

DOST Secretary emphasizes the benefits of PH Virology and Vaccine Institute, *p.26* First commercial e-beam facility, to aid local food, medical, other industrial sectors, *p.42*

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SCIENCE FOR THE PEOPLE Living the Legacy

Dost

Living legacy



The S&T Post, or simply Post, is a dynamic entity, a publication that constantly tries to move, jive, or groove to the tune of the changing times. The Post is now at the crossroads, mirroring the milestones of the Department of Science and Technology as the current administration

ends its term with the leadership still at high gear – leaving a living legacy.

This issue chronicles the past, present, and future. This isue of the Post serves as repository of the achievements for the last six years under the stewardship of Secretary Fortunato T. de la Peña. At the same time, it reports the current state, moving forward to the future with stories that showcase the technologies, innovations, and plans for tomorrow.

In these pages, we give you stories of successes and the beginnings of innovative projects that will chart the course of the future today. This issue is a collection of telling stories on waste to energy, the BUHAWI protective gear technology, the DOST-TAPI roadmap, the proposed Virology and Vaccine Institute of the Philippines, innovative products like milk alternatives and okra toothpaste, alternative source of fuel, and more.

We are confident that our stories will mark the many accomplishments of the de la Peña administration, but it will also signal the beginning of more exciting things to come as the new Secretary warms up to the aspirations of the men and women behind the successes of the Department.

True enough, we are hopeful that our stories will continue to serve as inspiration for all to think bigger, to harness the power of science, technology, and innovation for a better future. As communicators we ensure that the Post, under any leadership will continue to better itself in communicating science to the people. More than ever, we see the Post as an instrument to inform and a tool to transform.

Indeed, change is at our doorstep, shifting and gearing towards transition and the Post will be here to make sure that the positives are made known to our publics in our hope to strengthen the culture of science in the country.

Read on. Discover the amazing world of science in these pages. Know the science and live your future now!

NORLY B. VILLAR Executive Editor



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ABOUT THE COVER

"Living the legacy" is highlighted in this cover, with DOST Sec. Fortunato T. de la Peña at its forefront and the newlyrenovated DOST building at the back. The cover study features DOST Sec. de la Peña as he was the bearer and spearheader of the "Science for the People" initiatives, which coincidentally, stands for the same initials as "Sec. Fotunato T. de la Peña." As the science chief for six years, Sec. de la Peña carries on the legacy in championing DOST programs and S&T initiatives, which are also featured in this issue.

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DOST-FPRDI designs safe and effective machine for *abaca* **farmers**

By Rizalina K. Araral, DOST-FPRDI



Great news to the Philippine *abaca* industry! A locally developed abaca fiber-extracting machine made safe and effective by the DOST-FPRDI.

he Department of Science and Technology – Forest Products Research and Development Institute (DOST-FPRDI) has finally come up with a solution to one of our *abaca* farmers' biggest concerns: a fiberextracting machine that is both safe and effective.

According to the DOST-FPRDI's Engr. Edward Paul S. Marasigan, "For a long time, many of our *abaca* farmers have had no choice but to use very hazardous fiber-extracting machines that expose them to moving blades. With the Institute's abaca decorticating machine, this hazard has been removed while still giving them high fiber quality and yield. This is an important development, especially since *abaca* is one of the country's most vital cash crops and top export earners."

Known as the world's strongest natural fiber, *abaca* provides income to 76,000 farmers and tens of thousands of other Filipinos working in trading posts and processing plants. Fiber exports and manufacture of *abaca* cordage, yarns, fabrics and fiber crafts—as well as pulp and raw fiber, earn about USD 97 million per year.

According to Marasigan, "Coming up with a safe and effective fiberextracting device has been a longtime challenge for the country's abaca industry. Available technologies are typically labor-intensive, unsafe to use, and unable to yield fibers of consistent quality. We are glad we have been able to develop a machine that solves these concerns. At a fabrication cost of PHP 165,000 and a fiber recovery of 3.79%, our innovation is at par with the abaca decorticating devices available in the market."

The project was funded by the DOST-FPRDI and the output of Marasigan's Master of Science in Agricultural Engineering thesis at the University of the Philippines Los Baños. His coworkers included Dr. Fernando O. Paras Jr., For. Victor G. Revilleza and Engr. Alvin F. Vardeleon.



DOST-TAPI Director, Atty. Marion Ivy D. Decena, reveals the DOST-TAPI Roadmap for 2023 to 2032 and beyond on 13 May 2022 at the Novotel Manila Araneta City, Quezon City

he Roadmap of the Technology Application and Promotion Institute of the Department of Science and Technology (DOST-TAPI) was officially revealed during the Launching of the DOST-TAPI Roadmap and Stakeholders' Recognition on 13 May 2022 at the Novotel Manila Araneta City in Quezon City.

NOVOTEL

MANILA

DOST-TAPI Director, Atty. Marion Ivy D. Decena laid the strategic plan of the Institute including the desired goals and outcomes from 2023 to 2032 and beyond.

She acknowledged the presence of the "valley of death" in every technologybased business endeavor, which left many researchers and technology generators in a state of limbo.

"We see it more as a responsibility than a threat and a reason to thrive in providing what is expected from us," said Dir. Decena.

Thus, the Institute has created new markets through technology transfer and commercialization, provided capital seeds as a form of investment, helped accelerate the investment and technology-readiness levels, and established meaningful and relevant partnerships.

2023: reaching new heights

DOST-TAPI aims to internationalize intellectual property (IP) applications, fund spin-offs and startups to help them enter the international markets, and launch a virtual exhibit platform.

"With the internationalization of IP applications, we plan to support IP portfolio management with a hundred percent realtime updates published on our in-house IP management system," said Dir. Decena.

2024: institutionalizing the march-in of technologies

In preparation of the march-in of technologies, DOST-TAPI backs support and foundation to upgrade the technologyreadiness level of IP-based technologies.

"We shall provide financial and technical support to DOST generated and funded technologies in the preliminary stages of commercialization to reach foreign markets or economies," emphasized Dir. Decena.

She also added that the Institute looks forward to conducting introductory offers of technology including technology-market matching and market-needs assessment with the use of a web net.

2025: playing an essential role in the innovation system

The established due diligence machinery supports the commercialization of DOST-developed technologies at the international level by providing both defensive and offensive protection of IP assets in a foreign jurisdiction.

"We plan to provide commercialization assistance to DOST-generated technologies for those entities or institutions without technology transfer and business development office," said Dir. Decena.

The assessment of business modeling, certification, and eventually international licensing of the commercialized DOSTgenerated technologies is also part of the strategic plan.

2026: linking Filipino technologies into the world

This year inks the creation of more international IP-based strategies, conduct of business summits for beneficiaries and investors in local and international markets, and expansion of the Institute's platform for technology and product offerings.

continued on page 7



DOST-TAPI reveals new programs on invention development, commercialization, and marketing

By Jund Rian A. Doringo, DOST-TAPI

he Technology Application and Promotion Institute of the Department of Science and Technology (DOST-TAPI) launched programs of assistance to innovators during the launching of the DOST-TAPI Roadmap and Stakeholders' Recognition on 13 May 2022 at the Novotel Manila Araneta City in Quezon City.

For three and a half decades, DOST-TAPI has accomplished milestones year after year in promoting technology transfer and commercialization, as well as administering invention-related development through the provision of the Invention Development Assistance Fund.

Dubbed as the marketing arm of the DOST, the Institute has gained momentum in fulfilling the mandates that contributed to the social and economic development of the country.

"With our existing programs that cater to intellectual property rights

protection, venture financing, prototype development, market and pilot testing, special loaning facilities, and technology expositions, among others, we are adding comprehensive programs in our roster to service and reach out to more stakeholders nationwide," said DOST-TAPI Director, Atty. Marion Ivy D. Decena.

Honing Innovations, Research, Agreements, and Negotiations of Government-Funded Technologies 2.0 or HIRANG 2.0

HIRANG 2.0 is an improved internship program that arose from the previously completed Support to the Commercialization of 500 DOST-generated Technologies and Strengthening the Country's Intellectual Property (IP) and Technology Portfolios in 2020.

The previous HIRANG focused on technology transfer officers to improve their knowledge and skills on IP valuation, technology pitching, negotiation, and licensing.

This time, HIRANG 2.0 shifts the focus to training startups and spin-off companies through consultancies and capacitybuilding activities as most local micro, small, and medium entrepreneurs (MSME) are not ready to upscale for investment.

"We identified this lack of investmentreadiness hampers their potential for optimum growth," said DOST-TAPI Chief Science Research Specialist, Romeo M. Javate.

Local MSMEs have great potential to expand only if appropriate assistance is provided to them.

"A higher investment-readiness level builds confidence and trust among investors hence, a higher investment level attracts investors to share their resources to MSMEs," said DOST-TAPI Supervising Science Research Specialist, Pierre Sonia S. de la Corte.

Technology Optimization for Utilization and Market Preparation or TOP UP

TOP UP was created to guide inventors and innovators in turning their ideas into market-ready inventions, particularly for commercial prototyping, IP protection, testing and validation, and pilot production.

"The program provides financial and technical assistance to create a holistic approach that harmonizes the nitty-gritty processes of innovation and invention," said DOST-TAPI Senior Science Research Specialist, Roberto R. Verzosa.

The Program hopes to encourage the development of new technologies and to support the development of commercial prototypes for technology validation.

Marketing Assistance Program or MAP

Aims to provide a more focused approach in the formulation, development, and implementation of marketing strategies of assisted DOST-TAPI technologies, MAP is a detailed and oriented program designed to address the specific needs of the stakeholders. "The program is designed with prescribed policies and implementing rules to achieve key objectives," said DOST-TAPI Senior Science Research Specialist, Florisa Mae A. Ilagan.

Moreover, MAP targets to identify locally-developed technologies that need marketing assistance for them to have custom-fit marketing plans and strategies, and in turn publish market intelligence reports as a reference for other beneficiaries.

Self-sustaining institute

These programs solidify DOST-TAPI's position to become a self-sustaining institute that provides unique and responsive solutions to societal problems with science and technology at the very core of each response.

The previously added programs support the Institute's roadmap as DOST-TAPI eyes to become an investment partner for every local enterprise to start penetrating the international market from 2023 and beyond.

For more information, please contact 8837 2071 local 2151 or email info@tapi. dost.gov.ph.



Stakeholders and beneficiaries from the private sector, industry, government offices, and academe attended the activity.

DOST-TAPI (from page 5)

2027: increasing foreign partnership

Aided by enough and solid funding, DOST-TAPI establishes regional and foreign hubs.

"We will bring more DOST technologies to the foreign market that will be backed by our intensive marketing and promotional campaigns, and other related activities to attract possible foreign investors," said Dir. Decena.

She added that direct foreign investment will create immense opportunities, such as higher economic growth, increased employment rate, and improved technology transfer.

2028-2032: dominating global expansion activities

The subsequent five years will witness DOST-TAPI's limelight in acquiring international recognition derived from unwavering efforts over the past years.

"We envision ourselves to finally become a venture capitalist, a business stakeholder, and a partner Institute in the transfer and commercialization of Filipino governmentowned technologies," stressed Dir. Decena.

She mentioned that these are the steps to continuously and relentlessly provide unique, innovative, and practical solutions as an investment partner for the Filipinos, by the Filipinos.

"As we continue to make change happen to make science for the people, we advocate the way towards PROGRESS: Protect the IPs, Resolve the issues, Oversee the innovation system, Grow with our stakeholders, Reinvent our programs, Enter the markets, and Savor the Success," concluded Dir. Decena.

For more information, please contact 8837 2071 local 2151 or email info@tapi.dost.gov. ph.

F NATIONAL DEFENSE

BURST SHOT A

Ma

In an informational video, the first sea trial for the BUHAWI project was held on o4 April 2022, within the vicinity of Corregidor Island that proved the project's functionality, reliability, and doability. (Screenshot from the live stream of the Philippine Navy) DOST Secretary Fortunato T. de la Peña leads the ceremonial hand-over of a miniature replica of the BUHAWI to DND Secretary Delfin N. Lorenzana during the 124th founding anniversary of the Philippine Navy. (Photo by Henry A. de Leon, DOST-STII)

PH Navy receives fully automated remote weapon station from DOST

By Allan Mauro V. Marfal, DOST-ST//

research and development (R&D) output that would strengthen the firepower capabilities of our navy's small patrol craft in defending the country's littoral water territories was turned over to the Philippine Navy, an attached branch of the Department of National Defense (DND), on 20 May 2022.

During its 124th anniversary celebration, the Philippine Navy received the miniature version of the Building a Universal Mount for Heavy-Barrel Automated Weapon Integration or BUHAWI from the Department of Science and Technology (DOST). Developed by the scientists and researchers from the DOST-Metals Industry Research and Development Center (MIRDC), BUHAWI is an automated gun mount for heavy barrel Browning 0.50 caliber machine guns. The project is a product of the design and fabrication of the gun mount, as well as the design and development of the control system and integration of the mechanical and control systems of the gun mount.

DND Secretary Delfin N. Lorenzana emphasized in his remarks that BUHAWI would provide significant support to their Self-Reliant Defense Posture Program (SRDP) which aims to be selfsufficient in basic military requirements by manufacturing our own weapons, small arms and ammunition, tactical communications equipment, basic land vehicles and small sea crafts, among others.

He said that project BUHAWI would also give a significant boost to the SRDP which is the key towards having a truly patriotic and independent defense sector, through self-manufacturing of original and indigenous defense material. lar

DOST readies CAMANAVA for typhoons with garbage collecting technology

By Joy M. Lazcano, DOST-STII



City Administrator Voltaire De la Cruz (center) receives the 3D-printed model of the Automatic Trash Rake that was turned over to the City of Malabon. Also in the photo are DENR Acting Secretary Jim O. Sampulna (left) and DOST-MIRDC Deputy Executive Director for Research and Development Agustin M. Fudolig. (Photo by Henry A. De Leon, S&T Media Service, DOST-STII)

s illustrated in the children's storybook "The Ant and the Grasshopper," planning and working for the rainy days may always be the right approach, especially when it comes to the government's solid-waste management and flood control efforts.

Perennial floods caused by clogged drainage and sewerage lines have been the bane of every Metro Manila resident's existence as the problem seems to worsen every year in the absence of an integrated program to curb the urban waste problem.

Laying down one of the solutions on the table, the Department of Science and Technology (DOST) joins the Department of Environment and Natural Resources (DENR) in finding solutions to a national battle against garbage and floods as it recently turned over the ATR or Automatic Trash Rake technology to the City of Malabon, an initiative that will complement the city's solid waste management program to rid its constituents of floods and garbage.

The project was conceived in 2018 after several consultations with various local government units (LGUs) in the CAMANAVA area—comprising Caloocan, Malabon, Navotas, and Valenzuela. Historically, the area has been frequently inundated by heavy rains coupled with the rise in sea level and overflow of rivers and dams thus leaving low-lying and flat terrain areas submerged in water.

The Malabon-Navotas-Tullahan-Tinajeros, a major river system that connects to the Letre creek where Malabon ends up swamped with tons of garbage annually.

In Malabon alone, about seven to eight tons of residual waste are collected every month, a number that has been improved lately as the city turned to an effective waste segregation and recycling program. The said initiative is implemented in collaboration with a non-government organization to entice residents in helping the government manage its solid waste.

In previous years, about 0.56 kg per capita of the 400,000 Malabon residents contributed to its garbage woes.

During the ceremony, DOST Secretary's de la Peña admonished LGUs and other stakeholders to lay down the framework for using waste to convert it into energy. He expounded that the technology is already there saying, "We lack the policy on how we can implement this."

The ATR is installed at the Letre Creek in P. Aquino Ave. and is strategically positioned to collect about 43.5 cu/m of garbage in a month and 5 cu/m in an

continued on page 10

PH navy...

Meanwhile, DOST Secretary Fortunato T. de la Peña shared that project BUHAWI is aligned with one of the major priorities of the National Harmonized Research and Development Agenda which is R&D in Human Security.

He added that the project to strengthen the country's naval force is vital after the DOST conducted a foresight study through their National Academy of Science and Technology called Pagtanaw 2050, where the Philippines is considered a marine and archipelagic nation.

"With this, we will see the crucial roles of the Philippine Navy and private sectors concerned with our marine and seas as all of them will support the drive to make the Philippines a truly developed strong marine archipelagic nation," said Sec. de la Peña.

The science chief also stressed that the success of developing the BUHAWI project would not only give additional savings to our country but also enhance the potential of generating more jobs when the country will be able to commercialize and eventually export defense products.

"This is one of the project's we have worked on, and I am very glad hearing the positive feedback from the Philippine Navy," said Sec. de la Peña.

On another note, he encouraged all the staff of DND and the Philippine Navy to avail of the various DOST scholarship

programs especially related to space engineering.

Government collaboration for defense

Project BUHAWI is a collaborative project between the DOST through the MIRDC, the DND through the Philippine Navy, and the Mechatronics and Robotics Society of the Philippines.

The DOST and the DND sealed their partnership through a memorandum of agreement on 05 January 2018, to achieve a Self-Reliant Defense Posture which includes the development of BUHAWI.

As the implementing agency, the DOST-MIRDC with funding support from the DOST–Philippine Council for Industry, Energy and Emerging Technology Research and Development spearheaded the first phase of the project in 2019 that included the design and development of the BUHAWI's mechanical element system. The second phase was then funded by the Philippines Navy thus enabling the creation of the control system designs—including the peripherals, motors, military great cameras, and other requirements.

To prove the project's functionality, reliability, and doability, a series of landbased live test fires were conducted with Naval Sea System Command together with the Naval Research and Development Center. After the success of the land-based test, BUHAWI was then installed on one of the Navy's patrol crafts—BRP Heracleo Alano or PC 376.

According to Lieutenant Commander Jimmy P. Leanan Jr., Executive Officer of PC 376, shared that for the past two months, they conducted a series of sea trials for the BUHAWI weapon system and tested it in both day and night operations, as well as in various sea states up to Sea State 3. Sea state 3 means that the wave is around one meter high, and the wind condition is around 10 miles per hour.

"There are challenges encountered in sea trials but nevertheless the BUHAWI system is tested successfully. Surprisingly, the BUHAWI weapon system is better in terms of accuracy compared to the other or similar weapon system we acquired through our modernization, and I would say that the BUHAWI weapon system can be at par once it reaches mature state. It would become one of the fixtures of every naval ship in the future," said LCDR Leanan.

Lastly, Secretary de la Peña revealed during the program that after BUHAWI, next in the pipeline is the development of the digital twin for the monitoring of our country's naval ships for better extension of the ships' service life. He also shared that the DOST is now working with the Philippine Army on the project called COBRA or Controller Operated Battle-Ready Armament. It will also utilize mechatronics, robotics, and automation technologies in its implementation. (with information from the DOST-MIRDC)

DOST readies...

eight-hour operation. Initial runs posted 1.45 cu/m of trash were collected in a two-hour operation. The city personnel is now gearing up for the onslaught of heavy rains brought about by monsoon season as garbage from the nearby cities will swarm the river system leading to minor tributaries.

The DOST-developed technology will help the city in its solid waste management

program, particularly its collection of floating garbage from the Letre Creek to stop it from reaching its neighboring LGUs. This, in turn, hopes to augment the flood control efforts as it will minimize garbage and floodwater spillovers from entering the rest of Metro Manila.

The ATR was developed by the DOST-Metals Industry Research and Development Center (MIRDC). It runs on a 10-hp diesel engine with six sets of rakes with a total width of six meters. Similar technology was installed at the Balingasa Creek in G. Araneta Ave., Quezon City in 2014.

To fully address the waste disposal and collection problem in other areas, there are now plans for more ATR installations in the coming years as DENR is already wrapping up the details for two more locations in Metro Manila.

DOST, Hungary bring quantum computing to the bilateral table to benefit Virology Institute, agriculture, ICT

By Joy M. Lazcano, DOST-STII,



DOST Secretary Fortunato T. de la Peña and Hungarian Ambassador Titanilla Tóth sign the MOU that will promote and develop scientific and technological cooperation between the two nations. (Photo by Henry A. De Leon, S&T Media Service, DOST-STII)

teering the country's Research, Development, and Innovation (RDI) roadmap, the Department of Science and Technology (DOST) sealed a bilateral agreement that will "promote and develop scientific and technological cooperation" between the Philippines and Hungary.

Not known to many, Hungary has a very strong strategic research, development and innovation (RDI) program under its National Research, Development, and Innovation Office—the country's premier funding and RDI policy adviser to the government. It also has a developed science and technology sector, as well as an efficient RDI system that includes a reliable network of universities and industry players.

In fact, Hungary is home to 12 Nobel Prize winners—including Albert Szent-Györgyi who discovered ascorbic acid, a substance that prevents scurvy. It is also the birthplace of Erno Rubik, the inventor of the world's best-selling toy puzzle.

Leading the signing of the MOU last 8 April 2022 at the Embassy of Hungary at the Bonifacio Global City in Taguig are DOST Secretary Fortunato T. de la Peña and Hungarian Ambassador Titanilla Tóth.

The mutual cooperation will center on joint research and development (R&D)

initiatives on various technologies, foreign missions and exchange visits for scientists, researchers, and experts; capacity building activities including scholarships, fellowships, and training programs; RDI policies and strategies and programs; and promotion of collaboration between other relevant scientific institutions and organizations from the Philippines and Hungary.

The two parties will explore mutual cooperation in the fields, which include but are not limited to—sustainable agriculture (including aquaculture), infocommunication technology (includes spectrum monitoring and earth observation) and quantum technology.

continued on next page

DOST, HUNGARY (from page 28)



DOST Secretary de la Peña and Hungarian Ambassador Tóth during a brief discussion on the areas for collaboration under the mutual cooperation agreement between the two countries. (Photo by Henry A. de Leon, S&T Media Service, DOST-STII)

Also present during the MOU signing were DOST Assistant Secretary for International Cooperation Dr. Leah J. Buendia, DOST-Advanced Science and Technology Institute's Dr. Franz A. de Leon, and embassy diplomats Dávid Ambrus and trade attaché Gábor Lehőcz.

According to Sec. de la Peña, the collaboration is by far the shortest that has been forged since talks began in March last year.

Ambassador Tóth, on her part, agreed and explained that since last year, there have been numerous discussions already on disaster risk reduction and management through the use of space technology, webinars on aquaculture, field study at the Philippine Rice Research Institute, demo farms in Barangay Don Bosco in Parañaque City, and coffee farming in Mindanao region, among others.

Quantum computing

Also, Ambassador Tóth mentioned several collaborations in the areas of dairy production through the local Philippine carabaos, and water management using advanced water technology, mineral mining, and renewable energy. In the field of ICT, Tóth also shared that Hungary has companies and resource centers that are engaged in smart urban forestry and farm developments in the cities to help nurture the environment.

It was mentioned that the Philippines is interested in collaborating in the field of quantum computing.

DOST-ASTI's Dr. de Leon shared that the country would benefit from this very young technology as Hungary is already ahead in this field. He added that quantum computing would complement the Virology Institute of the Philippines in terms of drug development as it would need quantum computing to speed up the development of new drugs and vaccines.

Quantum computing is based on the principles of the superposition of matter and quantum entanglement and uses a different computation method from the traditional computing. In theory, quantum computing can process big data and come up with possible combinations and algorithms simultaneously, at an extremely faster way.

In classical computing, it follows a linear calculation that takes place one after the other. Similarly, a classical computer

for example, would process 500 basic problems one at a

time unlike in quantum computing where these 500 problems are processed simultaneously.

This new development in computing would benefit the following areas such as optimization of real-time logistics and transport processes—medicine and vaccine development new materials simulation and development—weather forecasting; and artificial intelligence and machine learning.

Currently, the country has limited capacities in quantum computing and its subsequent hardware due to the prohibitive cost. In this respect, quantum computers are only limited to a few R&D specialized institutions performing complex R&D activities.

"This is the first time that we, at DOST, are discussing quantum computing in a bilateral agreement," declared Sec. de la Peña.

The DOST through its International Technology Cooperation Office promotes partnerships with several nations across the globe in the hope of finding opportunities to leverage its R&D strategies and initiatives through collaborations and strategic partnerships.



The Davao Ground Receiving Station or D-GRS serves a as multi-mission ground control station for receiving, processing and distributing multisensor images and telemetry data from various earth observation satellites. It provides additional capacity and redundancy to the functions of the PEDRO Center housed at the DOST-ASTI office in Quezon City. (Text and photo by Allan Mauro V. Marfal, DOST-STII)

DOST, PhilSA working together towards efficient and sustainable space programs in the country

By Allan Mauro V. Marfal, DOST-STII and Neyzielle Ronnicque Cadiz, DOST-ASTI

he Department of Science and Technology (DOST), through the Advanced Science and Technology Institute (ASTI), and the Philippine Space Agency (PhilSA) entered into an agreement that would further help the advancement and sustainability of various space related efforts in the country.

A signing of the memorandum of agreement (MOA) was held on 25 April 2022 for the transition of so called "space science and technology assets" (SSTA) from the DOST to PhilSA. This collaborative effort will center on facilitating the smooth operation of the Philippine Earth Data Resource and Observation (PEDRO) Center, Remote Sensing and Data Science Help Desk (DATOS), the SARwAIS Project, and the GRASPED Project. All of them are currently being maintained or implemented by DOST-ASTI.

PhilSA was created in 2019 after President Rodrigo R. Duterte signed the the Republic Act No. 11363 mandating them to serve as the central government agency for all space activities and S&T applications in the country.

"Today, we leave all these infrastructures, all these capabilities in the hands of the Philippine Space Agency, confident that they will further cultivate

DOST PHILSA

it as we have intended," said DOST Secretary Fortunato T. de la Peña.

However, he assured to expect the DOST to continue working with PhiISA and other government agencies as the science department will provide much needed support to various space activities and through cooperative use of our existing science infrastructures such as our highperformance computing facility and our national research and education network.

Meanwhile, DOST-ASTI Director Franz A. de Leon shared that PhilSA did not build from scratch as they have been promoting and implementing numerous space related researches before it came into fruition.

"DOST will always be working handin-hand with Philippine Space Agency by providing relevant science and technology innovation in space R&D," said Dir. de Leon.

PhilSA Director General Dr. Joel Joseph S. Marciano Jr. said, that even though they are tasked to address all the concerns to space science, technology, and applications, they were not able to fulfill their mandate without building and strengthening the local space ecosystem and the DOST and its attached agencies are vital parts of that ecosystem.

"With these projects and outputs being turned over to us, PHiISA and DOST will continue working hand in hand towards inclusive development through science, technology, and innovation. This signing is an important step towards the fulfillment of our vision of a nation rich, uplifted, and empowered through space," said Dir.Gen Marciano.

Our place in space

Starting in 2014, the DOST through ASTI has been laying the groundwork for the country's SSTAs. The DOST had been the home for the country's SSTAs when the proposal for Diwata-1 came about. The Department funded the PHL Microsat Program, which developed the Diwata-1 and Diwata-2 microsatellites, as well as Maya-1.

Aside from microsatellites, the DOST has also deployed several nanosatellites in space. In cooperation with the Kyushu Institute of Technology under the BIRDS project, the agency has launched Maya-1, 2, 3 and 4 over the years.

Inevitably, the satellites in space require a means to communicate with them. The same year that Diwata-1 was launched, the DOST established the PEDRO Center. In 2019, the GRASPED project was operationalized to undertake systematic operations of the Diwata microsatellites as well as the subsequent processing, archiving, and distribution of data products.

These facilities are equipped with earth observation satellite tracking antennas that send and receive data from the satellites. As of today, we have two functioning ground receiving stations in Manila and Davao City—strategically placed to complement each other's functions, and ensure that there is reliability and redundancy in operations.

Meanwhile, the DOST has funded the DATOS in 2017 and SARwAIS in 2018 to maximize the provision and availability of free commercial satellite datasets from the PEDRO Center. Both of them make use of the DOST-ASTI's science infrastructures to come up with on-demand simulation modeling and

> analysis using RS/GIS tools. In additional to that, part of the project objectives is to coordinate and collaborate with mandated agencies in validating the accuracy and acceptability of DATOS and SARwAIS outputs for sharing with agencies and LGUs for disaster management policy and decision-making support.



DOST Secretary Fortunato T. de la Peña and PhilSA Director General Dr. Joel Joseph S. Marciano Jr led the signing of the MOA between both agencies for the transition of the "Space Science and Technology Assets" from DOST-ASTI to PhilSA. (Photo from DOST-ASTI)

Waste-to-energy in the Philippines: is it only a matter of time?

By Allyster A. Endozo, DOST-ST//

"Smokey mountain." From 2010 until 2020, waste generation in the Philippines had been projected to soar from about 13.5 M tons to over 18 M tons (image from stevepetch.blog)

arth: 29th century. On land, under water, even in space the world is completely replete with trash. Towers of scraps overshadow the city buildings. Sludge contaminates the water, or what's left of it, in oceans and seas. Smog fills the air with its noxious stench. This was the grim future portrayed in WALL-E, an animated children's film released in 2008 by Disney Pixar. None was to be blamed—with its insatiable consumerism driven by unmitigated capitalism—other than humanity itself.

We as the dominant species should know better. By 2050, our population across the planet would have reached a staggering 9.9 B—more than a 25% rise compared to 7.8 B in 2020. Such a rate could even be surpassed in the Philippines, whose populace is projected to swell by almost 30% from about 109.5 M in 2020 to 142 M by 2045. Metro Manila will become more crowded than ever as it hosts 14.5 M Filipinos by then. Think of Luneta being swarmed by over 10,000 visitors at once.

Yet with more consumers means more resources needed and waste generated, the latter of which may have already built up nationwide from nearly 13.48 M tons in 2010 to 18.05 M tons by 2020. Metro Manila, whose general share was projected to climb from 22.2% with 8,636 tons a day to 26.7%, may find itself churning out over 70 M tons of garbage in the next 30 years. Around 9,212 tons have already ended up in creeks and canals that empty into Manila Bay during rainy seasons.

Although households accounted for 56.7% of the total volume produced, commercial, institutional, and manufacturing establishments cannot escape guilt as they made up the rest of the quantity. Recyclable, residual, and special wastes comprised the nonbiodegradables, which represented 47.69% overall. Plastic and paper products composed about 70% of the amount, as the remaining 30% originated from common industrial materials like metals, glass, textile, leather, and rubber.

Up to 60% of the uncollected rubbish is burned or deposited in the few remaining open dumpsites near urban areas. People who live along or within these sites are especially vulnerable to chemical poisoning and infectious diseases like cholera, hepatitis, and typhoid amid pollution of ground and surface water. Carbon dioxide and methane emitted from decaying matter can contribute to global warming. Poorly disposed trash can clog waterways during floods that can damage infrastructure.

Despite all these risks, the volume of plastic wastes imported into our soil increased by 150% to nearly 11,800 tons in 2018. Over 2,400 tons of garbage loaded in 103 shipping containers arrived from Canada alone between 2013–2014.

ENVIRONMENT

The "Canadian souvenir"—which was falsely declared as "recyclables" consisted of electronic waste, household trash, and used adult diapers. Worse yet, a study revealed that 64% of these materials cannot even be reused, recycled, or composted. Looking further back, this dirty predicament of ours was much more arduous—deadlier even—in the decades past. In fact, at the turn of the millennium, the collapse of an enormous garbage pile at the Payatas dump in Quezon City left close to 100 squatters

in the area homeless, 300 missing, and at least 218 killed. It was this tragic incident that prompted the passing of the Ecological Solid Waste Management Act of 2000, which mandated the closure of dumpsites across the country.

Seemingly dissatisfied by ineffective outcomes that followed, lawmakers are now bent on passing House Bill No. 7829 or the proposed Waste Treatment Technology Act. Once the bill is enacted, incineration plus other toxin- and emission-free technologies can hence be utilized to convert solid wastes into fuel or electricity. "Waste-to-energy" facilities could then complement sanitary landfills—which are available to only 30% of our population amid creeping overcapacity and immense lifetime costs.

The soft launch of a 25-kW waste-to-energy facility—funded by the Philippine Council for Industry, Energy, and Emerging Technology Research and Development under the Department of Science and Technology—at the University of the Philippines Los Baños (images from mb.com.ph).

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ENVIRONMENT

First of all, what exactly is waste-toenergy and how will this technology help address our country's stubborn garbage problem? Here to speak about the issue is Mrs. Grace P. Sapuay, the President of the Solid Waste Management Association of the Philippines. Being an environmental advocate, she established KaliKaSan or Kalipunan ng mga Kabataan para sa Kalikasan as an organization that seeks to raise the awareness of Filipino children and youth on various environmental issues.

• Kindly explain how waste-to-energy works throughout the supply chain from production until distribution.

Waste-to-energy plants burn municipal solid waste, often called garbage or trash, to produce steam in a boiler that is used to generate electricity.

Municipal solid waste is a mixture of energy-rich materials such as paper, plastics, yard waste, and products made from wood. For every 100 pounds of municipal solid waste in the United States, about 85 pounds can be burned as fuel to generate electricity. Wasteto-energy plants reduce 2,000 pounds of garbage to ash weighing about 300–600 pounds, and they reduce the volume of waste by about 87%.

We recycle paper but only a few times. Otherwise, it will not be a good product. But plastic can be recycled many times. Although plastic is highly recyclable, the authorities must look into the process of plastic recycling because I have seen recyclers who do not take care of their employees well. No masks or whatever are needed by employees.

How does waste-to-energy compare with fossil fuels in terms of economic and emission performance?

There are technologies with environmental caps so that—unlike fossil fuels, for example—they contain high emissions. Singapore uses incineration technology, but not much emissions were seen. In terms of economy, of course, fossil fuels are cheaper, but what



Grace P. Sapuay, EnP—the President of the Solid Waste Management Association of the Philippines.

can we do if the people are adopting the "throw-away approach?" We have to have waste-to-energy technology in the Philippines.

What key factor has impeded the adoption of waste-to-energy in the Philippines, unlike in other countries?

There are those who oppose waste-toenergy. But they are building incineration waste-to-energy in Apalit, Pampanga. It is a French technology. Those who oppose waste-to-energy technology don't know much about this technology.

In contrast, what key factor has eventually promoted investments in the local waste-to-energy sector?

It seems that waste-to-energy is a more viable approach rather than landfilling; as with this approach, we not only produce energy but save our groundwater from toxicities. There is a study that says that we are imbibing microplastics from groundwater, but it is also very expensive.

 Around how many or in which parts of the country should there be the first viable facilities operating?
The National Economic and Development Authority conducted a study on waste-to-energy for Metro Manila, but I am not privy to the results. I think it would be better if waste-toenergy will be built in Metro Manila, because Metro Manila disposes of 12,000 tons of garbage daily and maybe now—it is more than that figure.

Can you comment on the significance of House Bill No. 7829 or the proposed Waste Treatment Technology Act?

House Bill No. 7829 should be made into law. It is the answer to our increasing garbage problem. Those who oppose waste-to-energy are only looking up but not looking down on the effects of landfills on our groundwater. This is precisely the reason why the United States closed down its landfills.

Waste-to-energy: could it be the key to solving our mounting waste problem amid the COVID-19 pandemic?

Yes, it is. Regarding waste-to-energy, it is better during the pandemic that medical waste must go through WTE rather than dispose of it through a landfill. Although in hospitals, they should autoclave it before disposing it to a landfill, but how many hospitals have autoclave? We can't tell for sure. In Cebu, for example, the contractor dumped hospital waste into the sea rather than the landfill.

Industrial waste can be used for waste-to-energy, but some of them are recyclable. Electronic waste is also recyclable; for example, the plastic containment of electronic waste is highly recyclable. Also, some of its parts are recyclable. Again, it would be best for medical waste to go through WTE, because not all hospitals have autoclaves.

Many S&T graduates land in non-S&T jobs

By Geraldine Bulaon-Ducusin, DOST-STII

ut of over 10 million bachelor's degree holders among the Filipino household members, 3.7 million or 37% are graduates of science and technology (S&T)-related degrees—and of these 44.6% are females.

This is based on the Women in Science study of the Department of Science and Technology-Science Education Institute (DOST-SEI) which used 1990-2015 data collected by the Philippine Statistics Authority (PSA).

Data further shows that about 76% of S&T graduates landed in non-S&T jobs, or those that are not related to their field of study. Only 24% of those with S&T bachelor's degrees are engaged in S&T occupations, or activities.

Among the 3.7 million S&T bachelor's degree holders, some worked overseas, but with more of them landing in non-S&T occupation, than in S&T occupation.

"While it is possible that some of the S&T graduates who are not absorbed locally work overseas, the data from the PSA, however, is not sufficient to support this claim," Randolf Sasota, a Science Research Specialist from DOST-SEI, said.

Sasota added that this result on S&T degree holders vis-à-vis occupation among Filipino overseas workers still needs verification through a qualitative survey where the S&T graduates are asked about the reason why they have chosen to work abroad.

The data at hand can only tell that there is a significantly low number of overseas Filipino workers who are S&T bachelor's degree graduate. It cannot specify the reason over why they work abroad; on whether or not it is solely because of the lack of opportunity to be absorbed locally or due to some other reasons. And while it's true that the number of female S&T workers increased by 52.3% and 30.3%, for years 1990–2000 and 2000–2010 respectively, and a strong growth was observed in 2015 with the 25.3% increase in the 2010 to 2015 period alone, most of these women-dominated occupations are nursing and midwifery at 74.4% and health at 66.2%.

In all the census years, the top three occupations with the highest proportion of female S&T workers are Nursing and Midwifery, Health-related professions, and Engineering and related professions.

The fields of Mathematics, Statistics, as well as Architecture and related professions posted the lowest proportions of female in the S&T field.

The Women in Science publication aims to provide information about gender disparity in the field of Science and Technology to guide policymakers, for them to have an informed decision. One striking result of the research is the disproportion among the identified S&T Core Classification. Majority of the S&T workers are clustered in only the top three occupations: Nursing and midwifery professionals, Engineering and related professionals, and Health professionals.

One possible solution to this is to increase the scholarship slots for the lower number of S&T occupations such as physicists, chemists, and related professionals and mathematicians, statisticians, and related professionals. But this, of course, would have to pass through some deliberations.



Credit: Image provided by DOST-SEI





Junior high students train on science news writing and reporting with gender lens

By Allan Mauro V. Marfal, DOST-ST//

here are 150 junior high school students from the 21 member-schools of the Association of Science and Mathematics Educators of Philippine Private Schools (ASMEPPS) who learned something new about writing and producing broadcast reports on science topics with gender-sensitive content.

On 22-23 April 2022, the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) spearheaded a two-day webinar session titled Enhancing Science Communication Skills with Gender Lens.

This e-learning session aims to help the student-participants acquire better appreciation on the significant contributions of science in our daily lives and eventually inspire and help them to craft compelling science articles and broadcast content suitable for print, online, radio, and television. Empowering the studentparticipants at a young age with basic knowledge in creating gender-fair and empowering content was also the goal of this webinar.

In his message, Director Richard P. Burgos said that DOST-STII, together with ASMEPPS, is working together to let our students learn and realize how science and technology can improve our lives and eventually inspire them to become science communicators or science journalists in the future.

"I am confident that these learning sessions will provide you with the skills you would need to produce compelling science stories, and I would not be surprised if many will become science communication advocates and champions of gender and development in the coming years," said Director Burgos.

The first day of the webinar focused on lectures on science news and feature

writing as well as on broadcast reporting for TV and radio. Ruby Shaira Panela, a seasoned science journalist, shared numerous tips on how to find better story angles on science related topics and translate them into interesting and impactful articles. Meanwhile, Kristine B. Sabillo, a former multimedia reporter from ABS-CBN, delivered a lecture on how to produce bitesized science reports for TV and radio.

Among the tips shared by Sabillo was about understanding the basic concept of the inverted pyramid, both in news writing and scripts for broadcast reports. She explained that with that you can easily identify the main characters and elements of your story out of the data provided to you.

In her lecture, Sabillo admitted that she understands the complexity of writing and reporting science related stories. One of her suggestions was to break down and simplify the definitions of complicated science topics by using case studies to introduce the problem or a concept. Also, she stressed the importance of

continued next page



Kristine Sabillo, former multimedia reporter, shares several tips with the student-participants on producing bite-sized science reports for TV and radio.



Dr. Mary Barby P. Badayos-Jover delivers lectures on basic GAD concepts and principles as well as on gender-fair communication on the second day of this e-learning session.

Junior high (from page 28)



Student-participants from the member schools of the ASMEPPS get the opportunities to grab basic knowledge on science news and feature writing, broadcast reporting, and gender-fair communication during the two-day webinar organized by the DOST-STII.

getting an interviewee that knows how to communicate well with the public, particularly in identifying the data one could include in the stories.

Lastly, Sabillo emphasized to the participants to choose the most important and significant information only since broadcast reports are more often limited to just one to two-minute-long reports.

"Just go back to the principle of 5Ws and 1H as well. You can answer these questions in your mind. Why is this important to my audience? What information can be useful for them? Then read your draft to another person and remove the parts that might sound confusing to them," she explained.

On the other hand, seasoned science journalist Panela emphasized that in writing science, either news or feature, one's goal as a journalist is to help people understand science; one only has to simplify it but not dumb it down.

She also said that a good science journalist should always try to strike a balance between what the audience needs to know, want to know, and what they already know.

"The good thing about writing about science is that we have the "edge", which can be described as our ability to understand the audience because we are members of it too," Panela said. Lastly, she reminded the studentparticipants that science does not happen in a vacuum; so that it is important to give proper context. So, when we communicate science, look at its implication to our country and impact on the people as Panela advised.

Crafting gender-sensitive and gender-fair science content

The student-participants also learned the basic principles of gender and development (GAD) through the use of non-sexist language, avoiding gender stereotyping, and balanced representation in numerous content materials.

Dr. Mary Barby P. Badayos-Jover, an associate professor from the University of the Philippines-Visayas and part of the National GAD Resource Pool of the Philippine Commission on Women, shared numerous insights on gender-fair and nonsexist communication.

In her lecture, Dr. Badayos-Jover pointed out that gender sensitivity is not a war of sexes nor is it an anti-male stance, and that the goal of gender sensitivity is not to discriminate against men but to empower women in the hope of achieving gender equality.

She underscored the fact that there are gender concerns in the media. She added

that while the media did not invent gender bias, it has a key role in perpetuating it. She emphasized that fair gender portrayals in media should be a professional and ethical aspiration along with accuracy, fairness, and honesty.

"Stereotypes are prevalent in everyday media. Women are often portrayed as homemakers and homecarers of the family. And men are also subjected to gender stereotyping," said Dr. Badayos-Jover.

She explained that there is a need to internalize the use of gender-fair language because women are often othered in the English language as neutralization and feminization are the principal strategies to make language gender-fair.

Lastly, Dr. Badayos-Jover said that the key principles for inclusive language is to recognize and challenge stereotypes, avoid omission and making others invisible and avoid trivialization, and subordination. And to start your gender-sensitive journey, she said that we should be aware and favor a gender-sensitive language.

"In order to be a gender-responsive communicator, we have to use our gender lens and write content that empowers your readers," concluded Dr. Badayos-Jover. (With reports from Carl Miguel Lusuegro, DOST-STII)

"Yes to STARBOOKS!", DepEd GenSan tells DOST-XII

Text and photos from DOST-XII



"Imagine teachers using their laptops, flashing STARBOOKS contents on the TV screen while delivering their lectures to the students. What a wonderful sight!"

epartment of Education (DepEd)-GenSan Schools Division Superintendent (SDS) Romelito G. Flores, CESO V expressed with glee his excitement about the nearing implementation of one of the Department of Science and Technology's programs called the Science and Technology Academic and Research Based Openly Operated Kiosks (STARBOOKS) to the division of General Santos.

DOST-XII Regional Director (RD) Engr. Sammy P. Malawan and SDS Flores signed a memorandum of understanding on 05 April 2022 at the Division Office, DepEd-Gensan, Tiongson St., Lagao, General Santos City—launching the fullblown deployment of the STARBOOKS program in the city.

RD Malawan highlighted that STARBOOKS is a one-of-a-kind technology introduced by DOST to the public. He elaborated on the features and contents of the kiosks and their impact on the daily undertakings of students. The DOST-XII also conveyed his warm thanks to SDS Flores for collaborating with DOST and for proactively aiming to bring science, technology, and innovation to the grassroots of their agency.

The MOU signing was facilitated by the Sarangani–General Santos Provincial Science and Technology Office led by Officer-in-Charge Provincial Director For. Nabil A. Hadji Yassin, together with his staff from the provincial office. Also in attendance during the event were Assistant SDS Dr. Carlos G. Susarno, CESE and top officials—Curriculum Implementation Division Chief Juliet F. Lastimosa, and Education Program Supervisors, Edilbert A. Reyes (science), Sally A. Palomo, (learning resources), Dr. Luzviminda R. Loreno (values education), and Senior Education Program Specialist-RMN Herven A. Allado.

Assistant SDS Dr. Susarno concluded the event by reaffirming their absolute acceptance of the STARBOOKS and assured RD Malawan that DepEd-GenSan will perform immediate actions to swiftly implement the program in the city for the upcoming limited faceto-face classes. Both he and the SDS immediately laid out initial plans and strategies for the way-forward enactment of the project.

DOST-XII and DepEd-GenSan are envisioning that this partnership will bring massive fruition to all schools of General Santos City.

PAGASA observes Typhoon and Flood Awareness Week, underscores relevance of Project #MAGHANDA in disaster preparedness

By Rowena N. Peter, Project #MAGHANDA

hith an average of 20 typhoons that hit the country every year, the Department of Science and Technology– Philippine Atmospheric, Geophysical, and Astronomical Services Administration (DOST-PAGASA) vigorously observes the Typhoon and Flood Awareness Week (TFAW) every third week of June to give emphasis on the importance of early warning systems and early action in strengthening disaster action and preparedness to ensure the safety of communities during calamities.

"Mahalaga na prepared tayo at alam natin kung ano yung magiging action kapag inilabas na ng PAGASA yung mga early warning systems (It is important to prepare and know what to do once PAGASA releases the early warning systems)," emphasized Dr. Esperanza O. Cayanan, DOST-PAGASA's Deputy Administrator for Research and Development. She also reminded the public to help clean the sewage systems to avoid the clogging of canals that cause floods during heavy rains and typhoons, underscoring the need for cooperation by all citizens.

This year's TFAW theme, "From Forecast to Action Towards a Typhoon and Flood Resilient Community", supports DOST-PAGASA's mandate in providing advanced information against hydrometeorological hazards and utilizing scientific knowledge as tools to ensure the safety, protection, well-being, and resiliency of the people and the whole nation.

This week's activity will conduct various learning sessions such as webinar on *"Maagang Aksyon at Akmang Gawin Ayon sa Panahon* for science teachers and school disaster reduction coordinators in Regions VI, VII, VIII, and NCR on 21 June; IEC (information, education, and communication (IEC) campaign for DRRMOs (disaster risk reduction and management officers) in Antipolo City, Rizal on 24 June; a flood drill in Sta. Ana, San Mateo, Rizal on 25 June; and media seminar-workshop for NCR and MIMAROPA on 8-10 July 2022.

To further help communities better understand the early warning messages on typhoons and floods being released by the frontline agencies, DOST-PAGASA and DOST-PHIVOLCS (Philippine Institute of Volcanology and Seismology), Project #MAGHANDA was launched on 16 March 2022 in partnership with DOST-STII (Science and Technology Information Institute), the Department of the Interior and Local Government, and the Local Government Academy to level up awareness and capabilities of the disaster risk reduction managers at the local level in understanding warning messages, as well as to enable them to translate those such information into better response action among its stakeholders particularly those from vulnerable communities.

Project #MAGHANDA stands for Meteorological And Geological Hazard Advisories, Warning and Notifications for Decisive Action and will be implemented in all 17 regions across the country, including the Bangsamoro Autonomous Region in Muslim Mindanao or BARMM.

"With improvements of monitoring tools and services from both agencies and the impact of climate change, there is a need to upgrade the understanding and knowledge of our local government partners and media as well as first responders," said Dr. Vicente B. Malano, DOST-PAGASA Administrator.

Malano also noted that because there is the possibility that the information was not

understood by the people, this initiative will address the need to re-educate the LGUs specifically local officials, disaster managers, and the media on the latest hazard information systems.

To achieve these, the Project #MAGHANDA will conduct trainings and workshops on meteorological and geological hazards via synchronous (Zoom) and asynchronous (LMS-CANVAS) sessions that target governors, mayors, PDRRMO, C/MDRRMO, C/MIO, MLGOO, first responders, and media of the 17 regions of the country. The training and workshop sessions will commence in July and will end on November 2022.

With the line-up of activities, the project will disseminate updated information materials (printed and digital copies) for both hydrometeorological and geological hazards like typhoon and flood, as well as earthquake and tsunami, to name a few. Another expected output is the updating of the broadcasters' manual that will help media practitioners in understanding the different hazards so they can relate accurate and timely information to the public. Moreover, the Project will produce recommendations and insights that can guide policy-makers in crafting guidelines and policies that are gendersensitive and inclusive for persons with disability to help better understand early warning messages and to have better response actions toward the goal of safer communities during calamities.

Lastly, Dr. Cayanan, in her closing message encouraged the participation of all individuals in this week's activities and to remain vigilant and well informed of the warning messages released by the disaster frontline agencies like DOST-PAGASA and DOST-PHIVOLCS to mitigate the negative effects of natural hazards.



The speakers at the opening ceremony of the 2022 APSTCDRR. (from L-R NRC President and APSTAG Member Ms. Antonia Loyzaga-Yulo, DOST Secretary Fortunato T. de la Peña, UNDRR-ROAP Chief and APSTAG Co-Chair Mr. Marco Toscano-Rivalta, Keio University Professor and APSTAG Co-Chair Dr. Rajib Shaw, UN Resident Coordinator and Humanitarian Coordinator in the Philippines Mr. Gustavo Gonzalez, and SM Supermalls Vice President for Corporate Compliance and ARISE Global Board Member Ms. Liza Silerio)

AsPac experts, government leaders promote application of science, technology, and innovation in disaster risk reduction and management

By Karen Lou Mabagos and Paolo Samoza, DOST-ITCU

athering more than 1,000 virtual participants and 150 physical attendees around the world, the 2022 Asia Pacific Science and Technology Conference for Disaster Risk Reduction (APSTCDRR) was held in a hybrid format on 70-08 April 2022 in Manila, Philippines.

The 2022 APSTCDRR was the first blended international conference on science and technology (S&T) for disater risk reduction (DRR) in Asia Pacific that also included both private and public sectors from local and the international community, in the organizing committee. It is held biennially and was hosted by Thailand in 2016, China in 2018, and Malaysia in 2020.

The Department of Science and Technology (DOST)¹ is one of the coorganizers of the Conference—together with the National Resilience Council (NRC, Chair of the Organizing Committee), National Disaster Risk Reduction and Management Council (NDRRMC), Office of Civil Defense (OCD), United Nations Office for Disaster Risk Reduction Regional Office for Asia and the Pacific (UNDRR-ROAP), UNDRR Asia Pacific Science and Technology Advisory Group (APSTAG), and ARISE Philippines.

DOST officials shared their messages at the Conference

"From victims of disasters to victors" is how the DOST envisions to rebrand Filipino resilience, according to DOST Secretary Fortunato T. de la Peña in

The DOST organizing team is composed of representatives from the DOST Central Office's DRRCCU and ITCU, DOST-PHIVOLCS, and DOST-PAGASA.



DOST Secretary Fortunato T. de la Peña delivers his opening remarks at the 2022 APSTCDRR.



Usec. Renato U. Solidum Jr. being introduced with NDRRMC Executive Director Usec. Ricardo Jalad at the opening ceremony of the 2022 APSTCDRR Day 2.

his opening remarks. The DOST chief illustrated how science can be applied in building programs for disaster risk reduction and management through enumerating the milestones of the DOST in the sector. The list includes the development of the country's own satellites and using their data in mapping hazards and assessing environmental conditions on the ground. The list continues to showcase the digital platform that identifies hazards and risks in different geographical locations, a structural health monitoring system for buildings and bridges, the software that simulates earthquake hazards, advances in the early warning system, and innovative and nutritious disaster relief goods.

Secretary de la Peña stressed that S&T innovations and services address the full cycle of prevention, mitigation, preparedness, response, and recovery. The DOST Secretary concluded his remarks by calling on all key players to rally more closely on constantly innovating in DRR as science, technology, and innovation (STI) shape the future.

DOST Undersecretary Renato U. Solidum Jr. also took the floor on the second day of the Conference. The DOST Undersecretary for Scientific and Technical Services raised that science needs to work with interconnected systems, sectors, and disciplines. Science works effectively in decision making. According to Undersecretary Solidum, STI is a powerful tool in facing the consequences of disasters. Policies need to be inclusive and science-based.

Conference sessions discuss the application of STI in DRR and policies

The Conference highlighted opportunities to advance the applications of science, STI in DRR and climate change adaptation from the local to regional to the global sphere. It underscored that the current pandemic has exacerbated the vulnerability of lives, livelihoods, and the environment.

The Conference was divided into eight technical sessions where key experts discussed [i] the incorporation of STI in policy and practice, [ii] the successes and insights gained from applying STI in relation to the Sendai Framework for DRR 2015-2030, [iii] the localization and inclusiveness of STI application in DRR, (iv) the importance of investing in disasterresilient infrastructure, [v] the need for support from the private sector; and [vi] the significance of cascading compound and systemic risks to protect lives.

An innovation pitch of U-Inspire and UNESCO was also conducted during the Conference. It emphasized that the youth and young professionals (YYPs) are catalysts for innovations in science, engineering, technology, and innovation (SETI) and in DRR. The Pitch featured several initiatives from the YYPs in the region by utilizing SETI to engage with local communities and various stakeholders.

At the end of the two-day conference, Antonia Yulo-Loyzaga presented the Manila Declaration on Science and Technology for Disaster Risk Reduction. The outcomes and policy recommendations of the conference will serve as a contribution to the Asia Pacific Ministerial Conference on Disaster Risk Reduction on 19-22 September 2022 in Brisbane, Australia and to the Midterm Review of the Sendai Framework which will take place in 2023 following a decision by the United Nations General Assembly.

HEALTH & NUTRITION

Science chief shares with UN the Philippines' STI efforts in achieving SDGs and in building back better from COVID-19

By Karen Lou Mabagos, DOST-ITCU

he Philippine Statement delivered by Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña at the Multistakeholder Forum on Science, Technology and Innovation (STI) for the Sustainable Development Goals (SDGs) featured the DOST's scientific efforts in recovering from the pandemic and contributing to the achievement of the SDGs.

The 7th annual STI Forum—with the theme "Science, Technology and Innovation for Building Back better from the Coronavirus Disease (COVID-19) while advancing the Full Implementation of the 2030 Agenda for Sustainable Development"—was held in a hybrid format on 05-06 May 2022 at the United Nations (UN) Headquarters in New York, USA.

As practiced in previous years, experts and representatives from various sectors around the world gathered together at the STI Forum to exchange insights on issues and topics aligned with the priorities of the High-level Political Forum on Sustainable Development. This year's discussions zeroed in on the crucial role of STI in SDGs—4 on quality education, 5 on gender equality, 14 on life below water, 15 on life on land, and 17 on partnerships for the goals.



The seventh annual Multi-Stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals was held in hybrid format at the United Nations Headquarters in New York, USA, on 5-6 May 2022.



DOST Sec. Fortunato T. de la Peña delivers the Philippine Statement at the 7th annual Multi-stakeholder Forum on STI for the SDGs.

The Philippines, through the representation of DOST Secretary de la Peña, showcased the country's various STI programs in line with the 2030 Sustainable Development Agenda. These include the Harmonized National R&D Agenda 2017–2022, technology breakthroughs in agriculture and marine resources, drug discovery and health programs, waste-to-energy facilities and hybrid vehicles development, scholarship offerings in STEM (science, technology, engineering, and mathematics), food security programs, and science-based interventions for livelihood.

Ministers and government leaders also shared their best practices in response and recovery from COVID-19. The DOST chief also highlighted that the country provided funding support to research studies on COVID-19 supplemental medicines, needed medical equipment and biomedical devices, and repurposing of available technologies.

At the end of the statement, Sec. de la Peña stated that "for sustainable recovery, investment should be made in research and development, infrastructure, and STI ecosystem. Shortto long-term agenda must also be set."

Distinguished speakers of the Forum collectively called for harnessing full STI potential for the benefit of all sectors in all countries.

DOST Secretary emphasizes the benefits of a PH Virology and Vaccine Institute

By Alyana Kaye M. Bacarra, DOST-PCHRD



Drafted site layout of the VIP.

he Department of Science and Technology (DOST), Department of Health, and the Department of Agriculture are pushing for the establishment of the Virology and Vaccine Institute of the Philippines (VIP).

Leading the initiative, DOST Secretary Fortunato T. de la Peña emphasizes how Filipinos may benefit from the VIP, which is envisioned to be the country's foundation of research and innovation on human, animal, and plant viruses in the next 10–15 years.

Virology research for health and agriculture

The emergence of SARS-CoV-2, a novel strain of the coronavirus, in 2020

highlighted the need for research and development (R&D) capacities in virology research. Having a pool of highly-trained virology experts and appropriate facilities could have enabled local researchers to conduct studies on the virus as quickly as possible and guided authorities in implementing evidence-informed response strategies.

To better prepare the country for similar health emergencies, the creation of a research institute that specializes in virology research is a must. Responding to this need is one of the objectives of the VIP.

Following the establishment of a fullyoperational VIP, the first five to six years of the Institute will focus on growing local expertise in virology research and building the body of research on virus strains and the diseases they cause in the country.

These efforts will serve as the foundation of applied research studies and the development of diagnostic kits, vaccines, and therapeutics not just for humans, but also for animal and plant diseases. In the same way, these initiatives will impact the agriculture sector by addressing viral diseases that affect crops and livestock that cause significant losses for local farmers.

Aside from generating knowledge and creating a local pool of experts, the VIP will also serve as a collaborative hub for both Filipino and foreign researchers. Its in-house virus gene bank, virus genome

How PH is winning the battle on malnutrition in sustained strides

By Geraldine Bulaon-Ducusin, DOST-STII

ccording to Global Nutrition report (GNR), there has been slight progress towards achieving global nutrition targets in Asia. The report said that "the global target for overweight, stunting, and wasting among children under 5 years of age have several countries on course to meet it, including exclusive breastfeeding among infants aged 0 to 5 months, which has [10] countries on course, while low birth weight and diabetes among women each have three countries on course. However, not a single country in the region is on course to meet the targets for [anemia] in women of reproductive age (15–49 years old), diabetes among men, obesity among men, and obesity among women. Twenty-seven countries in the region have insufficient data to comprehensively assess their progress towards these global targets."

The Philippines is among the countries that are "on course" to meet one target for maternal, infant and young child nutrition. This development may be attributed in part to a nutrition program developed as a result of a national survey. The Malnutrition Reduction Program (MRP), was launched where the concerns of young children 6–23 months and their mothers are being addressed through complementary feeding, nutrition education nutrition advocacy, and capacity building of community workers.

Curbing malnutrition

This "on course," is not achieved overnight, though. The country's fight against malnutrition has been around for decades, and the Department of Science Technology–Food and Nutrition Research Institute (DOST-FNRI) continuously develops food technologies that can help improve nutrition using scientific data.

The government's program in malnutrition, dubbed the MRP took off based on the 2008 National Nutrition Survey results of the DOST-FNRI, which showed that the prevalence of underweight among 0–5 year old children was 20.7%, which is considered high in magnitude and severity based from the World Health Organization cut-off points. This period is critical and proper nutrition intervention is needed to ensure proper physical and mental wellbeing of young Filipino children who will comprise the workforce in adult years.

In 2011, the DOST-FNRI came up with the MRP, a science-based nutrition strategy that has been helping address the high prevalence of underweight among infants and young Filipinos. It has been helping fight malnutrition, in partnership with the local government units (LGUs), national government agencies, and private sector partners. As part of the DOST's efforts in countryside development, which include improving the health and nutrition of children, the DOST- FNRI initiated a package of intervention for young children and their mothers.

This nutrition strategy comprised of complementary feeding for children aged 6 months to below 3 years, as well as nutrition education for their mothers/caregivers that addresses child undernutrition, by encouraging the LGUs and entrepreneurs to adopt the interventions in order to localize the production of complementary foods.

The strategy involves the conduct of research and at the same time, the implementation of a social program that will help these young children in the countryside. The nutrition intervention was initially pilot-tested in four provinces with high prevalence of malnutrition among this group of young children. With the favorable results of the pilot testing in increasing the weight of children and

continued next page



Image grabbed from the DOST-FNRI's You Tube video's presentation on eight new food technologies, which are responding to help improve the nutrition situation of malnourished children are ready for technology transfer by local entrepreneurs.

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DOST SECRETARY (from page 26)

laboratory, and virus reference laboratory will be available for researchers to conduct innovative and pioneering virology research.

Diagnostics for human, animal, and plant diseases

Access to comprehensive data on causative viral agents such as SARS-CoV-2 will also enable local researchers to develop targeted and effective diagnostic strategies. As demonstrated by the current pandemic, the development and availability of diagnostic tools will play a key role in managing diseases.

Aiming to ensure that these efforts will be translated to support communities, initiatives to boost technology transfer are also included in the VIP roadmap, including thrusts for sustained production and capacity building.

This will improve access and availability to low-cost, quality diagnostic kits that will benefit both the health and agriculture sector.

Development of locally-made vaccines

The COVID-19 pandemic highlighted the advantages of building local capacities in vaccine development. With the VIP, Filipino researchers will have access to cuttingedge facilities that adhere to the World Health Organization's biosafety guidelines as well as practical training on virology, allowing them to conduct R&D on vaccines for human, animal, and plant diseases.

The provision of these facilities will also support the overall vision to enable the Philippines to be self-reliant in terms of vaccine development. Establishing a local vaccine development and manufacturing industry will help secure vaccine supply for Filipinos, which was one of the challenges the country faced during the pandemic.

This will benefit not only the health sector in managing persistent viral diseases but also the agricultural sector by providing vaccines for animal diseases that impact livestock farms and fisheries.

Call for support for the VIP bill

The bill supporting the establishment of the VIP has been approved by the House of Representatives last July 2021 and is awaiting passage in the Senate. It has received endorsement from President Rodrigo Duterte as one of the priority bills once the Senate resumes session in May 2022.

Secretary de la Peña shares the need for the establishment of the VIP. "The DOST initiated the establishment of the VIP to have the necessary capability in conducting research to combat novel, emerging, and re-emerging viral diseases," he said.

Support for this bill from the public and legislators is crucial in building the country's capacities in preparing for potential health and economic crises. (article contributor: Jwynne Gwynneth P. Macan)

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improving the nutrition knowledge of mothers/caregivers after the 120-days intervention, the MRP was rolled-out in various regions of the country with the slogan, "Local Technology Works".

Introducing the eight new food technologies

In its commitment to continuously develop food products that help improve the nutrition of the Filipinos and help in the livelihood of entrepreneurs and in the employment of community folks, the DOST-FNRI came up with eight new food technologies that are ready for technology transfer.

These food technologies are the following: the Coco Blend, Coco Bisc, and Coco Puff; the *MeaLusog* in a

pack with three variants (*pork picadillo*, *chicken pochero*, *and mixed veggies arroz*); the Nutribunnets; Protein Food Bar; MNERK (Multi-nutrient Extruded Rice Kernel) and MGM (Micronutrient Growth Mix), the latter two of which are both for pregnant and lactating women.

The DOST-FNRI is not into food manufacturing, but only into food technology development. Translating these food technologies into commercial products is the important role of local entrepreneurs, cooperatives, and other groups who may be interested in manufacturing the product on a large scale and becoming the supplier of these nutritious products in their community or provinces. The food manufactured by the private sectors are the ones that are government-subsidized and are given for free to mothers and children in selected areas where malnutrition is quite prevalent.

Since the MRP roll-out over 10 years ago, a total of 16,448 children benefitted and have been a part of the complementary feeding component from 2011–2022. During President Duterte's administration, 5,370 children 5 years old and below benefitted from this program.

Whatever improvements the country has made in the area of nutrition are a product of sustained government programs, based on sound data and developed and implemented in collaboration with various government institutions, non-government organizations, civic groups, and private sector industries.

Switch it up: DOST's unusual but sustainable alternatives to our everyday needs

By Jachin Jane O. Aberilla, DOST-ST//

th the impending economic crisis and threat to food security, we Filipinos have always been on the hunt for a more sustainable and budget-friendly alternative to address our everyday needs.

As the main agency to develop innovations that would better the lives of the Filipinos, the Department of Science and Technology (DOST) and its attached agencies has been producing and research on sustainable alternatives that use locally available products.

Let's check out some of DOST's latest innovations that will soon be our alternate options when it's time to switch up.

COCONUT MUNGBEAN AS MILK ALTERNATIVE



If you are looking for a cheaper alternative to milk, the DOST–Industrial Technology Development Institute (DOST-ITDI) developed its ready-to-drink coconutmungbean using coconut cream or gata and mungbean or monggo.

Primarily made for disaster mitigation purposes, the beverage is also a good alternative for milk and chocolate drinks, juices, sodas, and similar products. It is nutritious and is shelf-stable for one year.

The new beverage is now being geared up to fill market shelves after passing the first market acceptability test done in collaboration with *Argao Guilang Tableya*, a manufacturer of 100% pure cacao tablea in Cebu City, and Livegreen International Inc., an organic vegetable producer In Quezon City.

BLACK GARLIC ICE CREAM



Craving for ice cream? How about blackgarlic flavored ice cream?

To help grow the country's garlic and agri-food condiments industries, under the banner of the NICER (Niche Centers in the Regions for Research and Development) program, the DOST supported black garlic production at Mariano Marcos State University in Ilocos Norte.

Black garlic is regular garlic that has been aged and fermented, with many describing its taste as milder and sweeter than the standard sort.

The DOST said that it is currently conducting consumer acceptability tests for the garlic-flavored ice cream.

Other black garlic projects in development include medicinal products, with the program aiming to increase the ingredient's yield and nutritional content.

SWEET POTATO AND CASSAVA FLOUR AS A WHEAT ALTERNATIVE

To mitigate the impact of the country's shortage of flour, the DOST Secretary Fortunato T. de la Peña proposed potential substitutes for wheat flour—such as sweet potato (camote), cassava, banana, and



arrowroot in a virtual presser last March 2022.

DOST is collaborating with its regional offices and partner state universities such as the Tarlac Agricultural University which is heavily into sweet potato research and development and sweet potato production.

Visayas State University in Baybay, Leyte on the other hand—is into root crops, and partners at the Bureau of Plant Industry and Department of Agriculture regional offices can be involved in the rollout and production of these crops.

The DOST-Food and Nutrition Research Institute has also developed non-wheat flour products using cocoa flour or flour that comes from corn, rice, and *monggo*.

Meanwhile, DOST-ITDI has also the so-called "emergency food reserve" or the *Sagip*-Nutri Flour which is a blend of powders made from cassava, sweet potato, *moringa* or *malunggay*, squash, and *mongo* and it is an intermediate product that can be added to various food products like bread, nutria-choco bar, polvoron, meatless burger patties, *lumpiang* Shanghai, cookies, cakes, and soup mixes.

Good to know that there are other alternatives for wheat. Here's another one!

OKARA WASTE INTO FLOUR

It was a long struggle for Queenbee Enterprises, a food manufacturer in Parañaque to process okara or soybean curd, a by-product of soybean milk

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processing that results in tons of waste every day.

Queenbee Enterprises—through the DOST-National Capital Region and experts from the Polytechnic University of the Philippines—come up with a solution to process okara wastes into soy flour which may later be used in producing pastries specifically pancake premix.

Outputs of the project are an optimized process of producing soy residue flour and a developed formulation for pancake premix, which will later be marketed by Queenbee Enterprises as a part of its growing product line.

OKRA AS TOOTHPASTE



Thinking of changing your regular toothpaste? You may or may not want to give this a spin: the DOST-ITDI is exploring using *okra* fluid — yep, that slimy stuff that comes out of cooked *okra* — as a toothpaste.

The agency is looking into repurposing okra into other products in a bid to address the surplus of *okra* in the market.

Okra toothpaste is infused with *calamansi* oil, an ingredient said to have whitening properties. Other *okra* developments the agency is working on include banaba milk tea and using *okra*—as a stabilizer.

TAHONG COSMETICS

Researchers from the University of the Philippines Visayas (UPV) will have you

know that mussels or *tahong* are good not only for food but also for skin care.

In a study, the researchers from UPV and the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) used foodgrade mussel glycogen extracts to develop cosmetic products like cream, ointment, and soap.



According to the DOST-PCAARRD, the green mussel is one of the emerging aquatic commodities that is poised to contribute to the economic output of the fisheries sector in the country.

The team worked on formulating the three cosmetic products from food-grade glycogen extracts and laboratory-grade glycogen.

Project leader Leni Yap-Dejeto presented their research in a webinar last November, in which she explained that mussels showed potential as sources of compounds with bioactive (or nutrients that are antimicrobial, antioxidant, and anti-inflammatory).

The glycogen in cosmetics acts as a moisturizer because it improves hydration and reduces redness and dryness without being oily, Yap-Dejeto said. "Some studies show it stimulates collagen production and makes the skin elastic. Since it is easily absorbed by the skin, it acts as a delivery agent of other essential minerals and vitamins," she said.

FRUIT-BEARING TREES TIMBER ALTERNATIVES

We have looked at food alternatives and personal needs alternatives, now let's look at the DOST's innovations for our basic needs such as shelter and furniture.



The DOST is now looking at fruit-bearing trees as possible alternatives to commercial timber due to the "insignificant movement of the wood during drying".

Old, fruit-bearing trees that abound in rural areas may help address the local wood industries' huge demand for raw materials. Many of these trees get uprooted whenever there are strong typhoons.

The DOST–Forest Products Research and Development Institute (FPRDI) studied the physical and mechanical properties of such trees as *nangka, santol, durian,* and *marang.* Underutilized antipolo and batino trees were also studied.

According to DOST-FPRDI, all the fruitbearing species in the study showed low to medium volumetric shrinkage, indicating insignificant movement of the wood during drying. This is an important property when processing wood into high-end products that need high dimensional stability.

The DOST-FPRDI suggested that wood from *nangka*, *santol*, and *antipolo* trees be used as construction materials that require moderately low strength.

Meanwhile, they also found that the *batino* could be a source of timber for medium to heavy construction due to its moderately high strength and medium volumetric shrinkage.

For light construction, he said *durian* and *marang* could be used as alternatives.

Senile *nangka, santol,* and *durian* trees, on the other hand, can be cut into timber.

For more information about the DOST's available innovations, products, and services, follow us on our social media pages.

Latest study shows a new look on traditional medicinal seaweed use in llocos Norte

By David Matthew C. Gopilan, DOST-STII





re you familiar with ar-arusip, pok-poklo, and garganatis?

These are some seaweeds fondly eaten by llocanos. Over the years, folk beliefs about their medicinal value are now being forgotten. But thanks to a new study, the names of these indigenous seaweeds and their known medicinal benefits will now be forever etched in science.

Reporting in the June 2022 issue of the Philippine Journal of Science (PJS), Dr. Richard V. Dumilag and Raymundo F. Javier documented 34 indigenous seaweed species used by llocanos for medicinal purposes. Their health benefits range from treating insect bites and parasitic infection, to solving digestive, respiratory, and skin diseases.

Itip-itip or Chondrophycus undulatus is believed to treat diarrhea. Commonly sold in public markets, ar-arusip or Caulerpa racemosa was reported to treat cough and asthma whereas *pok-poklo* is known to treat goiter. *Pok-poklo* can also be identified as *Codium* arabicum, Codium intricatum, and possibly Codium tenue.

Scientifically named Hydroclathrus clathratus, bal-balulang is known to fight skin allergies while Gelidiella acerosa or cul-culbet can treat rheumatism.

Ilocos Norte: [a] ar-arusip, [b] pok-poklo, [c] aragan, (d) culculbet, [e] cao-caoyan, and [f] garganatis. Photos from R.V. Dumilag and PJS.

DOST proposes alternative transport solutions amidst oil price surge

By Allan Mauro V. Marfal, DOST-STII

ith the recent oil price hike, the Department of Science and Technology (DOST) shared the readily available technologies developed by the department and other plans that can alleviate the impact of the current situation.

As the significant fuel price increases affect our transport sector, the DOST is pushing for a fuel diversified transport system and solutions, according to the DOST Secretary Fortunato T. de la Peña



The HERT was developed by the Metals Industry Research and Development Center of the DOST that uses diesel fuel and electric batteries.



The e-Trike, an alternative mass transport system, is now being implemented by the Cagayan State University in Tuguegarao City, wherein the implementors are from the University of the Philippines Diliman College of Engineering with assistance from the DOST.



The DOST Secretary Fortunato T. de la Pena (right) shares in a special virtual presser called the DOST Briefing Room the proposed alternative ways proposed by the science department to address rising fuel costs and shift to environment-friendly and more sustainable sources of energy. The event was organized by the DOST–Science and Technology Information Institute (DOST-STII) and was moderated by Norly B. Villar, Chief of the Communication Resources and Production Division of the DOST–STII

in a special virtual presser held on 09 March 2022.

The science chief said that electric vehicles or e-vehicles are already being manufactured here in the country such as the e-Trike, e-scooter, and e-Jeepney, aside from the Hybrid Electric Train and the hybrid electric road train (HERT), the latter having been adopted in the regions.

"We (DOST) have already developed several innovative products, particularly in the case of mass transport like hybrid train which is already in the possession of the Philippine National Railways. We have also developed the running prototypes of HERT which are now in the possession or being run in the cities of Cauayan in Isabela and General Santos in South Cotabato," said DOST Secretary de la Peña.

He also shared that hopefully—before the end of June, the hybrid trimaran will be launched.

Sec. de la Peña further explained

that while the trains are using fuel and batteries, it can be charged and reduced its fuel consumption about 25%. Meanwhile, for a trimaran, it uses wave energy where power is converted into mechanical energy that results in the reduction of fuel consumption. On the other hand, for e-vehicles, an ongoing project on e-Trike is now being implemented by the Cagayan State University in Tuguegarao City, wherein the implementors are from the University of the Philippines Diliman College of Engineering.

Sec. de la Peña also said that the DOST would like to promote the locally developed e-vehicle fast charging systems and modeling tools for strategically locating charging station sites for the particular number of e-vehicle for a specific route.

"Our goal and plan right now in DOST is to find ways to support its enhancement through improved infrastructure and continuous research and development

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LATEST STUDY (from page 31)

Bodo-bodo or *Diginea simplex* is used to fight off parasitic infections whereas *garganatis* or *Scinaia hormoides* is known to improve 'dampened sexual desire'.

Asked about estimates on the number of seaweeds in the country not yet known to science in which some may contain health benefits, Dr. Dumilag said that we can speculate that there could be more of these than what is presently known.

Contrary to common misconceptions, seaweeds are not plants. They are classified as algae.

New look for decades-old data

Dr. Dumilag and Javier first got hold of their data about two decades ago in llocos Norte's towns of Pagudpud, Burgos, Pasuquin, Paoay, Currimao, and Badoc. With informed consent, they interviewed 278 llocanos from different walks of life: herbalists or *mang-ngagas*, fisherfolk, farmers, housewives, teachers, carpenters, drivers, and government employees.

Dr. Dumilag explained that the interviews with the Ilocano townsfolk were done in the early 2000s. In every interview, informants were asked to identify seaweeds they use for medicinal reasons. If they don't know any, they were asked to refer someone who may be more knowledgeable.

Then recently, they updated the taxonomy — the science of identifying, naming, and classifying organisms — of the seaweeds that they first identified back in the years 2000 and 2001. They have done this by checking the works of other taxonomists working in the country and abroad.

Dr. Dumilag and Javier's PJS paper does not directly prove any therapeutic claims by consuming any of the 34 seaweeds, but they cited other studies that identified key substances, thereby offering clues behind the medicinal benefits of these seaweeds.

People and "plants" of the past and present

Dr. Dumilag and Javier hope that other researchers would look at how the llocanos and other ethnic groups nowadays use traditional seaweedbased medicines — including the perceptions of the younger generations toward it — given the current economic conditions of the province and access of the locals to modern medicine.

"Old knowledge, while may be familiar among the present groups may not be passed to the next generation due to large urbanization, loss of traditional lifestyle, and rural marginalization," Dr. Dumilag explains.

He added that these factors make "old knowledge intimately linked to superstitions," rendering these practices "ineffective, often highly dangerous or lethal."

Dr. Dumilag said that ethnobotanical studies offer "sophisticated insights" that can lead to scientific discoveries on disease treatments and biodiversity conservation, just to name a few blessings.

"By chronicling this old knowledge, we practically construct a strong link that facilitates the integration of cultural heterogeneity and data-driven sciences," the researcher added.

Dr. Dumilag and Javier are both currently a teacher and researcher at Sorsogon State University and Bulacan State University, respectively. Their peerreviewed paper enlisting the name of the 34 seaweeds, including their scientific names, and how llocanos use them are accessible for free at the PJS website, philjournalsci.dost.gov.ph.

PJS is published by the Department of Science and Technology through the Science and Technology Information Institute.

DOST PROPOSES (from page 32)

related to them (e-vehicles)," said Sec. de la Peña.

He added that the DOST has also developed earlier the electric charging stations for e-vehicles called Charging in Minutes or CharM which refers to the rapid charging system that reduces the charging time of utility-grade electric vehicles from hours to just minutes.

Meanwhile, on the use of fuel, the country's science department recommends a technology to help monitor and conserve energy like cloudbased monitors and e-sensors. "It can provide smart and comprehensive decision support that management can use whether they have to make adjustments for example, in the use of certain equipment, or they need to replace equipment that is not functioning well and wasteful in the use of energy," said Secretary de la Peña.

On the other hand, DOST-III Regional Director Julius Caesar V. Sicat shared their regional efforts in developing and utilizing an alternative source of energy for mobilization such as the solar cart that has already been developed by the Tarlac State University. "Tatlong taon na rin pong tumatakbo rito without charging kasi mayroon po siyang solar panels sa ibabaw at dinesign po ng TSU ang kaniyang charging system such that habang ginagamit mo siya o naka-park sya, nagcha-charge siya. Mayroon pong regulator 'yun kaya hindi nao-overcharge ang battery. I believe this is something that is ready for commercialization," explained Director Sicat.

"Dapat pong i-adopt natin para ipakita natin na maaari po tayong maging mobile without relying from fossil fuels," he added.

DOST sends relief food products Batangas residents affected by Taal Volcano eruption

Text and photo from DOST-CALABARZON



The Department of Science and Technology (DOST)-CALABARZON turned over science and technology (S&T) products as food relief to evacuees in the towns of Agoncillo and Laurel, Batangas who were affected by the recent phreatomagmatic events in Taal Volcano, 06 April 2022.

The food relief package was composed of the Enhanced Nutribun and Rice-Monggo Crunchies produced by DOST-Batangas cooperators. Enhanced Nutribuns were sourced out from Sweetie Pies Pasalubong Center, adoptor of enhanced nutribun and cooperator under the Small Enterprise Technology Upgrading Program or SETUP. Rice-Monggo Crunchies, on the other hand, were procured from Samahan ng mga Inang Gabay at Lakas ng Aktibong Komunidad, a Grants-in-Aid community-based project beneficiary of the DOST. The relief packages were distributed to Pook Elementary School Evacuation Center, Brgy. Pook, Agoncillo, Batangas and to the Donation Management Hub at the Municipal Hall of Laurel, Batangas.

Evacuees have been in the evacuation shelters for more than a week at the time of writing and Alert Level 3 still prevails over Taal Volcano indicating continuous volcanic unrest.

The Enhanced Nutribun, with several variants, was developed by the Food and Nutrition Research Institute of the DOST that is enriched with vitamins and minerals making ideal as relief food during disasters and also in addressing the incidence of malnutrition among children.



Newly installed bottom strip forming machine (left side) and spring making machine (right side)

Dipolog-based metals and engineering firm receives assistance from DOST

By Jelyn O. Bayonas, DOST-IX

ngr's Steel Industry, a firm based in Dipolog City had received PHP 2.5 M for equipment and productivity upgrades from the Department of Science and Technology Region IX Office (DOST–IX), through the agency's Small Enterprise Technology Upgrading Program (SETUP).

The said assistance enabled the firm to acquire 1–unit of bottom strip forming machine and 1–unit of spring forming

machine. With this new equipment, the firm is now capable of producing spring and bottom bar as one of the important materials in roll-up door construction. Engr's Steel Industry is the first firm to produce spring and bottom bar in the province.

Prior to DOST intervention, the firm relied on spring roll outsourcing from Cebu and Manila suppliers. The firm, on the other hand, produces the bottom bar by



Engr. Denis B. Tagab, the proprietor, expressed his gratitude to the DOST for providing the much-needed intervention for the firm. He also cited that this will help the firm in their ongoing projects and supplying these materials to their customers in Zamboanga del Norte and nearby provinces in Visayas and Mindanao.

SETUP, one of the flagship programs of the DOST, has been continuously providing assistance to the micro, small, and medium enterprises (MSME) in recognition of their important role to the country's economy. The program provides technical and technological assistance to MSMEs to enable them to improve their production capabilities through a package of science and technology interventions.

For more information, please contact DOST-IX Provincial Science and Technology Center–Zamboanga del Norte at (065) 212-2244/ 908-0117/ 0998-792-4622. To be updated on the latest happenings, please follow our Facebook page at www.facebook.com/ DOSTRegion9



In photo: Assitant Regional Director Mahmud L. Kingking, Provincial Director Nuhman M. Aljani,and DOST personnel with the proprietor, Engr. Denis B. Tagab during the project monitoring

3 *barangays* in Mapandan, Pangasinan set to benefit from DOST's CEST program

By Monique C. Esguerra, DOST-/



he Department of Science and Technology Regional Office I (DOST-I) started implementing the Community Empowerment thru Science and Technology (CEST) Program in three barangays (communities) in Mapandan, Pangasinan through the conduct of the community needs assessment (CNA) on 07-08 April 2022 as the first step towards helping these communities to level up.

CEST beneficiary-*barangays* that were identified by the Local Government Unit (LGU) of Mapandan are Barangays Luyan, Torres and Sta. Maria.

DOST-I Regional Director Armando Q. Ganal spearheaded the CNA together with the DOST–Provincial Science and Technology Center Pangasinan Director Arnold C. Santos, CEST Project Leader Decth-1108 P. Libunao, and the experts from Pangasinan State University. A total of 75 key informants participated in the activity which consisted of leaders of associations and organizations in the barangay, education representatives, barangay health workers, and barangay officials with the LGU heads of Mapandan.

The activity aimed to identify the current situation of the community in the areas of livelihood generation, health and nutrition, basic education, environmental protection, and disaster risk reduction in line with the thrust of the CEST program. This targets a wider implementation of the program, as part of its effort to sustain its initiatives in transforming marginalized communities to combat poverty and promote resiliency through science and technology.

Director Ganal emphasized, *"Hindi kayo iiwanan hanggang hindi niyo kayang tumayo sa inyong sariling paa"* ("We will not leave you unless you can stand on your own"). Particularly, the CEST program aims to empower rural communities and geographically isolated disadvantaged areas by implementing

a package of applicable science and technology interventions.

Officer-in-Charge Municipal Planning Development Council Melchor Serapion said "Handang matuto at paano malaman kung paano ma–empower ang mga kababayan namin, marami tayong resources, andiyan ang Department of Science and Technology para tulungan po tayo (We are eager to learn on how to empower our constituents, DOST will be there to support us with our resources").

The local government officials of Mapandan emphasized that the implementation of the program will greatly contribute to the improvement of the conditions in the province. Evidently, all of the DOST's projects and services are provided through CEST program throughout the region that empowers and assists underprivileged communities to improve their status and develop using relevant science, technology, and innovation.

SPECIAL FEATURE

DOST, NHCP open Rizal the Filipino **Scientist** exhibit in Calamba

By Allan Mauro V. Marfal, DOST-STII Photos by Henry A. de Leon, DOST-ST//

he Museo ni Rizal in Calamba, Laguna has added an attraction to its historical site as the Department of Science and Technology (DOST) with a special exhibit showcasing the significant contributions and impact of Dr. Jose P. Rizal in various fields of science.

Dubbed as the Dr. Jose P. Rizal: The Filipino Scientist Exhibit, the DOST, in partnership

with the National Historical Commission of the Philippines (NHCP), spearheaded its formal launched on 19 June 2022, coinciding with the 161st birth anniversary of our country's national hero.

A 2ft x 2ft replica of the 3D-Printed Monument of Dr. Jose P. Rizal serves as the main attraction of the gallery together with several publications and other information materials sharing the stories and journey of our national hero as an agriculturist, biologist, researcher, and medical doctor.

DOST Secretary Fortunato T. de la Peña said that Dr. Rizal was a true Filipino patriot, nationalist, advocate of political reforms, agriculturist, polymath, polyglot, and so on.

"Dr. Rizal was an advocate of science using it to better improve the lives of Filipinos. With the many achievements he



Rizal the Filipino Scientist Exhibit

had I have reason to believe that 'Pepe" as he was called during his younger days in Calamba was way ahead of his time as he could have already embraced the DOST mantra way back, 'Science for the People', more than a century ago," said Sec. de la Peña.

On the other hand, NHCP Commissioner Emmanuel F. Calaro underscored the importance of honoring Dr. Rizal, not only as a patriot but, also as scientist that transcends time and space as he remains relevant to this day.

"This 3D-printed monument of Dr. Rizal as a scientist is very important to introduce to our youth that the past contributions of our national hero, especially in the fields of science, is not obsolete. He is timeless and we, in the modern generation, can also appreciate his works through various means like 3D-printing technology," said NHCP Commissioner Calaro.

He added that NHCP is very thankful to DOST on this special exhibit as it would give the opportunities, especially for young people, to have better understanding on how technology can immortalize the huge contributions of Dr. Rizal.

"Kilala natin si Dr. Rizal bilang isang bayani, he is also a scientist. Gusto rin natin ipamahagi at ipaalala sa kabataan na 'scientists are also heroes," said Norly B. Villar, chief of the Communication Resources and Production Division of the Department of Science and Technology-Science and Technology Information Institute.

To further highlight the importance of the occasion, no less than National Artist Virgilio S. Almario paid tribute to our national hero by reciting a poem dedicated to Dr. Rizal. Also, the members of the group Linangan sa Imahen, Retorika at Anyo or LIRA were there to recite poems commemorating the special event.

SPECIAL FEATURE





OF ASSISTANCE





Php 370,976,315.55*

TOTAL NUMBER OF TARGET BENEFICIARIES

979

*Total amount is based on the inputs of Regions CAR, IV-A, IV-B, VI, VIII, IX, X, and XI

DOST confers SFTP awards to topnotch spin-off firms

By Allyster A. Endozo, DOST-ST//

The Department of Science and Technology (DOST), in commemoration of its 64th anniversary, recently honored three spin-off companies during the Science for the People (SFTP) Awards: *Gabi ng Parangal at Pasasalamat* last 13 June 2022 at the Sofitel Philippine Plaza Manila.



Algacon Aquafeeds Manufacturing (AAM)—through its Chief Executive Officer (CEO), Ms. Soledad S. Garibay—won the SFTP Award for Technology Commercialization for Juan Algae Paste, the first microalgae-based feed developed locally for fish hatcheries.

AAM originated from the Fisheries Technology Business Incubation Project—which was funded by the DOST–Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development, and implemented by the University of the Philippines Visayas.



Manila HealthTek Inc.—led by its founding CEO, Dr. Raul V. Destura—likewise copped the same award for the

GenAmplify[™] diagnostic kit. GenAmplify[™] can detect SARS CoV-2, the causative agent behind COVID-19, in respiratory samples with high specificity and efficiency in real-time.

Dr. Destura is a physician, a clinical molecular biologist, and an infectious disease specialist who leads the Philippine Genome Center as its Deputy Executive Director—even during the early stages of the pandemic in January 2020.

USHER Technologies Inc.—*via* its founding CEO, Dr. Francis Aldrine A. Uy—was the third recipient of the award for the Universal Structural Health Evaluation and Recording (USHER), a sensor-based device that he first conceptualized during his time at the University of Berkeley.



USHER—a system developed at Mapua University that enables 24/7 remote data monitoring and alerting on damage to a building or a bridge as earthquakes occur, was funded by the DOST–Philippine Council for Industry, Energy, and Emerging Technology Research and Development.

The SFTP Award for Technology Commercialization showcases programs or projects whose research outputs have fully translated into marketable products or services with regional or nationwide impact in terms of fostering a thriving entrepreneurial ecosystem.

The award comprises one of the 15 other categories of the SFTP Awards that were given to development partners in recognition of their outstanding contributions toward improving the lives of Filipinos as the DOST continuously pursues its mantra: Science for the People.

DOST launches the final installment of Science for the People book series

By Allan Mauro V. Marfal, DOST-ST//



DOST legacy. (from left to right) DOST Secretary Fortunato T. de la Peña together with his co-authors of the five volumes of the final installment of the 'Science for the People' book series during its launching held on 14 June 2022, at the Eastwood Richmonde Hotel in Quezon City. The coauthors were DOST-NRCP Executive Director Marieta B. Sumagaysay for the Science for the Arts, DOST Assistant Secretary Maridon O. Sahagun and DOST-PCHRD Executive Director Jaime C. Montoya for Science for Healing, DOST Undersecretary for Scientific and Technical Services Dr. Renato U. Solidum Jr. for the Science for Resilience, DOST-STII Director Richard P. Burgos for Science for Awareness, and DOST-TAPI Director Atty. Marion Ivy D. Decena for Science for Business. Also gracing this momentous event were DOST Undersecretary for Research and Development Dr. Rowena Cristina L. Guevara (right), and DOST Assistant Secretary Diana L. Ignacio (5th from left). (photo by Henry A. de Leon, DOST-STII)

wo weeks before the end of his term, Secretary Fortunato T. de la Peña made sure that his predecessor would have a lot to build on in terms of the implementation and enhancement of various research and development (R&D) programs and technical services of the Department of Science and Technology (DOST).

The legacy and significant contributions of the country's science department in the past six years have been immortalized through the 'Science for the People' book series.

The public unveiling of its final installment, composed of five special books, was held on 14 June 2022 at the Eastwood Richmonde Hotel in Quezon City. Each volume of this series provides us with a better view of how S&T related services and R&D initiatives could make significant and tangible contributions to various local sectors and communities.

DOST Secretary Fortunato T. de la Peña noted that these books highlight a number of innovative technologies, products and services introduced by our local scientists poised to generate local employment, create livelihood opportunities, and improve economic activities.

"Through these books, so many stories have been told. From the mouths of our scientists and researchers as well as from the target beneficiaries of their noble works, all of us would see how conducting S&T-related research and picking the brains of our local science heroes would give us a huge chance to achieve inclusive development," said Sec. de la Peña.

There is the book titled "Science for the Arts', co-authored by the DOST–National Research Council of the Philippines (NRCP) Executive Director Marieta B. Sumagaysay. This book features how S&T enhance cultural expressions and artistic platforms, bridging the gap between the different disciplines.

"There is no science, technology, and innovation without the arts and humanities. To leverage inventiveness, we believe that it is necessary to recognize that art and science share

SPECIAL FEATURE

many basic requirements and techniques that promote creativity and innovation," said Exec. Dir. Sumagaysay.

The second book featured was the "Science for Healing" co-authored by the DOST–Philippine Council for Health Research and Development (PCHRD) Executive Director Jaime C. Montoya and the DOST Assistant Secretary Maridon O. Sahagun. This book highlights how the entire health research community played the vital role in addressing health concerns particularly during the COVID-19 pandemic.

"It is our hope that by documenting these stories, we can generate appreciation for our own researches and encourage more to share our vision of leading R&D initiatives to make lives better of our Filipino people. Even beyond the pandemic, you can rest assure that we will continue to work and local government units in various parts of the country in addressing natural hazards, and it chronicled stories of triumphs in mitigating risks and addressing the negative impact of climate change.

"This book is inspired by the context of Filipino Resilience—not merely surviving amidst repeated losses and damages but about living, coping, thriving, and adapting to risks," shared Usec. Solidum.

The fourth book is the "Science for Awareness" co-authored by the DOST– Science and Technology Information Institute (STII) Director Richard P. Burgos. This book shares the various efforts and programs of the department toward communicating the benefits of science to the people in an easy-to-understand way. It tells stories of how the DOST and its agencies and regional offices adapted to the changing communication The last book, titled 'Science for Business', is co-authored by DOST-Technology Application and Promotion Institute Director Atty. Marion Ivy D. Decena. This book puts emphasis on the journey of some of the great Filipino inventors, innovators, and technopreneurs toward building their own and successful enterprises and how the DOST contributed to making them more competitive.

"This volume is one of the best ways we can offer in order to reach out and inspire as many inventors, innovators, and technopreneurs in the country who are in their journeys toward building their own enterprises," said Dir. Decena.

Incidentally, the initial five books in the series were launched on 23 November 2021. These books were "Science for Change," "Science for Innovation," "Science for Human Capital," "Science



for the advancement of our healthcare landscape for the benefit of everyone," said Exec. Dir. Montoya.

The third book unveiled was titled 'Science for Resilience' that is coauthored by the DOST Undersecretary for Disaster Risk Reduction and Climate Change Dr. Renato U. Solidum Jr. The book uncovers how science and technology guided government agencies landscape to bring science closer to the people.

"While R&D projects have a beginning and an end, communicating Science for the People is a process that never ever ends. We need to regularly inform our publics of all the developments in the areas of science, technology, and innovation. That is an advocacy you will become more familiar with in this book," said Dir. Burgos. for Cooperation," and "Science for Communities."

Sec. de la Peña also shared that the printed copies of the books will be distributed to selected recipients for free while the digital versions of Science for the Arts and Science for Resilience books will be available for download starting 15 June at www. dost.gov.ph.



Aerial perspective of the Tanay beam irradiation facility. (courtesy of ISI).

First commercial e-beam facility to aid local food, medical, other industrial sectors

By Allan Mauro V. Marfal, DOST-STII

he country's first commercial electronic beam (e-beam) facility is soon to rise at the *Barangay Sampaloc* in Tanay, Rizal aiming to help enhance the products and address the needs of the companies belonging to the food, medical, and pharmaceutical sectors.

Called Tanay Electron Beam and Cold Storage Facility, it is privatelyoperated under the management of Irradiation Services Incorporated (ISI), a 100% subsidiary of A Brown Company Inc. (ABCI). Meanwhile, the DOST–Philippine Nuclear Research Institute (PNRI) will be more of a supporting role particularly in the technical aspect such as providing training in radiation safety, operation and process control or dosimetry.

In an e-beam process, products are exposed to continuous beams of electrons which damage and destroy microorganisms and pathogens, resulting in sterilized products that have a longer shelf life.

Over the past 30 years, e-beam technology has been widely accepted globally and more than 1,200 e-beam irradiation facilities are currently operating worldwide.

ISI will be using a 10-million-electron-volt (MeV) e-beam accelerator manufactured for commercial irradiation and sterilization application.

"I am really happy that this is happening. This technology will immensely help not only the medical field but also those in the agriculture sector," said the Department of Science and Technology (DOST) Secretary

SPECIAL FEATURE



DOST Secretary Fortunato T. de la Peña (second from right) and DOST-PNRI Director Dr. Carlo A. Arcilla (rightmost) cheer on as Walter W. Brown, Chairperson of ABCI, leads the official groundbreaking of the Tanay Electron Beam and Cold Storage Facility on 13 May 2022 in Brgy Sampaloc, Tanay, Rizal. The facility will be headed by ISI President Paul Francis B. Juat (third from right). Photo and caption from Niña Grace S. Pineda, PNRI–Nuclear Information and Documentation Section.

Fortunato T. de la Peña during the groundbreaking ceremony held on 13 May 2022.

Haydee M. Solomon, Head of the DOST-PNRI's Irradiation Services Section, explained that the electron beam irradiation can be used for the radiation sterilization of surgical masks, dressings, syringes, surgical staplers, and other single-use medical devices.

She added that it can also be used for the reduction of microbial load of different products such as herbs, spices, raw material for cosmetics, animal feeds, and frozen seafood; elimination of pathogens in food; and for the quarantine treatment of fruits and vegetables.

Solomon added that the Tanay e-Beam and Cold Storage Facility will be able to serve the clients that the DOST-PNRI will not be able to accommodate due to its limited capacity. With that, it would still help local producers to address food safety requirements and gain wider access to international markets, and of course generate additional jobs. Meanwhile, DOST-PNRI Director Carlo A. Arcilla emphasized their commitment to help set-up a private irradiation facility. Then he assured that the DOST-PNRI will be providing

assistance in the training of the future workers of the ISI irradiation facility on the different aspects of the irradiation process.

After having some doubts initially on irradiation technology from Tanay, the ISI's comprehensive research as well as their recent educational visit to the irradiation facility at the DOST-PNRI contributed a lot to get the support their local government officials as shared by Tanay Mayor Rex Manuel Tanjuatco.

He added that consequently, they are now anticipating the creation of more jobs and other opportunities as a result of this new facility, which is expected to create an impact to the local economy.

Meanwhile, ISI President Paul Francis Juat believes irradiation technology is a "proven safe technology" that can expand the growth of various industries and help in developing the downstream industries. Additionally, he shared his optimism that after two years of technical planning and preparation, the 11,700-square meter irradiation facility will be operational 15 months after.

On the other hand, Solomon said that the DOST-PNRI is planning to establish a low energy electron beam (LE-EB) unit and hopefully it will materialize three to four years from now.

She explained that LE-EBs are the fastest growing market for industrial accelerators, and accounts for around 30% of the entire market.

"They (LE-EB) have lower unit costs, require less maintenance and are usually self-shielded with high-density materials such as lead and/or steel. LE-EB can be used in curing of inks, coatings and adhesive products, as well as in the development of novel functional materials," said Solomon. (with reports from Michael Angelo C. Sia, DOST-PNRI)

SFTP PROFILE STORY

Ang makulay na buhay ni Sec. Boy de la Peña, huwarang lingkod bayan

Ni Jerossa A. Dizon, DOST-ST//

gham at teknolohiya ang dalawa sa mga pinakamahalagang sangkap sa pag-unlad ng isang bansa. Ang pag-aaral, pagsusuri, at pananaliksik ang nagiging susi upang makahanap ng solusyon sa mga suliraning kinakaharap ngayon hindi lang sa bansa kundi maging sa buong mundo.

Sa loob ng anim na taon, ang pagpaplano at pagpapatupad ng mga programa at proyektong may kinalaman sa agham at teknolohiya ay naiatang sa kanyang balikat ng isang kagalang-galang na inhinyero, dating propesor ng Unibersidad ng Pilipinas (UP), isang mahusay na lider, at isang huwarang lingkod bayan.

Sino nga ba si Sec. Boy?

Si Fortunato Tanseco de la Peña o Sec. Boy ay ipinanganak noong ika-12 ng Nobyembre 1949 sa Bulakan, Bulacan at bunso sa tatlong anak nina Emilio Banzon de la Peña at Luz Fajardo Tanseco.

Bata pa lang si Sec. Boy ay naituro na ng kaniyang ama kung paano magbigay galang sa kapwa tao habang ang kanilang ina naman ang humubog sa kanila na maging mabuting mamamayan at magkaroon ng matibay na relasyon sa Panginoon.

"Live within your means", ito ang mga salitang tumimo kay "Ka Boy" noong siya ay bata pa na itinuro ng kanyang ama, kaya naman lumaki siyang sanay sa payak na pamumuhay. Ang mga katagang ito rin ang pinanghawakan at naging pamantayan niya sa buhay hanggang sa kasalukuyan bilang isang huwarang "public servant". Sa edad na sampung taon ay nagtapos si Sec. Boy ng elementarya at sa murang edad ay nabatid niya ang pagkahilig sa asignaturang matematika. Kaya ng pumasok na siya sa kolehiyo sa UP Diliman sa Quezon City ay kumuha siya at nagtapos ng kursong Bachelor of Science in Chemical Engineering noong 1969.

Bagama't bata pa si Sec. Boy noon, nagpakita na siya ng angking talino at kakayahan, kaya hindi siya nag-aksaya ng panahon sa pagkuha ng karanasan sa trabaho. Pagkatapos ng kolehiyo ay nag-apply at natanggap siya bilang *operations engineer* sa kumpanya ng langis, ang ESSO Philippines (kilala ngayon bilang Petron) sa loob ng dalawangtaon.

At dahil sa pagiging isang masugid na mag-aaral, hindi siya napalagay sa sistema ng mga korporasyon kaya gamit ang sariling ipon ay bumalik siya sa pag-aaral at kumuha ng *Master's Degree sa Industrial Engineering.* Kasabay nito, noong taong 1978, ay nagpasya siyang magturo sa UP Diliman (UPD) *College of Engineering.* Sa nasabing unibersidad ay naging research assistant at unang patnugot o editor ng *Philippine Engineering Journal.*

Kinalaunan ay naging pangulo siya ng Department of Industrial Engineering and Operations Research sa UP at noong 1988 ay naging isang full-time professor. Naging direktor siya sa Institute for Small Scale Industries noong 1992 at sa kasunod na taon ay naging pangalawang pangulo sa Planning and Development ng buong UP System.

Science for the People: ang pagtahak sa bagong landas

Pumukaw din ng atensyon sa Ehekutibong sangay ng pamahalaan ang katangi-tanging talento ni Sec. Boy dahil habang siya ay part-time professor sa UP ay naging *planning services officer* siya nang dalawang taon, naging direktor ng DOST – Technology Application and Promotion Institute mula 1989 hanggang 1991, at nagserbisyo bilang *Undersecretary for Scientific and Technical Services* sa loob ng labintatlong taon.

Nang maitalagang kalihim ng DOST noong 2016 sa ilalim ng administrasyon ni Pangulong Rodrigo Roa Duterte ay una niyang pinagtuunan ng pansin na gawing inklusibo ang mga proyekto at programa ng kagawaran para sa mga Pilipino. Sinikap ni Sec. Boy na paglaanan ng higit na malaking pondo ang iba'tibang ahensya sa ilalaim ng DOST at ang mga rehiyon sa bansa sa larangan ng pagsasaliksik at pagpapaunlad o *research and development* (R&D).

Sa termino niya ay nabuo rin ang isang mahalagang programa na tinawag na Science for Change Program (S4CP) na pinamunuan ni Undersecretary for R&D na si Dr. Rowena Cristina L. Guevara kung saan pinalalakas ang pananaliksik kaagapay ang mga unibersidad at mga pribadong institusyon sa mga lalawigan at mga rehiyon. Ang programa ay may apat na sub-programs: Collaborative Research and Development to Leverage Philippine Economy o CRADLE, Niche Centers in the Regions for R&D (NICER) Program, R&D Leadership (RDLead) Program, at ang Business Innovation through S&T (BIST) for Industry Program.

Bago magtapos ang kanyang panunungkulan ay nakapagtala na



ang S4CP ng maraming natatanging tagumpay. Ayon sa pinakahuling tala noong Marso 2022, 42 NICERs na ang naisakatuparan ng 49 higher education institutions (HEIs) at national government agencies (NGAs) sa 17 rehiyon na may kabuuang PHP2.23 B naigawad na pondo; ang CRADLE *Program* naman ay mayroon nang 86 aprubadong proyekto sa sampung rehiyon at umabot na sa PHP388.8 M ang naipamahaging pondo sa 36 na institusyon at 87 industry partners; sa RD Lead Program naman ay may 66 RD Leaders na sa 17 rehiyon at nagawaran ng PHP34.36 M pondo para sa 62 host institutions na inilaan sa pagsasaliksik. At sa ulat naman noong Disyembre 2021, mayroong apat na aprubadong proyekto sa ilalim ng programang BIST na nagkakahalaga ng PHP344.5 M.

Sa panahon ng pamumuno ni Sec. Boy ay pinalawig rin niya ang dalawang programang tumutugon sa mga suliranin ng mga maliliit at nagsisimulang negosyante at mga komunidad. Ang mga programang tinutukan ni Sec. Boy ay ang *Small Enterprise Technology Upgrading Program* o SETUP na may 4,684 benepisyaryo na simula noong 2016 hanggang Marso 2022 at ang *Community Empowerment thru Science* and Technology o CEST na simula noong 2013 hanggang Marso 2022 ay 864 komunidad na ang natulungan, 908 livelihood projects na ang naisakatuparan, 879 pagsasanay ang naisagawa, at 22,504 katao ang nakinabang.



Kabilang rin sa mga napalakas ni Sec. Boy ang iba't-ibang scholarship program ng DOST kung saan katuwang dito ang DOST–*Science Education Institute* at ang *Philippine Science High School System* upang matugunan ang kakulangan ng mga siyentipiko at mananaliksik sa bansa.

Sa mga susunod pang panahon, ninanais ng kalihim na matupad pa ang ilang mga programa kasama ang *SMART Food Value Chain Program* upang tugunan ang suliranin sa napakaraming pagkalugi sa food production higit pa noong panahon ngb Pandemya; *Business Innovation through Science and Technology*; mabuo ang *Virology and Vaccine Institute of the Philippines*; at maisabatas ang Science for Change Program.

Pagkilala sa kahusayan

Bilang pagkilala sa mga nagawa ni Sec. Boy sa loob ng 43 taong pagtuturo sa kolehiyo at higit 17 taon bilang lingkod bayan ay nakatanggap na ng maraming parangal at pagkilala ang natatanging anak ng Bulacan, at kabilang rito ang mga sumusunod:

- Lifetime Achievement Award (UP Alumni Association, 2019)
- Civil Service Commission Dangal ng Bayan Award (2005)
- Ateneo de Manila Award for Government Service (2019)
- Doctor of Laws, honoris causa (UP, 2018)

Sadyang hindi matatawaran ang ipinakitang dedikasyon at kahusayan ni Sec. Boy sa iba't ibang larangan... nawa'y magsilbi ito bilang pamantayan at inspirasyon ng bawat isang nagnanais na mapagbuti ang pananaliksik sa agham at teknolohiya para sa ikauunlad ng bansa.

Sa likod ng tagumpay

Sa higit na apat na dekada, napatunayan na ang galing at kakayahan ni Sec. Boy na mamuno ng iba't-ibang institusyon at magkamit ng iba't-ibang parangal, subali't maituturing rin na matagumpay si Sec. Boy pagdating sa kanyang buhay-pamilya, bilang isang mabuting asawa, ama, at lolo.



Sec. de la Peña sa isang outreach program ng DOST-FNRI katuwang ang CDO Odyssey Foundation Inc. noong Pebrero 2022 sa Bulakan, Bulacan.

- Distinguished Alumnus Award (UP Alumni Engineers, 2004)
- Professional Commission Award (1999)
- Career Executive Service Board Award (2005)
- One of the 100 Outstanding UP Engineering Alumni of the Century (2009)

Si Sec. Boy ang butihing haligi sa tahanan ng kanyang may-bahay na si Mariquit Tablan Banzon. Ang kanilang pagsasama ay biniyayaan ng limang anak: si Margarita na isang doktora ng medisina, si Emil na isang beterinaryo, si Fortunato Jr. na isa rin propesor ng industrial design, si Miguel na isang an artist o alagad ng sining at negosyante,

at si Federico na isang engineering geologist.

Sa likod ng kanyang mga tagumpay, maituturing rin na ang buhay ni Sec. Boy ay puno ng kasiyahan na makikita sa kanyang mga kinagigiliwang gawain sa labas ng kanyang trabaho.

Batid ng mga kasamahan niya sa DOST, na si Sec. Boy ay isa rin mahusay na mang-aawit na maaaring ipantapat kay Barry Manilow sa kanyang pag-awit ng *"I write the songs"* na isa sa paborito niyang kantahin matapos ang opisyal na mga pagpupulong sa mga regional offices ng DOST.

At sa kanyang pagbisita sa mga proyekto ng DOST sa iba't-ibang rehiyon ay mababatid ang kanyang pagmamahal sa mga mag-aaral na nagsisikap tulad ng mga iskolar ng bayan mula sa iba'tibang sangay ng *Philippine Science High School* sa bansa. Madalas pa ay nagpapacontest siya sa mga ito sa pamamagitan



Sec. de la Peña habang kumukuha ng "selfie" kasama ang mga piling iskolar sa lalawigan ng Marawi.

ng pagtatanong ng mga bagay na may kaugnayan sa siyensya at teknolohiya, at ang premyo ay galing sa sariling bulsa. Ito ay isa lamang pagpapatunay na talagang pinahahalagahan niya ang kinabukasan ng mga kabataan.

Ngayon, sa pagtatapos ng kanyang termino bilang Kalihim ng Kagawaran ng Agham at Teknolohiya, ay mananatili ang mga ala-alang ito mula sa kanyang mga naiambag sa pagsulong ng siyensya, teknolohiya, at inobasyon at ang pagiging totoong tao ng isang Sec. Boy—ang huwarang anak ng Bulacan na nagsilbi sa bayan ng buong katapatan, walang alinlangan, na mag-iiwan ng mahalagang pamana sa mga susunod na mamumuno sa DOST at sa darating na henerasyon.



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