-PCHRD, said that dancing is an enjoyable form of exercise or workout with many

DOST-PCHRD Director Dr. Jaime C. Montoya joins the participants in an energetic dance routine. (Photo by Marshall Louie M. Asis, DOST-STII)

beneficial effects. He added that the DOST-PCHRD is in-charge of emphasizing the value of not only the physical and mental health but also of the total well-being of a person so that he or she can properly perform his or her daily duties.

Introduced this year is Dance School Vol. 5, featuring instructors who taught the audience dance moves as a form of communication between the body and mind, and a key to a healthier lifestyle.

Before the dance, Dr. Ronald del Castillo, associate professor at the University of the Philippines Manila, talked about the different benefits of dancing to a person's physical, emotional, and mental well-being.

"A person's true feelings, thoughts, and emotions manifest whenever he/she dances. It is through dancing that we form deep interpersonal connections and meaningful relationships with other people, which is essential for our mental health," said Dr. del Castillo.

Dancing builds an individual's confidence and self-esteem, and is considered as the best physical activity to teach a person to become independent.

Scientific studies have shown that elderly people who regularly dance have a lesser chance of acquiring physical disability later on in life. Dr. del Castillo also shared that dancing is even better in promoting wellness than gymnastics, yoga, and walking.

Another benefit of dancing is building empathy or a person's awareness of other people's thoughts and feelings. Dancing likewise reduces stress, sadness, and worries.

Similar to the effects of exercise, dancing is good for the body because it speeds up metabolism (the manner the body burns food as fuel) and decreases excess body fat. Dr. del Castillo also emphasized that dancing is an effective way to attain the ideal weight while simultaneously maintaining social connectedness.

Dancing also conditions the heart and strengthens the muscles thus developing a person's endurance. A person who regularly dances do not get tired easily, he explained.

Every year the theme of "Hataw Agham" varies to target different sectors of society while ensuring the health of the public.

Even the kids-at-heart find dancing as a healthy exercise.

Students join the fun in the dance activity of Hataw Agham 5.0. (Photo from DOST-PCHRD Facebook page)

Director Josette T. Biyo (center, in orange) of the DOST-SEI with some of the outstanding DOST scholars who were recognized at the "In Touch with Excellence" awarding ceremony.

DOST-SEI celebrates scholar-achievers

Text and photos by Rodolfo P. de Guzman, *DOST-STII*

Some 5,764 young bright minds in the country were honored during the "In Touch with Excellence" awarding ceremony of the Department of Science and Technology-Science Education Institute (DOST-SEI) held 18 July 2019 at the Philippine International Convention Center.

For school year 2018-2019, one fourth of the total DOST scholar-graduates or 1,456 completed their respective undergraduate courses in science, mathematics, and engineering with Latin honors. There were 24 summa cum laudes, 221 magna cum laudes, 1,056 cum laudes, 146 with other academic awards, and nine scholars who completed their course earlier than expected. Of the total number of scholar graduates, 373 got their masters degrees and 86 received doctoral degrees.

DOST-SEI, the agency mandated to administer the different scholarship programs of the DOST, considers the recognition rites as a way of honoring exceptional accomplishments of the country's cream of the crop of scholars.

"In touch with excellence is a very special ceremony to honor our top scholars who graduated with honors. This year, we have produced 5,764 graduates and these scholars will form the critical mass of future scientists and engineers in the country," said DOST-SEI Director Dr. Josette T. Biyo.

Aside from joining the increasing roster of scientists and engineers in the country, the new graduates will serve as inspiration to younger students to pursue careers in science, technology, engineering, and mathematics or STEM.

"The DOST will always be supportive of your endeavors. You already have what you need to be successful but the important thing is for you to serve our country as patriots," said Dr. Biyo.

In his keynote address during the ceremony, DOST Secretary Fortunato T. de la Peña commended the DOST-SEI for working hard to increase the number of scholarships and even the financial assistance being given monthly to the scholars.

Sec. de la Peña further stressed that the science and technology programs of the

> *"The Filipino youth is really a pool of knowledge that we really have to nourish and I would encourage everyone to apply for scholarship."*
>
> *Vileser T. Naculangga*

DOST are aligned with the zero to 10-point socio-economic agenda of President Rodrigo Roa Duterte, and at least four in the agenda on adding value to our products that will be helped by science, technology, and the creative arts.

"In reducing inequality under the 10-point agenda, the DOST scholarship is one good example that offers the opportunity for poor students to get quality education and eventually improve their lives," said Sec. de la Peña.

The Secretary also mentioned the assistance that the DOST provided to some students who were displaced because of the conflict in Marawi.

"Together with Dr. Biyo we were also able to help 230 students in Marawi who were affected by the conflict and they were able to go back to school together with the help of Mindanao State University," he shared.

"We granted them assistance equivalent to what a DOST scholar gets and we are very proud to say that there were nine scholars who graduated with honors," added Sec. de la Peña.

After the awarding of plaques and medals, selected DOST scholars were given the chance to speak about their experiences on how the scholarship affected their lives.

"The DOST helped me in so many ways... 'yun pong stipend, 'yung tuition fees, book allowances... taos puso po akong nagpapasalamat kay Honorable Secretary de la Peña at Director Biyo po na walang kasawaan at walang kapagurang sumusuporta sa future siyentista at inhinyero ng bayan, gayun din po sa officers at staff na bumubuo ng SEI maraming, maraming salamat po at maraming pamilya ang nabibigyan ng pag-asa dahil sa trabaho ninyo," said Exequiel Kim Isaac I. Salvador, BS Mathematics graduate, summa cum laude, from the University of the Philippines Diliman.

Exequiel Kim Isaac I. Salvador, DOST-SEI Merit Scholar who graduated with a degree in BS Mathematics, summa cum laude, from the University of the Philippines Diliman, gives his message to fellow scholars and to DOST.

As the event ended, the atmosphere in the reception hall of the PICC became euphoric when the awardees, together with their parents and relatives, affirmed the experience of their fellow scholars and were inspired more to work harder as they continue to pursue excellence in their chosen fields.

"It was really life changing. If I did not have the scholarship I would not have been able to finish my studies especially because of the financial aspect," said Vileser T. Naculangga, a graduate of BS Computer Science, magna cum laude, from the Technological Institute of the Philippines-Manila.

"The Filipino youth is really a pool of knowledge that we really have to nourish and I would encourage everyone to apply for scholarship," Naculangga concluded.

The reception hall is filled with the country's young, bright minds as DOST-SEI gathers 5,764 scholar-achievers during the "In Touch with Excellence" awarding ceremony. (Photo by Gerardo G. Palad, DOST-STII)

'HIV, not a death sentence,' says advocate

by Geraldine B. Ducusin, *DOST-STII*
Photos from Val Zabala, *DOST-NRCP*

"HIV is not a death sentence. What is deadly is the stigma," this is the message imparted by Ico Rodulfo Johnson, CEO of Project Red Ribbon Care Management Foundation Incorporated, to the students and faculty participants of the forum "Enhancing Gen Z's Level of Awareness on HIV/AIDS through Digitized Arts."

"People's chances of dying from stigma—or fear that their families and friends will disown them once they discover that they're HIV positive—could be greater than dying from HIV itself," Johnson explained.

"This stigma makes them afraid of being exposed, which, in turn, prevents them from getting appropriate treatment and counseling," he added.

Johnson, himself a Person Living with HIV (PLHIV) and an HIV/AIDS advocate, vouched that there is life after HIV, that one can continue to go on living a meaningful life and pursue one's passion. But one has to undergo proper medication and counseling.

> *"People's chances of dying from stigma — or fear that their families and friends will disown them once they discover that they're HIV positive— could be greater than dying from HIV itself."*
>
> *Ico Rodulfo Johnson*

Dr. Louie R. Ocampo, country director of the Joint United Nations Programme on HIV and AIDS, suggests that HIV/AIDS awareness campaigns should cover far-flung areas.

HIV/AIDS statistics

Dr. Louie R. Ocampo, country director of the Joint United Nations Programme on HIV and AIDS, cited that 75 percent of the 77,000 estimated PLHIV know their status. "[That means,] 25 percent are walking undetected. Of those who were diagnosed, only 45 percent are on anti-retroviral treatment," said Dr. Ocampo.

"There is a risk of transmitting the virus if someone is not aware that he or she is infected and continuously engage in high-risk behaviors such as unprotected sex. That's why people are encouraged to undergo testing, and there are medical facilities that provide free HIV services including counseling, testing, and medication to people living with HIV," he added.

Based on the HIV and AIDS Registry of the Philippines, 240 cases of HIV (29 percent of the total cases), as of April 2019, are young people aged 15 to 24 years old.

"While HIV and AIDS in most Asian countries is declining, the opposite is happening in the Philippines. In fact, the country has a 203 percent increase in new cases between 2010 to 2018, which makes the country the fastest growing HIV epidemic in Asia and the Pacific region. If this trend continues, this could balloon to over 200,000 new cases in eight years," stressed Dr. Ocampo.

Implementing the law

When asked on the possibility of raising awareness on HIV and AIDS among the youth, given the Catholic Church's opposing stand on the issue of condom use among young people, Dr. Ocampo said that "the church and faith-based organizations can be our ally; they'll have to be convinced that the problem is here, and there is a pressing need to take action. Besides, there's a new AIDS law now that needs to be fully implemented."

The said law is the Philippine HIV and AIDS Policy Act of 2018 or Republic Act 11166, signed into law by President Rodrigo Roa Duterte on 20 December 2018. The new law allows voluntary HIV testing for a lower age of consent at 15 years old from the previous 18. It also specifically provides for intervention and the provision of proxy consent for children below 15 years old.

Learning institutions are also required to focus on the right information on HIV and AIDS, as well as on human rights principles to reduce stigma and discrimination. Further, HIV education must cover communities of indigenous people and those in geographically isolated and disadvantaged areas.

"The Philippines is always the first one to initiate innovation. However, we need to fast-track our response and expand the coverage of HIV services to include the far-flung areas and those are harder to reach key populations, leaving no one behind," Dr. Ocampo added.

Issues and proposed solutions

From an average of one infection a day in 2008, 36 new infections are recorded daily as of April 2019. Among the factors cited affecting HIV epidemic in the youth are the low level of knowledge on how HIV is transmitted and prevented, low condom use, lack of safe spaces for the youth such as adolescent-friendly facilities, and the overarching issue of stigma and discrimination.

Dr. Ocampo emphasized the need to engage the local government units especially the cities to scale-up their HIV response including community-based organizations and the private sector.

"Increase condom use," suggested Dr. Ocampo. He explained that condom use is one of the proposed solutions to halt the epidemic, along with the inclusion of Pre-Exposure Prophylaxis service in the national HIV program, and increase testing rate. There is also a need for early initiation of treatment and adherence to medication, and establishment of one-stop-shop HIV treatment facilities.

The Department of Science and Technology-National Research Council of the Philippines (DOST-NRCP) collaborates with other HIV/AIDS advocates and academic institutions in raising awareness on HIV/AIDS. In the pipeline is a similar collaboration with Pasig City students and Red Whistle, which commended the initiative and expressed willingness to work with the DOST-NRCP in advancing this activity to other places.

The forum, organized by the DOST-NRCP, was held during the National Science and Technology Week celebration held from 17 to 21 July 2019 at the World Trade Center in Pasay City.

Ico Rodulfo Johnson, CEO of Project Red Ribbon Care Management Foundation, says that what is deadly about HIV is the stigma that comes with it.

Low condom use is cited as one of the factors affecting HIV epidemic among the youth.

Calibration of flow measurement at the NML's Volume and Flow Standards Laboratory

PH metrology lab levels up with new calibration services

by Allyster A. Endozo, *DOST-STII*
Photos from DOST-ITDI

The National Metrology Laboratory (NML) is set to offer a wide range of new calibration services to educational institutions, private manufacturers, and other local stakeholders by year 2020.

This was announced by Engr. Sabino Paulo B. Leones Jr. of the National Metrology Division during a lecture organized by the Department of Science and Technology–Industrial Technology Development Institute (DOST-ITDI).

Fresh equipment in the pressure standards lab like load cell (proving ring), compression/tension testing machine, push-pull gauge (dynamometer), and platform weighing scale will be primarily used for testing in materials and structural engineering applications.

The NML's electricity standards lab will likewise enable the calibration of electrical engineering apparatus like AC measurement and AC-DC thermal transfer standards, eight digit multimeters, standard resistors, and multi-product and multi-function calibrators.

The thermometry standards lab's calibration capability could be extended to a range of –75°C to 600°C, as the maximum scope of its low- and high-range infrared thermometry would reach 120°C and 500°C, respectively. Such upgrades would primarily benefit manufacturers of medical and other high-sensitivity devices.

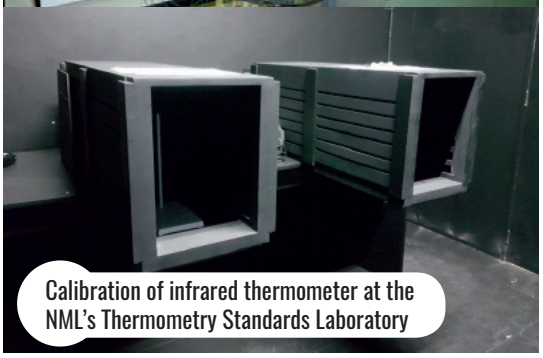
Lastly, the volume and flow standards lab will enhance its flow measurement capacity per minute to 2,000 L and 2,000 kg—a prospect that would bid well for interested engineers in the mechanical and civil subsectors.

The NML operates under the DOST-ITDI as the national institute for establishing, maintaining, and disseminating the national measurement standards for physical quantities.

As a full member of the Asia Pacific Metrology Program, it aims to be internationally recognized for its competence and nationally sought for traceability of calibrations.

The event entitled "NML: New Metrology Calibration Services" was held 19 July 2019 at Function Room 4 of the World Trade Center in Pasay City, as part of the celebration of the National Science and Technology Week, with the theme "Science for the People: Enabling Technologies for Sustainable Development."

Calibration of standard resistors at the NML's Electrical Standards Laboratory



Calibration of infrared thermometer at the NML's Thermometry Standards Laboratory

DOST-supported project makes physical therapy easier in PH

by Angelica Marie Paz, *DOST-STII*

In the Philippines, there are only 33,000 licensed physical therapists out of almost 105 million population.

To address this shortage, experts from the De La Salle University Institute of Biomedical Engineering and Health Technologies (DLSU-IBEHT) developed two technologies that can assist physical therapists in doing rehabilitation treatments. These are the Agapay Project, catered to the upper extremities, and the Tayô Project for the lower extremities.

The two projects are supported by the DOST Philippine Council for Health Research and Development (DOST-PCHRD).

Agapay Project

Agapay is an artificial intelligence-assisted therapy innovation that aids the upper limbs (shoulder, elbow, wrist) of patients so they can regain their motor control. The SEMG or surface electromyography enables it to detect muscle contraction.

It is designed as a wearable robot that acts as an external skeleton that can assist the motor movements of the patients. This new technology is user-friendly, and adjustable to the patients' specifications.

This therapy device also uses biofeedback mechanism system that trains patients to recover on their own by controlling bodily processes that usually happens involuntarily such as heart rate, blood pressure, and muscle tension.

The primary target patients of this technology are stroke patients.

Currently, there are already three working prototypes of Agapay. This new development in physical therapy technology also includes games that stimulate real life situations. This is to reduce the patients' fear and anxiety during the rehabilitation process.

Tayô Project

On the other hand, the Tayô Project is intended for the lower extremities of the body. It is a multifunctional device that acts as a 3D-printed external skeleton for lower limb and early trunk rehabilitation. It is a wearable machine that assists physical therapists to minimize lifting, mobilizing, and transferring patients.

Similar to Agapay, the equipment aims to restore the motion, strength, and ability of patients to stand through performing exercises and various gamification software. The device requires electricity but consumes minimal power only.

The Tayô Project is now at the clinical testing stage, and is set to be completed by May 2020.

Julius Banayo, one of the research associates under the Tayô Project, said that these innovations are meant to help physical therapists, not replace them. "It's made to assist them and enable them to handle more patients at a time," he explained.

Further, the lack of manpower and lack of equipment in Philippine hospitals served as the main inspiration in developing these technologies.

Newton Agham scholar Paul Dominique Baniqued using his robotic arm designed for physical therapy. (Photo from www.science.ph)

By showcasing the Tayô and Agapay projects in events like the National Science and Technology Week, Banayo hopes that their innovation could gain more awareness. "This is why we want to bring the innovation here in the NSTW, so we can attract entrepreneurs and businessmen to adopt our technology," Banayo shared.

Once the technologies are adopted by companies, it would be easier for these equipment to be commercialized and distributed to hospitals across the country. Such will make it the first pure Filipino made physical therapy equipment.

DOST's grassroots innovation plan focuses on SDGs attainment

by **Marshall Louie M. Asis,** *DOST-STII*

Photo by **Henry A. de Leon,** *DOST-STII*

DOST Secretary Fortunato T. de la Peña (left) and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) Director Mia Mikic (right) present the GRIND 2019-2022 Framework Plan.

Photo from GRIND Facebook page

Dir. Sales explains the significance of the regional R&D initiatives in communities.

To get to the nearest school, students and teachers from a far-flung community in Caraga, Davao Oriental hike for five hours and traverse a river. This daily challenge prompted the community to build a makeshift cable car made of rattan.

The aerial lift saved time and effort for the students and teachers, and made their daily journey more fun and adventurous. This simple grassroots innovation proved to be very important and precious to souls hungry for knowledge.

"Grassroots innovations will stimulate genuine engagement of the community and enable them to fulfill the MDGs (Medium-term Development Goals) and the PDP (Philippine Development Plan)."

This is according to Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña during the launch of the Grassroots Innovation for Inclusive Development or GRIND.

GRIND is a grassroots innovation plan of the DOST focused on the attainment of the country's sustainable development goals (SDGs). It aims to steer progress toward empowering Filipinos by promoting inclusive growth and reducing poverty and inequality.

Aligned with the Philippine Development Plan 2017-2022 and United Nations' SDGs, the GRIND 2019-2022 Framework Plan was presented by Sec. de la Peña and Dr. Mia Mikic, director of the United Nations Economic and Social Commission for Asia and the Pacific, in a forum held 20 July 2019 at Hotel Jen Manila. The forum was part of the celebration of the 2019 National Science and Technology Week.

During the forum, Sec. de la Peña introduced the concept of GRIND as something that stems from innovation and community action, which are considered as important drivers for inclusive development.

"GRIND is a modality of inclusive innovation and can enable extremely affordable and niche-adapted solutions to local problems," said the DOST Secretary.

Infographic from GRIND Facebook page

Implementing GRIND—the Davao experience

In said forum, DOST-XI Regional Director Dr. Anthony C. Sales discussed the quadruple helix model for implementing GRIND. The said model was put into picture specifically to ensure that the four sectors namely, government, academe, industry, and civil society are represented and will have a room in making the GRIND framework plan work.

The quadruple helix approach brings forward multidisciplinary viewpoints together in an environment that promotes teamwork, collaboration, and sharing of ideas.

"By deploying the 4L's of the GRIND framework plan namely, learning, leveraging, linking, and legitimization, the DOST hopes to contribute to the MTDP (Medium-term Development Plan) and the SDGs," explained Dir. Sales.

The first "L", which stands for learning, means taking stock of available resources. DOST had previously implemented small efforts in grassroots innovation in specific areas in the country, but most of the time not cascaded or introduced, said Dir. Sales.

An example of this is the makeshift rattan cable car for students and teachers.

Dir. Sales further explained that from the inventory of grassroots innovation (GI) in the Philippines, human resources, facilities, intellectual properties including traditional knowledge, movers, and catalysts, the DOST can identify GI opportunities and set-out the vision, targets, and strategies.

The DOST-XI's regional director also expressed the DOST regional office's support for the grassroots innovation development and implementation through its programs, projects, and activities that include product development, prototyping, capacity enhancement, technology transfer, and commercialization. These he said constitutes the second "L" or leveraging.

Dir. Sales also cited the various programs of the DOST that the regional office can leverage on. These include the Small Enterprises Technology Upgrading Program or SETUP, Niche Centers in the Regions for R&D program or NICER, and Community Empowerment through Science and Technology or CEST.

For the third "L" or linking, Dir. Sales shared that the DOST-XI establishes and fosters the GI ecosystem by creating GI networks and GI centers. A network of grassroots innovators and stakeholders can be created and can serve as an avenue for sharing of learning, experiences, and success stories.

Grassroots innovation support is also expanded through collaborations and facility sharing. The innovation and incubation centers, which the DOST currently have, can be promoted not just as a center for industry but also for anyone who would want to engage themselves in research and development (R&D).

To implement legitimization or the fourth "L", the DOST institutionalized PPAs (programs, projects, and activities), policies, and investments to support and sustain the GI ecosystem.

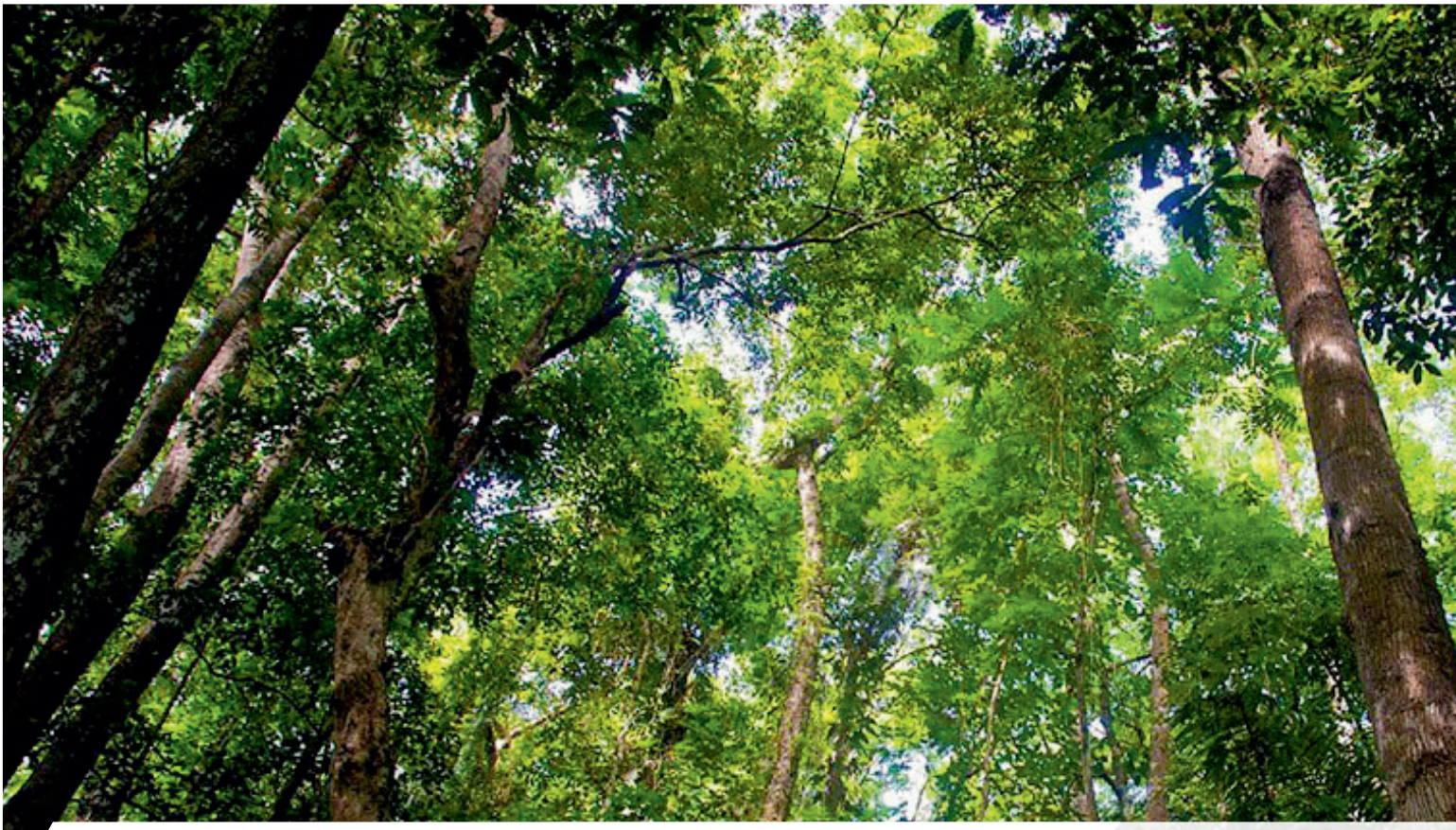
Dir. Sales mentioned the approval of the Philippine Innovation Act as an example. He said that the program provides funds and other support services from government to enhance the capabilities of innovators.

Further, he said that the passage of the legislation on the gender and development (GAD) budget is a milestone. The GAD budget provision mandated all government agencies and instrumentalities including local government units to allocate a minimum of five percent of their total appropriations to GAD programs and budget.

Part of grassroots innovation is support to women innovators who constitute 50 percent or higher among SETUP beneficiaries. The food products and handicrafts that these women make are products of GI.

Dir. Sales further explained that the regional R&D initiatives in communities and the regional development council can serve as platform for grassroots innovators to present their inventions, and hopefully craft policies. This will in turn strengthen the promotion and adoption of sustainability and fast track the attainment of the SDGs.

He also mentioned that the importance of grassroots innovation prods the DOST to culminate or consolidate its efforts and custom fit programs and initiatives that would support the development, implementation, and sharing of grassroots innovations in the country.



UPLB researcher pushes for germplasm conservation of indigenous trees

The Mount Makiling Forest Reserve is also considered as an ASEAN Heritage Park due to its rich flora and fauna and popularity among hikers. (Photo from Makiling Center)

by David Matthew C. Gopilan, *DOST-STII*

To maintain genetic resources of trees in the Philippines, a forestry researcher from the University of the Philippines Los Baños (UPLB) calls for conservation of indigenous trees through germplasm techniques. A germplasm is a general term for a plant part like seeds or plant tissue from leaves, roots or stems that can be used for propagation of plants.

Forestry researcher Dr. Lerma SJ. Maldia from the UPLB Department of Forest Biological Sciences said that conserving genetic resources of trees is essential in a sustainable and productive management of forests in the Philippines. Like any other plants, trees are also prone to bacteria-causing diseases and strong typhoons.

She reported her findings at a forum held 19 July 2019 during the National Science and Technology Week at the World Trade Center, Pasay City.

"We know that our country is rich in biodiversity and our germplasm conservation is one of the continuing activities of our college. Before we go far and study other forests, we studied first the forest near us," Dr. Maldia said, referring to the flourishing forests of Mt. Makiling Forest Reserve (MMFR) that is currently managed by the UPLB College of Forestry and Natural Resources (CFNR).

The MMFR spans a total of 4,244 hectares that crawls in Los Baños, Calamba, and Bay in Laguna as well as in Sto. Tomas, Batangas. Previous studies show that the forest reserve shelters at least 2,000 species of flowering plants and ferns.

The project of Dr. Maldia began in 2016, with support from the UPLB-CFNR and the Department of Science and Technology–Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development. She was joined by other UPLB-CFNR researchers like Dr. Marilyn O. Quimado, Dr. Marilyn S. Combalicer, Assistant Professor Dianne Joy D. Aguilon, Forester Amie C. Luna, and other forestry students who took part in the project for their thesis.

"Germplasm conservation in forestry takes a longer time as compared to agricultural crops. For example, the life cycle of *petchay*

or mustard (*mustasa*) usually ends after 30 days, but the life cycle of trees may even reach up to 300 years," Dr. Maldia said.

She further explained that germplasm conservation begins with selecting parent trees having desirable characteristics that can be sourced with germplasm. Seed collection comes afterward, with researchers picking fruits from the tree or taking fruits or seeds that have fallen on the ground. After that, the seeds will be planted in nurseries either inside or outside MMFR. Other seeds will be stored in seed banks for future use. Once seedlings are ready, they will be used for reforestation of other areas.

At present, Dr. Maldia and her colleagues have identified 29 species, represented by 312 candidate mother trees that could be sourced with germplasm. Dr. Maldia explained that the number of trees varied within and across the species as they were looking for trees with desirable traits like resistance to diseases, and high number of healthy seeds produced after flowering.

"We also extracted DNA from identified parent trees, which may be based on phenotype or outside appearance," Dr. Maldia shared. These DNA samples may be used in other studies like uncovering the genetic diversity of forest trees in the Philippines.

However, conventional practices like seed banking, maintaining of seedling orchard, and planting of indigenous trees outside MMFR were not applicable in most tree species. Dr. Maldia said that most trees either rarely bear fruits and seeds, or bear seeds with short dormancy, meaning the seeds could not be stored for a long time.

This is why Dr. Maldia shifted to macropropagation techniques. Macropropagation techniques include root induction of shoots or growing of roots in stems, and stem cuttings from the nodes while using growth hormones.

She also suggested that more research should be done about phenology or relationship of plant growth and climate, characteristics of the seeds and seedlings, and more conservation protocols.

Dr. Lerma SJ. Maldia shares that many organizations have benefitted from more than 6,000 seedlings that they have distributed. Some of the beneficiaries are the Philippine Wood Producers Association, City Environment and Waste Management Office of Antipolo City, and the Department of Environment and Natural Resources for their National Greening Program. (Photos from www.pcaarrd.dost.gov.ph)

(photo from goodfruitandvegetables.com.au)

Intelligent packaging: The RFID-based "Smart Ripe" concept for ripeness monitoring of avocados.

DOST-ITDI unwraps the goods on 'smart packaging'

by Allyster A. Endozo, *DOST-STII*

The Department of Science and Technology–Industrial Technology Development Institute (DOST-ITDI) showcased the latest trends and innovations in the emerging field of "smart packaging" on the third day of the National Science and Technology Week (NSTW), which ran from 17 to 21 July 2019.

In general, smart packaging features a wide array of embedded components to maintain superior standards on both product quality and consumer safety. It is commonly categorized into two, based on functionality.

Active packaging uses films and sachets with active ingredients to combat spoilage due to microbial and oxygen exposure and to enable special functions like self-heating.

On the other hand, intelligent packaging incorporates batteries, circuits, displays, and sensors to monitor product condition and capture data on its quality and quantity during transport and storage.

Specifically, a freshness indicator can signify the quality of frozen foods through a color-shade scheme, while a time-temperature indicator can record the temperature history of goods over time.

Even more advanced are radio frequency identification or RFID systems, which can track each product's origin—as well as sources of contamination and tampering—within the supply chain. The process is done using a computer and even a mobile phone.

RFID systems are at the heart of the so-called "Smart Ripe" concept, which uses tags and readers to ensure that consumers get exactly the quality and shelf-life of produce that they want. Such concept had already been successfully studied on avocado, cheddar cheese, and even *mamon* (sponge cake).

Daisy E. Tañafranca, chief of DOST-ITDI's Packaging Technology Division (PTD), said that the Philippine market for smart packaging is picking up fast despite its meager share globally. She warned, however, that challenges abound in the attempt to fully commercialize this technology.

High production cost would be one, as it has yet to reach the mass manufacturing phase. Moreover, recyclability of electronic components poses serious questions on sustainability, while privacy issues are likewise raised as real-time monitoring and tracking necessitates protection against theft of sensitive consumer information.

Still, she remains confident about the prospect of smart packaging being fully integrated in our country's manufacturing sector as it moves toward realizing the Industry 4.0 revolution.

"We would want to contribute to reaching one of the goals that all packaged products in the Philippines would become 'easy-open'," she shared.

PTD offers packaging research and testing services to local stakeholders for all types of products—most prominently on multi-layer high-barrier technologies and ready-to-eat food items. PTD aims to be recognized worldwide as a center of excellence in packaging technology.

Photo from ABS-CBN

Photo from DOST-PTRI

Dressing up to perfection the scientific way

by Rodolfo P. de Guzman, *DOST-STII*

Do you find it difficult to get the perfect fit for your wardrobe?

With science and technology, your worries may now be a thing of the past because of a Perfect Fit 3D Body Scanner made available by the Philippine Textile Research Institute (PTRI) of the Department of Science and Technology (DOST) to textile designers, artists and clothes manufacturers.

"The Perfect Fit" Project under the Textile Product Development Center of DOST-PTRI is part of the Institute's move to introduce modern technologies and innovations with the aim of becoming the first textile research and development laboratory in the Philippines.

A component of the Perfect Fit Project, the 3D Body Scanner was recently acquired by DOST-PTRI to give textile designers, artists, retailers, and manufacturers easy access in the prototyping of their designs and products for evaluation before public offering.

With this technology, the textile and clothing industry will be able to provide accurate measurements using the avatar specifically "tailored-fit" for the Filipino body type. Later, this is expected to provide a national sizing system for clothes in the country.

At the 2019 NSTW, the 3D Body Scanner was the centerpiece of the DOST-PTRI exhibit where visitors had the chance to get their body measurements and find their perfect fit.

Aside from the 3D Body Scanner, some state-of-the-art equipment for textile product development such as the 3D visualization system and computerized fabric prototyping loom were also featured.

Dress made of natural dyed BANDALA fabric

Photos from DOST-PTRI

Surigao fisherfolk coop wins Best SETUP Adoptor award

by Allan Mauro V. Marfal, *DOST-STII*

Photo from MAFISCO Facebook page

A multi-purpose cooperative composed of fishermen, boat operators, traders, retailers, and ambulant vendors from Bislig City, Surigao del Norte was named as top implementer of the Small Enterprises Technology Upgrading Program (SETUP) of the Department of Science and Technology (DOST) for 2018.

Mangagoy Fishermen Multi-purpose Cooperative or MAFISCO bagged the Best SETUP Adoptor award at the closing ceremony of the National Science and Technology Week celebration, held 21 July 2019 at the World Trade Center in Pasay City.

The Best SETUP Adoptor award recognizes micro, small, and medium enterprises (MSMEs) for their significant achievements and efforts to complement the assistance provided by DOST through SETUP.

SETUP is a flagship program of the DOST that provides MSMEs with equipment and technical assistance to enable them to increase sales and production, streamline and improve overall company operations, upgrade the quality of products and services, conform to national and international standards of excellence, and be competitive in their respective fields.

From micro-lending to ice blocks to bottled tuna

MAFISCO, established by 17 small-scale entrepreneurs and fishermen in 1994, started as micro-lending business to its members.

In 2003, MAFISCO had decided to establish its ice plant and cold storage operation with a ten-ton per day capacity. Ice block is an essential commodity in the fishing industry as it is used to preserve the freshness of fishes harvested from sea, pond, or from cages.

MAFISCO manager Rho Cougee C. Garrido said that although the ice plant stabilized ice blocks production for almost a decade, the supply remained insufficient, as the increasing number of fishing boats also increased the demand for ice blocks.

"Ten years after the ice plant started, deliveries of ice blocks to our members were rationed and on schedule basis. Usually, fishing boats wait for seven to 15 days for the delivery of ice blocks," Garrido said.

He also shared that oftentimes, cooperative members had resorted to purchasing ice blocks from other suppliers due to frequent unscheduled shutdown of MAFISCO's ice plant for repair and servicing.

In 2012, the cooperative saw a further increase in demand for ice blocks because of the growing tuna fishing industry in Bislig City.

Thus, in the same year, MAFISCO applied for SETUP assistance to rehabilitate and upgrade its old ice plant into a 17-ton energy-efficient ice plant. Since then, the program has helped the cooperative a lot as their efficiency improved and ice production increased significantly.

Garrido said that previously, an ice block takes 50 hours to frost. After the ice plant rehabilitation, MAFISCO can frost an ice block after 48 hours, saving two hours per block. "From our production of 53, 379 ice blocks in 2013, it increased to 67,765 in 2018," said Garrido.

Photo from MAFISCO Facebook page

DOST Secretary Fortunato T. de la Peña (fourth from right) presents the prizes for Best SETUP Adoptor for 2019 to Mangagoy Fishermen Multi-purpose Cooperative or MAFISCO, represented by its manager Rho Cougee C. Garrido (fourth from left) and its chairperson Paterna Velasquez (middle). With them are (from left to right): Chair of the Board of Judges for SETUP Awards Dr. Aleli Bawagan, DOST-VIII Regional Director Edgardo M. Esperancilla, DOST Undersecretary for Regional Operations Brenda L. Nazareth-Manzano, DOST-Caraga Regional Director Dominga D. Mallonga, Assistant Regional Director for Field Operations Ricardo N. Varela, and Provincial Science and Technology Center-Surigao del Sur Director Caressa Leanne Lim. (Photo from DOST-Caraga)

"In 2018, MAFISCO had a net revenue of PhP 21 million, PhP 16 million of which came from the income of the ice plant," Garrido shared.

With the availability of ice and the increasing volume of fish caught by the cooperative members, MAFISCO took the opportunity to produce bottled tuna products.

Garrido said that for their newest venture, the DOST provided assistance with the product label, laboratory testing, and training on Good Manufacturing Practices or GMP, which helped them produce better, world-class products that they can sell.

Through DOST-SETUP, MAFISCO also availed of the MPEX (Manufacturing Productivity Extension Program) consulting service. "It greatly helped make our processes better and effective. With this, our members were encouraged to improve their capacity to fish by upgrading their boats—from small 3-ton capacity boats to 25-ton capacity commercial fishing boats," Garrido shared.

MAFISCO now has 1,372 members from its original members. From PhP 17,000 pesos capital, the cooperative now has a total asset of PhP 56 million, as of December 2018.

"On behalf of our general membership, we are very thankful to DOST, to all those who provided assistance to us be it in technical trainings, services, and financial aspect. It is an honor for us to be declared as winner at the national level," Garrido said in his acceptance speech. "The DOST not only provided us the opportunity but also recognized us for doing good implementing the opportunity," he added.

The Mangagoy Fishermen Multi-Purpose Cooperative received a plaque of appreciation and PhP 100,000 cash prize.

The other finalists for the Best SETUP Adoptor Award were Dielle's Apiary and Meadery, Incorporated from the National Capital Region, MAS Steel Fabricator from Region V, Long Live Pharma from Region I, and Antofel Trading from Region XI.

Photo from MAFISCO Facebook page

MoJo: Making science communication more exciting

by Angelica Marie Paz, *DOST-STII*

Gone are the days when pen, paper, and printing press defined journalism. In recent years, the way we produce news has radically changed.

Today's technology allows people to share information to a wider audience at the convenience of their own devices. This new wave of reporting often called mobile journalism, or MoJo for short, poses a great potential in improving science communication in the country.

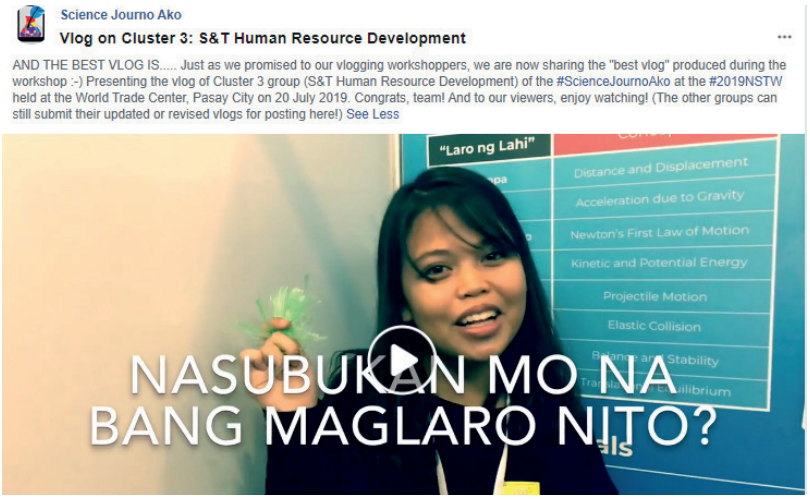
This year's #ScienceJournoAko seminar workshop by the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) highlighted vlogging (short for video blogging) as an emerging form of science communication. On 20 July 2019 during the National Science and Technology Week (NSTW), students from different high schools within Metro Manila and nearby provinces learned the essentials to mobile journalism and techniques on how to communicate science and technology (S&T) effectively.

In his opening remarks, DOST-STII Director Richard P. Burgos stressed the difficulty of understanding hard science, and if S&T information remains unreachable, it will just be put to waste. "DOST is moving heaven and earth to ensure that science is properly communicated," Dir. Burgos said.

According to a commissioned SWS survey, the national S&T awareness of Filipinos was only at six percent in 2017. Through increased funding from the government to pursue more projects, the S&T awareness in the country has risen to 13 percent this year.

However, there are still many more obstacles to overcome in bridging the gap between science and the people. Science journalism serves as a bridge that connects science to the people.

But beyond the traditional method, science communicators are now encouraged to use mobile journalism, specifically in the form of vlogging, in order to engage with a more gadget inclined audience.



(Screenshot from Science Journo Ako Facebook page)

Mikael Angelo Francisco, editor-in-chief of FlipScience.ph and science news contributor for GMA News Online, emphasizes the importance of visualizing data in order to effectively communicate science. (Photo by Allan Mauro V. Marfal)

Telling the S&T story

During the workshop, Mikael Angelo Francisco, editor-in-chief of FlipScience.ph and contributor for GMA Science News, gave some techniques in reporting S&T effectively. As a freelance science journalist, Francisco shared his experience in producing science communication materials through print and audio-visual media. He stressed the importance of using images, charts, and graphics to visualize data.

Like any other forms of journalism, science writing should also explore different angles to make the story compelling to the readers. "Do not state hard facts and details. Instead, determine the meaning of the research findings to the general population," Francisco explained.

Through the years, some science journalists often exaggerate information that leads to conflicting and misleading claims, which is why accuracy is important in writing science news. Every piece of information written should be backed by solid evidence. "As a writer, you should always ask the right questions, and verify the information with an expert. You do not want the audience to be alarmed," advised Francisco.

The medium is the message

After refining the information, the next step in communicating science effectively is using an appropriate medium for the story.

One of the emerging mediums for storytelling is through mobile journalism, which vlogger Jerald Uy said has the capacity to make science news more interesting for the people. "Merely presenting facts doesn't invite the reader to continue reading. The presentation makes all the difference, and one way is by using videos to create your story," shared Uy, who is one of the reporters of GMA 7's online newscast "Stand For Truth."

Uy encouraged the participants to venture out to different platforms to communicate S&T. He said that the capacity of the internet and mobile devices should be maximized.

Even with mobile journalism, science information must still be packaged and presented effectively. "Each medium caters to a different audience. But whichever medium you use, you still have to present it well," Uy added.

Jerald Uy, one of the reporters of GMA 7's online newscast "Stand for Truth", encourages the students to use vlogging as a platform to share information about science to a wide audience. (Photo by Allan Mauro V. Marfal)

In order to produce a clear and effective vlog, Uy highlighted the importance of preparing a script and pre-visualization before shooting. "Write your spiels beforehand. The best language is the one where you can write best," he said.

The audience comes first

Perhaps the most important lesson the participants picked up from the seminar-workshop is that the audience should always be the priority. "The goal is to make the audience smarter, not make you look smarter," stressed Francisco.

One of the participants of the workshop, Quinn Tiffany Bacarse, said that she was encouraged to try using mobile journalism when it comes to reporting science news. "I'm happy that this workshop did not only focus on videotaping or vlogging but also on developing your content. And that we have to connect to the audience even if we are alone facing the camera," she shared.

Nicole Garbino, another student-participant, also shared her learnings from the workshop. "I have learned so much from the workshop like the do's and don'ts. You have to boost your confidence; you don't have to be mindful of the people around you. Instead, you need to think about the people you need to inform and impart knowledge through the vlog you are making. You will set aside your shyness because you want to make your vlog clear for your viewers," she said.

The big potential of mobile journalism to rejuvenate science communication in the country is proven by the increasing number of video blogs and online content about science breakthroughs. Through the synergy of science communication and MoJo, Filipinos may be able to appreciate S&T even more.

During the workshop, the students were given the opportunity to shoot their own vlogs about a certain exhibit cluster at the NSTW. The best vlog was chosen by the resource speakers and was posted on the official Facebook page of #ScienceJournoAko. (https://www.facebook.com/sciejourn/)

Sailing the seas of science: A Filipina's voyage

by Angelica Marie Paz, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

In recent years, science and technology (S&T) is believed to be one of the sectors where men and women can equally prosper. This fact contributes, to a certain extent, in the nation's eighth spot ranking in last year's Global Gender Gap Index, making the Philippines the country with the narrowest gender gap in Asia.

Despite this victory, women are more prone to experience circumstances that hinder them from pursuing careers in S&T, according to a Pew Research Center survey. Overcoming these challenges is not an easy task, as they are deeply-rooted in the society—but recognition and awareness could go a long way.

Through events like the National Science and Technology Week (NSTW), an annual event organized by the Department of Science and Technology (DOST), women are given the platform to showcase their work and gain recognition in the fields of S&T.

At this year's NSTW, the DOST-Science Education Institute (SEI) invited students and young professionals to celebrate Filipina women who are making waves in the fields of S&T. Three inspiring Filipinas shared how they were able to breakthrough in male-dominated disciplines at the forum entitled "Women Inspiring Women" held 19 July at the Philippine International Convention Center.

One of the featured speakers was Jakellen S. Del Prado, a researcher and physical oceanographer from the University of the Philippines (UP). Apart from working in the academe, she has also worked with DOST-SEI as a science communicator through nuLab, Science Explorer Mobile Classroom, and other projects by the agency.

Jakellen, "Jakey" to her peers, sailed the seas of S&T quite early. She had 15 roles in the last 10 years working as a biologist, marine mammal trainer, and marine researcher, to name a few.

Her maiden voyage

Growing up, Jakey dreamt of a being a crime scene investigator, which later on changed when she took biology in college. "I went for biology simply because it was a flexible degree for both premed and the next step in pursuing any career in the field of science," she said.

Her voyage in the field of marine science came in the most unusual way–it was not expected for a girl raised in the mountains of Cordillera to land a job as a marine mammal trainer in Subic. "While I was employed there, a blockmate of mine visited with his family and were guests at the park. He mentioned taking up a master's degree in Marine Science in UP where he was, at the time, also working as a researcher. I got so interested and enrolled the next semester," she explained.

That's how it started for Jakey. According to her, she feels extremely happy and blessed to experience a career as a marine scientist and a science communicator at the same time.

Currently, Jakey is on the tail-end of writing her master's thesis and creating an environment health report card for municipalities in Pangasinan, working with Dr. Charissa Ferrera, a DOST-Balik Scientist. "This involves working closely with stakeholders in the coastal community so they can monitor the health of the marine environment, which is their main source of livelihood," she shared.

She is also about to embark on her new journey in market research. "I'm about to set sail to uncharted waters in my career. The new job in market research still involves two of my greatest loves, scientific research and public communication, but instead of being out in the water, I'm in a corporate environment. It's refreshing and yet humbling," Jakey said.

> *"Talk to actual scientists. Attend talks and forums featuring young professionals in STEM and other industries. If you can see yourself in their shoes, then go for it!*
>
> *Jakellen S. Del Prado*

Three women from different fields of science share their inspiring stories during the forum. Dr. Gay Jane Perez (left), recipient of the 2018 ASEAN US Prize for Women, Maria Isabelle Layson (center), one of the recipients of the 2019 Gokongwei Brothers Foundation Young Scientist Award, and Jakellen S. Del Prado, researcher and physical oceanographer from the University of the Philippines.

Keeping up with the waves

As a marine researcher, Jakey's routine differ vastly each day—from riding fishing vessels, swimming in the ocean, going on expeditions aboard oceanographic ships, to writing reports and arranging events. Her career as an oceanographer proves that a career in S&T is much more than what people perceive it to be.

Marine science and oceanography is not a common pursuit in the country, despite being an archipelago. Jakey believes that there is still a notion that scientists should be inventors like Einstein, and that it is not an actual paying job.

"In the Philippines, it is ironic that marine resources are rarely highlighted or focused in our education system when our coastal environment and archipelagic waters are, in fact, our most influential resource," she lamented.

In addition, Jakey said that one of the greatest challenges that the research community and academe face is how to efficiently communicate valuable information to a non-scientific community.

"As a scientist, my fear when talking about my work is thinking

that in my attempt to simplify a complex idea, I might be 'dumbing it down' instead of making it more comprehensive," she said.

This is just one of the many reasons why science communication is important for the public to have deeper understanding of S&T. Luckily, DOST-SEI and other agencies of DOST have helped Jakey discover her love for communicating science.

"In 2013, I was part of a team in the Marine Science Institute of UP that DOST-SEI collaborated with in conducting annual marine-themed summer camps. The main goal was to encourage high school students to take up courses in STEM (science, technology, engineering and mathematics). Since then, DOST-SEI has constantly given me opportunities to share my journey as a scientist in the hopes of guiding and inspiring the youth in any way I can," Jakey shared.

The vast journey ahead

For Jakey, science is a promising field, but it also requires immense effort to have a fruitful journey in the STEM fields, which is why during the forum, she shared practical tips to help graduates find experiences that are anchored on their skills.

She shared that while having a leader mindset is important for goals to set sail, having a mentor or role model can help give a person direction. She also emphasized that the DOST and partner agencies offer various programs that could help kick-start a career in S&T.

"Talk to actual scientists. Attend talks and forums featuring young professionals in STEM and other industries. If you can see yourself in their shoes, then go for it! Sometimes we just need to meet someone else who is already living the dream for us to know that it is possible and that it can also happen to you," she advised.

She added that being a scientist entails being competent in any work environment. "Explore! A lot of industries need scientists because in STEM we are equipped with the skills that make us relevant and adaptable in any work environment," said Jakey.

As her parting message, Jakey reiterated the vitality of STEM in the country's development. "Use STEM to go beyond, it is never too late or too soon to find the inner scientist in you," she said.

The forum also had a special feature on the inspirational journey of Dr. Gay Jane Perez, the recipient of the 2018 ASEAN US Prize for Women Award for her research on using satellite observations to improve agricultural yields, also known as precision agriculture. Dr. Perez had her postdoctoral fellowship at the National Aeronautics and Space Administration and currently works as the Deputy Director for Research and Extension of the UP Institute of Environmental Science and Meteorology.

Iloilo National High School Student Maria Isabelle Layson, who came into spotlight because of her research on the anti-diabetic components found in *aratiles*, also shared her experiences as a young researcher. Layson was one of the recipients of the 2019 Gokongwei Brothers Foundation Young Scientist Award.

In her free time, Jakey loves to go free diving for leisure. She takes this time to discover more about marine science outside of the academe. (Photo from Jakey Del Prado's Facebook account.)

Photo by Gerardo G. Palad, *DOST-STII*

Jakey Del Prado tells the students about her journey in becoming an oceanographer, and encourages them to pursue a career in the sciences.

2019 REGIONAL SCIENCE AND TECHNOLOGY WEEK

DEPARTMENT OF SCIENCE AND TECHNOLOGY

Science chief urges entrepreneurship in Region III

by Jasmin Joyce P. Sevilla, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

DOST Secretary Fortunato T. de la Peña proudly shares his Bataeño roots while promoting the programs and projects of DOST in Region III.

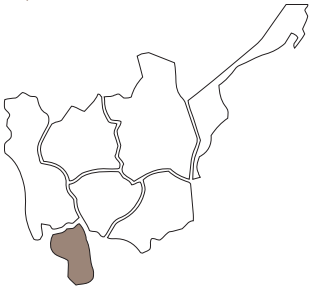
As host of this year's Regional Science and Technology Week (RSTW) in Region III, the City of Balanga in Bataan proved that its rich historical background is not just what it should be proud of.

"Region III should bank on entrepreneurship since the region's attractiveness to investments is high. This would be helpful as well for our scholars so that they would have a potential job they can land on," Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña emphasized during the opening ceremonies of the 2019 RSTW in Balanga City, Bataan.

DOST-III Regional Director Julius Caesar V. Sicat also proudly shared that it is indeed high time for the Region III, specifically the province of Bataan, to strengthen its entrepreneurship.

"With its promising potential as an innovation hub, Region III is one of the three regions in the country with the highest R&D (research and development) funding from the DOST," Dir. Sicat explained.

"And Bataan, in particular, was just recently awarded as the Most Business Friendly Local Government Unit in 2018," he added.



RSTW BATAAN

SETUP and CEST in Central Luzon

Micro, small, and medium enterprises (MSMEs) in Region III, particularly in Bataan, flourished throughout the years with the assistance of the DOST through its Small Enterprises Technology Upgrading Program or SETUP.

With SETUP's financial and training assistance to the MSMEs, quality products that were produced from the region helped put them on the map both locally and internationally.

One of the local businesses in Bataan assisted by the DOST is Amanda's Marine Products. Owned by Amanda C. Battad, Amanda's specializes in producing dried fish (tuyo), smoked fish (tinapa), and sautéed shrimp paste (bagoong)—food products that are famous in Bataan.

Through SETUP, Amanda's received a package assistance which includes the purchase of production equipment and provision of technical consultancy services that addressed production concerns. Being a three-time recipient of SETUP, the company was able to multiply its production and meet the volume requirements of its institutional customers in the food industry. This helped the company increase its net income by 147 percent from 2009 to 2012 and has also widened its local and overseas market through partner companies. Currently, the company has been exporting its products to USA, Canada, Australia, Dubai, and other Middle East countries.

DOST-Region III Director Julius Caesar V. Sicat welcomes guests and participants to the RSTW.

Some of the products and delicacies of Region III that highlight the region's competitiveness in entrepreneurship. DOST through SETUP provided technical and financial assistance in making these products.

DOST Sec. de la Peña and DOST Undersecretary for R&D Rowena Cristina L. Guevara had free taste of SETUP-assisted products from Region III at the techno-bazaar.

Bagoong (crab and shrimp paste) and araro (cookies) are just some of the delicacies that Bataan is famous for. These are products of Gloria's Delicacies, a local entrepreneur in Bataan assisted by the DOST through SETUP.

Amanda's products were just some of the DOST-assisted products featured during the 2019 RSTW at the techno-bazaar. Delicacies and other native products from Pampanga, Aurora, Zambales, Bulacan, Nueva Ecija, and Tarlac were also showcased during the regional celebration of the S&T week.

Aside from SETUP, DOST's other flagship program is the Community Empowerment through Science and Technology or CEST. By providing S&T interventions through CEST, the DOST builds resilient and smart communities toward socially and economically stable communities. The DOST, through CEST, is also able to bridge gaps and transform lives, engage committed partners, and empower people through synergistic partnerships.

Currently, DOST's CEST program has established assistance to 25 municipalities and communities within Region III through various interventions. The program also provided technology interventions such as use of solar powered pump in eight cooperatives from seven municipalities, and in one Aeta community in Tarlac to improve their crop production systems.

Another notable project is the engagement with the Carmencita Sampaguita Growers Association in Floridablanca, Pampanga. Technical consultancy and other inputs were provided to the association to improve their sampaguita production and for them to produce jasmine tea. Provision of assistance to farmers and farmer groups is intended to help them face the challenges of inadequate land and insufficient water resources that are currently affecting food security in the country.

Aside from this, eCEST or the Expanded Implementation of Community Empowerment through Science and Technology in Region III also established resource-based livelihood projects for 11 municipalities in Central Luzon. Ten associations from Bataan, Bulacan, Nueva Ecija, Pampanga, and Zambales were already assisted with livelihood equipment and technological training.

To further promote the CEST program and to also showcase its benefits to the region, some of the region's products under the program were featured during the celebration of the RSTW in Bataan.

The three-day celebration of the RSTW in Bataan, held from 30 July to 1 August 2019 at the Vista Mall, Balanga City, also featured S&T exhibits and other activity areas such as science film showing, techno-fora, and techno-bazaar that showcased globally competitive products from SETUP and CEST programs.

Bearing the theme "Science for the People: Enabling Technologies for Sustainable Development," the DOST-Region III showcased significant contributions of the region's science community to the country's national development, particularly in the attainment of the Sustainable Development Goals as mandated by the United Nations.

S&T week lights up Siquijor

by Framelia V. Anonas, *DOST-STII*

Hosted for the first time by the province of Siquijor, the RSTW in Region VII boasts of technologies, S&T programs, and local products in the province as well as in Bohol, Negros Oriental, and Cebu.

Siquijor, the so-called enchanting "island of fire" south of Cebu, came ablaze in its celebration of the Regional Science and Technology Week (RSTW) highlighting the latest technologies, products, and services in the local science community.

The exhibits and forums were right smack in the heart of the province, at the Capital Square in Siquijor town. In attendance at the opening ceremonies on 15 August 2019 were no less than the provincial and town dads who themselves have availed of S&T interventions for their respective turfs.

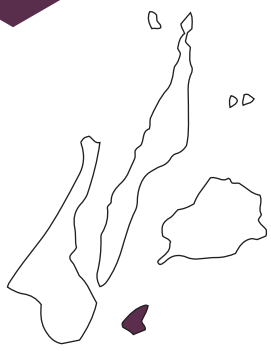
And to this province which has no malls, cinemas, or modern supermarkets, this celebration jampacked the Capital Square with students, teachers, parents, entrepreneurs, and other interested individuals to check what this S&T event is all about.

S&T intervention in Siquijor

Rep. John Vincent Villa, in a speech delivered by Atty. Caneza Joanna Antepuesto, acknowledged how the Department of Science and Technology (DOST) has helped his constituents. "DOST has installed 18 STARBOOKS units, making S&T (science and technology) information accessible to our students," Antepuesto read.

STARBOOKS, or the Science and Technology Academic and Research-Based Openly Operated Kiosks, is a digital S&T library that contains hundreds of thousands of materials, news, journal articles, and even videos, as well as K to 12 materials that students, researchers, and entrepreneurs could use.

He also said that more than 60 Surigao-based entrepreneurs have received various support from DOST to increase their production.



RSTW SIQUIJOR

Some of the products and delicacies of Region VII showcased during the 2019 Regional Science and Technology Week in Siquijor. (Photos by Framelia V. Anonas)

Siquijor Governor Zaldy S. Villa, meanwhile, informed that though Siquijor dramatically lowered its poverty rate at 10 percent from a previous 49 percent, its inflation rate is very high. This is why the province needs facilities such as feed mills to produce its own feeds because importing feeds contributes to the inflation rate.

Secretary Fortunato T. de la Peña also said that aside from support to entrepreneurs, the DOST has also given various assistance to mango farms in the province, and in various aspects such as energy conservation, cleaner production technologies, business incubators to start-ups, and scholarship for human resource development.

The DOST regional and provincial offices have also provided Consultancy for Agriculture Productivity Enhancement and Manufacturing Productivity Extension Program services to Siquijodnons.

"We are also working with the Siquijor State College in the documentation of herbal medicines and the province's traditional medicinal practices," he said.

With this project, Gov. Villa said he now wants the province to be known as the "Healing Paradise Island of Siquijor" instead of "Mystic Island."

Meanwhile, Siquijor Mayor Richard Quezon has something to be very excited about. In his town, particularly in Brgy. Caipilan, he, along with Gov. Villa and DOST executives, laid down the time capsule of the DOST-PAGASA synoptic station to mark the site where the station will soon rise.

The PhP 4M-facility will not only provide Siquijor updated and localized weather information but will also serve as a vital component in establishing the Siquijor International Airport very soon.

S&T champs

Also at the opening ceremonies, DOST recognized Dr. Lanndon A. Ocampo of the Cebu Technological University as an Outstanding Filipino Scientist for being named one of Asia's Top 100 in the 2018 Edition of the Asian Scientist magazine. The recognition stemmed from his previous Outstanding Young Scientist Award conferred by the DOST-National Academy of Science and Technology, Philippines for his major contributions to the country's manufacturing and supply chain sector.

During the RSTW, DOST-VII, as part of its Small Enterprises Technology Upgrading Program, awarded to LCCJ Eatery and General Merchandize based in Lazi, Siquijor some PhP 300,000 worth of equipment; Mr. Brother Mechanics Motorcycle Repair Shop, PhP 469,900.00 worth of equipment; and Lilibeth Viernes, PhP 414,700 worth of equipment.

For its Grants-In-Aid program, DOST-VII awarded PhP 500,000 each to the local government of San Juan through Mayor James Capundag Jr. (as beneficiary of the Community Empowerment through Science and Technology or CEST program), Siquijor town through Mayor Quezon for enhancing its disaster prevention and mitigation program, and Siquijor province through Gov. Villa for technology enhancement.

DOST Sec. de la Peña (fifth from left) awards the DOST support to beneficiaries of the CEST program. (From left to right): Representative of the Siquijor provincial government, DOST-Siquijor Provincial Director Mario E. dela Peña, DOST-VII Regional Director Edilberto L. Paradela, Siquijor Gov. Villa, and SETUP beneficiaries (middle to right) San Juan, Siquijor Mayor Wilfredo Q. Capundag Jr. and staff, Lilibeth Pan Bisaya, with proprietors of Mr. Brother Mechanics Motorcycle Repair Shop and LCCJ Eatery and General Merchandize. (Photo by Gerardo G. Palad, DOST-STII)

Dr. Lanndon A. Ocampo receives his award as Outstanding Filipino Scientist as he was not able to personally receive his award as Asia's Top 100 in the 2018 Edition of the Asian Scientist magazine. With him are DOST Sec. de la Peña (middle), Gov. Villa (left), and DOST-VII Regional Director Paradela. (Photo by Gerardo G. Palad, DOST-STII)

Moron, a glutinous rice cake, is a native delicacy in the Eastern Visayas.

Eastern Visayas RSTW highlights DOST's role in addressing social concerns

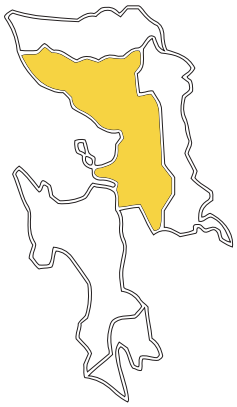
by Marshall Louie M. Asis, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

The 2019 Regional Science and Technology Week (RSTW) celebration in Eastern Visayas put on center stage the important role of science and technology (S&T) in addressing some of society's most pressing concerns.

At the opening ceremonies of the Eastern Visayas 2019 RSTW celebration, Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña highlighted the many contributions of the DOST in achieving the country's commitment to the 17 Sustainable Development Goals (SDGs) of the United Nations. DOST's efforts were focused on providing solutions to some of the country's pressing concerns.

The DOST Secretary also emphasized that the DOST's 11-point agenda is consistent with President Rodrigo Duterte's zero to 10-point socio-economic agenda. He pointed out that out of the 10 agenda, there are some points where the DOST can easily make significant contributions in making the Philippines more competitive.

"Through competitiveness, the DOST can contribute in many ways such as helping small and medium-scale enterprises (SMEs), the agriculture sector, and human resource development," Sec. de la Peña said.



RSTW TACLOBAN

Helping MSMEs

Assistance to micro, small, and medium enterprises (MSMEs) is at the core of one of DOST's flagship programs called SETUP, which stands for Small Enterprises Technology Upgrading Program.

Through SETUP, the DOST provides assistance to MSMEs in upgrading their production, efficiency, product quality, sales, and marketing through technological and other assistance.

In the Eastern Visayas, one of the SETUP beneficiaries is Amyr's Refreshment and Delicacies Center, now known as Mary's Abuyog Spesyal Tsokoleyt Moron, Atbp., which is located in San Jose, Tacloban City. The chocolate moron-producing facility owned by Esmeralda D. Manaog received PhP 738,000 worth of technology interventions from DOST-Region VIII.

In 2016, Manaog asked help from the DOST-Provincial Science and Technology Center (PSTC)-Leyte to avail of SETUP's Innovation System Support. Through a project proposal, Manaog availed of funds used to buy better food-grade equipment. She also constructed a new facility, which was designed by PSTC-Leyte and the Eastern Visayas Food Safety Team.

PSTC-Leyte Director John Glenn Ocaña said that the DOST-VIII office provided Manaog's business with technical assistance through Manufacturing Productivity Extension for Export Promotion, and training on food safety and Good Manufacturing Practices that eventually led to the firm's acquisition of its License to Operate from the Food and Drug Administration.

Other trainings that were provided by the DOST were training for water retort process at the Eastern Visayas Food Innovation Center (EVFIC), and training in proper techniques in production of cacao intercropped with suitable high-value crops.

According to PSTC-Leyte Director Ocaña, DOST's interventions increased Manaog's business production capacity resulting in the creation of more jobs and higher incomes for employees. The number of distribution channels for Manaog's chocolate moron increased from six local distributors to 25 resellers all over the country—11 in Eastern Visayas, nine in Central Visayas, three in Luzon, and two in Mindanao.

Manaog's enterprise also availed of technologies that prolong the shelf life of chocolate moron so it could be safely sold in markets outside Eastern Visayas. Previously, catering to a growing demand for the delicacy outside the region was a problem for Manaog, as moron is highly perishable. The delicacy has a shelf-life of three to four days only even when stored in a refrigerator.

To address this problem, the DOST, Eastern Visayas State University, and the EVFIC joined together in a project to create an improved moron that has a longer shelf life and remains edible for three months after production without refrigeration.

Just recently, Manaog proposed for another SETUP assistance to help her business acquire a unit of DOST-developed water retort that is used to make the shelf-stable moron. "Indeed, technology is key to preserving the cultural food heritage of Eastern Visayans and in making these ethnic products world-class quality," said Dir. Ocaña.

DOST Sec. de la Peña (seated, left) expertly wraps moron in banana leaves at the factory of Mary's Abuyog Spesyal Tsokoleyt Moron, Atbp. with its owner Esmeralda Manaog (seated, right). Mary's Abuyog Spesyal Tsokoleyt Moron, Atbp. is DOST-VIII's Regional SETUP Awardee for 2019. With the DOST chief are (standing, left to right): PSTC-Leyte Director Ocaña, DOST-STII Dir. Richard P. Burgos, and DOST-Region VIII Dir. Edgardo M. Esperancilla.

Building strong linkages

Another major undertaking of the DOST that the Secretary emphasized during the Eastern Visayas RSTW is the value of creating linkages to push forward S&T initiatives that can help attain the country's commitment to the SDGs.

One way to build linkages, said the DOST chief, is by improving the value chain particularly for those in the countryside through assistance to SMEs. "When we help our small and medium-scale enterprises we look at the backward and forward linkages that can be established or strengthened," he said.

Besides establishing linkages with SMEs, the DOST also collaborates with research and development (R&D) and academic institutions to create innovations. In Eastern Visayas, such kind of collaboration happened between Metallica Shipyard Corporation and the Aklan State University on the production of a prototype hybrid trimaran.

The Aklan State University, without any experience in ship-building but has a campus in New Washington, submitted a proposal on the construction of the country's first trimaran which is expected to be the spark that the country needs to transform its maritime transport industry.

Meanwhile, Metallica Shipyard was started by retired marine engineers who worked in Norway for several decades and are now residing in New Washington, Aklan. They decided to establish a company which specializes in boat manufacturing. Sec. de la Peña shared that several decades of experience in shipbuilding encouraged the engineers to put up a business that is oriented toward their expertise.

Sec. de la Peña said that the project opens up opportunities to discover alternative energy sources since the trimaran utilizes the ocean waves' energy to partly supply and add to its energy requirement. The wave energy will reduce the trimaran's energy consumption from fossil fuels by 20 percent.

The hybrid trimaran can carry up to 150 passengers, five cars, and 50 motorcycles. When successfully constructed, the hybrid trimaran will be an alternative for inter-island transport system.

The 2019 Best CEST Community in Eastern Visayas was awarded to Villaconzoilo Community Association (VILCOA) through its owner Alex Aborita (third from left) and colleagues (fourth and fifth from left). DOST has awarded Villaconzoilo with more CEST Projects in 2018 namely, "Establishment of Organic Fertilizer Processing Facility" and "Science and Technology Support to Strawberry Production." The award was presented by Secretary de la Peña (second from left), DOST-VIII Regional Director Esperancilla (second from right), Leyte Governor Leopoldo Dominico Petilla (third from right), PSTC-Leyte Director Ocaña (rightmost), and CEST Regional Coordinator Engr. Ramil Uy (leftmost). CEST stands for Community Empowerment through Science and Technology, a DOST program that aims to provide livelihood and alleviate poverty in remote communities.

During the visit of Sec. de la Peña and Director Edgar I. Garcia of the DOST-Technology Application and Promotion Institute at the project site in Aklan, the trimaran's hull was already constructed and needed equipment were already being installed inside.

Agricultural productivity issues

From the maritime industry, Sec. de la Peña also addressed issues faced by the agriculture sector, particularly on low agricultural productivity. Sec. de la Peña said that the newly appointed Secretary of the Department of Agriculture, Sec. William Dar, has committed to increase agricultural productivity of rice to four percent annual growth.

Sec. de la Peña also emphasized the need to utilize the many available technologies for agriculture. He cited the development of hybrid varieties, technologies related to crop protection, and postharvest processing technologies.

Also, he commended DOST-Region VIII under the leadership of Director Edgardo M. Esperancilla for demonstrating that S&T, with the help of other sectors, can uplift the plight of farmers. This was exemplified by the Villaconzoilo farmers' association in Jaro, Leyte, which Sec. de la Peña hopes to become a best practice model that can be replicated in other areas.

As part of DOST's latest support given to Villaconzoilo group, the agency lined up a number of farms and agricultural areas where the owners are "Magsasaka Siyentista" (farmer scientists). The "Magsasaka Siyentista" model was recommended and approved to become a model for agritourism, and expectedly will encourage more tourists to visit Jaro, Leyte.

DOST Sec. Fortunato T. de la Peña (seated, fourth from right), DOST-Science Education Institute Director Josette T. Biyo (seated, fifth from right), DOST-VIII Regional Director Edgardo M. Esperancilla (seated, fourth from left), together with other DOST officials and guests (seated in front), join the DOST scholars from the region who graduated with latin honors and special awards.

Environmental and energy concerns

Another area where the DOST can contribute significantly is environmental protection, said Sec. de la Peña. He cited the involvement of the DOST in the rehabilitation of Boracay island in terms of wastewater treatment and waste reduction.

Meanwhile, the Secretary called on the DOST-VIII to develop projects in collaboration with other groups that can demonstrate the agency's capability to help deliver electricity to far-flung areas. This is to contribute to solving the problem of access to electricity for 12 million Filipinos.

Education and scholarships

Moreover, Sec. de la Peña acknowledged the region's initiatives when it comes to education and scholarships. He commended the active involvement of the Visayas State University (VSU) in pushing for academic excellence. The VSU is very efficient in producing MS and PhD graduates, said the Secretary. The percentage of incoming scholars and those who are able to graduate from VSU is relatively high compared with other universities offering the same DOST scholarships.

DOST Sec. Fortunato T. de la Peña (second from right) and key DOST officials visit the PAGASA Weather Station near the Tacloban City Airport. With him are (left to right): DOST-Science and Technology Information Institute Director Richard P. Burgos, Engr. Ramil Uy from DOST-VIII, Provincial Science and Technology Center (PSTC)-Leyte Director Dr. John Glenn Ocaña, DOST-VIII Director Edgardo M. Esperancilla, DOST-Technology Application and Promotion Institute Director Edgar I. Garcia, and DOST-PAGASA Tacloban Weather Station Officer-in-Charge Mario A. Peñaranda.

Secretary Fortunato T. de la Peña leads the ceremonial ribbon cutting to signal the start of the 2019 Regional Science and Technology Week in Cagayan Valley. With the DOST Secretary are DOST Region II Director Sancho A. Mabborang (left) and Cagayan State University President Urdujah A. Tejada (second from right).

Amidst the rain, S&T still reigns in the valley

by Angelica Marie Paz, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

Five hundred kilometers away from Manila is the sunny city of Tuguegarao. Dubbed as the Gateway to the Cordilleras, '*Tugue*' has a growing economy and home to premiere research and academic institutions.

It is without a doubt a perfect venue to celebrate science and technology (S&T) in the Cagayan Valley. And so, despite the *hanging habagat* (monsoon) that welcomed the participants, the Regional Science and Technology Week (RSTW) pushed through at the Cagayan State University (CSU) Andrews Campus on 27 to 30 August. The RSTW, hosted by the Department of Science and Technology-Region II (DOST-II), had the theme "Enabling Technologies for Sustainable Development", the same theme bannered at the 2019 National Science and Technology Week.

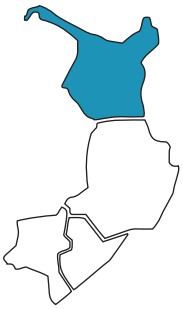
During the opening ceremony, DOST Secretary Fortunato T. de la Peña reported the progress of the nationwide and regional projects of the Department. He also recognized the different S&T contributions of DOST-II such as the Food Innovation Center, the Engineering Research and Development Center, and the continuous projects under the Small Enterprises Technology Upgrading Program or SETUP.

"S&T plays a critical role in alleviating quality of life, that is why we need to partner more with agencies to mobilize S&T and improve research and development," said Sec. de la Peña.

Engr. Sancho A. Mabborang, regional director of DOST-II, also stressed the importance of the RSTW in increasing the level of S&T awareness among Cagayanos. He encouraged the public, especially the youth, to actively participate in the activities prepared by the DOST.

On the part of the CSU, University President Dr. Urdujah A. Tejada emphasized that S&T gives the people capacity to ceaselessly innovate and eventually enable the society to explore new things.

She also explained the role of the CSU in raising the productivity in the region. "We at CSU are continuously cultivating scientifically literate students. DOST and CSU have always been partners in efforts to increase the quality of life through S&T," Dr. Tejada said.



RSTW TUGUEGARAO

Innovations for practical use

Following the opening ceremonies, three projects of the DOST-II were launched. First among these is BIZNEST or the Business Incubation Zone for Novel and Sustainable Enterprises.

BIZNEST is DOST's project with the CSU that aims to nurture the ideas of local inventors and accelerate the commercialization of technology. The project centers on food safety and quality assurance, business growth and optimization, and partnership development. BIZNEST offers Food and Drug Administration licensing and registration assistance, access to investment or financing, and technical consultancy and advisory services.

An example of a BIZNEST project is the pilot testing of the Peanut Postharvest Mechanization and Bulk Storage Technologies. Funded by DOST-II and the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development, the project intends to validate and optimize, under various field conditions, the performance of a locally developed prototype. The developed machine is composed of a peanut stripper cum pod sorter, peanut sheller, and automatic aerated bulk storage system.

Another DOST-II project launched during the RSTW was the e-tricycle. The e-tricycles are intended for commuters and employees working within the commercial centers in both urban and rural areas. The e-tricycle project hopes to improve the transport industry and encourage local government units to adopt e-tricycles in their communities.

"The Department of Energy and DOST have teamed up to work on the Regional Development Plan 2017-2022, and this project (e-tricycle) contributes in reducing the consumption of fossil fuel," said Dr. Arthur G. Ibañez, e-tricycle project leader.

Lastly, the Regional Geographic Information Network or RGIN project was launched to "facilitate online information sharing and spatial data management where every member ensures accuracy, consistency, and relevance of their own data."

"The RGIN is targeted to improve the efficient use of spatial and geographic information for better decision making," said National Economic and Development Authority Assistant Regional Director Ferdinand P. Tumaliuan.

Technology Transfer Day

As part of the Region II RSTW, the DOST-Technology Application and Promotion Institute (TAPI) conducted the Regional Invention Contest and Exhibits (RICE) and the Technology Transfer Day at the Robinson's Place Tuguegarao.

RICE is conducted all over the regions to recognize inventors, researchers, and students for their outstanding inventions. Among the awards that were given for RICE include the Outstanding Industrial Design, Outstanding Creative Research, and Outstanding Student Creative Research for high school and college levels. The

DOST-II Regional Dir. Mabborang (rightmost), together with DOST-TAPI Director Edgar I. Garcia (second from left), and Filipino inventor Francisco Pagayon (leftmost), join (from L-R): Conrad B. Reyes, Cesar B. Mangadap, and Joel M. Alcaraz from Isabela State University—the winners of the Outstanding Creative Research of the Regional Invention Contest and Exhibits.

DOST Sec. de la Peña (middle) shares an entertaining anecdote about his project visit to SETUP beneficiaries in Isabela. Joining him at the press conference are DOST-II Dir. Mabborang (left) and CSU President Dr. Tejada (right).

winners will represent the Cagayan Valley in the National Invention Contest and Exhibits next year.

Meanwhile, the Technology Transfer Day paved the way for researchers and academic institutions within the region to learn more about the programs of DOST-TAPI that could protect their inventions and secure funding for their R&D undertakings. Enterprises and organizations were also invited to encourage them to invest in Filipino-made technologies and make it available for wider use.

During the Technology Transfer Day, opportunities for Filipino inventors were also presented such as the DOST-Academe Technology-Based Enterprise Development, more known as DATBED—one of the main projects for technology transfer and commercialization in the country. DATBED targets the youth in academic institutions and non-governmental organizations to assist them in generating projects intended for their needs.

Romeo M. Javate, officer-in-charge of DOST-TAPI's Investment of Business Operations Division, explained that the project is designed to train students and young professionals to become entrepreneurs of S&T innovation.

Like any other programs, DATBED has several stages—the first one being the assistance coverage stage that evaluates the financial assistance to cover the operating expenses on raw materials, packaging, and labelling expenses.

"This project wants to train students and give them financial assistance so they could create their own technology-based enterprise," Javate explained.

"There are academic requirements needed from the school to ensure that they can undergo the program smoothly," he added.

Some of the completed DATBED projects in Region II are the following: manufacture and marketing enterprise of organic fertilizer and mushroom production from CSU-Carig Campus, as well as organic banana fruit production from CSU-Piat Campus.

Another opportunity presented by DOST-TAPI is the Venture Financing Program, which speeds up the commercialization of technologies by giving micro, small, and medium enterprises financial support so they could propagate their inventions to a wider market.

Activities for the youth

One of the highly-anticipated events of the Region II RSTW is the annual Ginoo at Binibining Agham 2019. Student-representatives across the region showcased their wit and talents before DOST officials, guests, and participants of the RSTW. During the pageant night, the contestants' knowledge and grasp on S&T issues were put to the test.

After a series of eliminations, senior high school students Rafael Villar from Isabela and Mariel Kaye Guzman from Tuguegarao City were crowned as the 2019 Ginoo at Binibining Agham.

Other activities for the students were the spoken poetry, oratorical contest, and S&T quiz bee, which assessed the students' knowledge on S&T's role in achieving the 17 Sustainable Development Goals.

Trina Bernal from Tuguegarao City Science High School won the S&T oratorical contest, while the representative of Casa del Niño Montessori School from Ilagan, Isabela bagged first place for the spoken poetry event. For the S&T quiz contest, students from Santiago City Elementary School were declared winners.

Rain or shine, and through the collective efforts of DOST-II, the local government of Cagayan, and various stakeholders, the RSTW in the valley proved to be successful in showcasing the region's S&T initiatives and programs.

Agriculture champ and Academician Emil Q. Javier hailed as National Scientist

By Charyl C. Apuyan, *DOST-NAST*

uplb.edu.ph

FORMER UNIVERSITY of the Philippines (UP) President Emil Q. Javier became the 42nd scientist who has been conferred the Order of National Scientist by virtue of Proclamation No. 781 signed by President Rodrigo Duterte on 02 August 2019.

The Order of National Scientist is the highest honor that the Philippine government can bestow on a Filipino scientist for his or her outstanding contributions to the fields of science and technology.

Dr. Javier was elevated to the rank of National Scientist for his impeccable leadership and invaluable achievements as an agricultural scientist and as an international civil servant. Dr. Javier is likewise an Academician of the National Academy of Science and Technology, Philippines (NAST PHL), an advisory body of the Department of Science and Technology (DOST).

As an agricultural scientist, Dr. Javier pioneered in forage and pasture crops breeding in the country. He focused on the integration of fodder production with intensive cropping systems, and brought together the country's research and development efforts involving universities and the Bureau of Animal Industry into a national pasture resources development program.

In 1975, Dr. Javier founded the Institute of Plant Breeding (IPB) at the UP Los Baños (UPLB). The UPLB-IPB popularized high-yielding crops and disease-resistant varieties in the country and in Asia. The Institute also spearheaded the creation of a system of national research institutes in food and agriculture to complement the traditional academic department system.

Dr. Javier also co-founded the Crop Science Society of the Philippines and led the establishment of the UP Open University, UP Mindanao, the network of the National Institutes of Molecular Biology and Biotechnology in the UP system pioneered by the UPLB BIOTECH, and the Ugnayan ng Pahinungod or Oblation Corps during his term as UP President.

His dedication to advancing agricultural research and development led him to sit in policy and decision making bodies here and internationally, such as the International Service for National Agricultural Research and the Technical Advisory Committee of Consultative Group for International Agricultural Research.

Meanwhile, his leadership qualities propelled him to occupy top positions in several institutions and the academe. Dr. Javier provided excellent direction and management of the Asian Vegetable Research and Development Center as Director General. He was also Head and Minister of Science at the National Science and Technology Authority, which is now DOST. He was also a former president of NAST PHL and former chancellor of UPLB.

His lifelong mission has been and continues to be to look after the needs of the poor in this country and the world by capitalizing on the resources of modern science and technology. He believes that modern technology and logical approaches when coupled with compassion can be effective in attaining inclusive growth and a democratic social order.

Dr. Javier obtained his Bachelor of Science in Agriculture in 1960 from the UP College of Agriculture, Mater of Science in Agronomy in 1964 from the University of Illinois, and his Doctor of Philosophy in Plant Breeding in 1969 from Cornell University. He was elected to NAST PHL in 1982.

Dr. Teodulo M. Topacio Jr.: A pioneering veterinary scientist

By Charyl C. Apuyan, *DOST-NAST*

HE WAS known for his most notable studies on leptospirosis, an infection that comes from rodents and other wild and domesticated species. His contribution to the medical world through his researches is quite notable.

For one, he was able to establish three strains of the pathogen, and develop appropriate treatment to prevent the transmission of the disease from pigs to humans. Further, he was able to ascertain that the disease was an occupational hazard to workers.

This scientist, a pioneer in the field of animal science, is Dr. Teodulo M. Topacio Jr., a National Scientist and Academician of the National Academy of Science and Technology, Philippines (NAST PHL).

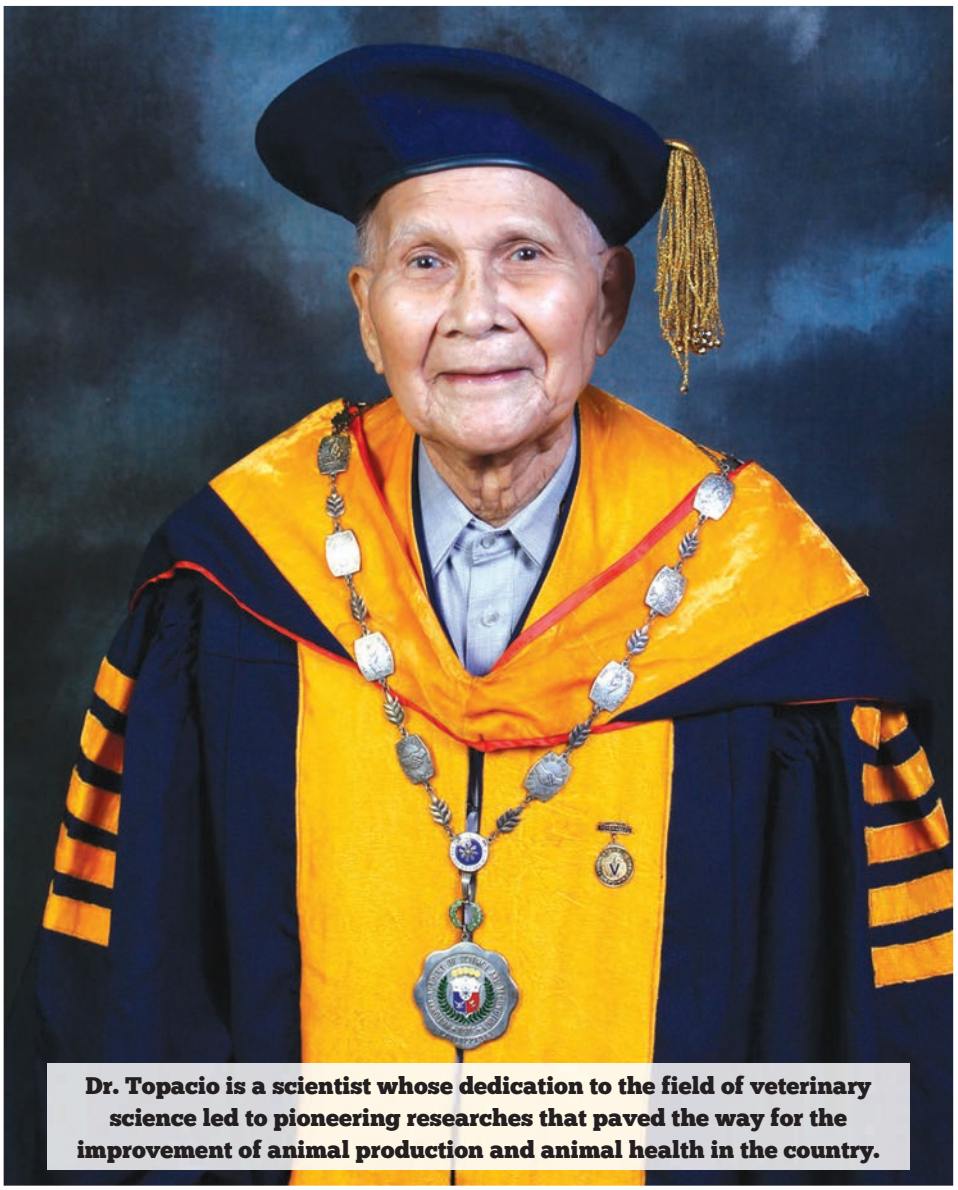
Dr. Topacio is a scientist whose dedication to the field of veterinary science led to pioneering researches that paved the way for the improvement of animal production and animal health in the country.

His many studies looked into animal health. His other researches on animal diseases covered brucellosis, fasciolosis, distemper and tumors of dogs. His book "Annotated Bibliography on Philippine Biodiversity: Animal Diseases—Prevention and Control" published by NAST PHL has served as guide to veterinary, medical, and related field researchers in their work.

As focal person of NAST, he once led a group of veterinarians and physicians and the Bureau of Animal Industry in the preparation and lobbying of a bill that will prevent, control, and eradicate rabies. This bill was eventually signed into law as RA 9482 on 25 May 2007.

Because of his many worthwhile achievements, Dr. Topacio received numerous awards including the Most Outstanding Veterinarian in Research in 1975 from the Veterinary Practitioners Association of the Philippines. He was also bestowed the Outstanding Professional of the Year in 1979 from the Office of the President, and the Most Outstanding Health Professional Award in 1986 from the Council of Professional Health Association.

Dr. Topacio obtained his Doctor of Veterinary Medicine in 1951 from the University of the Philippines (UP), his Master of Science from the Michigan State University in 1956, and his Doctor of Philosophy from the Purdue University in 1963.



Dr. Topacio is a scientist whose dedication to the field of veterinary science led to pioneering researches that paved the way for the improvement of animal production and animal health in the country.

Photo from DOST-NAST

From being an instructor at UP, he rose through the ranks and became professor in 1967. He also served as Dean of the UP College of Veterinary Medicine from 1964 to 1969. Dr. Topacio also served as chairman of the Board of Veterinary Medicine of the Professional Regulation Commission from 1994 to 2004. Upon his retirement from UP, he was appointed as professor emeritus.

Dr. Topacio was elected to the NAST PHL as academician in 1993. In 2008, Dr. Topacio was conferred the Order of National Scientist.

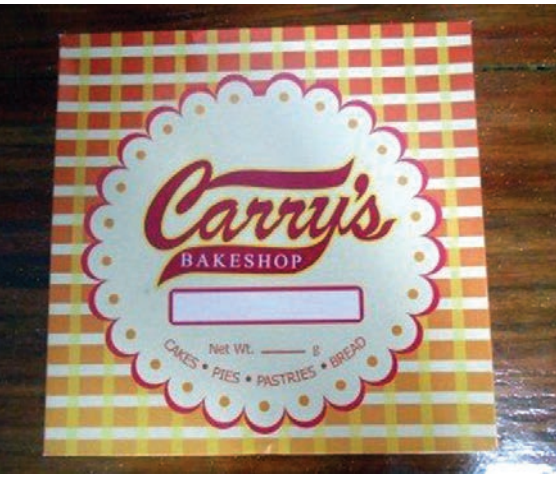
But on 09 July 2019, the Philippines lost Dr. Topacio, and the country's flags were put on half-mast in honor of this great scientist.

The Department of Science and Technology (DOST) on 16 July 2019 paid tribute to Dr. Topacio through a necrological service held at the DOST in Bicutan, Taguig City, followed by the inurnment and state funeral at the Libingan ng mga Bayani in Fort Bonifacio, Taguig City.

A baker's rise to victory with DOST's SETUP

By Veronica A. Laguitan, *PSTC-Northern Samar*
Photos from PSTC-Northern Samar

Sofia Buenconcejo, owner of Carry's Bakeshop



Out of goodwill, a baker from Catarman taught a native kakanin seller the basics of bread baking sometime in 1995. Learning this new skill became a turning point in the entrepreneurial career of Sofia Buenconcejo, the former kakanin seller and now proprietor of Carry's Bakeshop.

Buenconcejo ventured into the bakery business with only PhP 20,000 as initial investment. By the year 2000, her small bakery evolved into a family business that sells traditional bread items such as *pandesal*, sliced bread, and *monay*. At present, 16 assorted breads, crackers, cakes, and pies of different flavors are sold in Carry's main bakeshop and three other municipal outlets.

Prior to her current success in the bakeshop business, Buenconcejo's drive to innovate and succeed led her to seek the assistance of the Department of Science and Technology (DOST)-Provincial Science and Technology Center in Northern Samar back in 2012. Through the DOST's Small Enterprises Technology Upgrading Program or SETUP, Buenconcejo received financial and technical assistance to upgrade her bakery business.

The bulk of the financial assistance that she received from the DOST was used to improve the packaging and label design of her bakeshop's products. Furthermore, nutritional analyses and product development/shelf-life improvement were done for the products as part of the DOST intervention.

In addition, the bakeshop also adopted the veggie bread technology of the DOST-Food and Nutrition Research Institute, which resulted in a 25 percent increase in its production volume per month. At present, the high demand for bakery products, especially veggie bread, gives Carry's Bakeshop a great opportunity to grow its business even more.

To further expand her business, Buenconcejo once again availed of the financial assistance of DOST in 2016, which she used to acquire additional equipment necessary to improve her bakeshop's production. With the second financial assistance through SETUP, Buenconcejo was able to procure a spiral mixer, dough molder, and divider rounder, which led to an evident increase in the bakeshop's daily volume of production.

Now with mechanized equipment, Buenconcejo is optimistic that her bakeshop's production efficiency and productivity will soar high to satisfy the growing market demand.

Spiral mixer

Divider rounder

Dough moulder

Sun-dried and unpulped coffee cherries gathered for manual pounding.

Brewing community of coffee makers in Santol, La Union

By Katrina F. Ronquillo, *DOST-I*
Photos from DOST-I

For most of us, welcoming a new morning is best done with a good cup of coffee. With its captivating aroma, calming warmth, and full taste, coffee truly deserves a spot on the breakfast table.

From beans to brew, coffee is undeniably a magical elixir that gets one going, be it in the middle of a busy day or when pulling an all-nighter.

Rise of the local coffee industry

Named as the second most-traded commodity in the world, coffee is undoubtedly one of the most consumed beverages worldwide. The Philippines, which lies on the so-called "Coffee Belt", has vast lands that are favorable for coffee plantation and production of the four commercially-available varieties of coffee: arabica, liberica (commonly known as barako), excelsa, and robusta.

As far as the Philippine coffee industry is concerned, the government has implemented efforts to promote and support local coffee growers. Local coffee farmers supply around 20 percent of the country's annual coffee requirement.

The rising demand for coffee can be attributed to its growing market, the increasing number of coffee drinkers who are populating the myriad of coffee shops in the country. The coffee craze continues as baristas incessantly craft innovative and exquisite coffee concoctions that meet the demands of coffee lovers everywhere.

Espresso, cappuccino, macchiato, café latte, and cold brew – you name it! The local coffee market has indeed become a delicious, entrepreneurial trend.

Coffee farming community in Santol's highlands

Tapping on this trend of increasing demand for coffee are the coffee farmers of Santol. The municipality, situated at the northeastern part of the province of La Union, is mainly an agricultural community. Its vast terrains made the municipality popular for its forest products. Further, other agricultural produce like rice, corn, tobacco, and root crops are also abundant.

Coffee production has become a tradition for locals in Santol's upland barangays of Sasaba and Sapdaan. For years, residents grew coffee in their backyards for their own consumption. Imbued with a common aim to commercialize their produce, some of these residents converted their backyards into coffee plantations.

Coffee production basics

Aside from establishing their own coffee plantations, the residents of Sasaba and Sapdaan also run their own coffee production, which they do the old fashioned way.

Ground coffee production starts with harvesting coffee cherries. The residents would dry these coffee cherries under the sun for a month to come up with the husked beans. Since the process is weather dependent, drying of the coffee cherries takes some time.

To separate the husks and hull from the bean, manual pounding is done using a large wooden mortar and pestle. Then the pound coffee is winnowed in which the detached coffee skin is totally removed. To ensure the quality of the coffee beans, the locals manually separate the coffee beans from the hulls.

Next, the beans are roasted in the traditional way using firewood to bring out the aroma and flavor. This step brings life to the drink. The roasted coffee beans will then be ground through manual pounding before it is packed for consumption.

Into a drug free, coffee producers society

With the eagerness to earn more, several residents of Sasaba and Sapdaan have previously engaged in the plantation and trade of marijuana. But with the present administration's campaign against illegal drugs, they have surrendered themselves to the authorities and went on a six months base camp rehabilitation.

With the counseling and training provided through the rehabilitation program, surrenderers from Sasaba and Sapdaan decided to form an association to reinforce the coffee farming livelihood that they have previously started.

Hence, the Samahang Pangkabuhayan ng Sasaba at Sapdaan Association (SPSSA) was formed, composed of 24 drug surrenderers from Sasaba and six from Sapdaan. In partnership with the local government unit, the Department of Social Welfare and Development helped the association start their ground coffee processing enterprise.

S&T interventions in coffee processing

Ground coffee processing has become an alternative way for these members to earn income to sustain their families' needs. To intensify their aim to penetrate the local market, the association tapped the regional office of the Department of Science and Technology (DOST) through its Grants-in-Aid program.

The DOST then identified science and technology-related interventions that will improve the association's tedious production process and instill compliance to food safety standards and good manufacturing practices.

As a starting community enterprise, the primary objective of the DOST assistance is to upgrade some of the association's existing tools and facilities to enhance the production and quality of their ground coffee.

Freshly brewed black coffee proudly made and prepared by the members of SPSSA.

To enhance production, the association acquired several equipment like a portable solar dryer, coffee pulper, grain moisture meter, coffee huller, heavy-duty coffee grinder, large cooking vat, stainless steel table, digital weighing scale, impulse sealer, and a heavy-duty burner. The DOST also assisted the association in terms of label design and packaging.

Like a fresh brew that greets the sunrise, the members of the association are very enthusiastic on the outcomes of the DOST assistance. They are hoping that this will eventually lead to the realization of their vision for Sasaba and Sapdaan to be hailed as the "coffee mug" of the municipality.

Dielle's Honey Wine:
How one man's hobby turned into a profitable venture

By Rozanne Marie Caparas, *DOST-NCR*
Photos from DOST-NCR

Dielle's Apiary and Meadery was hailed as DOST-NCR's Best SETUP Adoptor for 2019 and National Winner of the Packaging Innovation Award. DOST Secretary Fortunato T. de la Peña (third from right), together with DOST Usec. for Regional Operations Brenda L. Nazareth-Manzano (third from left), DOST-NCR Regional Director Jose B. Patalinjug III (rightmost), DOST-VIII Regional Director Engr. Edgardo M. Esperancilla (second from left), and MUNTAPARLAS Cluster Director Kim L. Atienza (leftmost) bestow the award to Myla Macababbad (middle) and Luke Macababbad (second from right), owner of Dielle's Apiary and Meadery.

Raising honeybees was a natural business of choice for Luke Deogracias D. Macababbad, especially since he had always harbored a love and fascination for bee farming.

Macababbad wasn't even thinking of going into a formal business involving bees when he bought his first four colonies of honeybees. "Ang aim ko lang naman noon ay magkaroon kami ng honey para mayroon kaming magamit dito sa bahay."

But the bees produced more honey than what he and his family needed. He was able to harvest 100 kilos of honey during the first yield. The decision on what to do with the excess honey came easy when his father-in-law, who had experience with wine-making abroad, talked to him about the possibilities of producing honey wine.

And so, Dielle's Apiary and Meadery made its debut in the highly competitive and constantly evolving world of wine making.

Sweetened with SETUP

Dielle's Apiary and Meadery Inc. is a producer of honey, honey wine (mead), and melomel, an alcoholic beverage produced by fermentating honey and tropical fruits. Its wine initially had four variants, namely wild berry (bignay), Philippine plum (duhat), mango, and mead.

It took several experimentations before Dielle's was able to perfect its mead or honey wine. Being the first of its kind in the Philippines, Dielle's honey wine soon captured the taste, not just of Filipinos, but of foreigners as well. The demand for the honey wine increased, and this is when Macababbad sought the assistance of the Department of Science and Technology-National Capital Region (DOST-NCR) to upgrade Dielle's production capacity and product quality.

Under the Small Enterprises Technology Upgrading Program or SETUP, Dielle's availed of services such as Cleaner Production Assessment, Good Manufacturing Practices (GMP), Food Safety Assessment, Plant Layout Assistance, Packaging and Labelling Design and Development, and Lean Management for MSMEs from 2009 to 2018. The company was also provided with innovation fund for the procurement of appropriate equipment to aid in production.

The DOST assistance on packaging and labelling design development helped the company to design a unique product label and logo that passed the

mandatory labelling requirements and greatly improved the packaging design of the product. With the new label design and packaging, the company was able to promote its honey wine products in trade fairs and bazaars, receiving a lot of orders in the process. Dielle was also able to establish a kiosk in Festival Mall in Alabang.

As a micro enterprise and a developing company, Dielle's also encountered problems in acquiring food-grade equipment and bottles, which resulted in a shortened product shelf life for its products.

For example, the company expected that its wine was supposed to taste better as it ages just like any other wine. But it wasn't the case for Dielle's wine which turned into vinegar instead. The sour taste, it was found out, was caused by contamination due to the improvised wine fermentation and aging tanks, and unsanitary production process.

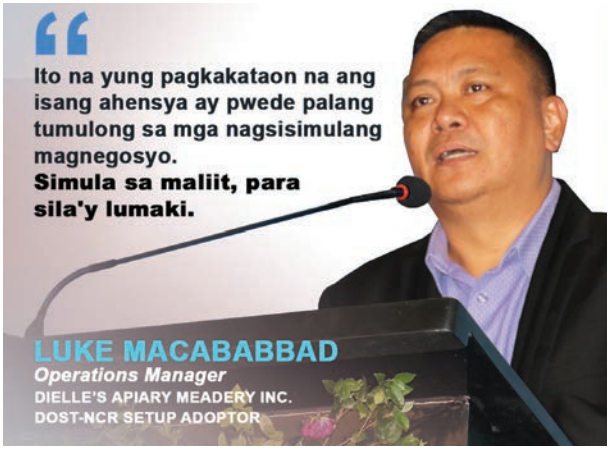
The filling process that the company initially used was also inefficient and unhygienic, using only a pitcher and a funnel to transfer an estimated amount of wine to a bottle. Since availing of DOST's Food Safety Consultancy, Dielle's production staff learned the proper handling and processing of the product to prolong its shelf life.

The clarity and quality of the wine eventually improved and the company was able to comply with the industry standards of wine production. More importantly, the company has now established a standardized taste for its wines.

Dielle's also availed of the Plant Layout Assistance, upgrading its backyard setup to a significantly-improved GMP-compliant production facility. Further, as a result of DOST-NCR's assistance, the Food and Drug Administration granted the company the License to Operate in 2013 and the Certificate of Product Registration in 2018.

Today, Dielle's Apiary and Meadery Enterprises prides itself in being one of the most successful clients of DOST-NCR under SETUP. It has grown from a 50-square meter backyard enterprise to a 150-square meter small enterprise.

The company's production increased from 100 bottles of wine per day in 2008 to 1,000 bottles per day in 2018. The public has since become more familiar with its products, leading to an increase of 1,714 percent in sales from 2008 to 2018.



Moreover, Macababbad's bee farm has expanded from his house in Muntinlupa City, to locations in Lipa and Tanauan in Batangas, and in Cavite. Twenty more variants were also added to the original four, including mangosteen, guango (guava and mango mix), dragon fruit, chili, and coffee.

As part of the company's product line expansion, Dielle's also ventured into manufacturing honey wine vinegar by processing fruit wastes from their honey wine production using the DOST-developed vinegar acetator.

Awards and recognition

Dielle's Meadery and Apiary's constant initiatives to innovate and improve its products resulted in several awards and recognitions to acknowledge its excellence as a company.

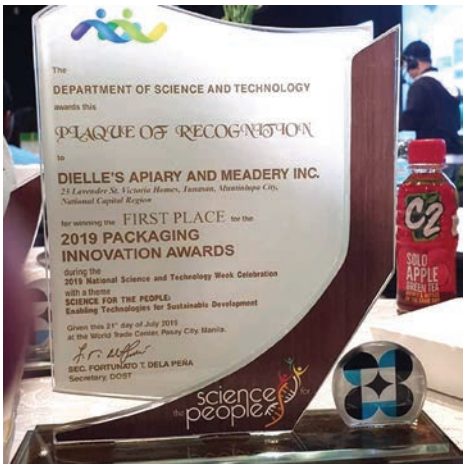
In 2017, Dielle's was awarded the Micro Enterprise Excellence Award by the Philippine Chamber of Commerce and Industry-NCR, and a Muntinlupa Centennial Commemorative Award by the City of Muntinlupa.

In July this year, it was hailed as DOST-NCR's Best SETUP Adoptor for 2019 and was adjudged as the National Winner of the Packaging Innovation Award at the 2019 National Science and Technology Week .

"Marami pong salamat sa inyong lahat. Ito pong pagkakataon na ibinigay sa amin ay napakahalaga, sapagkat hindi lamang para sa akin, hindi lamang sa kumpanya namin, kundi sa komunidad na rin," said Macababbad. (I give my thanks to everyone. This opportunity given to us is very important not only to me and our company but also to our community.)

"Sapagkat ang komunidad at kami ay tulong-tulong para mapalago ang aming kabuhayan, gayun din, mayroon kaming maibabahagi sa kanila. Ang lahat ng ito ay dahil sa tulong ng DOST na walang sawang maglingkod, magbigay ng kaalaman, at magbigay ng pagpapahalaga sa mga MSME na katulad namin," Macababbad concluded.

(It is because we worked together with the community to improve our livelihood, we have something to share with them. This is because of DOST's support in providing knowledge to entrepreneurs like me.)



PhilAAST names outstanding scientists, announces new awards

By Jasmin Joyce P. Sevilla, *DOST-STII*
Photos by Henry A. de Leon, *DOST-STII*

The six awardees proudly hold their plaques of recognition awarded by PhilAAST for their exemplary contribution in their respective fields in science and technology.

To mark its 68th year, the Philippine Association for the Advancement of Science and Technology (PhilAAST) recognized six Filipino scientists for their exemplary contributions in their respective fields. At the same time, PhilAAST announced a new set of awards for year 2020.

Two of the scientists who were recognized for their achievements were Dr. Carlo A. Arcilla and Dr. Raymond R. Tan, who received the Gregorio Y. Zara Awards for Basic Science Research and Applied Science Research, respectively.

Dr. Arcilla is currently director of the Department of Science and Technology-Philippine Nuclear Research Institute (DOST-PNRI). Among his projects include the lowering of costs of cancer diagnosis through nuclear medicine, as well as researching for innovative nuclear applications in agriculture.

Dr. Tan, on the other hand, is a professor of chemical engineering and current Vice Chancellor for Research and Innovation at the De La Salle University (DLSU). He is also an Academician of the National Academy of Science and Technology, Philippines. His researches are focused on the development of novel computational techniques for the design of sustainable industrial systems.

Established by the family of National Scientist Gregorio Y. Zara and the PhilAAST in 1968, the Gregorio Y. Zara Awards for Basic and Applied Science Research are given to local scientists for their valuable contributions in science and technology.

Further, Dr. Cleotilde H. How, professor emeritus from the University of the Philippines (UP) Manila, received the Dr. Paulo Campos Award for Health Research. This award was established by PhilAAST and the Campos family in 2012 to honor outstanding medical researchers with utmost commitment to service and contributions for the betterment of the country.

"This is such a huge honor for me—to be recognized in the name of my late professor in UP, Dr. Paulo Campos," Dr. How mentioned. "His work in community health inspired me and made a huge impact in my career as a health researcher and practitioner," she continued.

Dr. How's contribution in health research has influenced the understanding, management, and diagnosis of tuberculosis (TB) among children and adolescents. With her expertise in the field, she worked for the World Health Organization core group for childhood TB in reviewing the essential list of drugs for TB in children in 2008.

"This award inspires me to do more work in reducing TB cases among children, especially in the community level," said Dr. How.

Another scientist who received an award from PhilAAST was Dr. Susan M. Gallardo, who was bestowed the David M. Consunji Award for Engineering Research. Dr. Gallardo is a university fellow and retired professor of chemical engineering from DLSU.

Dr. Gallardo specializes in environmental engineering, specifically on industrial and hazardous waste treatment

and management. Her technologies on water filtration system and photocatalyst of titania with activated carbon recently received a patent and a utility model registration, respectively.

Established by the PhilAAST and the DMCI Holdings, Inc., the David M. Consunji Award for Engineering Research aims to recognize outstanding researchers in the field of engineering.

In the field of agriculture, Dr. Emma K. Sales, professor at the University of Southern Mindanao and currently working with the Bureau of Plant Industry, received the Leads Agri Award for Agricultural Research.

Bestowed by the Leads Agricultural Products Corporation, the award recognizes committed researchers in the production of excellent products and programs contributing to the improvement of the lives of Filipinos.

Among Dr. Sales' notable accomplishments was the establishment of the first tissue culture and biotechnology laboratory in Region XII. Her work as a crop scientist—developing molecular diagnostic tools in identifying varieties of durian, rubber, and mango—became a valuable tool in producing quality planting materials.

Another awardee was Engr. Robert O. Dizon who received the Mario Cruel Award. Engr. Dizon is the executive director of the DOST-Metals Industry Research and Development Center.

Engr. Dizon's involvement in spearheading the development of the first Filipino-made hybrid electric train led him to bag the Mario Cruel Award for Advanced Engineering Technology Application. The award recognizes individuals with notable contributions for the promotion, enhancement, and development of engineering and technology innovations in the country.

The awarding ceremony was conducted during the two-day annual convention of PhilAAST, held 11 to 12 September 2019 at Hotel Jen Manila in Pasay City, bearing the theme "Science for the People: Fostering Centers of Excellence in the Regions."

New awards for 2020

"PhilAAST is a strong partner of the DOST in promoting S&T in the country," DOST Secretary Fortunato T. de la Peña emphasized as he welcomed guests and awardees during the convention.

True to its mission of "promotion of public understanding, knowledge, and application" and also of "inculcation of a culture of excellence and integrity among Filipino scientists and technologists," the PhilAAST will be adding three more awards to its current roster of five prestigious recognitions given to local scientists.

One of the new awards is the Dr. Ceferino L. Follosco Award for Product and Process Innovation—named after the late Dr. Ceferino L. Follosco, a well-accomplished industrialist and former DOST secretary from 1989 to 1992.

The second addition to the list of awards is the Dr. Michael Purvis Award for Sustainability Research in honor of Dr. Michael Robert Irvin Purvis who was a distinguished energy engineer from the United Kingdom and served for 20 years in the academe of DLSU.

Lastly, the Lourdes Espiritu Campos Award for Research in Infectious Diseases, in honor of the late Dr. Lourdes Espiritu, will be given to outstanding scientists to recognize their significant work on infectious diseases research.

Nominations will be accepted next year and the first awardees for the three new recognitions will be announced in the 69th PhilAAST Annual Convention in 2020.

On top of the awarding ceremony, PhilAAST held six sessions throughout the two-day convention. Invited researchers and scientists from all over the country shared the development of centers of excellence in the regions, specifically in the fields of agriculture, medicine and social sciences, engineering, earth and environmental sciences, and information technology.

Founded in September 1951, the PhilAAST is a non-profit association of scientists and technologists in the country that aims to promote the value of science in the community.

DOST Secretary Fortunato T. de la Peña (front row, middle), PhilAAST President Dr. Jaime C. Montoya (front row, second from right), PhilAAST Secretary and Director Dr. Diana L. Ignacio (front row, rightmost), and keynote speaker Cabinet Secretary Karlo Alexei B. Nograles (front row, fourth from right) join the six PhilAAST awardees for 2019 (back row, from left to right): Dr. Susan M. Gallardo, Engr. Robert O. Dizon, Dr. Emma K. Sales, Dr. Cleotilde H. How, Dr. Carlo A. Arcilla, and Dr. Raymond R. Tan. Together with them are the immediate relatives of Dr. Gregorio Y. Zara, Dr. Paulo C. Campos, and Dr. David M. Consunji—the founding families of PhilAAST.

DOST chief receives UPAA Lifetime Distinguished Achievement Award

Text and photo by Enrico P. Belga Jr., *DOST-OASec Admin*

DEPARTMENT OF Science and Technology (DOST) Secretary Fortunato T. de la Peña was conferred the Lifetime Distinguished Achievement Award by the University of the Philippines Alumni Association (UPAA) during the UP General Alumni Homecoming at the UP Diliman on 24 August 2019.

Secretary de la Peña, BS Chemical Engineering Batch '69; MD '76, is one of the only four alumni recipients of the said award.

In the said homecoming, UPAA Legal Counsel Atty. Raul R. Reyes delivered the six resolutions passed by the UPAA in recognition of the DOST and its importance and contributions in nation-building during the event.

The six resolutions presented are the following:

1. To recognize the greater importance and relevance of science and technology, improvement of the comfort level of the Filipinos, positive contribution to the economy, the facilitation and delivery of services, and to our country's standing among other nations.

2. To recognize the contribution and support provided by the DOST to the University of the Philippines and in the field of education through the funding and contributions, thus ensuring the education of our youth so that someday they may contribute as experts in the fields of science and technology to the development of our nation.
3. Engage in the dissemination of information about the milestones reached in the fields of science and technology to the youth, students, and all citizens so that all may be aware of the benefits that are available to the Filipinos rich and poor alike for the purposes of raising our pride as a nation.
4. Encourage the UP community and the local communities to raise a unified voice and support to the DOST so that we may be heard by the Executive and the Legislative Departments for purposes of their policy and budgetary support to the DOST.
5. Encourage a collaboration of all facets of society, all agencies, media, business, and people from all walks of life, for the purpose of supporting the programs and develop the nation's standing in the arena of science and technology.
6. Petition the Administration to support and empower the DOST in its purpose and projects. Exhort the Congress to provide ample and just funding to the DOST and other research and scientific agencies so that they may truly perform their mandate.

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GENERAL PROGRAM OF ACTIVITIES

Region	Date	Venue
1	17-19 September	Laoag City, Ilocos Norte
2	27-30 August	Cagayan State University, Tuguegarao City
3	29 July - 01 August	Vista Mall, Balanga, Bataan
CAR	20-22 November	Bontoc, Mt. Province
4A	24-27 September	Sta. Rosa Convention Center, Sta. Rosa, Laguna
4B	27-29 November	City Coliseum, Puerto Princesa City, Palawan
5	08-10 October	Naga City, Camarines Sur
6	21-24 October	Iloilo Convention Center, Iloilo City
7	15-17 August	Capital Square, Siquijor, Siquijor
8	09-11 August	Robinson's Place, Tacloban City
9	09-11 September	Zamboanga City
10	11-13 November	Valencia City, Bukidnon
11	28-30 October	SM Lanang, Davao City
12	(to be announced)	
CARAGA	03-05 September	Bayugan City, Agusan Del Sur
NCR	01-03 October	Pasig City