

### **EDITORIAL**

### Science for the People in 2019



In 2019, I would say the Department of Science and Technology (DOST) made the people feel that science is working for them. We leapfrogged several steps toward the attainment of our 2022 goals.

In the most recent Global Innovation Index, the

Philippines moved 19 ranks higher from 73rd place last year to 54th place this year out of 129 economies. Our achievement is said to be "above expectation for level of development" among lower middle-income economies.

In Research and Development, we had several breakthroughs in transportation, space technology, drug discovery and agriculture, among others.

In transportation, DOST turned over the hybrid electric trains (HET) to the Philippine National Railways. HET is a Filipino-made train which proves that we can make technologies that work for our people. It is now serving Filipino passengers. In space technology, we have Diwata-2 and Maya-1 micro and cube satellites, respectively, up in the sky that continue to send high resolution images that can be used for disaster risk reduction, climate change adaptation, agricultural modelling, and land use classification. Diwata-3 is still at the development stage and is set to launch in 2021. Complementing the satellites is the Philippine Earth Data Resource Observation (PEDRO), which has the first satellite tracking antenna in the country, the Ground Receiving Station in DOST-Advanced Science and Technology Institute, Quezon City, to access earth-surface information for disaster management, environmental monitoring, national security,

urban mapping, rehabilitation assessment, and research purposes. We also launched a second Ground Receiving Station in Davao City, to enhance PEDRO operations and serve as a redundant station in case of any catastrophe and disaster threats in Metro Manila.

In drug discovery, formulation of standardized dosage from 28 plants are nearing completion. After this stage, dosage forms that pass will go through pre-clinical studies. Also, a pre-clinical trial of a fixed dose combination of three plants as possible treatment for dengue has been completed and results are very promising. These are among the promising research outputs under the Tuklas Lunas Program.

In agriculture, the national annual average yield of coconut at 45 nuts/palm/year is projected to increase to 60-80 nuts/palm/year. A tremendous increase that will definitely improve the productivity of our coconut farms through Coconut Somatic Embryogenesis Technology or CSet, an alternative technique for rapid mass propagation of superior genetic stocks for high yield, pest and disease resistance, and high value products. We also have R&D on nanofertilizers which led to the development of Fertigroe®, an environment- friendly and cost-effective alternative fertilizer that improves nutrient absorption and increase crop yield. The patent for FertiGroe<sup>®</sup> Nitrogen nanofertilizers is now for review.

*Full editorial on Science For The People section, page 51.* 

Forfunato T. de la Peña Secretary, DOST



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# DEPARTMENT OF SCIENCE AND TECHNOLOGY FOURTH QUARTER 2019



### **ABOUT THE COVER**

The 4th quarter issue of the S&T Post focuses on the technological advancements and research and development (R&D) initiatives as spearheaded by the different DOST agencies and regional offices that bring science closer to Filipinos wherever they are. Through the conduct of the Regional Science and Technology Week and other S&T initiatives such as the Regional Invention Contest and Exhibits, the Balik Scientist program, research paper presentations, and scientific forums, to name a few, the DOST is also able to capitalize on the partnership with state universities and colleges to propel R&D activities to greater heights in the regions. The cover represents R&D interventions in the regions and how these contribute to the holistic growth of science, technology, and innovation in the country. The Filipino's thirst for innovation is reflected through the magnifying glass, complemented by the pins on the map that represent the growing presence of R&D in every corner of the Philippines.

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### **DOST-TAPI holds info drive on amended IP policies**

By Mary Anichie C. Itoh, DOST-TAPI Photo from DOST-TAPI



DOST-TAPI's Romeo M. Javate welcomes the participants.

THE TECHNOLOGY Application and Promotion Institute of the Department of Science and Technology (DOST-TAPI) conducted an information drive to orient representatives from DOST Regional Offices, as well as from state universities and colleges and higher education institutions, on the DOST's amended Intellectual Property (IP)-related policies.

Almost 100 participants joined the event dubbed "Information Drive on the Amended DOST Intellectual Propertyrelated Policies", which was held 09-10 October 2019 at Midas Hotel in Pasay City. According to DOST-TAPI, the event is the first in a series of information campaigns planned throughout the country to disseminate the amended IP-related policies.

"We would like to help you clearly identify your roles in IP Protection and

Management of your R&D (research and development) works," said Romeo M. Javate, officer-in-charge of the Investment and Business Operations Division (IBOD) of the DOST-TAPI, as he addressed the participants during the event's opening ceremonies.

Javate emphasized that the changes made in the DOST IP-related policies affect the participants' different research processes and transactions.

Since the enactment of the Philippine Technology Transfer Act of 2009 or Republic Act (RA) 10055 into law in 2010, the DOST has been vigorously initiating activities to support the RA's goal to successfully transfer government-funded R&D results for the benefit of the Filipino people.

RA 10055 expanded DOST's function in calling for a regular national conference of government funding agencies and research and development institutes (RDI) to promote multidisciplinary, joint and cross collaboration in R&D, coordinate and rationalize the R&D agenda, and harmonize all R&D priorities.

Moreover, the Implementing Rules and Regulation (IRR) of the Act requires the DOST to define a policy on IP and lay down the institutional mechanisms for technology transfer activities.

"The amended DOST IP-related policies are for the efficiency and effectiveness of the implementation of the law," explained Atty. Lucieden Raz, consultant of IBOD during her discussion of the amended IRR, DOST IP Policies, and Technology Transfer Protocol of DOST RDIS.

Likewise, Atty. Marion Ivy Decena of DOST-TAPI's Invention Development Division, presented the "Guidelines on Fairness Opinion Report and Written Recommendation", while Atty. Ma. Gladys C. Vilchez, tackled the "IP Management Protocol of DOST-Government Funding Agency and Policy on Governing Contract Research."

### Launching of the Technology Transfer Day Website

Subsequently, the official website for the Technology Transfer Day (TTD) was launched during the event.

The TTD website is a one-stop online source of all the technologies generated and funded by the DOST RDIs and councils.

Included in the website are brief descriptions of the technologies, photos, contact information of the technology generators, as well as the technology licensing offices and basic information and requirements for licensing agreements.

For more information on technology transfer, visit techtrans.gov.ph.

### DOST's electronics testing center gets ISO 17025 accreditation

By Beatrice Marie S. Basi, DOST-PCIEERD Photos from DOST-PCIEERD

**ELECTRONIC PRODUCTS** from the Philippines have a better chance of cracking into the international market as the Department of Science and Technology's (DOST) Electronics Product Development Center (EPDC)– the Philippines' premiere electronics testing center–gains its ISO 17025:2017 accreditation for electrical testing or EMC (electromagnetic compatibility) testing.

Awarded the American by Accreditation for Laboratory Accreditation (A2LA)—an independent, non-profit, internationally-recognized accreditation body in the United States for laboratory and laboratory-related accreditation services-the ISO 17025:2017 positions the EPDC at par with electronics testing centers around the world as it recognized EPDC's several testing methods for its international compliance.

The accreditation recognized the technical competence and the laboratory quality management system of the EPDC for electrical testing.

DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development



The Electronics Product Development Center.

Executive Director Dr. Enrico C. Paringit said, "The recognition that the A2LA awarded to EPDC is a testament to the continuous innovation that we have committed to the Filipino people. We are optimistic that more electronics companies will be trooping to the EPDC to have their products tested or create new designs using our machines."

A2LA awarded the ISO 17025:2017 for commercial and automotive component



In preparation for the accreditation of the EPDC, a Global Compliance Consulting Technical Training was conducted by Thomas Dickten (fourth from the left) and attended by DOST staff (from left to right): Lemuel Borgonia, Victor Gruet, Hilary de Leon, Julius Solomon, Janel Sito, Jhonatan Tapay, and Darwin Bernabe Mendez.

tests for both radiated and conducted emissions tests of EPDC for the following products: Internet of Things equipment, information technology equipment, multimedia equipment, power supplies, uninterruptible power supplies, 3D printers, medical equipment, and onboard automotive devices (i.e., camera, sensor, ECU, etc.).

DOST created the EPDC in response to the industry need for facilities to improve product design, development, test, and to spur even more electronics manufacturing in the country, a call championed by the Electronic Industries Association of the Philippines, Inc. (EIAPI).

With EPDC, companies can have their product tests done in the country instead of sending them abroad. Inaugurated in 2017, the DOST-Advanced Science and Technology Institute manages the EPDC in partnership with EIAPI.

Through the EPDC, small, medium, and large enterprises can have easy access to testing facilities for their electronics products and even help them create their own through the various innovation programs of the facility.

# Preparedness, accurate info saves lives—DOST-PHIVOLCS

Text and photo by Rodolfo P. de Guzman, DOST-ST//

**PREPAREDNESS BY** knowing the correct information about any natural hazard spells the difference between experiencing a disaster and being safe from it.

This was the key message stressed by Dr. Renato U. Solidum Jr., undersecretary for Disaster Risk Reduction and Climate Change of the Department of Science and Technology (DOST), during the celebration of the World Tsunami Awareness Day (WTAD) on 05 November 2019 at the PHIVOLCS Auditorium.

Usec. Solidum, the so-called "Fault Finder" (a monicker attributed to him as an expert on the different faults in the Philippines) and officer-in-charge of the DOST-Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS), emphasized the importance of having the right information about tsunami—how it is created and how it can affect coastal communities after an earthquake.

"We need to educate our people on what tsunami is, how they should respond," said Usec. Solidum. "They should also know their evacuation plan or route to remain safe."

According to him, natural hazards like earthquake, tsunami, or landslide cannot be avoided nor can these be precisely predicted before they happen, but the negative effect can be reduced or mitigated with appropriate knowledge of the science behind them.

Backtracking to past earthquake and tsunami events in the Philippines, Usec. Solidum underscored the need to ensure that infrastructure like houses and buildings ascribe to the National Building Code of the Philippines. Tragedy occurs when these infrastructure collapse because they do not meet engineering specifications.

Usec. Solidum referred to the "How Safe is Your House?" brochure produced



Dr. Renato U. Solidum Jr. (second from left) emphasizes the importance of creating an evacuation route and installation of signage or markers in strategic locations to inform the community ahead of time and remain safe during the occurrence of tsunami that is triggered by an earthquake.

by the DOST-PHIVOLCS that specifies the quality of building materials that can withstand strong earthquakes, like the use of six-inch hollow blocks compared with just four-inch hollow blocks, as well as the use of the 10mm reinforced steel bars instead of just the 6mm size.

"People should know the characteristic of tsunami whether they are distant (emanating from other countries) or local (if occurring in the Philippines) because the preparation time will vary from just as short as 20 minutes before it hits land or up to one hour or more, so as not to create unnecessary panic," stressed Usec. Solidum.

On the other hand, Mylene M. Villegas, chief of the Geologic Disaster Awareness and Preparedness Division of DOST-PHIVOLCS, presented the different disaster mitigation initiatives of the agency for earthquake, tsunami, and landslide in accordance to the Sendai Framework and its ongoing partnership with different international agencies like the Japan International Cooperation Agency. Villegas mentioned the different programs of DOST-PHIVOLCS to address tsunami like the following: installation of 19 tsunami early warning detection system using sensors; establishment of five Tsunami Detection Centers; 10 Tsunami Community-Based Early Warning System in cooperation with local government units; 104 earthquake monitoring stations; and the holding of regular tsunami drills in schools.

Further, the agency bannered the use of innovations like drones for disaster risk assessment and the adoption of digital technology to aid in gathering important data for decision making.

DOST-PHIVOLCS is currently implementing the GeoRiskPH which is under the agency's Risk Information Management and Assessment Program. This initiative is envisioned to benefit both operations and research and development of the agency through continuous research, analysis, and development of platforms, methods, and applications for hazards and risk assessment.



Screenshot of the HazardHunterPH website.

As a result of the GeoRiskPH program, DOST-PHIVOLCS recently launched the HazardHunterPH, a web application designed to increase hazard assessment accuracy, improve process efficiency, and enhance the ease of doing business in relevant private and government institutions. It can be accessed through the website https://hazardhunter.georisk.gov.ph. During the WTAD celebration, Mabelline T. Cahulogan of GeoRisk Philippines of DOST-PHIVOLCS, presented another digital app called the GeoAnalytics. This enables analysis and visualization of the exposure of population and elements at risk to natural hazards and generates summaries of hazards and risk assessments. This tool will be very important for disaster risk managers, local government executives, urban planners, and other institutions.

The United Nations General Assembly on December 2015 declared 05 November every year as World Tsunami Awareness Day to promote a global culture of tsunami awareness.

### DOST launches first nat'l research agenda for mental health

By Christine Jane M. Gonzalez, DOST-PCHRD Infographics from DOST-PCHRD

THE COUNTRY'S lead in health research, Department of Science and Technology-Philippine Council for Health Research Development (DOST-PCHRD), and announced the conception of the first National Mental Health Research Agenda (NMHRA) during the World Mental Health Week on 11 October 2019 at the Philippine International Convention Center, Pasav City.

Intended to set the direction for the country's future mental health research investments, the development of NMHRA 2019-2022 was facilitated by DOST-PCHRD and the World Association for Psychosocial Rehabilitation (WAPR)– Philippines, working with various stakeholders. The selection of NMHRA research priority areas is based on the provisions of the Philippine Mental Health Act of 2017.

"We still have much to do in the field of mental health research, and I hope with the NMHRA, we can inspire more evidence-informed research programs on mental health in the country," said Dr. Jaime C. Montoya, executive director of DOST-PCHRD.

According to the Principal Investigator of NMHRA and the President of WAPR-Philippines, Lucita Lazo, mental health is not a national priority over the years, but now solutions to address the problems are being brought out. Lazo expressed her high hopes that more government and nongovernment organizations will initiate and support mental health research efforts in the country.

Lazo co-developed the NMHRA along with Dr. Lourdes L. Ignacio, Founding President of WAPR-Philippines.

## Mental health situation in the Philippines

"In a developing country like the Philippines, the shortage of human and financial resources along with the stigma on anything 'mental', and the low prioritization for mental health hamper the national capacity to respond to the increasing needs of the Filipino to sustain a good quality of life," said Dr. Ignacio.

Mental health is listed as the third most prevalent form of illness in the Philippines, according to a 2018 study of John Lally, John Tully, and Rene Samaniego entitled, "Mental health services in the Philippines." The Department of Health reported that one in every five Filipino adults has some form of mental illness.

Every year, around 3,500 Filipinos commit suicide, according to the World Population Review in 2019. Additionally, the highest percentage of depression affects teenagers and young adults aged 16 to 29.

In terms of healthcare, there are only two to three mental health workers for every 100,000 Filipinos, according



The new mental health research agenda seeks to support the current policy reforms in mental health, as it is informed by developments at the global level and continues to support a life course perspective on mental health research.

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### DOST NEWS



The future of mental health research with NMHRA 2019-2022

to the World Health Organization and Department of Health in 2006. This, according to experts, accounts for a severe shortage of mental health specialists in the country. Moreover, researchers argue that mental health in the Philippines remains an under-resourced aspect in healthcare.

## National developments in mental health

There are two major waves of mental health development in the Philippines, said Dr. Ignacio. The first was initiated in 2001 by the National Mental Health Policy issued by the Secretary of Health as the country's commitment in observance of the World Health Day. The second was done in the last two years: the enactment of the Philippine Mental Health Act of 2017, the promulgation of its implementing rules and regulations, and the enactment of the Universal Health Law. These recent developments are all deemed to change the landscape of mental health in the country.

Mental health is one of the research priorities in the National Unified Health Research Agenda (NUHRA) 2017-2020. However, no mental health research framework existed that the DOST-PCHRD could follow in supporting mental health programs.

With the NMHRA 2019-2022, future mental health research projects are expected to achieve three major outcomes as follows: improved mental health information system; strengthened leadership and governance; and accessible, available, affordable, and responsive mental health services.

Both Lazo and Dr. Ignacio believe that a strengthened mental health information system is crucial as it will lay the basis for innovations in the field. More so, this will help steer the provision of mental healthcare services for Filipinos.

Subsequently, an improved leadership and governance will ensure adequate supply of resources needed for mental health services in the country. Well-informed duty bearers will fuel the provision of treatment and care in local mental health facilities and mental hospitals, which will increase the availability of mental health services among local communities all over the country.

"Now, it seems like there can be reality to the movement towards approaching mental health from a transformative framework to being more wide-ranging, as it's going to traverse the whole of life, because that's what mental health is all about, the whole total well-being, so exciting!" said Dr. Violeta Bautista, head of University of the Philippines Diliman Clinical Psychology Program. DOST NEWS

## SOX energy audit team gets PhP 800k worth of equipment

By Jehan Alioden, DOST-XII Photos from DOST-XII





The energy audit equipment which was successfully turned-over to the Energy Audit SOCCSKSARGEN team.

THE ENERGY Audit SOCCSKSARGEN Team is now gearing up for more energyfocused productivity-enhancement activities after the successful turnover of an estimated PhP 800,000 worth of energy audit equipment this year. Eight of said equipment were already turned over in February 2019 and the other two were delivered in November 2019.

Recently, the Department of Science and Technology-Industrial Technology Development Institute (DOST-ITDI), as the implementing agency of energy audit, conducted the two-day "Training on the Use of Energy Audit Equipment" at the Mindanao State University GenSan Campus for different energy audit teams of DOST-XII and selected state universities and colleges in Region XII.

Part of the training was the conduct of energy audit on Brylle Matthieu Foods in General Santos City during the first day.

The Energy Audit Team serves as a technical arm to both public organizations and private enterprises in conducting critical examination of energy use pattern. The team also recommends ways and means of reducing the level of



Energy audit teams of DOST-XII and selected SUCs in Region XII attend the two-day "Training on the Use of Energy Audit Equipment."

energy consumption, improving energy efficiency, and recommending energysaving strategies and opportunities that lead to higher productivity.

Moreover, the conduct of energy audit will identify areas of energy loss/wastes, relate energy consumption to production, and improve process/equipment efficiencies. Energy audits were also scheduled for DOST SETUP beneficiaries in the region and hopefully will be available next year to other S&T-inclined companies.

Interested firms and companies can still signify their intent by sending their request letter addressed to Engr. Mahmud L. Kingking, OIC-Office of the Regional Director, DOST-XII.

## **NegOr studes receive STARBOOKS**

By Engr. Reinhold Jek Y. Abing, *PSTC-Negros Oriental* Photos from PSTC-Negros Oriental

HIGH SCHOOL students from Bayog High School in Canlaon City, Negros Oriental will now have access to thousands of science and technology (S&T) information with the arrival of STARBOOKS or the Science and Technology Academic Research-Based Openly Operated Kiosks in their school.

The Department of Science and Technology (DOST), through the Provincial Science and Technology Center (PSTC), brought STARBOOKS to Bayog High School in an effort to bring S&T information to hard-to-reach areas like Bayog.

Branded as "library-in-a-box", STARBOOKS contains thousands of digitized science and technology resources in various formats (text and video/audio) set in a user-friendly interface.

Students and teachers of Bayog High School had the chance to interact with the Philippine's first digital science library during the STARBOOKS technical demonstration conducted by PSTC-Negros Oriental on 09 October 2019.

Bayog High School's Principal Francisca Villocillo said that she aims to include STARBOOKS in the school's priority plans for the coming school year. She is hoping as well that all the school's computers under the Department of Education Computerization Program will be connected to STARBOOKS in order to maximize its use.

In addition to STARBOOKS, PSTC-Negros Oriental also provided the school with S&T information, education, and communication (IEC) materials.

Coincidentally, PSTC-NegOr conducted a review class for students who will be taking the DOST-Science Education Institute (SEI) scholarship examination. The review class was held at the Jose Cardenas Memorial National High School in Panubigan, Canlaon City, Negros Oriental.

Participated in by 34 students, the review class aims to increase the awareness of the students on the nature of the exam, and thereby increase their probability of passing the actual scholarship examination.

DOST-SEI's S&T Undergraduate Scholarship Program aims to stimulate and entice talented Filipino students to pursue productive careers in S&T and ensure a steady, adequate supply of qualified S&T human resources who can steer the country toward national progress.



A staff of PSTC-Negros Oriental conducts a technical demonstration on the operation of STARBOOKS among students of Bayog High School in Bayog, Canlaon City, Negros Oriental.



Students of Bayog High School explore the different science and technology digital contents of STARBOOKS after the conduct of the technical demonstration.



Students undergo a mock exam after the conduct of a review for those who will be taking the DOST-SEI scholarship examination. The review and mock exam were held at the Jose Cardenas Memorial National High School in Panubigan, Canlaon City, Negros Oriental.

### **Slingshot Dumaguete showcases DOST innovations**

By Engr. Reinhold Jek Y. Abing, *PSTC-Negros Oriental* Photos from PSTC-Negros Oriental

THE 21ST Century Learning Environment Model (CLEM) and the Advanced Manufacturing Center (AMCen), two innovations of the Department of Science and Technology (DOST), were recently showcased the Slingshot Dumaguete at 2019.

Engr. Fred P. Liza and Engr. Joseph Garcia of DOST-Metals Industry Research and Development Center (DOST-MIRDC) said that the AMCen aims to become the country's leading research center in 3D printing technologies, processes, and materials.

It will have two state-of-the-art facilities: the Multiple Materials Platform for Additive Manufacturing (MATDEV) and the Research on Advanced Prototyping for Product Innovation and Development using Additive Manufacturing Technologies (RAPPID-ADMATEC).

Compared to traditional 3D printing facilities, AMCen has the ability to combine and optimize the use of two or more materials like ceramics and polymers to develop a product through its MATDEV facility. Likewise, the Center can develop more innovative designs and speed up prototyping through its RAPPID-ADMATEC facility.

Josephine Feliciano of the DOST-Science Education Institute, meanwhile, presented the 21st CLEM. The project aims to support the Department of Education's (DepEd) K to 12 curriculum by setting up a



A participant of the activity inquires on how to avail of STARBOOKS.

classroom with strategic facilities designed to promote collaborative teaching and learning.

Feliciano said that in the 21st CLEM, the tables and chairs are designed for mobility. Teaching science, technology, engineering, and math subjects are made more interesting through the use of high tech equipment.

To fully integrate the 21st CLEM teaching into the curriculum, teachers are expected to attend a series of trainings on the various modules, Feliciano said. Students also underwent similar trainings to introduce and familiarize them with the new classroom environment. These trainings include basic robotics and coding, among others.

The CLEM project is now being implemented by the DOST with the support of the DepEd and stakeholders in some regions.

DOST Negros Oriental also exhibited the STARBOOKS, also known as Science and Technology Research-based Openly



Various representatives of the collaborating agencies participated in the Slingshot. With them are resource persons and exhibitors.

Engr. Fred P. Liza of DOST-MIRDC explains what AMCen is.

Operated Kiosks. It is the Philippine's first digital library which has received recognitions for its innovative approach in bringing quality science and technology resources to the general public, even in hard to reach areas.

DOST Negros Oriental collaborated with the Department of Trade and Industry (DTI) in the province to promote the technologies and innovations of the science department to stakeholders and clients through the Slingshot event.

Other exhibitors during the event were Subida Souvenirs, PuzzleBox 3D Solutions Inc., C&E Publishing Inc., Silliman University–Technology Business Incubator (SU-TBI), and Negros FabLab of the Negros Oriental State University (NORSU).

Other speakers in the event include representatives from Mindanao State University-Ilgan Institute of Technology, Servio Technologies, Philippine e-Learning Society, C&E Publishing Inc., E-Commerce University, SU-TBI, NORSU Fablab, and Puzzlebox 3D Solutions, Inc.

Slingshot Dumaguete 2019 was initiated, spearheaded, and funded by the DTI in collaboration with the DOST, Department of Information and Communications Technology, Negros Oriental Chamber of Commerce and Industry, Inc., and the Province of Negros Oriental. It was held at Brooke's Place, Dumaguete City, Negros Oriental on 19 November 2019.

### TECH•NEW•LOGY

# DOST-FPRDI partners with private firm for plywood glue pilot test

By Apple Jean C. Martin-de Leon, DOST-FPRD/ Photos from DOST-FPRDI

A PLYWOOD glue newly formulated by the Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI) was recently tested in making full-sized plywood.

This was made feasible after the Institute and a private company signed a Memorandum of Agreement (MOA) on 04 October 2019 that prompts the trial run of producing full-sized panels (4 ft. x 8 ft.) using glue mixtures developed by DOST-FPRDI with spent tea leaves (STL) and tobacco dust as additives.

"We are partnering with the Mindanao-based Impasug-ong Integrated Wood Processing and Plywood Manufacturing Inc. (IM WOOD) for the pilot testing of our adhesive," shared project leader Engr. Juanito P. Jimenez Jr.

"We will test if the plywood produced will pass national and global standards for shear strength, formaldehyde emission,



The newly formulated plywood glue was recently tested in making full-sized plywood.

and termite resistance. Formaldehyde is a chemical compound found to cause certain types of cancer in humans," he added.

According to Jimenez, the trial run will determine the effectiveness of the glue mixture when used in a full-sized panel. It will also help establish how much a plywood company can save once the adhesive is used.

Studies by Jimenez, Dr. Erlinda L. Mari, and Rebecca B. Lapuz in 2014 and 2018 have proven that STL and tobacco



The MOA signing led by DOST-FPRDI Director Romulo T. Aggangan (third from left) and IM Wood President Maria Cristina Huang (third from right).

stalks are affordable and environmentfriendly extenders and fillers to plywood adhesive, replacing the commonly used wheat and rice hull flour.

"Fillers are used to cover up holes and cracks on the veneer surface, improving its strength and durability. Extenders, on the other hand, are substances mixed with the glue to reduce the amount of primary binder used," explained Jimenez.

According to the study, STL—an industrial waste product—has the ability to trap excess formaldehyde gases from plywood, thus resulting in safer panels. The tea-flavored drinks industry across the country generates around 18,000 kilos of STL every day.

Tobacco stalks, meanwhile, can repel termites and also lessen formaldehyde emission. The National Tobacco Authority estimates that the country's tobacco waste is around 45 million kilos every year.

"We are positive that our research will create productive uses for these two waste products," ended Jimenez.

The pilot testing, which started in October, will run for a year, with production and validation tests conducted in the IM WOOD factory.

### Local chemists develop abaca-based fabric to filter pollutants

By Hans Joshua V. Dantes, DOST-PNRI

**LEADING CHEMISTS** from the Department of Science and Technology-Philippine Nuclear Research Institute (DOST-PNRI) are recently using native products such as abaca to make fabrics that can prevent pollution by filtering toxic materials and other contaminants.

Said chemists were able to develop a composite nonwoven fabric from natural fibers such as abaca, and paired it with synthetic polymers that can filter heavy metals dissolved in liquid. Nonwoven fabric is made of materials bonded together by chemical, mechanical, heat or solvent treatment.

This composite material is able to filter hazardous metals such as lead, cadmium, nickel, chromium, mercury, and arsenic.

Abaca, meanwhile, is known for its strength, making it perfect as a base material that can withstand the grafting procedure. Abaca and the synthetic polymers are grafted using radiation at DOST-PNRI's Electron Beam Irradiation Facility. After radiation, the material is further processed into its final form-a synthesized filter for heavy metals.

Radiation can modify materials and graft various polymers to develop advanced properties such as filtering various contaminants from water.

Studies by the DOST-PNRI Chemistry Research Section showed that the nonwoven fabric is reusable and cheaper to use than commercial resins. The nonwoven fabric can be used for the same purpose as resin and may even be better in filtering waste.

The DOST-PNRI was granted a utility model for the technology in 2019 and continues to develop radiation grafting for other applications.

More recently, the invention was declared as the Regional Winner for the Outstanding Utility Model Award during the 2019 DOST Regional Invention Contests and Exhibits (RICE) in the National Capital Region held 06-08 November 2019.



During a training course hosted by the Philippines under the International Atomic Energy Agency, representatives from various countries in the Asia-Pacific region observe as a researcher demonstrates radiation grafting procedures at the DOST-PNRI Chemistry Research Section. (Photo from DOST-PNRI)

Radiation-grafted materials are expected to prove useful for various industries, particularly those requiring waste water treatment.

Increasing the use of these technologies will help minimize hazardous pollutants in various bodies of water in the Asia-Pacific region. As such, the International Atomic Energy Agency has engaged in projects with the Philippines and other countries to develop these kinds of technologies.

DOST-PNRI researchers are looking forward to the development of other

applications of radiation grafting such as producing biodiesel and recovering precious metals.

The abaca-based adsorbent was developed under a project funded by the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) and in cooperation with the DOST-Philippine Textile Research Institute (PTRI) which provided the abaca-polyester nonwoven fabric.



Dr. Jordan Madrid (middle), head of the DOST-PNRI Chemistry Research Section, receives the certificate of recognition for the Outstanding Utility Model Award entitled "Composite Nonwoven Fabric Heavy Metal Adsorbent and Method for Preparing the Same" during the 2019 Regional Invention Contest and Exhibits (RICE). They are joined by DOST-NCR Director Jose Patalinjug III (2<sup>nd</sup> from right) and other officials. (Photo from DOST-NCR)

SCIENCE NEWS

# **PH hands AMMSTI leadership to Singapore**

Text and photo by Enrico A. Belga, Jr., DOST-CO



DEPARTMENT OF Science and Technology Secretary Fortunato T. de la Peña officially turned over his post as chairperson of the ASEAN Ministerial Meeting on Science, Technology and Innovation (AMMSTI) to His Excellency Dr. Koh Poh Koon - senior minister of State, Ministry of Trade and Industry of the Republic of Singapore during the 18th AMMSTI held 11 October 2019 in Singapore.

The Ministers expressed their support to the development of the ASEAN Innovation Roadmap 2019-2025 among other agendas.

According to the ministerial meeting's official statement, the

Ministers exchanged views on: The Fourth Industrial Revolution: Workforce Readiness and Private Sector Engagement and Science, Technology and Innovation Talent Development.

"Science, technology and innovation are important assets and key enablers of economic growth. Over the years, ASEAN cooperation in these fields has enabled us to deepen our ties and achieve synergies on many fronts," Senior Minister Kho emphasized.

"If ASEAN continues to collectively leverage science, technology and innovation, it will go a long way in helping us address challenges from disruptive trends and technologies and equip our citizens with the skills for a future-ready ASEAN," he added

The Ministers agreed that the ASEAN Innovation Roadmap 2019-2025 is intended to act as the guide to introduce the collective future that ASEAN leaders want to create.

The Roadmap is likewise intended to guide the delineation of roles, processes, and arrangements needed to coordinate, develop, implement, and adjust the initiatives under the Roadmap's Implementation Plan, encouraging strengthened utilization of science, technology, and innovation for economic growth.

# Sounding the alarm on teen pregnancy

Prof. Gloria Luz Nelson of DOST-NRCP designed programs to curb teen pregnancy during disasters.

By Jenny Leigh Daquioag-Porca, DOST-NRCP

eenage pregnancy is now considered as a "national emergency." The alarming rise of incidence rate of teen pregnancy has prompted the Commission on Population and Development (PopCom) to request President Rodrigo R. Duterte for the issuance of an executive order declaring teenage pregnancy as a national emergency.

This urgency stems from the fact that adolescent pregnancy rates in most countries are declining, but here in the Philippines, the figures are growing. According to PopCom Executive Director Juan Antonio Perez III on 23 October about 1.2 million children are having their own children yearly, with 30,000 young mothers who have experienced repeated pregnancies.

This escalating rate of teen pregnancy has brought an economic loss of PhP 33 billion in terms of lost income in the country, Perez said. Vice President Leni G. Robredo and Sen. Juan

JIP

Edgardo Angara have expressed their support to the request of PopCom to make the issue on teenage

pregnancies a "national emergency." Citing a report from the Department of Education, Sen. Angara noted



Figure 1. Teenage pregnancy in Eastern Visayas is two for every ten youth, regardless of the severity of the disaster/ typhoons.



*Figure 2. Indicates that most youth had their first boyfriend at the age of 15, the age of initiation to premarital sex. Age of menarche is 12.* 

that unwanted pregnancy is a major reason why many elementary and high school female students stop going to school.

# DOST-NRCP project on teenage pregnancy during disasters

The Department of Science and Technology-National Research Council of the Philippines (DOST-NRCP) collaborated with the PopCom in 2017 in a research project that explored the links and external factors of incidence of teenage pregnancies after super typhoon Haiyan (Yolanda) and typhoon Ruby in the case of Eastern Visayas. The study led by Prof. Gloria Luz Nelson, DOST-NRCP member, used the study results in designing programs for teenagers during disasters.

According to the study, crises such as natural disasters compel families to be evacuated, relocated, or displaced. With the poor conditions of temporary shelters that have very minimal, or none at all, provisions for privacy and security, adolescents especially girls 10-19 years old are considered a vulnerable group.

In Eastern Visayas teenage pregnancy was recorded at two for every ten youth (Fig 1).

Moreover, most girls had their first boyfriend at age 15, the age of initiation to premarital sex (Fig 2).

The survey was participated in by 727 (12-21 years old) female youth from randomly selected households.

## Protocols and policies from the project

As an advisory council, DOST-NRCP crafts research/ evidence-based protocols and policies, which are useful in policy-making particularly in crafting house bills and laws, as well as in aiding schools and government agencies in developing programs for the youth and the public in general.

The study that focused on the disaster shelter experience of those who participated in the survey gave the following results:

 length of stay of youths in disaster shelters is positively associated with the incidence of teenage pregnancy;
 adolescents in disasterprone areas are likely to be molested;

3) the number of moves from one shelter to another prolongs the return of teenagers and youth to normal life; and
4) the timeliness of the Adolescent Sexual and Reproductive Health (ASRH) programs, should mean ageappropriateness rather than grade-level appropriateness.

The results of the study were also disseminated to all women legislators in the Senate and Congress. Particularly, the results were submitted to Congresswoman Sol Aragones as inputs to house bill 4742 (Prevention of Adolescent Pregnancy Act of 2017) which she authored. The House Bill has no provision on the link of teenage pregnancy and disasters. DOST-NRCP recommended the inclusion of provisions that will address both sexual and non-sexual risk factors that increase the incidence of teenage pregnancy.

The results of the study were also compiled in the DOST-NRCP Policy Brief, A Special Series on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA), Issue 1 Q1 2017.

On 06 August 2019, the project of Prof. Nelson was featured in the Technology Media Conference at the Sequoia Hotel, Quezon City, and the NRCP Visayas Policy Forum at the University of the Philippines Visayas Tacloban College on 03 November 2017.

#### **R&D IN THE REGIONS** AND BEYOND



(From left to right): PSHS Caraga region campus student-researchers Miko C. Nunez, Angelo Mari C. Montero, and Hannah Marielle G. Tecson are the brilliant minds behind the project "Feasibility of an Adaptive Timer System in Traffic Management Utilizing Induction Loops."

# Pisay students' winning research aims to end traffic problems

By Pierre Sonia S. Dela Corte, DOST-TAPI Photo from DOST-TAPI

> research project on a system that would help manage traffic in intersections more efficiently, done by students from the Philippine Science High School (PSHS)-Caraga Region Campus, bagged the Outstanding Creative Research (Sibol) Award for High School in the Regional Invention Contest and Exhibits (RICE) in the Caraga Region.

Student-researchers Hannah Marielle G. Tecson, Angelo Mari C. Montero, and Miko C. Nunez are Grade 12 students whose project was hailed as the best among 43 contenders for the Outstanding Creative Research category during the RICE in Caraga held 03-05 September 2019 at the Bayugan City Hall, Agusan del Sur.

Their research "Feasibility of an Adaptive Timer System in Traffic Management Utilizing Induction Loops" uses an algorithm that works by counting the number of cars in traffic and determining the appropriate amount of time for the traffic lights to enter the green light phase.

Tecson explained that the system is able to get the number of cars by getting data from sensors that detect vehicles. "The logic of the system could be implemented to traffic controllers and, if installed alongside the sensors, traffic flow could speed up significantly," she added.

Getting stuck in traffic for hours in congested areas encouraged them to come up with a solution to speed up the traffic flow. "The research benefits everyone living in cities since vehicular travel is an integral part of people's dayto-day lives," said Tecson.

Their winning research received PhP 20,000 and is now a qualified entry to the National Invention Contest and Exhibits (NICE)–Outstanding Creative Research Category to be held in 2020.

#### **R&D IN THE REGIONS** AND BEYOND



RICE is one of the programs implemented by the Department of Science and Technology-Technology Application and Promotion Institute. It is conducted in all regions nationwide to recognize the indispensability of Filipino inventors and researchers in economic development.

There are six categories of the RICE and NICE that give due recognition to the best efforts of inventors and researchers, including student-researchers. "Tuklas" is a Filipino word for discovery and the Tuklas Award reflects the innovativeness and intrinsic capability of the awardee to develop something useful from otherwise commonplace knowledge/resources. The award is given to the most outstanding invention with demonstrable qualities and potential for widespread commercialization or dissemination.

The Outstanding Utility Model Award is given to an outstanding new model of implement or tools, or of any industrial product that does not possess the quality of an invention, but of practical utility by reason of its form, configuration, construction, or composition.

The Outstanding Industrial Design Award given to outstanding new, original, and ornamental design for an article of manufacture.

"Likha" signifies creativity, thus the Likha Award reflects the potential of a research and development activity to develop into a relevant, commercially viable technology that may generate impact and benefits to adoptors.

"Sibol" means a young shoot, a growth reflecting youthfulness and hope for something fruitful and useful. The Sibol Award is given to the most outstanding invention/creative research for both high school and college students. This is in recognition of the need and potential to tap young minds who will contribute significantly to S&T development and inventiveness in the country.



By Michelle P. Caparas, DOST-PCAARRD Photos by Dr. Wenresti G. Gallardo

Dr. Gallardo's student from Sultan Qaboos University in Oman shows giant spinach produced using the aquaponics system.

"If we don't change the way we catch fish and the way we treat our environment, there might come a time when there will be more plastics than fish in the sea."

ore of a reality than a threat, Dr. Wenresti G. Gallardo stressed this point as he pushed for aquaponics technology toward a sustainable environment. Dr. Gallardo is a Balik Scientist whose expertise is in aquaculture and marine science.

The Balik Scientist Program (BSP) is being implemented by the Department of Science and Technology through its councils. Dr. Gallardo's expertise is under the supervision of the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD).

Aquaculture or growing fish in cages, pens, ponds, and tanks is compensating for the almost stagnant growth of capture fisheries. However, environmental problems such as pollution, which is associated with aquaculture due to overstocking and overfeeding in culture facilities, still persist. To address this challenge, Dr. Gallardo worked together with his host institution, the University of the Philippines Natural Sciences Research Institute (UP-NSRI) and in coordination with UP-Institute of Biology (UP-IB), both in Diliman. They set up a smallscale aquaponics system to demonstrate how floating and media bed aquaponics systems work. This is being showcased at the top floor of the UP-IB.

Part of the promotion is the conduct of lectures about aquaponics during a series of talks at UP Diliman and at the BSP Pre-Convention Forum held at the Philippine International Convention Center in Pasay City.

UP-NSRI and UP-IB are also looking at submitting

a multidisciplinary research proposal on aquaponics to DOST-PCAARRD and other funding agencies. The proponents of the said research proposal come from various fields such as analytical chemistry, microbiology, plant and animal physiology, and fisheries.

During his first engagement with UP-NSRI, Dr. Gallardo conducted water analysis on samples from different aquaponics/ hydroponics systems to check for accumulation of heavy metals in the water within the system to set a benchmark.

Dr. Gallardo is an Associate Professor at the Sultan Qaboos University in Oman, where he has been successfully growing several types of plants in combination with either tilapia or koi carp through aquaponics for four years. He said that the system does not use fertilizers or pesticides and does not generate waste water. It can also be set up even in areas not suitable for traditional farming.

Through aquaponics, Dr. Gallardo intends to help farmers, urban dwellers, agriculture enthusiasts, and environmentallyconscious consumers to have additional sources of income and to produce eco-friendly vegetables and fish at the same time.

Established in 1975, the BSP seeks to encourage

highly-trained overseas Filipino scientists and technologists, experts, and professionals to return to the Philippines and share their expertise for the acceleration of the scientific, agro-industrial, and economic development of the country.

BSP is also being implemented by the DOST-Philippine Council for Health Research and Development for the health industry and the DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development for BSP engagements in industry, energy, emerging technology, and special concerns.



Small-scale aquaponics setup assembled by Dr. Gallardo hosted in UP Diliman.

# Helping OFWs in their health woes

By Framelia V. Anonas, DOST-ST// with report from Angelica Marie Paz, DOST-ST//

> Away from their homes and loved ones, Overseas Filipino Workers (OFWs) experience various illnesses caused by several conditions in their workplaces. Researcher Dr. Veronica Esposo Ramirez proposes several policy recommendations that could help our OFWs battle their health woes.

any Overseas Filipino Workers (OFWs), considered the country's modern-day heroes, are developing work-related diseases and need better access to social security and health services.

This was found by Dr. Veronica E. Ramirez of the University of Asia and the Pacific when she surveyed the Overseas Workers Welfare Administration (OWWA) records of land-based OFWs.

Based on the OWWA medical claims, the most common illnesses of OFWs in the global regions are reproductive and urinary/excretory diseases, followed by cardiovascular disease. Among women, the most common health problem concerns the reproductive system while among men, the most common are cardiovascular, urinary/excretory, neurological, and digestive diseases.

On a worldwide scale, claims for diabetes mellitus appear in all regions. Those into domestic work, meanwhile, filed most claims for cardiovascular, digestive, endocrine, reproductive, and urinary diseases.

"The study found that there is strong positive correlation between household service domestic work and diseases related to the digestive, immune and lymphatic, musculoskeletal and reproductive systems," Dr. Ramirez said. "The rest of the occupations have no correlation to their diseases."

Strong positive correlation means that domestic or service workers are more prone to digestive, immune and lymphatic, musculoskeletal and reproductive diseases.



Dr. Veronica E. Ramirez had one of her surveys in Cebu.

Dr. Ramirez noted that household service workers in the Middle East have the most number of medical problems based on filed claims. The highest number of diseases are related to the reproductive and digestive systems, followed by cardiovascular and urinary/ excretory systems.

"There are also many cases of immune and lymphatic diseases, as well as those involving the endocrine systems," added Dr. Ramirez.

She likewise said that other occupations that have high health problems are service workers such as drivers and kitchen crew, followed by technicians, electricians, and operators.

#### Survey on health problems

Dr. Ramirez also conducted a survey on OFWs' experiences on health problems and not the results of actual medical treatment. This survey showed that common health problems of land-based OFWs are musculoskeletal pains (or those involving muscles and bones), arthritis, cold, flu, headache, respiratory problems, and hypertension.

The survey showed that more women are affected by musculoskeletal pain, arthritis, and hypertension compared with men.

With these findings on OFWs' illnesses, Dr. Ramirez explained that many factors affect the OFWs' health condition.

# Health conditions of OFWs

**BY GENDER** 

The most common

health problem among

Among men, the most

common ailments are

digestive diseases. Also

dominated by men are

and lymphatic diseases.

claims for endocrine, respiratory, and immune

related to

cardiovascular, urinary/excretory,

neurological, and

women is related to the reproductive system.

### TOP DISEASES BY BODY SYSTEM IN THE REGIONS



Disease

Europe
Endocrine Disease
Reproductive Disease
Urinary/ Excretory Disease

### **REGIONAL CLAIMS**

Middle East: the top medical benefit claims are on hypertensive cardiovascular

and chronic kidney diseases. Asia: top claims are on end stage renal and

pulmonary tuberculosis diseases.



Worldwide: claims for Diabetes Mellitus which appear in all regions.





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\*based on OFW OWWA Medical benefit claims TOP OFW MEDICAL BENEFIT CLAIMS BY

Acia

Europe

Amoricas

### REGION AND DISEASES (MAY-OCT 2017)

Middle East

	Piludie Last	Asid	Luiope	Americas
Hypertensive Cardio Disease	34	0	0	0
Chronic Kidney Disease	33	3	0	0
🚯 Diabetes Mellitus	24	3	2	2
Breast Cancer	13	4	0	0
End Stage Renal Disease	12	5	0	0
Cardiovascular Accident	11	0	0	0
Stroke	11	0	0	0
Pulmonary Tuberculosis	10	5	0	0
Cervical Cancer	0	4	0	0
🚯 Hypertension	0	4	0	0
Depression	0	3	0	0



The researchers with OFWs in Cotabato.

Public transportation is one factor, she said, as many OFWs take public transportation to and from work everyday, and this affects their health.

Unaffected by this condition are OFWs, especially domestic workers, who live in their employer's residence. But though domestic workers are spared from the stress of daily commute, they face a different kind of challenge.

"Unlike those employed in companies who have regular work shifts, domestic

workers have extended hours of work, and this deprives them of rest and sufficient number of sleeping hours," explained Dr. Ramirez.

She also noted the exposure of OFWs in the Middle East to hazardous work environments which involve radiation, smoke, bacteria, viruses, repetitive motion, and prolonged working hours. Their counterparts working in Asia also contend with various work hazards such as "radiation, fiber, vapor, bacteria, fungi,



Dr. Ramirez with OFWs in Passi.

improper lifting, repetitive motion, and excessively demanding physical/ mental tasks."

In Europe, meanwhile, the hazardous work environment consists of extreme temperature, atmospheric pressure, radiation, bacteria, viruses, fungi, parasites, awkward position, and excessively demanding physical/mental tasks.

Dr. Ramirez said that her study did not involve identifying the causes of the OFWs' illnesses. "There are also no reports on medical cases of abortion, drug addiction, HIV, nor sexually transmitted diseases," she said.

#### Survey of OFWs

Dr. Ramirez's study surveyed 689 landbased OFWs who claimed medical benefits from October 2009 to November 2010. The claims were made through the Health PRO and Welfare Assistance Program.

She also surveyed 701 OFWs across global regions of the Middle East, Asia, Europe, Americas, Africa and Oceania, as well as OFWs vacationing in NCR, Regions I, II, IV A, VI, and X.

#### Health not a priority

The survey revealed the stark reality that OFWs are not that keen on health maintenance and treatment. Dr. Ramirez said that this attitude comes from the OFWs' lack of awareness of their benefits, as well as their considerations on the distance between health service centers and their workplaces.

Further, the OFWs said that they fear losing their jobs if they spend time on medical treatment. The OFWs surveyed also revealed that they rely on self-medication.

Meanwhile, the families left behind by OFWs gave their thoughts on how the Philippine Health Services can collaborate with recruitment agencies to safeguard the OFWs' health. They suggested that there should be full PhilHealth coverage, efficient medical examination before deployment, and insurance in the country of work.

Another suggestion is for the mandated and upgraded Philippine Overseas Employment Administration or POEA insurance to include confinement and major operations, OFW family support, dental check-up, trainings, and additional insurance.

According to Dr. Ramirez, several health services are available to OFWs in their work areas, including PhilHealth, employer-provided health insurance, personal/private company health insurance, Gulf Approved Medical Centers Association member medical health facilities, migrant health facilities in the regions, and country specific social security such as Italy's National Institute of Social Security, UK National Health Service, US Social Security System, etc.

#### Recommendations

To help OFWs from their illness woes, Dr. Ramirez recommended that the Department of Health (DOH) should provide treatment and monitor HIV, TB, sexually transmitted diseases, hepatitis, and noncommunicable diseases.

"There is high number of these medical cases among overseas work applicants," Dr. Ramirez said. "Such treatment and monitoring will prevent them from posing health risk to their own community and from pursuing employment overseas through illegal means."

She also recommended the strengthening of medical information and campaign to promote good health among OFWs. Likewise, needed vaccines, such as anti-flu and anti-Hepa B, should be provided to OFWs before deployment.

"Health services should be extended or broadened for OFWs in countries where said services are limited," she suggested.

Dr. Ramirez also pointed out that the Migrant Health Unit of the DOH, together with its accredited clinics for OFWs, needs to spearhead and relentlessly pursue health education and promotion, focusing their effort and resources on the most pressing health problems of OFWs.

"And, as we have already identified ways to promote good health among OFWs in their workplace, we also need to improve coordination with foreign employers to ensure proper working conditions for OFWs," she said. "Further, we should examine the social services extended to migrant workers per country region and respond to OFW health needs according to demand and condition."

Dr. Ramirez also suggested some health-related preventive measures and initiatives that can be undertaken by OWWA and other agencies, such as health awareness programs for common OFW diseases to be incorporated in the OFWs' pre-departure orientation seminar.

"OFWs need to be constantly reminded of the healthy lifestyle habits they need to adopt wherever they may be, both here and abroad," she said.

She also recommended the formulation and implementation of policies that directly respond to health needs of OFWs, such as portability of health insurance. "Since the study found that work and living conditions of OFWs cannot fully promote their welfare and wellness, the OFW wellness program can be designed for specific occupational groups," said Dr. Ramirez.

She added that such program can be implemented overseas through OWWA and locally through the National Reintegration Center for OFWs to respond to the OFWs' health needs. The Wellness Program, according to Dr. Ramirez, can be designed to include awareness sessions on disease prevention and health services in the country of work, occupational ergonomics, occupational safety and health, work and leisure balance, healthy psycho-social work environment, emotional intelligence and anger management, and spirituality.

This study by Dr. Ramirez received funding from the Department of Science and Technology-National Research Council of the Philippines (DOST-NRCP). The survey was conducted in collaboration with OWWA Regional Welfare Offices, I-Remit Global Remittance, and the University of Asia and the Pacific-Bank of Philippine Islands Professorial Chair for Migration and Overseas Filipino Work.

One of the advisory councils of the science department, the DOST-NRCP is mandated to promote and support fundamental or basic research. It is also mandated to provide advice on problems and issues of national interest.



# DOST-BIST program supports R&D in the private sector

By Reina Kris Villaluna and Jorelle S. Bonifacio Photos by Herbanext Laboratories, Inc.



Commercial-scale plant extractor at the Herbanext facility in Bacolod can isolate certain plant components.

espite the notable climb of the Philippines' ranking in the recent Global Innovation Index 2019, there is still low level of research and development (R&D) spending in the Philippines, with a huge chunk being funded by the Philippine Government. R&D budget has been increasing each year but has remained at 0.6 percent of the Philippine Government's budget.

As such, the Department of Science and Technology (DOST) through the Business Innovation through Science and Technology (BIST) Program seeks to boost R&D in the private sector. This is to work toward achieving the UNESCO benchmark for developing countries, such as the Philippines, to spend one percent of their gross domestic product on R&D.

The BIST Program is designed to assist Filipino-owned companies to innovate and develop competitiveness through the acquisition of new and relevant technologies—hardware or software for research. The proposed technology acquisition with its corresponding research and technology must be implemented within three to five years with a refund, without interest, commencing on the third year of project implementation.

Aiming to take the herbal extracts in the Philippines to the next level and to back the R&D efforts of local companies, the DOST-BIST program awarded its funding support to Herbanext Laboratories, Inc., a Filipino research-oriented natural products company based in Bacolod, Negros Occidental. Herbanext is the program's first grantee. The DOST BIST grant to Herbanext Laboratories, Inc. will be used to develop local technology to produce pharmaceutical-grade extracts for the local drug manufacturing industry. In the coming years, Herbanext intends to scale-up this technology to allow the local production of active pharmaceutical ingredient for the Philippine herbal drug industry.

"The rise in our global innovation ranking to 54th from 73rd the previous year validates our work and encourages us to continue our mission to strengthen R&D across the country," said DOST Secretary Fortunato T. de la Peña. As opportunities for R&D are created for Filipino companies, technologies and business innovations will equate to increased profitability.

Herbanext ventured into the production of standardized botanical extracts in 2008. The primary target market of the company were food supplement and functional food industries which required simple spraydrying as a method to obtain plant extracts.

In 2017, the Herbanext facility was tapped to produce standardized extracts by consortium members of the DOST-Philippine Council for Health, Research and Development (PCHRD) Discovery and Development of Health Products Program. It has such become clear that there was a need for a versatile pilot-scale facility that can semi-purify plant extracts of unwanted compounds.

These unwanted compounds—which include starches, oils and waxes, pectins, organic acids, and excessive tannins need to be removed as they dilute the concentration of active ingredients, cause problems in machine handling, reduce shelf life, and create potential chronic toxicity. In addition to the removal of unwanted compounds, there was a need for further processing steps to conform to pharmaceutical standards. The BIST financial assistance granted to Herbanext will be used to acquire pilotscale R&D equipment to address the technology gaps mentioned. In the coming years, Herbanext intends to scale-up this technology to allow the local production of active pharmaceutical ingredient for the Philippine herbal drug industry.



Herbanext is also one of the researchers that contributed to the 18 formulations presented by DOST-PCHRD to the private sector, which are ready to be commercialized as herbal supplements under the Tuklas Lunas Program. The Tuklas Lunas Program aims to harness the potential of the Philippine biodiversity and leverage on local expertise to respond to the growing health needs of the Filipinos.

Interested parties may send their inquiries to the Science for Change Program-Project Management Office, with office address at Department of Science and Technology 2/F ADMATEL Bldg., DOST Compound, Gen. Santos Ave., Bicutan, Taguig City. They may also send an email at s4c.ousecrd@ dost.gov.ph or call the S4C - PMO at (+632) 8837-2943 / 8837-2071 local 2510 or visit the S4C Facebook page at @dost.s4cp.



Herbanext staff explains the pilot-scale extraction and spray-drying facilities of Herbanext to pharmacy manufacturing interns.

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# Brewing up local coffee production through R&D

By Rose Anne M. Aya, DOST-PCAARRD

offee production in the Philippines has been declining in recent years. Data from the Philippine Statistics Authority showed that Philippine coffee production decreased from 75,454 metric tons (MT) in 2014 to 72,341 MT in 2015; 68,822 MT in 2016; and 62,077 MT in 2017.

This continuous decline in coffee production has prompted local coffee producers to resort to imports in order to meet consumer demand. However, instead of imports, an expert says that the country should strive for increased production by empowering farmers with technologies developed from

Photo Source: Pixabay.com

research and development (R&D) initiatives.

This is according to Acting Executive Director Dr. Reynaldo V. Ebora of the Department of Science and Technology-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD).

Dr. Ebora's sentiment was delivered by Marita A. Carlos, director of DOST-PCAARRD's Applied Communication Division, when Carlos spoke on behalf of Dr. Ebora during the event called Coffee Farms and Industry Encounters through the Science and Technology Agenda or FIESTA held in the middle of this year in Digos City, Davao del Sur.

FIESTA is a technology promotion initiative of DOST-PCAARRD. It aims to link farmers, fisherfolk, processors, distributors, and consumers in a thriving agribusiness environment propelled by interaction and interdependence.

It was organized by DOST-PCAARRD's consortium, the Southern Mindanao Agriculture, Aquatic and Natural Resources Research and Development Consortium. The event aimed to address the declining coffee production by promoting technologies developed to improve production, harvest,

postharvest, and processing of coffee.

As the second largest coffee producer in the country, the Davao Region is the fitting venue of the Coffee FIESTA. In the first quarter of this year, the region produced 2.41 thousand MT of coffee, the second highest after SOCCKSARGEN or Region XII, which recorded 5.43 thousand MT.

The Coffee FIESTA highlighted the technologies developed by the Southern Philippines Agri-Business and Marine and Aquatic School of Technology (SPAMAST) and DOST-PCAARRD for coffee farmers in the region. These technologies include the developed equipment of the Department of Agriculture-Philippine Center for Postharvest Development and Mechanization for coffee harvest, postharvest, and processing to ensure quality and efficiency.

The result of the study "Varietal Study of Arabica Coffee in Mt. Apo Highland" by SPAMAST researchers was also presented. Moreover, the event highlighted the collaboration of coffee farmerproducers and the academe.

Part of this industryacademe collaboration is the support to coffee R&D, which the DOST-PCAARRD has invested with PhP 83 million since 2011, said Carlos. This investment is aligned with the Coffee Industry Strategic S&T Program of DOST-PCAARRD, which aims to increase coffee productivity from 0.3 to 2.1 MT per hectare in 2022, as well as improve the quality of green coffee beans to Grade 1 for local and export market.

"Attaining Grade 1 green coffee beans require 100 percent adoption of postharvest technologies by our local farmers. This is why technology promotion, like FIESTA, is conducted by R&D institutions," said Carlos.



BSTC serves as a venue for students, science enthusiasts, and the general public to experience the wonders of science, technology, and innovation.

# **Bicol S&T Centrum now an attraction**

#### By Rodolfo P. de Guzman, DOST-ST//

Photo by Art A. Aguila, as posted in the Bicol Science and Technology Centrum Facebook page

WHEN SCIENCE and technology blend with the landscape of Naga City, Camarines Sur, a really interesting treat awaits the local and foreign tourists when they enter the revitalized Bicol Science and Technology Centrum (BSTC) soon.

The BSTC was relaunched during the celebration of the 2019 Regional Science and Technology Week in the Bicol Region on 08-10 October 2019 at the LVR Pavilion, Bicol State College of Applied Sciences and Technology in Naga City.

This unique facility was a brainchild of then Department of Science and Technology-Region V (DOST-V) Administrative Officer Lumen M. Puno and DOST Camarines Sur Provincial S&T Center Director Prescilla M. Encila back in 1993 when they envisioned the creation of an interactive science education venue in the Bicol Region.

This novel idea was fully supported by former DOST Secretary Ricardo T. Gloria who gave the go signal to construct the facility. When done, it was jointly managed by the Local Government Unit of Naga City (LGU-Naga) through then Mayor Jesse M. Robredo and the DOST-V through then Regional Director Dr. Danilo O. Vargas. On 15 June 1995, BSTC was created as a pilot project of the DOST, establishing a science center outside of Metro Manila. It became the first of its kind in the region and some 24 year later, the BSTC still stands tall and mighty beside the Naga City Hall.

The BSTC started with only the Main Science Gallery featuring exhibit materials on various science concepts and practical applications some of which are the following: chaotic pendulum, momentum machines, optical illusions, and the Archimedes' screw. The science exhibit materials were provided by the DOST-Science Education Institute and the Philippine Science Foundation, Inc.

Later, the centrum added more interesting attractions and interactive exhibits like the Sci-Art Cubbyhole for Toddlers and Pre-Schoolers; IBM Kidsmart/Young Explorer computers containing early childhood education Gallery; modules; Naga River Space/Astronomy Gallery; Gallery on Lights, Colors and Shapes; Optical Illusion Gallery; Audio-Visual Room; and Science-on-Wheels.

With its unique attraction and educational value, the BSTC now plays an

important role in developing the tourism industry in Camarines Sur and the entire region. Since it opened its doors after almost two decades, the centrum already attracted approximately 1.1 million visitors, thus contributing also to the coffers of LGU-Naga City.

With the support of the DOST-V and Naga City, more important for the centrum is to continuously provide Bicolanos the rare experience and appreciation of science, technology, and innovation (STI), with the end in view of making people see how STI helps improve people's lives.

With the interest in STI gaining ground, other features were added to satisfy the hunger for knowledge of the locals. The centrum offers the chance to explore the skies and know more about astronomy through "Stargazing sa Barangay" coupled with film showings that are staged in several barangays of Naga City and nearby municipalities.

The re-establishment of the centrum indeed gave Bicolanos the opportunity to savor the new experience of science and technology to a higher level.



By Geraldine Bulaon-Ducusin, DOST-ST// Photos by Gerardo G. Palad, DOST-ST// **THE BENEFICIARIES** of the Pantawid Pamilyang Pilipino Program or 4Ps are also among those who are employed and trained under the Department of Science and Technology (DOST) - Small Enterprise Technology Upgrading Program (SETUP). Based on partial reports as of the third quarter of 2019, in three areas, namely Zamboanga City, Zamboanga Sibugay, and Zamboanga del Sur, DOST- Region IX (DOST-IX) SETUP was able to employ 55 4Ps beneficiaries, mostly men, and train 148 4Ps beneficiaries, many of which are women.

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"These are just based on three areas, all in Zamboanga. Imagine if you add up these little figures of 4Ps beneficiaries who are getting employed in all regions of the country because of these MSMEs (micro, small, and medium enterprises), this program could really be changing some people's lives," said Ricardo J. Apolinario





*Ester A. Perez, a SETUP-assisted entrepreneur, speaks at the DOST Technopreneurs Forum during the RSTW and RICE in Zamboanga.* 

DOST Secretary Fortunato T. de la Peña during Secretary's Hour at the Regional Science and Technology Week in Zamboanga City.

#### III, DOST-IX SETUP Center Manager.

DOST Secretary Fortunato T. de la Peña reinforces this support to MSMEs, saying, "Sana mas malaking budget to serve the MSMEs. Maliit ang requirement nila (MSMEs) to create jobs, they make use of local materials that add value to products coming from the regions," during the Secretary's Hour at the DOST-IX Regional Science and Technology Week (RSTW) in Zamboanga City.

Apolinario says that they are now looking at how these enterprises are able to add value to the lives of people in the community, other than the usual numerical impact, such as increase in labor and profit, resulting from the assistance which the government gives to the small enterprises.

"We're seeing among those who've been assisted by the SETUP. There are those who employ beneficiaries of DSWD's 4Ps program. So we want to see how those MSMEs we're helping are helping other people in their communities," says Apolinario.

Baker's Field is a good example of a venture that has employed 4Ps beneficiaries and thus changed lives. After retiring from her corporate job, Ester A. Perez put up a bakery, intending to make pandesal for her community. Her workforce consisted of herself and a baker. After a few months, she went into distribution, then, within three years offered different variants to her customers.

"When we joined the local trade fair, that exposure boosted the demand for our products," says Perez.

They used to operate manually and had a difficulty in meeting the demands. Perez recounted how SETUP responded to their deficiencies and in just two months after signing up for the program they were able to receive the equipment they needed.

"Because of these operations improvement, we're able to help the community by employing out-ofschool youth, as well as housewives. We're grateful to DOST for making the impossible, possible. Baker's Field now helps in making lives better," says Perez.

Started with just one baker, Baker's Field now employs 24 people, mostly folks from the community. Other than their summer program and Brigada Eskwela, wherein they extend assistance to students from the community, by way of giving school supplies and employing them during the summer, they're also receiving solicitations from nearby communities.

Zam's Delight is also another

successful Zamboanga-based enterprise that has managed to conquer not only Mindanao but also the Visayas through its bottled Calamansi juice. The firm started with four employees, and now they have 25.

"We used to cook in a 50-liter cooking pot, but now with SETUP assistance, we have a pot which can accommodate 160 liters. Plus, we're now using machines for codes and expiry dates," says Cheryl Jean Candido, owner of Zam's Delight.

Whether it is economic impact or impact to people's lives, when it comes to business, everything has to be quantified.

"What gets measured, gets managed," says Pedro Rufo N. Soliven, president of Zamboanga Chamber of Commerce and Industry Foundation, Inc. to 35 companies who attended the Technopreneurs Forum and Consultation at the 2019 RSTW and Regional Invention Contest and Exhibits in Zamboanga City.

SETUP assistance helps the MSMEs improve their product quality, upgrade their workforce, mechanize their operations, and manage their wastes.

# DOST's sustainable dev't initiatives banner regional S&T fair in CALABARZON

By Allyster A. Endozo, DOST-ST// Photos by Gerardo G. Palad, DOST-ST//



Sec. Fortunato T. de la Peña (leftmost), Santa Rosa City Mayor Arlene B. Arcillas (center), and Dr. Alexander R. Madrigal (center-right) tour the exhibit area during the opening day of the 2019 RSTW CALABARZON in Santa Rosa City, Laguna.

**INNOVATIVE SOLUTIONS** with sustainable impact were on full display as the Department of Science and Technology Region IV-A (DOST-CALABARZON) showcased the latest in science and technology (S&T) innovations and initiatives in its celebration of the Regional Science and Technology Week (RSTW).

Rallying behind this vear's National Science and Technology Week's theme, "Science for the People: Enabling Technologies for Sustainable Development," DOST-CALABARZON led by Director Alexander R. Madrigal kicked off its celebration of the RSTW with the opening of the exhibits at the Santa Rosa Multi-purpose Complex in Santa Rosa City, Laguna. The celebration was held from 25 to 27 September 2019.

DOST Secretary Fortunato T. de la Peña heralded the many research and development (R&D) projects and innovative technologies developed by the Department in the areas of small and medium-scale entrepreneurship, food production and safety, disaster risk reduction, governance, education, S&T media, electronics, and mass transportation.

This year, as with the other RSTW events nationwide, the exhibit areas were clustered in tune with the United Nations' (UN) Sustainable Development Goals (SDGs)—namely biodiversity, disaster resilience, education, global partnerships, health, resource security, rural development, and sustainable communities.

Sec. de la Peña encouraged industrial stakeholders to maximize DOSTdeveloped technological innovations to aid the Department in fulfilling its commitment to the UN SDGs. "Iniimbitahan ko po ang lahat na pasyalan ang aming mga facilities, whether they are the ones in the regions or in the central offices. We have upgraded facilities that they can use," he appealed.

During the opening day, DOST-CALABARZON also launched the project, "21st Century Learning Environment Model (CLEM)" at the Los Baños Senior High School in Los Baños, Laguna.

With the modern classroom, DOST-CALABARZON hopes to create learning



Sec. de la Peña (second from the left) and Los Baños Mayor Caesar P. Perez (third from left) led the inauguration of the 21st CLEM classroom at the Los Baños Senior High School in Los Baños, Laguna.





Sec. de la Peña (right) tries to pack candies at Paula's Candy Store in Calamba City, Laguna, with its owner and SETUP beneficiary, Pablo Daz (center).



Tristan M. Ocampo, Technical and Design Promotion Manager at ABB Inc., talks about intelligent technologies for "smart cities" during the second day of the 2019 RSTW CALABARZON.



Students from schools across the CALABARZON region tour the exhibit area.

practices and physical environment that will support teaching and learning 21st-century skills or the so-called "4Cs"-collaboration, critical thinking, communication, and creativity. The 21st CLEM is a joint project of the DOST, through the DOST-Science Education Institute and Philippine Council for Industry, Energy and Emerging Technology Research and Development the Department of Education and through its Laguna Division Office.

The DOST Secretary lauded such example of a fruitful collaboration between national government agencies and local government units, saying that it is "the key to really lift our people." With initiatives like this, he expects the Philippines to reach the 40th rank in the Global Innovation Index in the coming years, up from 73rd in 2018 and 54th this year.

Also, during the event, the DOST-CALABARZON unveiled a project under its Small Enterprises Technology Upgrading Program (SETUP) in Calamba City, Laguna. Through the use of encrusting and packaging machines, the project hopes to aid Paula's Candies Store in enhancing the production and profitability of its trademark *yema, pastillas,* and *sampaloc* candies.

The RSTW celebration also highlighted a myriad of S&T activities including forums on 21st century learning, transferable technologies developed by DOST-Food and Nutrition Research Institute, youth orientation on intellectual property rights, technical sessions on smart governance, competition orientations on regional pitching and integrated circuit design, exhibits of different DOST attached agencies, and product bazaar composed of innovative food products of SETUP beneficiaries.

The opening ceremony was also attended by DOST officials namely the former Undersecretary for Scientific and Technological Services Dr. Carol M. Yorobe, Undersecretary for Regional Operations Brenda L. Nazareth-Manzano, Undersecretary for R&D Dr. Rowena Cristina L. Guevara, DOST-Technology Application and Promotion Institute Director Engr. Edgar I. Garcia, and DOST-Philippine Nuclear Research Institute Director Dr. Carlo A. Arcilla. Joining them in attendance was Hon. Arlene B. Arcillas, mayor of Santa Rosa City.

All five provinces under Region IV A–Cavite, Laguna, Batangas, Rizal, and Quezon–were represented at the RSTW celebration by their respective Provincial S&T Center directors.



Winners of the Regional Invention Contest and Exhibits during the awarding ceremony on the closing day of the 2019 RSTW CALABARZON.



# Outstanding Pasigueño DOST scholars honored in NCR RSTW

By David Matthew C. Gopilan, *DOST-STI* Photos by Henry A. de Leon, *DOST-STI* 



DOST Secretary Fortunato T. de la Peña (second from left) and DOST Undersecretary for Scientific and Technological Services Renato U. Solidum Jr. (leftmost), join the three DOST scholars (in black, with medals): Keith Monreal, Margie Patio, and Khennyrie-Ar Peroja and their parents during the awarding. With them are DOST-NCR Director Jose B. Patalinjug III (rightmost) and Pasig City Mayor Victor Ma. Regis "Vico" N. Sotto (second from right).

THREE PASIG City residents and former scholars of the Department of Science and Technology (DOST), who recently graduated with Latin honors, were recognized during the National Capital Region's (NCR) Regional Science and Technology Week (RSTW) celebration at the Rizal High School, Pasig City on 01 October 2019.

Honor graduates Keith Monreal, Margie Patio, and Khennyrie-Ar Peroja, who were recipients of the DOST Undergraduate Scholarship Program, were recognized for their outstanding academic achievements. Peroja graduated magna cum laude in the BS Chemistry program of the Polytechnic University of the Philippines. Meanwhile, Monreal and Patio are BS Statistics graduates from the University of the Philippines Diliman, who both graduated as cum laude.

Peroja shared that the scholarship

has kept him focused on his studies since his tuition and allowance were already taken care of. "Kahit yung family ko hindi na kailangan mamroblema sa mga gastusin dahil sa scholarship [My family didn't need to worry on expenses for my schooling because of the scholarship]," Peroja gladly revealed. Patio and Peroja also appreciated the support of the DOST.

The DOST Undergraduate Scholarship program attracts young Filipinos to consider pursuing a career in science, technology, engineering, and mathematics or STEM, and be part of the growing number of S&T personnel in the country. The program is implemented by the DOST-Science Education Institute.

DOST Sec. Fortunato T. de la Peña and Pasig City Mayor Victor Ma. Regis "Vico" N. Sotto presented the awards to the scholars, along with DOST Undersecretary for Scientific and



Technological Services Dr. Renato U. Solidum Jr., and DOST-National Capital Region Director Jose B. Patalinjug III.

"This is our investment in scholarship and I am happy that we have three examples here who graduated with Latin honors," Sec. de la Peña said. He added that the Department was able to award undergraduate scholarships to some 9,000 college students this year.

The RSTW celebration is DOST's effort to bring the annual National Science and Technology Week (NSTW) celebrations to the 17 regions of the country. With the theme "Science for the People: Enabling Technologies for Sustainable Development", this year's NSTW aims





DOST Secretary Fortunato T. de la Peña highlights the role of the Department in attaining the Sustainable Development Goals.

to showcase in the exhibits the DOSTsupported technologies that contribute in attaining the Philippines' commitment to the United Nation's Sustainable Development Goals (SDGs).

#### DOST techs supporting SDGs

Like in other RSTW celebrations, DOST Sec. de la Peña bannered the various S&T innovations of the Department that are supporting the attainment of the SDGs.

Sec. de la Peña revealed the DOST's exploration of its role in the efficient use of public resources and law enforcement. One of which is the detection and identification of illegal substances, which will be led by the DOST-Industrial Technology Development Institute and DOST-Philippine Nuclear Research Institute.

The said venture will involve isotope-based techniques and artificial intelligence to determine the original source of illegal substances. The Science Chief said that it will be contributory in the attainment of SDG Number 16: Peace, Justice, and Strong Institutions.

The Secretary also made mention of Project DIME or Digital Imaging for Monitoring and Evaluation, which uses technologies like LIDAR or Light Detection and Ranging, geotagging, and geostore to monitor the speed and implementation of infrastructure projects of the government. This joint program of the DOST and the Department of Budget and Management also contributes to SDG Number 16.

Another DOST-developed technology that was mentioned, which will be useful for disaster risk reduction and management, is the HazardHunterPH app. Led by the DOST-Philippine Institute of Volcanology and Seismology, the HazardHunterPH can describe if the person's location is prone to various hazards related to earthquake, volcanic eruptions, landslides, storm surge, and flooding. It supports SDG Number 11: Sustainable Cities and Communities, and SDG Number 13: Climate Action.

The Science Chief then emphasized the importance of innovation such as mentioned above in national development. "These are some of the technologies we supported and we are proud of," Sec. de la Peña remarked.

Meanwhile, Pasig City Mayor Sotto shared his excitement to showcase various DOST-developed technologies in Pasig City. "Nawa'y hindi ito manatili bilang isang show o fair lamang kundi sana'y isang instrumento para sa mga Pasigueño lalo na po sa mga mag-aaral na maging interesado muli sa larangan ng agham at teknolohiya [I hope this event would not remain merely as a show or fair but would serve as an instrument for the residents of Pasig, especially for the students to be interested once more in science and technology]," he said.

#### Philippines becoming more innovative

Aside from the S&T innovations contributing to SDGs attainment, Sec. de la Peña proudly presented the remarkable improvement of the Philippines in the 2019 Global Innovation Index. Accordingly, the Philippines jumped 19 notches from 73rd in 2018 to 54th out of 129 countries worldwide, thanks to output innovation factor. He also acknowledged the role of the mounting university-industry collaboration, which involved DOST-funded projects.

"Pero ang aking target bago po matapos ang aking term sa 2022, umakyat tayo sa number 40. Kasi kapag umakyat na tayo sa top 40, ibig sabihin nasa top onethird na tayo [My target is that before the end of my term on 2022, we would reach the top 40. Once we have reached that, we are part of the top one-third in the world]," Sec. de la Peña said.

Continuing on the innovation index, the Philippines ranked 18th in terms of graduates in science and engineering, and 6th in research talent. Sec. de la Peña pointed out that the generous scholarships of DOST from undergraduate up to PhD degrees could most likely have contributed to such improved ranking. WHO'S WHO?

# DOST's ASTROS, irradiation teams bag Presidential Lingkod Bayan Award

By Neyzielle Ronnicque, DOST-ASTI and Hans Joshua V. Dantes, DOST-PNRI Photos from DOST-ASTI and DOST-PNRI



President Rodrigo Roa Duterte (second from left) and CSC Commissioner Alicia dela Rosa-Bala (leftmost) presented the award to the DOST-PNRI Irradiation Services team: Aurelio Maningas, Giuseppe Filam Dean, Franklin Pares, Haydee Solomon, and Geofrey Tranquilan.



The ASTROS team: Engr. Alvin Retamar, Engr. Gerwin Guba, Engr. Joven Javier, Maria Cristina Manuel, and Engr. Harold Bryan S. Paler, received the award from the President and CSC Commissioner dela Rosa-Bala.

**PROVING THE** quality of Filipino civil servants at the Department of Science and Technology (DOST), two teams from two DOST research institutes bagged the prestigious Presidential Lingkod Bayan Award of the 2019 Search for Outstanding Government Workers by the Civil Service Commission (CSC).

The ASTROS team (for Advanced Space Technology, Research and Services) of the DOST-Advanced Science and Technology Institute got the award for its groundbreaking contributions to the Philippine Space Technology. The team was able to place the country in the space technology map through the development of Diwata-1 and 2, the country's first microsatellites. The team is also credited for the Philippine Earth Data Resource Observation (or PEDRO) Center, the country's first ground receiving station for earth observation data. Through the microsatellites and the ground receiving station, the country can now generate its own data and images for weather forecasting, disaster risk management, agricultural growth pattern detection, forest cover monitoring, cultural and historical sites monitoring, and territorial border protection.

The ASTROS team was able to elevate the value of space to the Philippines through projects and activities that have nationwide impact and multi-sectoral importance. The team has unique contributions towards public service and, to a certain degree, can be considered as one of the pioneering teams in the country's space program initiatives.

Meanwhile, the DOST-Philippine Nuclear Research Institute Irradiation Services team was recognized for its outstanding contribution to the country's nuclear research program, particularly in improving the overall operations and control of irradiation facilities at the WHO'S WHO?

### **Biotek-M lead receives Presidential Lingkod Bayan Award**

By Jwynne Gwyneth Macan, DOST-PCHRD Photo from PCOO



President Rodrigo Roa Duterte (second from left) and CSC Commissioner Alicia dela Rosa-Bala (leftmost) presented the Presidential Lingkod Bayan Award to Dr. Raul Destura (third from left).

**PRESIDENT RODRIGO** Roa Duterte conferred the prestigious Presidential Lingkod Bayan Award to Dr. Raul Destura of the University of the Philippines-National Institutes of Health for his contributions to health and medical biotechnology, especially in diagnostics. The awards rites was held 10 September 2019 in Malacañang.

Dr. Destura led the development of the award-winning Biotek M dengue

aqua kit for a faster, more affordable, and accessible diagnosis for dengue. As the kit is capable of detecting the infection within an hour from extraction, it is seen to ultimately lessen the number of hospital admittance and lower health expenses, especially for the marginalized sectors of the community.

The project was funded by the Department of Science and

Technology-Philippine Council for Health Research and Development (DOST-PCHRD).

The annual Search for Outstanding Government Workers forms part of the Civil Service Commission's Honor Awards Program (HAP). The award aims to recognize civil servants who have shown exemplary performance and have contributed significantly in achieving our national goals.

DOST-PNRI. Through the team's efforts, the government was able to generate savings in maintenance costs of the country's irradiation equipment used for food preservation, medical product sterilization, and research.

The team handles the operation of the Institute's irradiation facilities which are mainly used for radiation processing of various products such as food, medical equipment, and raw materials, as well as for advanced research and development applications. The Cobalt-60 Multipurpose Irradiation Facility is the first and currently the only facility of its kind in the country, established in 1989, and serves the needs of the commercial and industrial sectors.

Meanwhile, the Electron Beam Irradiation Facility, inaugurated in 2014, opens the doors to more advanced applications, with higher radiation doses and faster irradiation time. The facility is also currently being used to produce DOST-PNRI's highly successful carrageenan plant growth promoter which can increase rice yields by around 30 percent, and is now available in the market.

The Presidential Lingkod Bayan Award is conferred to extraordinary contributions resulting from an idea or performance that had nationwide impact on public interest, security, and patrimony, whether in the form of a suggestion, an innovation, or a superior accomplishment, according to the CSC.

# Two Pinoy docs chosen among IAP's Young Physician Leaders



By Dhan Michael L. dela Peña, DOST-NAST Photos from DOST-NAST

TWO FILIPINO doctors are among the next generation of physician leaders who have been selected for this year's InterAcademy Partnership's (IAP) Young Physician Leaders Programme. Dr. Jaifred Christian Lopez and Dr. Raymond Francis Sarmiento joined 20 other outstanding early career physicians in Berlin, Germany on 22-24 October 2019 at the World Health Summit, a leading international forum for global health.

Over the past nine years, the IAP has been conducting the Young Physician Leaders Programme, which is internationally known for its tailored workshop on leadership. The program is focused on analyzing models of leadership in the hope of developing an individual action plan for personal leadership growth.

It has so far provided 191 outstanding young health professionals with skills and knowledge that they will need to promote health and strengthen health systems around the world. The participants of the program are chosen by a committee of medical and scientific professionals who reviewed the nominations received by the global network of the IAP that includes 140 national and regional member academies collaborating to provide independent expert advice on scientific, technological and health issues, and the "M8 Alliance", a unique network of 25 leading international academic health centers, universities, and

research institutions. For this year, the Department of Science and Technology-National Academy of Science and Technology, Philippines (DOST-NAST PHL) the country's premiere recognition and advisory body on matters related to science and technology, nominated Drs. Lopez and Sarmiento, who both made it as official participants of the program.

Dr. Lopez is currently a health policy research and faculty member of the Department of Epidemiology and



Biostatistics at the College of Public Health, University of the Philippines (UP) Manila. His notable works include his service in the Doctors to the Barrios Rural Physician Deployment program of the Department of Health for over two vears (2011-2013). Dr. Lopez also led the successful implementation of the pioneer project modelled on the World Health Organization Package of Essential Non-Communicable Disease Interventions Protocol. The said project enabled the engagement of civil society and local government, particularly the senior citizens and the rural women's sector.

He obtained his Bachelor of Science in Basic Medical Sciences-Integrated Liberal Arts and Medicine (Intarmed) Program in 2008 and his Doctor of Medicine degree in 2011 in UP Manila. In 2013, he finished his Masters in Public Management, major in Health Systems and Development at the Development Academy of the Philippines.

Dr. Sarmiento, on the other hand, serves as director of the National Telehealth Center at the National Institutes of Health in UP Manila. His current research projects include health data science, health information exchange for genetic diseases, standards and interoperability, clinical decision support, telemedicine, and public health surveillance.

He obtained his Bachelor of Science in Psychology in UP Diliman where he graduated cum laude in 2003 and his Doctor of Medicine degree in UP Manila in 2008. This year, he was recognized by DOST-NAST PHL as one of the Outstanding Young Scientists for his notable contributions in the field of biomedical and health informatics.



Dr. Raymond Francis Sarmiento

At the World Health Summit, Drs. Lopez and Sarmiento engaged with a diverse group of outstanding early career physicians (ages 40 and below) with multiple specialties and career interests such as education, clinical practice, public health, health policy, and research, who are committed to be the agents of change for health in their countries.

They also participated in peer-to-peer learning and matchmaking mentorship scheme at the World Health Summit, and were exposed to interactive websites that can post real-time professional information that can gain visibility both nationally and internationally.

Dr. Peggy Hamburg, IAP Health co-chair, said that effective health care and health policy need effective leaders and that more countries should provide necessary training for young professionals to hone their leadership skills. Moreover, IAP President and IAP Health Co-chair Depei Liu added that by being the IAP Young Physician Leaders, they will be able to join a network with members who they can continue to share their experiences and best practices in their respective fields.

Inspired by the program, the DOST-NAST PHL conducts locally the Future Science Leaders Forum which aims to empower young Filipino science leaders and create a pool of potential outstanding young scientists. This seminar-workshop also aims to assist Filipino young leaders to maximize their leadership potential in their respective fields and to provide a venue for a leadership network of peers and potential mentors and advisers. This program is chaired by Academician Carmencita D. Padilla, member of the Health Sciences Division of DOST-NAST and IAP for Health Executive Committee. WHO'S WHO?

# Prolific "innoventer" gets 2019 TOFIL for S&T award

Text and photos from MINDS, INC.



Dr. Malang (middle) receives The Outstanding Filipinos Award.

DR. VIRGILIO "Billy" Malang, a highly-productive inventor who champions innovation among his peers, bagged this year's The Outstanding Filipinos (TOFIL) award. The Awards and Recognition Night was held on 02 December 2019 at the Centennial Hall of the historic Manila Hotel.

Previously, Dr. Malang was first runner up in the Invention Category for "Biogas from Water Lily" patent at the RICE (Regional Invention and Contest Exhibition) Awards by the Department of Science and Technology (DOST) on 06-08 November 2019 at the Technological Institute of the Philippines in Quezon City

Dr. Malang founded the Manila Innovation Development Society (MINDS), Inc., an organization accredited by the DOST-Technology Application and Promotion Institute (TAPI). Recognizing the pressing need for creative thinking, he founded MINDS and launched its flagship Creativity Cram School initiative which conducts crash courses in cracking creativity, IP, and technical innovation.

"Creativity is not emphasized in the Philippine curricula as much as rote memorization and curriculum mastery," he said. The school thus targeted the top quarter of students in the 32 public secondary and three tertiary schools of Manila.

MINDS has also been showcasing original prototypes of students side-byside with gizmos by mainstream inventors in top drawer fairs, such as in Tekno Maynila and its repeats at Harrison Plaza, Reinventing Pinoy Inventors in Makati's Glorietta, Schools of Thought Campus Tour, Inventors Invade Avenida Rizal

# "Sell only what we innovate, innovate only what sells"

-Dr. Virgilio "Billy" Malang

Outdoor Fair, MINDS @ Muelle de Gallina Open Air Show, Inventors by the Manila Bay, and MINDS@Work al fresco exhibit at Plaza Miranda Quiapo.

Most noteworthy was Manila's Greatest Kid Inventors wherein MINDS selected two high school students and

#### WHO'S WHO?

a teacher chaperone to compete at the 2001 Asia Children Inventions Contest in Japan Expo, Kitakyushu. Astoundingly, the top two prizes went to the Division of City Schools Manila. This greatly encouraged MINDS which forayed into the WIPO-staged 1st World Computer Implemented Inventions Tournament and then into Exhibition of Inventions China and Bangkok NRCT, bringing home plum awards in most of its engagements.

On top of these, Dr. Malang, as six-year chair of the Filipino Inventors Multipurpose Cooperative, imposed a very important policy: "Sell only what we innovate, innovate only what sells".

He likewise won a WIPO gold medal and a record of 23 major prizes in seven National Inventors Week Contests by DOST-TAPI. Further, the Intellectual Property Office Philippines (IPOPHIL) granted him 69 letter-patents and enlisted him as Resident Agent for professional patent services to nonresident foreigners.

As well, IPOPHIL credits him for drafting formal disclosures for maiden issued inventions, utility models, and industrial designs in Filipino language.



Dr. Malang's vitamin-fortified beer won a gold medal at the European Union-sponsored Genius-Europe competition at the Budapest Fair Center in Hungary in May 2004.

Dr. Malang has authored four books including "Inventions & Innovations: A Glimpse of the Filipino Legacy (Philippine nationhood Centennial edition)" that was exhibited in the Philippine booth at the 1998 Frankfurt Book Fair.

Characteristically, he was the first Filipino elected to a 12-year term (2004-2016) into the executive committee of the Geneva-based International Federation of Inventors Association (IFIA) which comprises 120 member-countries. He was further assigned at the IFIA Speakers Bureau and was appointed Vice-President of Genius Europe International Invention Contests Jury of the European Union.

So far, he holds a record 78 jury awards in 35 international invention fairs, seven of which were funded by the DOST-TAPI under RA 7459. Further, he clinched a two-time Presidential Awards by former President Gloria M. Arroyo for international invention feats in 2002 and 2004, with cash incentives as endorsed by then DOST Secretary Estrella F. Alabastro.

Other awards he won were the 2004 Outstanding Manilan Award in S&T by the City of Manila; the 2015 Most Outstanding Kapampangan Award in S&T by the Province of Pampanga; and the 2019 Outstanding Fernandino Award in S&T by the City of San Fernando.

Winners for The Outstanding Filipinos (TOFIL) for 2019 were jointly announced by the Junior Chamber International (JCI) and the JCI Senate Philippines (JCISP), in partnership with the ANSA Foundation, during a press conference at Club Filipino in Greenhills, San Juan City on 11 November.

"For over 30 years, the TOFIL awards have been giving recognition to remarkable men and women who have served the Filipino through their inspiring work and excellence," said JCISP president Domingo Roque. "They are the pride of our nation. They are great inspiration to all of us," he added.

(Editor's Note: "Innoventer" refers to highly creative people who are able to put themselves in customers' shoes, and are able to solve a problem using already invented components [Besrour, 2016])

# TIKME event features Cavite's unique foods and flavors

By Rosemarie C. Señora, DOST-ST// Photos by Henry A. de Leon, DOST-ST//

isitors to the three-day science and technology (S&T) fair and exhibits dubbed as "TIKME Ahoy sa Bacoor!" were treated to a gastronomic feast as a wide array of food exhibits were put up by some of Cavite's homegrown firms and entrepreneurs.

The S&T fair and exhibits, a first for the province of Cavite, was spearheaded by the Department of Science and Technology-Provincial Science and Technology Center (DOST-PSTC) in Cavite, headed by Engr. Raul D. Castañeda, in cooperation with the City of Bacoor – the event's host city. It was held 30 September to 02 October 2019 at the Activity Area of the Main Square Mall, Molino Boulevard, Bacoor City.

TIKME, which stands for Teknolohiya at Inobasyon Kaagapay ng Micro Enterprises, is a program that attempts to revolutionize traditional food expo by giving spotlight to homegrown entrepreneurs provided with DOST assistance and technology. DOST Undersecretary for Regional Operations Brenda L. Nazareth-Manzano explained that TIKME is not just an acronym but an actual term that is being used in the province of Batangas meaning "to taste" or "tikman."

"Aptly so, nag-umpisa po ito sa Lipa, Batangas at nakita natin na talagang very successful kaya isinagawa ito sa bawat probinsya ng CALABARZON," she added.

A total of 31 exhibitors participated in the event. Of this number, 15 were enterprises assisted by the City of Bacoor, and the remaining 16 were assisted by the DOST's Small Enterprise Technology Upgrading Program or SETUP.

SETUP is a nationwide strategy encouraging and assisting micro, small, and medium enterprises (MSMEs) to adopt technological innovations to improve their products, services, operations and increase their productivity and competitiveness.

"They (MSMEs) are considered as the lifeblood of the Philippine economy because they comprise the majority of the businesses in the country," stressed Usec. Manzano.



DOST Usec. Brenda Nazareth-Manzano and City of Bacoor Mayor Lani Mercado-Revilla visit the stalls of participating homegrown Cavite firms/enterprises right after the opening ceremonies of the TIKME Ahoy sa Bacoor! held 30 September 2019 at the Main Square Mall, Molino Blvd, City of Bacoor, Cavite.



One of the exhibitors, Virgie Baylon Angeles, shows Mayor Mercado-Revilla the tahong chips, the flagship product of her enterprise Ocean Fresh Tahong Chips. (Photo courtesy of Virgie Baylon Angeles.)

According to a 2017 data from the Philippine Statistics Authority, 99.56 percent of businesses in the country are MSMEs, from which 62.9 percent of local employment come from. MSMEs also contribute highly to the exports revenue of the country.

"We would like you to know that we provide a wide array of interventions to help MSMEs to plan out their competitiveness. We want to improve their productivity through innovation and technological interventions," said Usec. Manzano. She added that the DOST also offers training, consultancy, and laboratory services.

For the regional office's part, DOST-CALABARZON Assistant Director Lydia Manguiat, shared the various assistance offered by the DOST regional office for MSMEs, such as technology upgrading program, grants and aids for communitybased projects, and food safety programs including trainings and certifications, etc.

Bacoor City Mayor Lani Mercado-Revilla expressed her gratitude to DOST for choosing Bacoor as the host city of the event. "I would like to thank the DOST for choosing the City of Bacoor as the venue of this event. Tamang-tama po ang TIKME bilang paggunita natin ng 348th founding anniversary ng Bacoor City. We look forward na makasama pa namin kayo sa marami pang pagdiriwang sa lungsod ng Bacoor," said Mayor Revilla.

The three-day event also featured a seminar on product packaging and food safety awareness, a livelihood seminar on *tahong* chips processing, and a cook-off challenge using *tahong* as the main ingredient. Bacoor is known for its delectable *tahong* (mussels) and its mussels growing industry.

DOST-Cavite reported that TIKME Ahoy sa Bacoor! earned PhP 88,862 in profits during its three-day run.

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Some of the tahong products that are on display at the "Tikme Ahoy sa Bacoor!" event.

Also present in the TIKME event were DOST-PSTC Directors Felina C. Malabanan of PSTC-Batangas, Engr. Samuel L. Caperiña of PSTC-Laguna, and Fernando E. Ablaza of PSTC-Rizal. They were joined by Irene Bencito, who represented Cavite Governor Jonvic Remulla, Alda Lou Cabrera from the office of Cavite 2nd District Congressman Strike Revilla, Bacoor City Councilor Rowena Bautista-Mendiola, and Head of Bacoor City Livelihood Office, Carmelita Fabian-Gawaran.

### Successful tahong enterprise

Cavite, Bacoor in particular, is known for its generous harvest of mussels, which is one of the main sources of livelihood for most Caviteños living in the coastal areas. One of these entrepreneurs whose livelihood centered on *tahong* is Virgie Baylon Angeles.

As a resident of Bacoor, Angeles wanted to show something different that can be made out of *tahong*, and thought of using it as raw material for snack foods. Her idea gave birth to her business, which she called Ocean Fresh Tahong Chips – deep fried snack from Asian green mussels (*Mytilus edulis*), locally known as *tahong*.

Her *tahong* chips are processed naturally, without additives or preservatives. Ocean Fresh Tahong Chips is a delicious exotic food rich in iron, iodine and calcium. However, *tahong* chips are quite new in the market back then.

"In fact, when I first sold my product, many were skeptical. Some people didn't want to buy because they are not familiar with the new product," she said.

Nonetheless, she did not give up on her new innovation. "I attended enrichment seminars spearheaded by different line government agencies. The seminars equipped me with insightful and strong foundation for my business management, production, and marketing," said Angeles

She added, "I also did my own product research so as to improve the quality of taste, texture, and packaging." Angeles also participated in trade shows where she offered free food tasting of her products to get customer feedbacks.

In her quest to continue improving her product, Angeles applied for SETUP assistance and was granted in 2006, PhP 352,374 in financial assistance for the acquisition of packaging and sealing equipment. The amount was used to improve the processing and handling of her *tahong* chips.

With the SETUP assistance, the new and improved *tahong* chips became instant hit in most trade shows, often becoming a crowd favorite. Banking on this success, Angeles now sells them in malls and supermarkets in Cavite and Metro Manila.

Aside from *tahong* chips, the company now also specializes in the production of crispy *tahong*, *malunggay* chips, and *ampalaya* chips. Another remarkable achievement of Ocean Fresh Tahong Chips is that it is now identified as a One Town One Product (OTOP) enterprise of Bacoor. The OTOP program supports MSMEs in the development and marketing of products and services through the use of indigenous raw materials and the employ of local skills and talents.

With support from SETUP and the OTOP program, Angeles dreams for her *tahong* chips to make it to the export market.

"I thank the DOST for reaching out to small entrepreneurs like us to meet our needs in availing the appropriate technologies to lessen our manual works in production, thus increasing our outputs and increasing our sales," said Angeles.

She added that the continuing package of interventions in financing, marketing, training, product and technology development, and access to businessrelated knowledge and information interventions from the DOST resulted in new and larger income opportunities.

She advised fellow entrepreneurs to have patience and focus in achieving their goals, to invest in their creativity in terms of product development, and to never stop until their target markets accept their products. Opportunities like the SETUP, she said, should be grabbed by small entrepreneurs to improve their products. **FEATURES** 

# Towers of hope rising in Aurora

By Lineth Brondial, CHED-PCARI

Some coastal barangays in Aurora province used to rely on boatmen to be updated on happenings, but things changed when cellular towers were built and provided them with access to communication.

Normelyn Lopez, 34, looks on with excitement as the boat carrying her fish produce leaves the shores of San Luis going to Baler, Aurora. Located against a backdrop of the Philippine sea and the green slopes of the Sierra Madre, their community is a remote island in the province. She smiles, a little surprised at the beep of her cellphone. One text message and the fish she just sent is sold.

"Naitawag ko na. Na-itext ko na rin, para sigurado (I've called already. I also sent a text message to be sure)," she says. Her buyer waits for the bucket load of fish on the other side of the island. In this kind of transaction, her family's income would range from PhP600-PhP800 daily.

Business has never been this convenient for Normelyn. She used to worry a lot before. "Nakarating kaya? Nabili kaya?" (Has it reached the other side? Has it been sold?) For a community that has little to no mobile signal or internet connection, Normelyn adds they didn't even know when the price of fish and other goods increased or decreased.

"Madalas, kailangan namin pumunta ng personal o kaya naman ay ipapakiusap sa bangkero (Usually, we needed to go personally or ask the boatman for this errand)," she shares. Travelling to and fro Baler and San Luis would take two hours or so via boat ride.

Their life in San Luis took a major turn when the Village Base Station (VBTS) provided a mobile signal by putting up a cellular tower. It saved them travel time as well as money. The PhP100 that Normelyn used to spend for a boat ride now avails her calls and texts for her loved ones.

"Napakalaking tulong. Nakatipid kami sa oras at pamasahe (It's a great help. Saves us a lot of time and money)," she utters happily. "Nabawasan din yung mga inaalala namin (It also lessened our worries)," adds Normelyn.

VBTS is a research project led by University of the Philippines Diliman in partnership with University of California-Berkeley. It provides low-cost mobile communication tower and signal in rural areas such as Aurora where telecommunication services are not yet available. It is funded by the Philippine-California Advanced Research Institutes (PCARI), a research and capacity-building project of the Commission on Higher Education (CHED).

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Not only did the VBTS project provide Normelyn Lopez and her neighbors an access to local texting and calling, it also provided her an additional source of income through buying and selling of loads and sim cards. Their sitio in Dikapinisan, Brgy. Dibut, San Luis is just one of the seven remote coastal communities that benefited from the VBTS project.

VBTS Project Leader UP Professor Cedric Festin says that in the age of digital connection, it is difficult to imagine that there are still areas in the Philippines where simple text and calls are not accessible.

In the early 2000s, the country earned its title as the "text capital of the world." For consecutive years between 2016-2018, WeAreSocial reported that the Philippines has since transitioned to be the social media capital of the world, with millions of Filipinos spending an average of four hours a day on platforms like Facebook.

"But this convenience is still unknown to many remote areas in the country," says Professor Festin.

Unsurprisingly for these areas, the popularity of smartphones and data plans means nothing if no signal from a cell site is available.

He added that an estimated 10,000 out of 42,000 barangays still do not have cellular coverage.

Data released by TowerXchange and WeAreSocial in 2018 suggested a disproportionate number of mobile and internet users against existing cell sites in the Philippines. Only at least 16,600 total cell sites serve around 67 million users across the country, a stark difference compared with its neighboring countries in Asia like India with 1.459 million cell sites against 462 million users; Indonesia with 91,700 cell sites against 132.7 million users; China with 1.95 million cell sites against 751 million users; and, Vietnam with 70,000 cell sites with 64 million users.

At the very least, this is what VBTS seeks to support – an access to communication. Since its launch in 2017, the project has already distributed community cellular sites in seven coastal barangays in the towns of Dingalan, Dilasag, and San Luis in Aurora Province. Travel from one site to another would require about two to three hours, each site reachable via land or sea. The sites in San Luis are the farthest locations.

Every site is deployed with modified transceiver stations, a satellite plate and signal booster. In partnership with Globe Telecom, which provided the frequency for the specialized VBTS sim cards, the project's goal has been realized. The provisions of VBTS are not perfect, Normelyn and the others admit this. For instance, the cell site doesn't support 2G to 4G internet connection. But to them who haven't been able to experience short messaging and calls services, VBTS is lifechanging. The minimum load to send a text message only costs P0.50 cents.

This school year, one of Normelyn's four children will be enrolling as a freshman student at the Aurora State College of Technology in Baler, Aurora. Through VBTS, she will be able to communicate with her son who needs to stay in a boarding house in the main town.

"Ngayon, pwede ko na siyang matext o matawagan kung halimbawa mang kulang na ang allowance niya o kung may emergency (Now, I will be able to text or call him in case he is short on his allowance or if there happens to be an emergency)," says Normelyn.

"Ito yung gusto namin sa proyektong ito; binigyan kami ng access at naging madali ang komunikasyon (This is what we like about this project, it gave us access and made communication easy)," she adds.

(*Editor's note:* This article is an output of Lineth Brondial of the Commission on Higher Education [CHED] during the training "Capacity-building Seminar and Training in Writing Science, Technology, and Research and Development News, and Basic Photojournalism and Layout and Design" held at Microtel By Wyndham in UP Technohub, Quezon City on 02-06 September 2019. The training is a partnership between the Commission on Higher Education-Knowledge Management Division and the Department of Science and Technology-Science and Technology Information Institute)

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# Innovative weaving seen to push the 'hablon'

Secretary Fortunato T. de la Peña (left, in barong) inspects the yarns and other facilities of the Regional Yarn Production and Innovation Center in Miag-ao, Iloilo.

By Rodolfo P. de Guzman, DOST-ST// Photos by Ceajay N. Valerio, DOST-ST// he age-old tradition of weaving fabrics for clothes has been a preoccupation embedded in the way of life of women weavers and the entire community in Miag-ao, Iloilo. Blending creativity and mastery of the craft, young and old weavers are able to churn out colorful fabrics, but unfortunately at a pace that cannot meet market demand.

By introducing modern technology with the establishment of the Regional Yarn Production and Innovation Center (RYPIC) in Miag-ao by the Department of Science and Technology-Philippine Textile Research Institute (DOST-PTRI), the uniquely designed fabrics of Iloilo can now be seen more as garments that can be worn on special occasions by clients here and abroad.

The facility is a scaled down replica of the Innovation Center for Yarn and Textile (ICYT) housed at the DOST-PTRI headquarters in Bicutan, Taguig City.

The RYPIC in Miag-ao was inaugurated by DOST Secretary Fortunato T. de la Peña on 06 November 2019 at the Iloilo Science and Technology University Miag-ao campus together with DOST Undersecretary for Research and Development Dr. Rowena

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Cristina L. Guevara and DOST-PTRI Director Celia B. Elumba.

Sec. de la Peña said that the facility will open more opportunities for local fabrics and textiles to find its way to the international market, thus creating more jobs and income for marginalized sectors in the community. Further, the science chief lauded the transfer of technology to the university that will capacitate human resource by upscaling skills and expertise in textile science.

The facility will also add value to textile products by harnessing potentials in the supply of raw materials that farmers produce, to the finished fabrics that will be easily available for use by Filipino fashion designers and clothes manufacturers.

Miag-ao Mayor Macario N. Napulan is grateful to the DOST for the establishment

of the first regional facility in his hometown that he said will help invigorate the local textile industry and allow their products to be known worldwide.

A highlight of the RYPIC inauguration was the Hablon Fashion Presentation, curated and directed by international lifestyle designer PJ Arañador and indemand fashion event director Bombette Marin. At centerstage were the different designs of colorful patterns and forms of the hablon.

The name of the fabric was taken from the Hiligaynon word "habol" meaning "to weave." It also refers to both the process of making the fabric up to the end-product. Hablon is traditionally made from locallymade fibers like piña, abaca, and cotton.

To date, the municipalities of Miag-ao and Oton remain to be the top producers

of the hablon weave in the province. The facility will surely benefit the largest weaving communities in these municipalities that produce and sell exportquality products such as the elegant *barong tagalog*, the traditional *patadyong* skirts and *saya*, the headgear called *bandana*; and household and novelty items such as table runners, picture frames, slippers, and bags.

Others present during the inauguration of the facility were DOST-Region VI Director Rowen R. Gelonga; Iloilo Science and Technology University President Dr. Raul F. Muyong; Great Women Philippine President Jeannie E. Javelosa; Chairperson of the Commission on Higher Education Prospero E. de Vera; and Assistant Secretary Anthony Gerard Y. Gonzales from the Office of the Presidential Assistant for the Visayas.



Frallie Bacnat showcases some of her furniture designs. She is the one handling the family business, F. Bacnat Furniture Shop in Batac City, Ilocos Norte.

# **Ilocos businesses invest in S&T**

By Angelica Marie Paz, DOST-ST// Photos by Ceajay N. Valerio, DOST-ST//

Locanos have been described as stingy because instead of spending on material things, they invest their money in some ventures. Up north in the province of Ilocos Norte, four local businesses are now thriving not because the owners are misers but because they invested on science and technology to improve their production.

Particularly, these businesses sought the assistance of the Department of Science and Technology's (DOST) Small Enterprise Technology Upgrading Program (SETUP).

#### **Dough rises**

Baker's PH is one of the first beneficiaries of SETUP in Ilocos Norte. Located in Laoag City, the bakery is a well-established brand in the province known for its high quality baked products. Plant Manager Eldie Domingo, during a tour inside their production plant, showcased the equipment they acquired through SETUP. According to Domingo, Bakers PH was granted packaging equipment, as well as employee training on Good Manufacturing Practices (GMP) and Quality and Environment Management System.

According to Domingo, the support from SETUP increased their factory's productivity. "Dati naiiyak na yung mga tauhan namin sa dami ng binabalot, ngayon mas mabilis na po. Mas marami na ring variety of packaging yung nao-offer namin sa market," he said.

(Our workers used to feel sad because they had to wrap a lot of things, but now they can work faster. We can also offer more packaging varieties to the market.) "We have a wide range of pastries including *hopia baboy* (pastry with bean paste filling), but since Ilocos is known for *bagnet* (crispy pork belly dish), we tried to incorporate a fusion of both Filipino delicacies," Domingo shared. Right beside the factory is their flagship store where customers can purchase their products.

The bakery also made a big break as Jollibee's supplier of buns in Ilocos Norte. Its sister company, Bakers Percent in Tuguegarao City, supplies fast-food chains in other provinces in Northern Luzon.

### When fashion meets innovation

SETUP caters to a wide array of sectors. In fact, the program is open to any company or individual firm, just as long as it is based in the country, and owned by a Filipino. In Ilocos Norte, the program has

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paved way for fashion to collide with new technology.

Engineering graduate and former college instructor JC Salvador applied for the technology acquisition and equipment upgrading under SETUP to help expand his printing business. With the assistance of DOST, he was granted a full-sublimation printing equipment that enabled him to pursue creating quality clothing pieces.

Salvador's seven-year old business is named Laoag Graphics and Engineering Designs (LEDS) Clothing. Initially, the company started with printing services like tarpaulin, souvenir printing, but it eventually expanded to creating t-shirt designs in 2016. Through SETUP, Salvador is now able to cater to customized designs and print them into various clothing pieces.

"Today's technology in clothing is full sublimation. We have a new machine. Whatever we print on paper is the actual output. We first layout the design on the computer then we print it on sublimation paper. That copy is what we put into the machine," Salvador explained.

Full sublimation uses a special paper wherein heat is applied allowing the printed design to become part of the fabric. This type of printing is the latest trend that allows garments to have vibrant prints. Because of the sublimation printer, LEDS Clothing can now produce bulk orders for different occasions.

Since he availed of the SETUP assistance, Salvador has already opened six outlets across Ilocos Norte with a total of 17 employees. "Fashion design is really my passion, so I want to use my background in engineering in my business especially in technicalities," he said as he shared his inspiration in starting his business.

"My investment came from my salary and loan from relatives. They helped me. The DOST gave me the sublimation machine," Salvador added. He plans to open up an online shop to cater to more customers, even outside Ilocos Norte.

To further enrich his knowledge in fashion design and business, Salvador enrolled in a fashion design school in Manila, wherein he takes classes during weekends.

#### Sustainable business

In the neighboring city of Batac, SETUP has also helped a family boost its ongoing business – the F. Bacnat Furniture Shop. They supply different kinds of fitments to several towns in Ilocos Norte.

Frallie Bacnat, the current manager of the family business, says that the SETUP

played a huge role in the growth of their shop. "The equipment are really expensive. Previously, we used manual labor but now we already have the machinery that makes our work faster. We are also able to meet many orders," she shared.

In 2013, Bacnat applied for DOST assistance for the expansion of their business. Through SETUP, they received manpower training and equipment package worth PhP 300,000.



LEDS Clothing owner JC Salvador shows an example of a sublimated clothing piece. The design was made by Laoag artist Angelie Banaag.



Sharon Dulig, owner of Citipoint Metalcraft, explains how he built his own machine for his business.

After settling payments with DOST, she decided to apply for another equipment support worth PhP 600,000.

They also bought their own land up in the mountains of Nueva Era as a source of their wood supply through the assistance of the Department of Environment and Natural Resources. "When we were able to raise some amount, we invested by buying lots in the mountains to sustain our supply (of wood)," Bacnat said. They primarily use gmelina and mahogany for the production of their furniture.

### No place like home

One of the long-term goals of SETUP is to provide sustainable income for Filipinos who want to venture out into business. For Sharon Dulig, a former overseas worker in New Zealand, the program helped him build his own business without having to leave the country.



Bakers PH now has improved manufacturing processes and better packaging because of the equipment acquired through SETUP.

Citipoint Metalcraft in Batac City, Ilocos Norte was made possible by Dulig's background in steelworks from his job as a welder abroad. He thought that starting his own metalcraft services would be a good opportunity for him to go back to the Philippines. Later on, Dulig found out about SETUP through his colleague back in New Zealand. "Nung pagkabalik ko ng Pilipinas inisip ko magtayo ng negosyo. Nung kumikita na, tinry kong mag-avail sa SETUP kasi malaking tulong rin yun," Dulig shared.

(Upon return to the Philippines, I thought of embarking on a business. When this business was already making a profit, I tried to avail of SETUP because I know it will be of big help.)

Through SETUP, Dulig acquired PhP 90,000 on his first application, which he used to purchase a metal fabricator. On his second loan, he was able to get a PhP 612,000 SETUP support through DOST-Region I. Among his creations were kitchen equipment and distillers for ethanol, vinegar, and the like.

Aside from the equipment he received from DOST SETUP, he also uses a metal fabricator that he assembled on his own. According to Dulig, it only cost him about PhP 30,000 to make the machine. "Our production went faster, I no longer do manual work," he added.

His growing company now supplies to private contractors across Ilocos Region. This year, he marked his ninth year in the metalcraft business.

Currently, Citipoint Metalcraft is creating oil expellers that will be used from the Nipa Fuel research of DOST-Region I and Mariano Marcos State University.

Some of the SETUP beneficiaries, including Bakers PH and LEDS Clothing, showcased their products at the Regional Science and Technology Week on 17-20 September 2019 at the Centennial Arena, Laoag City, Ilocos Norte. The SETUP graduates were also awarded with Certificate of Ownership. Through the program, DOST aims to reach out to more emerging business across the country and help them adopt technological innovations for the growth of their livelihood.



By Fortunato T. de la Peña, DOST Secretary Photos from DOST-Philippines Facebook page

In 2019, I would say the Department of Science and Technology (DOST) made the people feel that science is working for them. We leapfrogged several steps in the attainment of our 2022 goals.

In the most recent Global Innovation Index, the Philippines moved 19 ranks higher from 73rd place last year to 54th place this year out of 129 economies. Our achievement is said to be "above expectation for level of development" among lower middle-income economies.

In research and development (R&D), we had several breakthroughs in transportation, space technology, drug discovery and agriculture, among others.



### Transportation

In transportation, DOST turned over the hybrid electric train (HET) set to the Philippine National Railways. HET is a Filipino-made train which proves that we can make technologies that work for our people. It is now serving Filipino passengers.

### Space technology

In space technology, we have Diwata-2 and Maya-1 micro and cube satellites, respectively, up in the sky that continue to send high resolution images that can be used for disaster risk reduction, climate change adaptation, agricultural modelling, and land use classification. Diwata-3 is still in the development stage and is set to launch in 2021.





The hybrid electric train

Sec. de la Peña rides the hybrid train along with Usec. for R&D Rowena Cristina L. Guevara.

Sec. de la Peña (third from left) together with University of the Philippines Diliman Chancellor Michael L. Tan (rightmost) represent the country during the official launching of Diwata-2 on 29 October 2018 at the Tanegashima Space Center, Japan

Complementing the satellites is the Philippine Earth Data Resource Observation (PEDRO), which has the first satellite tracking antenna in the country, the Ground Receiving Station at the DOST-Advanced Science and Technology Institute in Quezon City, to access earth-surface information for disaster management, environmental monitoring, national security, urban mapping, rehabilitation assessment, and research purposes. We also launched a second Ground Receiving Station in Davao City, to enhance PEDRO operations and serve as a redundant station in case of any catastrophe and disaster threats in Metro Manila.



Sec. de la Peña (seventh from right), along with other DOST officials, officially launch the Davao Ground Receiving Station or D-GRS, which will be the facility to receive the images gathered by the microsatellites.

### **Drug discovery**

In drug discovery, formulation of standardized dosage from 28 plants is nearing completion. After this stage, dosage forms that pass will go through pre-clinical studies. Also, a pre-clinical trial of a fixed-dose combination of three plants as possible treatment for dengue has been completed and results are very promising. These are among the promising research outputs under the Tuklas Lunas Program.

### **Agriculture**

In agriculture, the national annual average yield of coconut at 45 nuts/palm/year is projected to increase to 60-80 nuts/palm/year. A tremendous increase that will definitely improve the productivity of our coconut farms through Coconut Somatic Embryogenesis Technology or CSet, an alternative technique for rapid mass propagation of superior genetic stocks for high yield, pest and disease resistance, and high value products. We also have R&D on nanofertilizers which led to the development of Fertigroe®, an environment-friendly and cost-effective alternative fertilizer that improves nutrient absorption and increases crop yield. The patent for Fertigroe® Nitrogen nanofertilizers is now for review.



### Research & development, technology transfer

Our R&D program has generated technologies that have been transferred or commercialized through technology transfer agreements covering forestry, textile, health, food and nutrition, agriculture and natural resources, and manufacturing technologies.

Through technology transfer we tried to touch the lives of the people specially in the countryside. We expand access to technology and innovation through networking of S&T laboratories through the OneLab Network; catalyzing food innovations through the Food Innovation Centers; expanding technology business incubators and innovation hubs through the Technology Business Incubation programs which has already supported 295 startups as of March 2019; providing S&T interventions to the micro, small, and medium enterprises and the economically disadvantaged communities through the Small Enterprises Technology Upgrading Program (SETUP) and the Community Empowerment through Science and Technology (CEST) program; and developing regional R&D capabilities through the Niche Center in the Regions for R&D (NICER) Program. Through SETUP we provided innovation fund for technology adoption and S&T assistance to 363 firms/other entities from January to June 2019. These firms were able to improve their productivity and generate jobs. Through the CEST program, we extended S&T interventions to a total of 71 economically

disadvantaged communities nationwide, from both rural and urban areas. Through the NICER Program, we have identified 14 R&D laboratories located in state universities in 11 regions as Niche R&D Centers with entitlement for grants for R&D, facilities upgrading, and human resource development.



### S&T human resource <u>develo</u>pment

S&T human resource development is one of the vital strategies we take to ensure that we capacitate our most important resource. DOST has reached 98 percent of the country's municipalities and congressional districts with at least one DOST-SEI scholar. In 2019, we have 9,852 new scholars. In response to the destruction brought by Marawi siege, we supported 217 BS scholars through the Bangon Marawi Program, 131 of whom have graduated with three Magna cum laude and nine Cum laude honors. The Philippine Science High School awarded 8,358 scholarships for SY2018-2019 which is 23.56 percent higher than SY2016-2017.

On space technology, aside from the 16 additional researchers in 2019 engaged in the fields of cosmoscience, aerospace, and space engineering for the development of nanosatellites, 60 people were trained in space technology development, particularly in processing image datasets captured by the satellites.



An undergraduate course (ECE 197S-Introduction to Satellite and Space Systems Engineering) was also developed and offered in the University of the Philippines- Electrical and Electronics Engineering Institute which now has 69 students. Further, scholarship for nanosatellite engineering is now being offered by the DOST-Science Education Institute, in partnership with UP Diliman, under the STAMINA4Space Program which now has eight scholars.

To further strengthen our S&T human resources and accelerate the flow of new and strategically important technologies vital to national development, we engaged 51 Balik Scientists in the fields of health, agriculture, aquatic and marine, and energy and emerging technology, from January to June 2019. Of the 51, 34 are newly approved in 2019 while the rest are continuing engagement from prior year.



DOST Secretary Fortunato T. de la Peña (seated, middle) share a light moment with Mindanao State University (MSU) Marawi City campus students who will receive scholarship grants through the Bangon Marawi Program on Science and Technology Human Resource Development of the DOST-SEI. With them are MSU-Iligan Institute of Technology Chancellor Sukarno D. Tanggol (left) and MSU System President Dr. Habib W. Macaayong (right). (Photo by Henry A. de Leon, DOST-STII)

### Collaboration

Collaboration is another strategy that we maximize and continuously strengthen to bring the results that we want to deliver to our people. DOST supported 18 Masters and PhD scholars from Cambodia, Lao PDR, and Myanmar, as part of its commitment in ASEAN. DOST research and development institutes also engaged in



several international activities, most significantly in the exchange of scientists and experts on specialized S&T areas. The Department also collaborated with Thailand on the use of its synchrotron facility by local scientists under a shared-time use scheme. Recently, bilateral programs for science, technology, and innovation were signed—with Israel, Switzerland, France, and Iran—in areas such as agricultural biotechnology, high energy physics, genomics and nanotechnology. We also facilitated collaboration with industry and academe to ensure that R&D results are relevant, commercialized, and utilized at a more accelerated pace and timely manner. This is done through the Collaborative R&D to Leverage the Philippine Economy where we already have 18 collaborative R&D projects as of June 2019.

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# Disaster preparedness interventions

We worked hard to make science, technology, and innovation responsive to the needs of the people. We continually improve and make our services as accurate and timely as possible. Vital state-of-the-art facilities are in place and monitoring capabilities are continuously upgraded to deliver accurate and timely forecast on weather, rainfall and water levels, and volcano and seismological updates. Aside from the improved early warning systems, we also utilized digital technology. The DOST-PHIVOLCS developed the "Hazard Hunter Philippines", an application that can identify and assess the degree of exposure of a location to various hazards, including earthquake, volcano-related hazards, tsunami, floods, landslides and storm surges, guickly and easily. On the other hand, natural hazards are inevitable. Therefore, we did not stop our intervention in preparing people for disasters but we also provided intervention to address their needs during disasters. In the last guarter of 2019, earthquakes rocked some parts of Mindanao. As a response, DOST, through the Industrial Technology Development Institute, distributed 30,000 packs of ready-to-eat food (called "Pack of Hope") to earthquake victims in coordination with DOST-XII and the National Disaster Risk Reduction and Management Council. The food packs contained DOST-developed products such as rice porridge, smoked fish rice meal, and BigMo (bigas/rice-mongo) curls, to provide 12 percent of recommended energy and 11 percent of recommended protein to children. The DOST earlier turned over 2,490 arroz caldo (rice porridge), 504 smoked fish rice meal, and 150 BigMo to the province of Cotabato.







### **Good governance**

We also made S&T interventions in the area of good governance. Together with Department of Budget and Management (DBM), we implemented Project DIME, or the Digital Imaging for Monitoring and Evaluation which provides a geo-spatial based monitoring for reforestation and irrigation programs and other infrastructure projects funded by government. This project assists the DBM in monitoring the status, financing, and implementation of big-ticket government projects using existing technologies such as satellites, drones, LiDAR, and geotagging software. This a very relevant tool that aids transparency and accountability efforts of the government, that incidentally gained an award during the 1st Anniversary of the Presidential Anti-Corruption Commission in March 2019 for DOST and DBM.

### **S&T excellence**

It is also noteworthy to mention the local and international recognition of our talents. In the 2019 Edition of the Asian Scientist 100, eight Filipino scientists made it to the list for their significant contributions in scientific research and leadership. The DOST also recognized 1,469 students who won in international competitions from January to June 2019 through the Youth Excellence in Science (YES) Awards. The YES Award is a DOST institutional award for exemplary achievement of the youth in international competitions in the fields of science and mathematics.

Reflecting on the challenges we faced and the results we delivered in 2019, I would say that indeed, we made Science for the People. But we did not do it alone, I share the triumph to our partners and stakeholders. Together, we bring science to the people and make it work for the people.



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## FREE ADMISSION!

## **2019 REGIONAL SCIENCE AND TECHNOLOGY WEEK**

**ENABLING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT** 

### **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	03-05 December	General Santos City
CARAGA	03-05 September	Bayugan City, Agusan Del Sur
NCR	01-03 October	Pasig City







### ENABLING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

The DOST family would like to thank all our partners, stakeholders, and guests for the success of 2019 National Science and Technology Week (NSTW) and the Regional Science and Technology Week nationwide!

Hope to see you again next year as we hold our 2020 NSTW in November. Please visit **www.nstw.dost.gov.ph** for updates and more details.

Thank You!



DEPARTMENT OF SCIENCE AND TECHNOLOGY in cooperation with Science and Technology Information Institute (DOST-STII) and Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST- PAGASA)

### SYNCS ALL ITS TIME DEVICES WITH THE PHILIPPINE STANDARD TIME (PhST) IN THE OBSERVANCE OF THE

# NATIONAL TIME CONSCIOUSNESS WEEK 01-07 January 2020



To synchronize time devices with the PhST, visit: https://www1.pagasa.dost.gov.ph/and click Philippine Standard Time