ISSN 0116-7766

VOL. XXXVIII NO. 4

S&T POST

OCT- DEC 2020

DOST-PCIEERD launches Startup Grant Fund Program

Sweet but not pure: DOST study shows 80% of honey sold in markets contain sugar syrup

DOST-PHIVOLCS urges construction of resilient houses for low-income households

Pisay rolls out new learning strategies amid COVID-19 pandemic

COVID-19: A public health crisis fought with additive manufacturing

SCIENCE EMPOWERMENT

www.science.ph
www.dost.gov.ph

Science empowerment is people empowerment

Usually, the fourth quarter issue of the S&T Post carries stories of what transpired for the entire year, composed of wrap-up activities of agencies and regional offices. But for this year 2020, despite the lowdown brought by the COVID-19 pandemic, the fourth quarter still became a banner issue as imprints of the first ever virtual celebration of the National Science and Technology Week made its mark.

First, this issue encapsulates the theme, "Science empowerment" as a fitting testament to the inherent force of science as an enabling tool for societal transformation with or without pandemic. In these pages are science stories that mirror the many innovation and discoveries showcased during the science week celebration through virtual exhibits, webinars, and online forums, that can create positive impact on the lives of many Filipinos.

True enough, science empowered by digital technology, enabled us to continue communicating science to the people in all media that include print, broadcast [via DOSTv] and online through social media.

As we continue to pivot towards the new normal, we remain true to publishing stories of substance in our magazine that included our SETUP proponents who survived and thrived amidst the pandemic; the adoption of the enhanced nutribun by communities; innovative learning tools rolled out by Pisay; math and science coursewares developed; textile sustainability technologies; the concert of bamboo musical instruments; and inspiring Pinoy scientists, to name a few.

Now, as we close 2020 amid uncertainty, we pledge our commitment to communicate with you as we tell more in-depth stories of how science changed people's lives for the better; of descriptive narratives that will feed our minds, touch our hearts, and nourish our souls, from here on.

NORLY B. VILLAR
Executive Editor

S&T POST
VOL. XXXVIII No. 4

Like us on Facebook

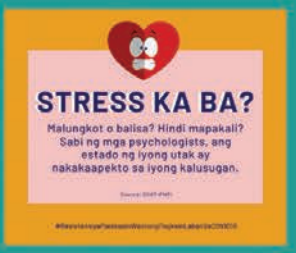
DOST-Science and Technology Information Institute
DOST-Philippines
Science and Technology Information Institute (Library)
DOST-STARBOOKS

papi Publishers Association of the Philippines, Inc.

The S&T Post is published by the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) with editorial office at DOST Complex, Gen. Santos Avenue, Bicutan, Taguig City.
Telefax: (02) 837-7520
Tel No.: (02) 837-2071 to 80 local 2148
Email: dost.digest@gmail.com

Visit:
www.stii.dost.gov.ph

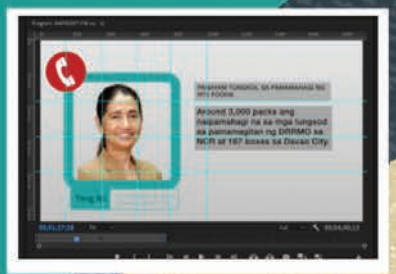
#BEATCOVID19

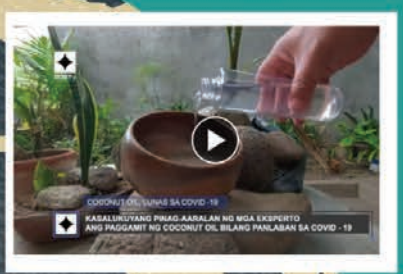


VIDEOS

PAGE 1/2

CLICK HERE





DOSTv
Science For The People

S&TPOST

ISSN 0116-7766 Vol. XXXVIII No. 4 OCT-DEC 2020

CONTENTS

ABOUT THE COVER

Our cover is a symbolism of how science empowerment drives growth and development. The light bulb, an iconic symbol of power, provides light, direction and clear vision for the path towards prosperity and success. It also reflects the concept of enabling energy that provides the spark to economic activity as represented by the growing plant growth.

Bigkisan at Damayan sa Gitna ng Pandemya:

DOST-FPRDI celebrates 63rd Anniversary

By Apple Jean C. Martin-de Leon, *DOST-FPRDI*

THE DOST-FOREST Products Research and Development Institute (DOST-FPRDI) celebrated its 63rd anniversary this year with a series of events that highlighted its commitment to better serve its clients in the midst of the pandemic.

"During these difficult days, we are witnesses to how the nation manages to stay afloat through social solidarity," said DOST-FPRDI Director Romulo T. Aggangan. "This year's anniversary celebrates the Filipino people's innate *bayanihan* spirit, as it also underlines the Institute's unwavering support to help the public battle the effects of COVID-19."

With the theme "Bigkisan at Damayan sa Gitna ng Pandemya", the anniversary is also a way of recognizing the DOST's contributions towards stopping the spread of the deadly virus. Anniversary events included the following:

Series of webinars on bamboo-framed face shield production

The Institute's Technology and Manpower Delivery Services Section (TMDSS) conducted weekly technology webinar on the DOST-FPRDI bamboo-framed face shield production until November.

Aside from the face shield production, other topics were tackled: charcoal production and briquetting, fossilized leaves processing, engineered bamboo production, handmade paper production, bamboo furniture making, wood and non-wood preservation and treatment, anti-microbial personal hygiene products, and basic finishing.

Continuing Professional Development (CPD) courses for forestry professionals

The DOST-FPRDI, thru the TMDSS, has recently been accredited by the Professional Regulation Commission as a CPD provider for forestry professionals. CPD units are required for foresters renewing their professional licensure cards.

Bamboo Musical Instruments (BMI) webinar and virtual concert

Fusing science with the arts, the BMI Webinar and Virtual Concert are part of the celebration of the country's indigenous music. The events aim to raise public awareness and appreciation for the cultural and socio-economic importance of BMIs.

Dubbed "Pantugtog Kawayan and Juan: Usapang Kultura at Kabuhayan", the webinar on 12 November 2020, had Datu Waway Saway of the Talaandig tribe and Prof. Siegfredo B. Calabig of *Banda Kawayan Pilipinas* as speakers.

Appreciation webinars were also held to showcase DOST-FPRDI technologies for interested entrepreneurs and start-ups. The last session on 28 October 2020 feature topics that aim to provide a deeper understanding of wood as used in construction and furniture, and an informative topic on wood panel products in the market.

Forest Products Research Chair Lecture

A public lecture on local handicraft producers was delivered by For. Jennifer M. Conda on 4 November 2020. Titled "Status of Community-Based Handicraft Producers in Selected Bicol Provinces", the lecture tackled some issues confronted by the handicraft makers, as well as possible interventions to help them.

Inauguration of new DOST-FPRDI facilities

Two new DOST-FPRDI facilities were launched on 3 November 2020 — the Forest Products Innovation Center (FPIC) and the Bamboo Musical Instruments (BMI) Processing Facility. The FPIC will house modern equipment and innovative products on furniture, handicraft and construction.

The BMI Processing Facility, meanwhile, will feature a mini museum where students, ethnic music enthusiasts, and the public can appreciate the bamboo instruments, as well as the technologies that will improve their production.

The Technology Business Incubator marker was also unveiled on the same day.

For more information, please check DOST-FPRDI's official Facebook page (www.facebook.com/fprdi), or at info@fprdi.dost.gov.ph or fprdi@dost.gov.ph.

DOST-PCIEERD launches Startup Grant Fund Program

Text and photos from DOST-PCIEERD

THE DEPARTMENT of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) officially launched the Startup Grant Fund Program at the 4th Technology Business Incubator (TBI) Summit, one of the major events at this year's Philippine Startup Week.

DOST Executive Director Dr. Enrico Paringit disclosed that the Startup Grant Fund Program is the Council's response to the demand for quick and rapid solutions adapting to the "new normal."

"We hope to support startups with technology-based solutions that can potentially contribute to economic rebirth of our country. By supporting the creation or deployment of more post-COVID-19 products and services, we are looking at opportunities to provide additional jobs, raise revenue, and attract local and foreign investment," he said.

Paringit said the Startup Grant Program will provide funding opportunities for innovative startups for their research and development (R&D) activities as they develop solutions in line with the program theme "Jumpstarting the Economy in the New Normal".

He said the program intends to provide a fund mechanism that would support local startups, help them focus on providing solutions that are relevant to the needs of the people, and reinvigorate the economy during this post-COVID situation with provisions for the funding support, aligned with the Innovative Startup Act of 2019 (RA 11337).

The Startup Grant Fund Program is established to overcome R&D roadblocks by means of prototype improvement, conduct of feasibility studies, development of product specifications, as well as validate user requirements, to strengthen their intellectual property (IP) by means of protection and development of the appropriate IP strategies.

It also aims to help startups establish initial market traction and engage one (1) or two (2) potential users and/or clients for feedback/ validation, to refine their business model based on the user and/or client feedback in order to establish acceptable product offerings or service packages with defined pricing and financial metrics, and lastly, to prepare business continuity plans for operations, expansion of IP protection in other countries, as continuous marketing programs.

The Program shall organize startups who will provide automated, digitalized, and contactless solutions under the following areas of concern:

DOST-PCIEERD Executive Director Dr. Enrico Paringit announcing the renewal of the Startup Grant Fund Program during the DOST TBI Virtual Summit last 24 November 2020.

- Sustainable Industries - Technologies intended to fill in the gaps in the value chain of critically important industries to increase productivity, reduce costs and facilitate production and distribution of goods in the new normal.
- Supply chain and logistics management - Technologies that reduce dependency on physical labor across transportation, logistics and warehousing; platforms for online matching and delivery of goods from source to point of use.
- Learning/Education - Technologies in support of remote learning, distance education, and online learning in response to the surge in online teaching in schools and universities.
- Work from home productivity tools - Productivity tools that remote workers can use for connection, collaboration, workforce monitoring, time management, etc.
- Content and talent development - Tech support for content and talent development, infusion/ enhancement of new digital tools and technologies, marketing and customer engagement activities.
- Digitally empowered-tools for public service - Digital tools that will enable government agencies to consistently deliver public services at a faster rate, a wider reach but with enhanced accuracy and transparency.

Paringit said the DOST shall issue the new guidelines for the Startup Grant Fund that is now more aligned to the provisions of the Innovative Startup Act.

He said public consultations will be conducted by DOST with the startups and startup community this December in Luzon, Visayas and Mindanao.

"With the new guidelines in place, DOST-PCIEERD shall start officially accepting proposals for the Startup Grant Fund Program starting December 2, 2020 until February 1, 2021, we will be announcing the first batch of grantees of the new Startup Grant fund by May 2021," he said.

In 2017, DOST-PCIEERD was the first to provide R&D grants amounting to PhP 66 M to 15 startups for them to overcome their R&D roadblocks, validate their products/services, strengthen their Intellectual Property, and refine their business model.

This enabled the 15 startups to collectively acquire 328 clients, generate PhP 84 M in revenues, raise PhP 45 M investment, and create 142 jobs. With the passage of the Innovative Startup Act (RA 11337), the other DOST Councils and agencies will also be implementing their own Startup Grant Program to cover more sectors and cater to more startups.

The Philippine Startup Week is an annual celebration organized by DOST, DTI (Department of Trade and Industry), and DICT (Department of Information and Communications Technology), in partnership with QBO Innovation Hub and the startup community.

This year, the TBI Summit featured keynote messages and panel discussion of different local and international startups and startup enablers anchored on the theme "Building a Sustainable Startup Ecosystem in the Midst of the Pandemic".

DOST-MIMAROPA promotes basic research, looks at local issues in the region

By: Charlotte F. Pizarras & Kathy Lynn Bolataolo, *DOST-MIMAROPA*

Screenshot from the Regional Basic Research Caravan with NRCP Executive Director Marieta Bañez Sumagaysay (upper right), DOST-MIMAROPA Regional Director Dr. Ma Josefina Abilay (lower left), and Marinduque Governor Presbitero Velasco Jr (lower right).

MIMAROPA STATE Universities and Colleges (SUCs), Local Government Units (LGUs), and various government and private institutions recently convened for the NRCP Regional Basic Research Caravan held virtually.

The caravan was a collaboration between the Department of Science and Technology-MIMAROPA (DOST-MIMAROPA) and the DOST-National Research Council of the Philippines (NRCP) conducted on 17 November 2020 as part of DOST-MIMAROPA's celebration of the 2020 National Science and Technology Week in MIMAROPA.

Under the banner of "Nurturing Regional R&D Niches," it is aimed at promoting the importance of basic research and strengthening regional collaboration for research and development (R&D) in the region.

DOST-MIMAROPA Regional Director Dr. Ma. Josefina Abilay shared in her welcome remarks how science and technology and research and development have been beneficial in coping with the recent struggles due to COVID-19 and other hazards, and how it can help address many more concerns and issues, when strongly reinforced in the future.

In her speech, DOST-NRCP Executive Director Dr. Marieta Bañez Sumagaysay highlighted the importance of aligning the region's fundamental research priorities to the National Integrated Basic Research Agenda (NIBRA) under the 2017-2022 Harmonized National Research and Development (HNRDA). NIBRA provides the roadmap for the basic research in the country.

In the presentation led by DOST-MIMAROPA, the MIMAROPA R&D Agenda has already prioritized the following research areas: NIBRA, Health, Agriculture, Aquatic Natural Resources Sector (AANR), Industry, Energy and Emerging Technology, and Disaster Risk Reduction and Climate Change Adaptation in line with the HNRDA.

Among the highlights of the caravan is Governor Presbitero J. Velasco Jr.'s talk about the importance of an evidence-based policy making in the province. He emphasized that decision-making should be independent from political and external influences but based on available and reliable data and evidence. This signifies the need for more research studies that the local government units can use as basis for development of policies for the region.

Local R&D Issues in MIMAROPA

Part of the program also centered on the identification of local issues in the five provinces of MIMAROPA to generate possible R&D projects and/or programs that can be implemented in the region.

Through an online self-administered survey, participants from various institutions in the region were asked to define the unmet needs in their localities and their importance under the sectors of SAKLAW (sustainable communities), LIKAS (health sufficiency), TUBIG (water security), SAPAT (food and nutrition security), ALERT (clean energy), and ATIN (inclusive nation building).

Results showed that some of the identified needs in the region are industry-related researches especially for priority commodities, healthy product development from farm produce, sound nutrition program for marginalized communities, and utilization of clean and renewable energy as source of power in rural communities.

To overcome the identified needs, the participants recognized the importance of conducting a dialogue between the academe, industry, and stakeholders to pay significant attention and participate in R&D undertakings. They also noted that government agencies like DOST has been encouraging the academe to conduct research within the priority R&D agenda in the region including the provision of research funding.

Call for more researchers, R&D leaders

Dr. Sumagaysay also revealed that the caravan seeks to promote and encourage membership to DOST-NRCP to expand the pool of researchers and experts in MIMAROPA.

DOST-NRCP is a collegial body, research council, and advisory body to the government that is mandated to promote and support fundamental or basic research.

It is also looking for more R&D leaders under the DOST Science for Change Program (S4CP) as its implementing agency. The R&D Leadership Program aims to strengthen the research and development competencies of HEIs, SUCs, and Research and Development Institutes (RDIs) by engaging R&D leaders or experts to extend their proficiencies and assist institutions in different R&D activities. The program also complements the Niche Centers in the Regions for R&D (NICER) Program, which is also under the S4CP, by allowing R&D leaders to help in activities significant for the establishment of R&D centers from crafting of proposal for funding to temporary management of the facilities until it become self-reliant and sustainable.

In MIMAROPA, the Philippine Native Pig Research, Development, and Extension Center in Marinduque State College was already established under the NICER Program.

New studies in the region

The caravan served as an avenue for bringing the result of DOST-NRCP-funded research to the region, allowing for increased relevance of knowledge generation and innovation.

DOST-NRCP gave Dr. Decibel F. Eslava from the University of the Philippines Los Baños an opportunity to present the result of her study titled "Paleomagnetism of the Amnay Ophiolite Constraining the Translation History of a South China Sea Oceanic Fragment."

According to the result of their study, Amnay ophiolite originated in the South China Sea. They also found out that older rocks like the Guinlo formation and Mansalay formation which is approximately 130 million and 160 million years old, respectively, came from at least 20 degrees latitude. Meanwhile, rocks from the Cretaceous period such as the Mangyan ophiolite came from nearly the equator.

Amnay is a major river within the watershed areas situated in Sablayan, Occidental Mindoro. The result of the study would further provide significant information necessary for the advancement of geochronology and arriving at solutions for contemporary environmental issues.

Dr. Decibel F. Eslava's Presentation on "Paleomagnetism of the Amnay Ophiolite Constraining the Translation History of a South China Sea Oceanic Fragment."

2020 Inventors' Week generates new health essentials for COVID-19

By Jund Rian A. Doringo, *DOST-TAPI*
Photos from DOST-TAPI

THE LAST leg of the 2020 National Inventors' Week (NIW) concluded with the Department of Science and Technology (DOST)-developed and -assisted technologies in response to the ongoing coronavirus disease (COVID-19) pandemic on 27 November 2020.

In collaboration with the Filipino Inventors' Society (FIS), Inc. and the Technology Application and Promotion Institute (DOST-TAPI), the 2020 NIW is a series of webinars that inspires inventors and would-be inventors to develop inventions and innovations in the new normal.

As the impact of COVID-19 shook the world with its great threat to public health, it has also triggered the global economies to reassess the strategies on crisis management as the search for the cure and vaccine continues.

The sixth and last episode featured the new health essentials for the new normal – facemask, face shield, hand sanitizer, and specimen collection booth.

When wearing face masks became mandatory, the Philippine Textile Research Institute of the Department of Science and Technology (DOST-PTRI) immediately developed the REwear facemask technology which conforms to the standards set by the World Health Organization.

"The innermost layer is absorbent, the middle layer consists of two pieces of fabric for additional filtration capability while the outer layer is water-repellent to prevent the absorption of liquid droplets that may contain microbes and viruses," said Dr. Julius L. Leaño, Chief Science Research Specialist of DOST-PTRI during the first session.

The compulsory wearing of face shields came next to provide another protective layer from the virus.

This prompted the DOST-Metals Industry Research and Development Center (DOST-MIRDC) to act fast and shifted the production of face shield frames through plastic injection technology and ramped up the production by up to 50,000 pieces per day from the initial 50 pieces.

"One of the biggest advantages of 3D printing is rapid prototyping - the ability to design, manufacture, and test in as little time possible," said Engr. Denise Daryl A. Florante, Science Research Specialist II of DOST-MIRDC during the second session.

Speakers of the 2020 NIW webinar series on 27 November 2020

Furthermore, hand sanitizing became a norm to adapt to a new way of life to keep the virus at bay.

The DOST-Industrial Technology Development Institute (DOST-ITDI) through Jan Rotsen Kyle A. Delos Santos, Science Research Analyst, quickly responded by preparing a step-by-step instructional video on making hand sanitizers as an alternative to hand washing during the third session.

Lastly, the Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD) Executive Director Dr. Enrico C. Paringit tackled the support given in designing the specimen collection booth as an aid to frontliners in conducting mass testing.

All of these new health essentials for the new normal are a testament to Filipino inventiveness and ingenuity in this trying time.

DOST-TAPI Director Edgar I. Garcia emphasized the Institute's programs for the Filipino inventors in his closing remarks.

"We have crafted technical assistance and financing schemes and options for the best interest of our local inventors in intellectual property protection, enterprise development, prototyping and market testing, and laboratory tests, to name a few," said Director Garcia.

UP researchers develop low-cost air quality monitor

Text and photo from DOST-PCIEERD

RESEARCHERS FROM the University of the Philippines Diliman (UPD), in partnership with the Department of Science and Technology -Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD), has locally developed a low-cost, high-quality aerosol monitor to help find ways in minimizing air pollution in the cities.

Spearheaded by Dr. Len Herald V. Lim, the Robust Optical Aerosol Monitor or Project ROAM was initiated to measure particulate matter concentration in the air. It provides crucial information to create policies and programs for environmental protection.

"ROAM units use a different method in detecting particles that does not require the manufacture/fabrication of specialized parts typical of contemporary commercial instrumentation. This allows a much lower production cost, smaller maintenance requirement, and an exclusive research chain," said Dr. Lim.

The team has already produced 10 optical aerosol monitors. Four of these have been verified for performance through collocation experiments with aerosol equipment used by the Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB) while the remaining six are being tested for performance and will be subject for stricter collocation experiments when conditions permit.

The ROAM team is now exploring the creation of a spin-off company through DOST-PCIEERD's Funding Assistance for Spinoff and Translation of Research in Advancing Commercialization or FASTRAC program to help advance the commercialization of their technology and bring this citizen science project to the community.

DOST-PCIEERD Executive Director Dr. Enrico C. Paringit expressed hope that the technology can be adopted by local government units who want to improve their area's air quality through scientific means.

"As leader and partner in enabling innovations, we encourage our researchers for coming up with cutting-edge solutions to solve major environmental and societal issues. This technology is one significant stride in our path towards improving air quality. Now is a good time for cooperation with our innovators to adopt this solution to protect our future," Dr. Paringit said.

The latest version of aerosol monitor unit developed by the University of the Philippines Diliman

Close-up images of the cyanobacteria (dark brown) and sponges (light gray) overgrowing corals (light brown) resulting from the nutrient buildup in Tubbataha Reef.

Enhanced monitoring to protect Tubbataha Reef seascape needed, says marine scientists

By Allyster A. Endozo, *DOST-STII*

MARINE SCIENTISTS from the De La Salle University (DLSU) Manila found ways to preserve the wonders of the Tubbataha Reefs Natural Park as they also warned that continued nutrient buildup can greatly reduce the coral cover and diversity of the reef in the coming years.

The Tubbataha Reef in the Sulu Sea is globally renowned for its high coral diversity. Recently, however, its status as a global benchmark for reef conditions within a marine protected area is under threat by notable changes in its residing species.

"These changes are small but significant and may presage a continuing decline in corals," said Dr. Wilfredo Y. Licuanan, a biology professor at DLSU and the founding director of the Br. Alfred Shields FSC Ocean Research Center.

Hard coral cover in four study sites shrunk by 1.1% per year from 2012 to 2019, as algal cover expanded by 1.9% over the same period. Rocky spaces for coral growth are steadily being overrun by sponges and cyanobacteria or "blue-green algae."

Shifting conditions are most consistently seen at the South Atoll, where lagoon waters drain through during low tide. The atoll, which is already prone to damage from drifting logs and metal buoys, is also exposed to rising ocean temperatures and acidity.

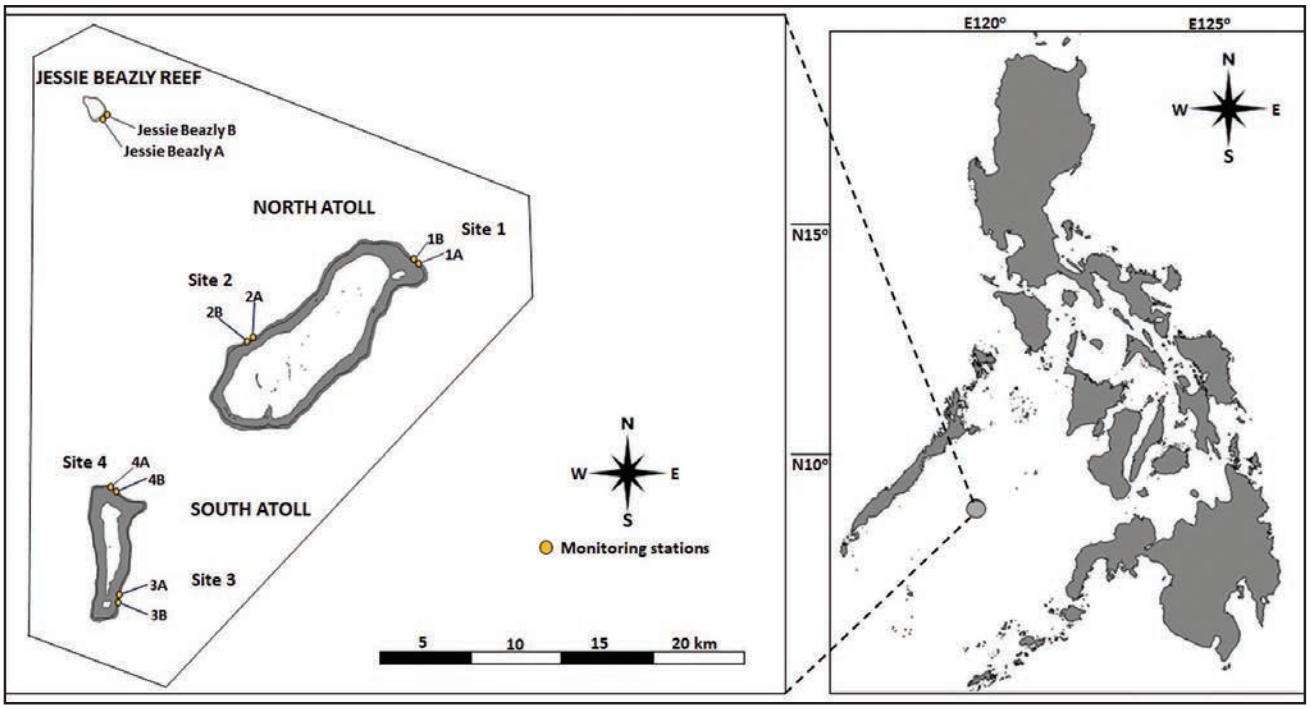
These low-key changes may indicate that the area is slowly becoming "eutrophic," wherein buildup of nutrients from "guano" or seabird droppings would trigger the bloom of species that can seriously affect coral survival, growth, and reproduction.

Sponges and algae can outcompete coral larvae for space to settle and impair the photosynthesis of symbionts that supply oxygen to corals, while the crown-of-thorns starfish aggressively feed on coral polyps.

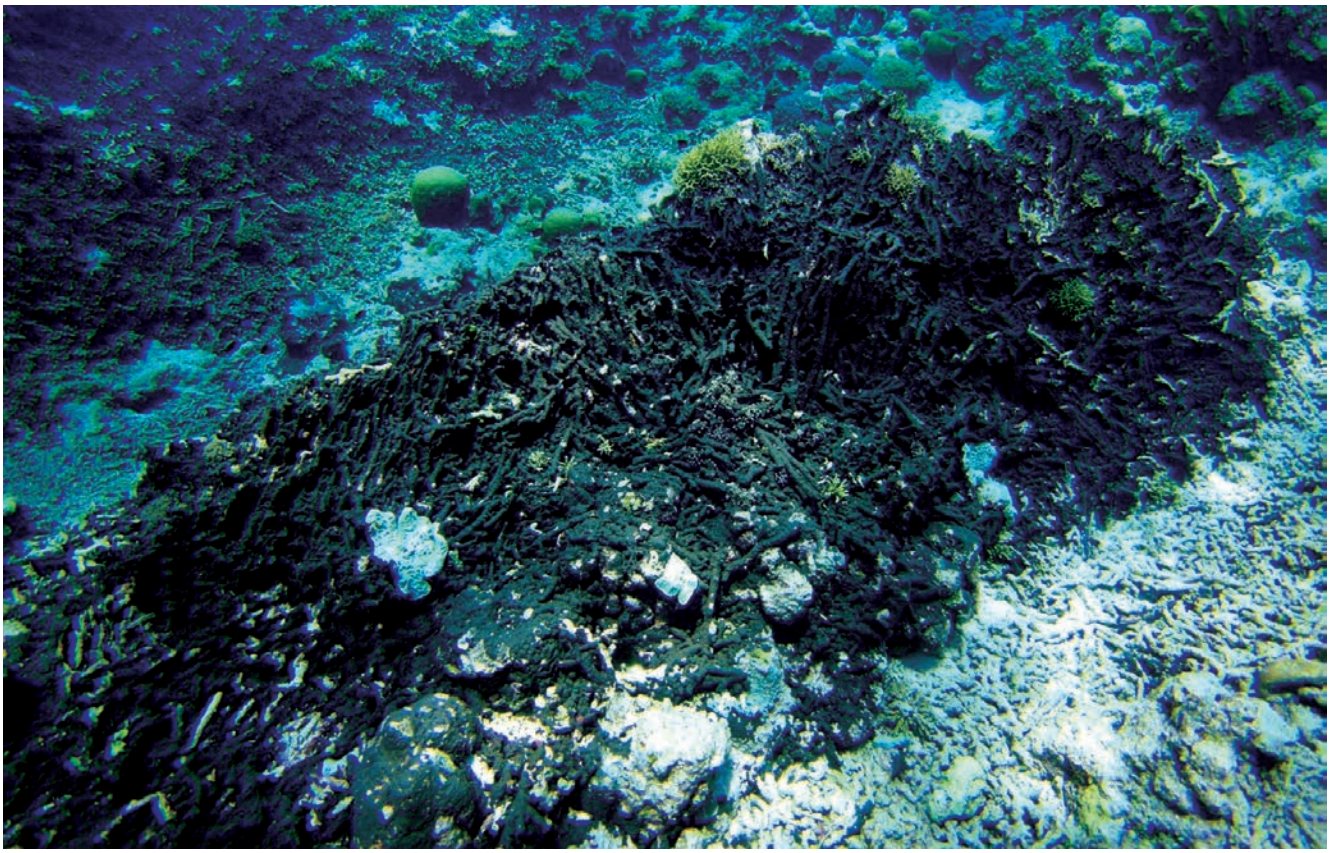
Despite this alarming development, Dr. Licuanan is confident that the Tubbataha Reef—with its large size, a considerable population of algae-grazing species, and a high level of larval connectivity—can manage to withstand such risks.

Enhanced monitoring and management practices, he believes, would be the key—even amid the disruptions brought about by the COVID-19 pandemic. "Fortunately, the Tubbataha Management Office was able to continue the monitoring, but they require the help of additional scientific expertise and instrumentation."

The full article of the study "Changes in Benthic Cover in the South Atoll of Tubbataha Reefs due to Possible Eutrophication" will be published online by the Department of Science and Technology in Vol. 150 of the Philippine Journal of Science (philjournalsci.dost.gov.ph). The photos were taken from the said paper.



Map shows the Tubbataha Reefs Natural Park and study sites.



A patch of coral-killing sponge (dark gray; measuring about 5 m x 1 m) sustained by the nutrient buildup in Tubbataha Reef.

Sweet but not pure:
DOST study shows 80% of honey sold in markets contain sugar syrup

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

RESEARCHERS FROM the Department of Science and Technology-Philippine Nuclear Research Institute (DOST-PNRI) found that about 80% of honey products sold in groceries, souvenir shops, and online platforms were not pure honey.

This was revealed using the nuclear-based tests showing honey products contain syrups made from sugar cane and corn. This fraudulent practice allows manufacturers to increase the volume of their products while reducing the production costs.

"62 out of the 76 (82%) of honey brands that were found to be adulterated were composed of 95% C4 sugar syrup. So, they are not actually adulterated but they are just completely purely sugar syrup," said DOST-PNRI's Dr. Angel T. Bautista VII.

Dr. Bautista explained the extent of impure honey proliferated the Philippine market. According to him, 12 out of 16 or 75% of local honey brands sold either in groceries or souvenir shops are not entirely honey. In addition, a staggering 87% or 64 out of 74 of local honey products sold online are impure. Lastly, from 41 imported honey products marketed in local stores, none of them were found to be adulterated.

"The problem is that people are being tricked," Dr. Bautista remarked. "You may be buying honey for its wonderful health benefits, but because of adulteration, you may actually just be buying pure sugar syrup. Consuming too much pure sugar syrup can lead to harmful health effects," he added.

Impure honey can seriously damage the local industry for it can pull down the price of honey. Fake honey can be sold as low as one-third of the original price of the authentic honey.

"Imagine, incomes that are supposed to be for our honest beekeepers and honey producers are being lost instead due to adulteration and fraud. This is affecting our local honey industry so badly that we estimate that they are losing PhP 200 million per year," Dr. Bautista lamented.

According to the Philippine National Standard for Honey of the Bureau of Agriculture and Fisheries Standards, honey sold in the market must not have any food additives and other substances. If so, any substance added to the mixture must be declared in the label. Moreover, the geographical location where the honey was sourced should be written in labels.

Busy bees keep the honey industry in the Philippines alive (Photo from Pexels.com).

Nuclear science fights food fraud

Honey is one of the most common food items being replicated all over the world. While its demand can make honey farming a promising business, it also became a subject of fraudulent production.

The DOST-PNRI researchers came up with these surprising, sobering findings through the stable carbon isotope ratio analysis.

This type of analysis allows researchers to see isotopes – elements with same number of electrons and protons but different number of neutrons – which can give clues on the origin of the substance. If honey is authentic, its protein content will show carbon isotopes that match those of flowering plants and bees. However, adulterated honey will have carbon isotopes which can be traced from sugarcane and corn.

"The carbon-13 signature is like a fingerprint of honey and common adulterants like sugarcane and corn are completely different from each other. Therefore, we can differentiate one from the other. This unique isotopic signature is what we are using to tell if honey is authentic or fake," Dr. Bautista explained.

The carbon-13 he refers to is the stable isotope of carbon. The carbon-13 in a substance like honey can be used to trace the biological processes it went through.

To make honey, the bees start with sipping nectar from flowers using their straw-like tongue called proboscis. The enzymes in their gut will then process the nectar. Once done, they will vomit it and pass on to other bees of their colony. This process called regurgitation turns complex sugars of nectar into simple sugars. Next, they will store the regurgitated nectar in their hive and reduce its water content by flapping their wings. To cap it off, they will cover it with beeswax to complete the honey-making process.

These processes have fingerprints of carbon isotopes which are important for checking the authenticity of honey.

Dr. Bautista and his team has already forwarded their findings to the Department of Agriculture and the Food and Drug Administration.

"If we just release the names of the companies, they may stop for a while. But no one can stop them from faking honey again in the future. If we incorporate these isotope-based standards into our regulatory system and the Philippine National Standards, then we think it will be long-lasting solution to this problem," Dr. Bautista reported.

They also call for stricter policies, regulation, and control measures to protect the honey industry and buyers.

Dr. Bautista leads a laboratory which studies application of nuclear and isotope techniques in the environment, geology, and food authentication. Joining him in this study are Marco R. Lao and Norman DS. Mendoza, also from DOST-PNRI, and Dr. Cleofas F. Cervancia, a retired professor at the University of the Philippines Los Baños (UPLB) who previously led its Bee Program. They presented their DOST-funded study at the Philippine Nuclear Research and Development Conference, which was held online during the Atomic Energy Week of DOST-PNRI on 09 December 2020.

Honey is known for its anti-microbial, anti-diabetic, and wound-healing properties (Photo from Pixabay.com).

DOSTv
Science For The People

MONDAYS | 5PM

YOUR SCIFLIX! SINESIYENSYA

HOW MUCH DO YOU PAY WITH YOUR FLIX SUBSCRIPTIONS? NO MONTHLY SUBSCRIPTION AND NO LIMITED TRIALS. DOSTv OFFERS BINGE-WORTHY STORIES OF HOW SCIENCE BENEFITTED FILIPINOS. CHILL AND LEARN WITH SINESIYENSYA, YOUR SCIFLIX AT YOUR FINGERTIPS.

WEDNESDAYS | 5PM

EXPERTALK ONLINE

DO YOU WANNA BE IN THE KNOW ON SCIENCE MATTERS? GET IN TOUCH WITH THE EXPERTS TO GIVE YOU FACTUAL AND RESEARCH-BASED INFORMATION AND RECOMMENDATION TO HELP MAKE SENSE OF RELEVANT ISSUES.

FRIDAYS | 4PM

LEGIT S&T NEWS
DOST REPORT

TIRED OF FAKE NEWS? ARE YOU LOSING CONFIDENCE WITH THE GOVERNMENT? HERE IN DOST WE ONLY STRIVE TO HELP THE FILIPINO PUBLIC, ALL NEWS BASED FROM FACTS AND THOROUGH RESEARCH! STRAIGHT FROM THE DOST SECRETARY, LEARN MORE ON WHAT DOST HAS TO OFFER ONLY HERE ON DOST REPORT.

@DOSTvPH
www.dostv.ph
dostvscienceforthepeople

S&T virtual exhibit opened to the public in 29 November

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

In recent years, the exhibition of the latest innovative technologies and services plus having the chance to meet our science heroes is the main reason why the staging of the National Science and Technology Week (NSTW) has been a regular box-office hit.

However, as we are in a middle of pandemic with various health and quarantine protocols, including the restriction on mass gathering, the traditional way of celebrating NSTW did not happen this year.

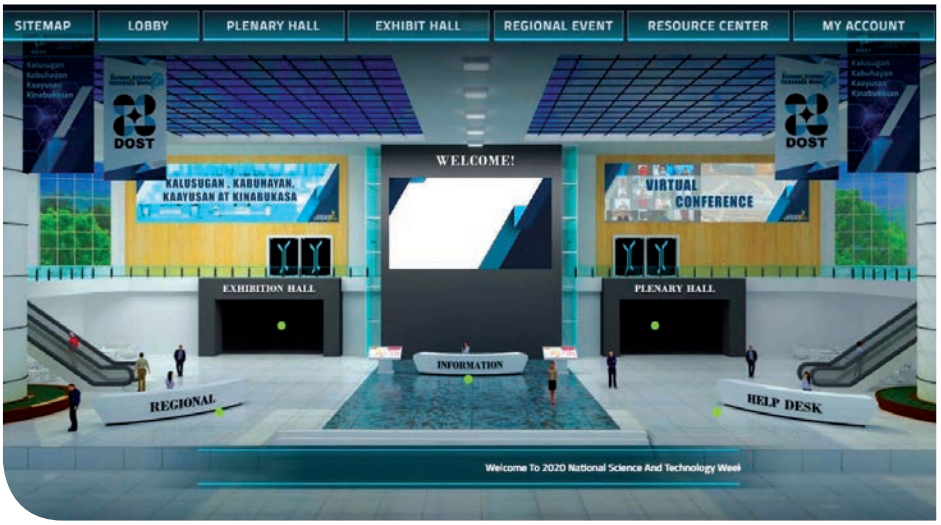
Despite these limitations, the Department of Science and Technology (DOST) has found alternative way and due to the advancement in technology, we continued to enjoy the NSTW.

Starting November 23 to 29 November 29, all DOST agencies and regional offices as well as partners from the academe and private sectors gave the public the opportunity to explore and navigate through the virtual exhibit with their respective innovative technologies and services.

Hosted in the NSTW website, the virtual exhibit was divided into four thematic clusters: Kalusugan, Kabuhayan, Kaauyusan, at Kinabukasan, that are aligned with the framework of the Bayanihan to Heal as One Act.

The virtual exhibit, was accessed through the link https://nstw2020.dost.gov.ph/. It had a registration button that directed the vistors to the convention- type lobby, wherein one would see different buttons such as Plenary Hall and, most important of all, the Exhibit Hall.

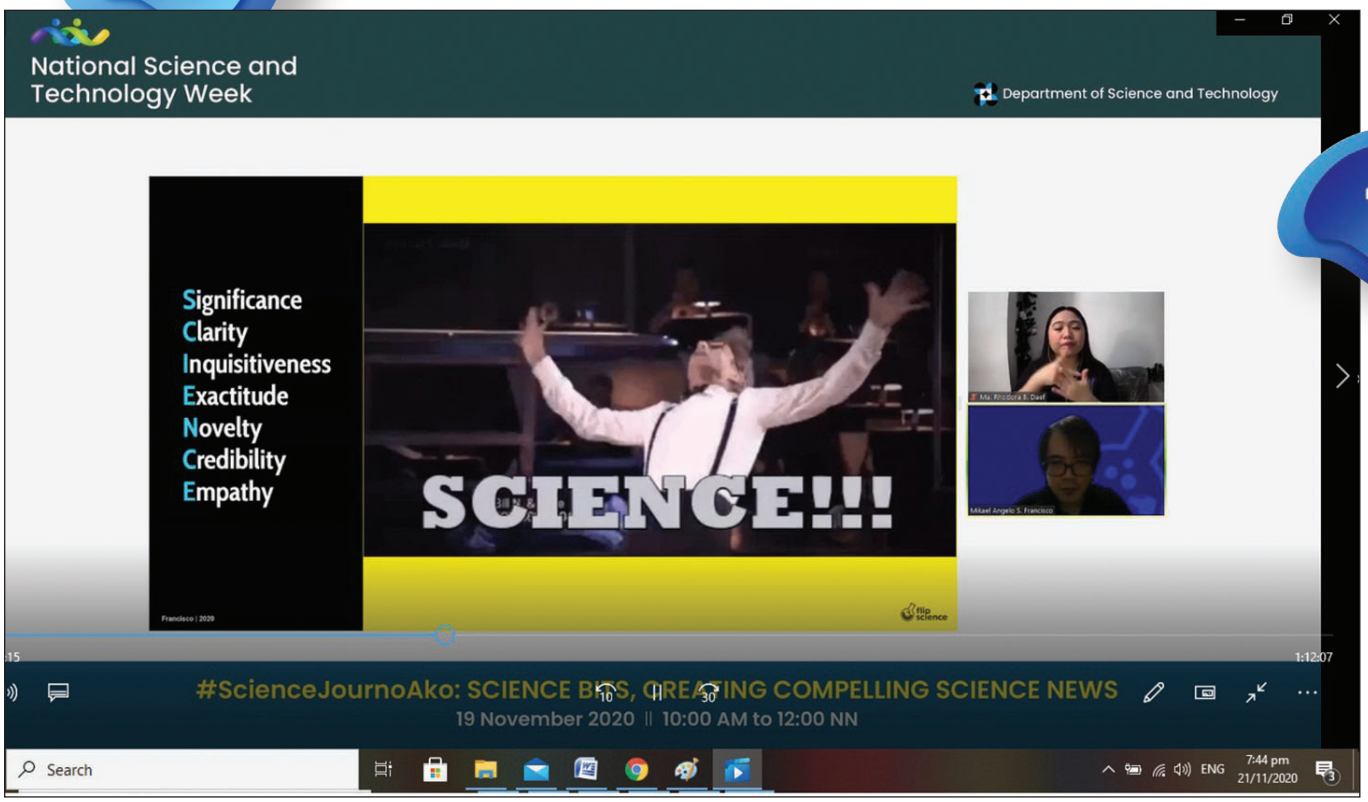
Once inside the Exhibit Hall, online participants were able to visit, navigate, and access all relevant information and knowledge about the different DOST technologies and services featured in four exhibit clusters.

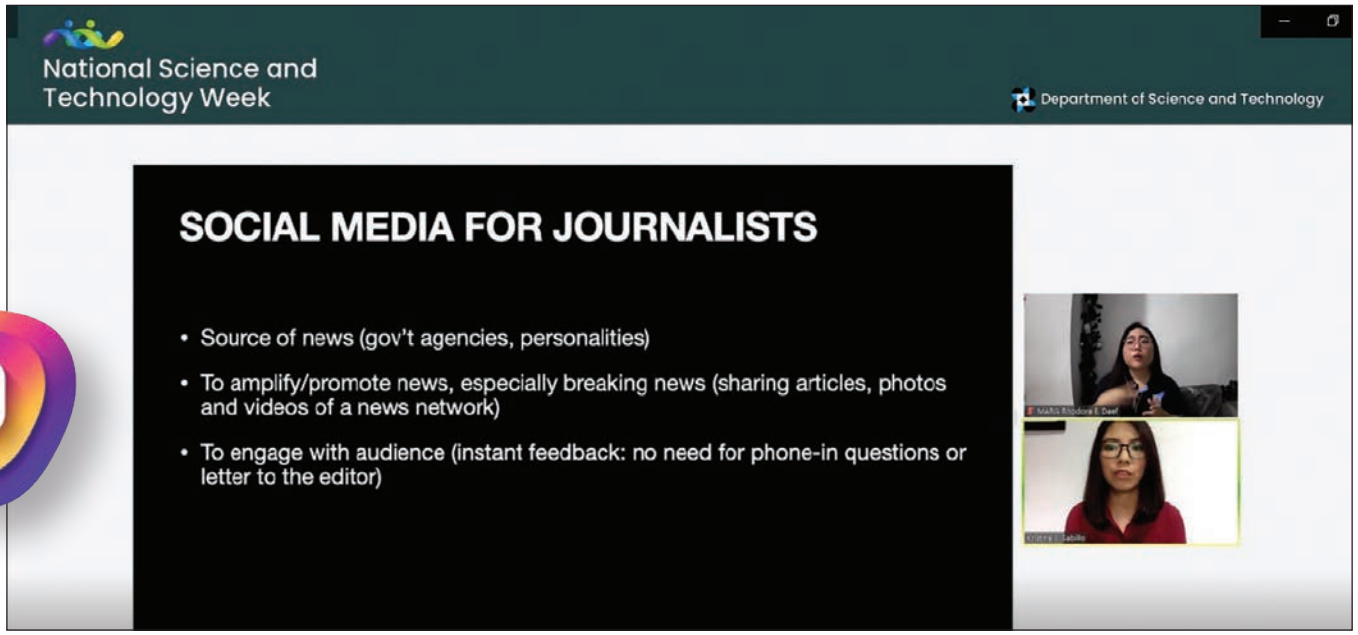


The latest innovative technologies and services developed by the DOST agencies and regional offices as well as their partners from academe and private sectors were featured in the virtual exhibit of the 2020 National Science and Technology Week (NSTW) celebration from November 23 to November 29.

For the Kalusugan cluster, technologies and services related to the Bamboo Use Redefined, New Normal Necessities, and Modern Textile were highlighted. For Kabuhayan cluster, there were services and products focused on providing rural livelihood and industrial innovation in metals and engineering and more. Technologies related to emergency foods, hazard and risk assessment, smart agricultural technology, and transport system technology bannered at the Kaayusan cluster. Lastly, Innovative Learning Tools were the main attraction of the Kinabukasan cluster.

There were available chat operators for each technology and product that was featured in the virtual exhibit from 9:00 AM to 6:00 PM.





With less than a week before the 2020 National Science and Technology Week (NSTW) celebration, the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) offered free e-learning sessions for students and media on 19 November 2020 that enhanced their knowledge in creating compelling S&T related content suitable for social media. A sign language interpreter was also employed to allow those with physical disabilities to learn from the webinars. (Screencap from Science Journo Ako Facebook page)

DOST info office conducts mobile journalism webinar for students and media

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

With few days remaining before the start of the 2020 National Science and Technology Week (NSTW) celebration, the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) spearheaded two succeeding e-learning sessions for college students and traditional print and broadcast media on 19 November 2020.

It was a build-up activity for the virtual 2020 NSTW celebration from 23 to 29 November with the theme "Agham at Teknolohiya: Sandigan ng Kalusugan, Kabuhayan, Kaayusan, at Kinabukasan."

These e-learning sessions aim to capacitate future science journalists and traditional media practitioners in maximizing the use of various social media platforms such as Twitter, Facebook, and Instagram effectively; particularly in writing and reporting S&T related topics and discussions.

The first webinar centered on enhancing student-participants' skills in creating stunning visual designs complementing their short science news. Titled #ScienceJournoAko: Science Bits, Creating Compelling Science News, FlipScience co-founder Mikael Angelo S. Francisco shared numerous tips with the student-participants to produce compelling social media publishing materials promoting S&T benefits.

"Finding a story angle is very crucial especially if we want to get the interest of your target audience and by doing that, you have to do some research works such as interviewing the authors, finding existing information related to the study or the topics that you're discussing," said Francisco.

Meanwhile, he also said that in creating S&T promotional materials, regardless of the platforms, the presentation makes a difference. If writing is your strength, write down your material because if you have found the medium you are most comfortable with, you can see yourself enjoying producing science-related content.

"People will read an article that is relevant, exciting, accessible, and digestible. With this, it gives your audience a reason to keep them invested in reading it. It can be done if you can answer the "so what?" question and it can be accessible in more than one way," said Francisco.

After his presentation, Francisco provided a short demonstration on creating stunning social media materials using free online editing software Canva.

"Science communicator's greatest enemy is your own ego. It is not your job to look like a great expert; if you're trying to make yourself look smart, you're only boosting your ego. If you want to look smart instead of making people understand science, you're not doing your job right," Francisco reminded the student-participants and all the aspiring science journalists and content creators.

Meanwhile, the afternoon session focused on helping traditional media members learn how their science-related reports and information could be suitable for social media platforms such as Twitter, Facebook, and Instagram or could be translated into bite-sized content.

Kristine S. Sabillo, an experienced multimedia reporter from ABS-CBN, shared various tips and techniques to our media-participants who usually create a 400 plus article or a 60-seconder worth of broadcast spiel, to convert it as well into a less than 140 characters report and complement it with relevant photos or videos.

"Twitter is very useful when it comes to news because most media organizations are using it, and its followers and users are usually looking for breaking news. Aside from Twitter, it provides real-time information such as live-tweeting of a significant event, "explained Sabillo.

Sabillo shared several tips on how to get a following in Twitter as a journalist. It includes tweeted interesting and helpful news regularly because people would like to be informed, post photos and videos to provide visual appeal, and show a bit of personality.

She also reminded the media-participants that in tweeting a story, always remember the news values principle, which involves impact, timeliness, prominence, proximity, oddity, conflict, and exclusivity.

"For my fellow science journalists and reporters, it is a perfect opportunity right now to explore and adapt to new technologies such as social media so that we can serve our target audience much better, especially in sharing the efforts and initiatives of our scientists and engineers to address some of country's pressing issues," said Sabillo.

The participants' workshop outputs sourced out from virtual activities lined up during the 2020 NSTW celebration.

DOST-PHIVOLCS urges construction of resilient houses for low-income households

Photo from www.habitatforhumanity.org.u

By Jachin Jane O. Aberilla, *DOST-STII*

At the Disaster Resilience Summit on 24 November 2020, DOST-PHIVOLCS Officer-In-Charge and DOST Undersecretary Renato U. Solidum Jr. urged the need to update the building code of the Philippines to adapt to the current times.

During the summit's open forum, USec. Solidum said that by law, the local government should be in charge of inspecting the different buildings and houses constructed in its localities. However, the capacity of the local governments is not enough to be doing this.

"It is important to revisit the Philippine Building Act or the former Philippine Building Code to ensure that structures are more resistant to calamities. The act should also adopt the emerging technologies available on building structures and houses," Solidum said.

He added that the problem with the current building code is it was enacted in the 1970s and needs to be updated. Consequently, there is an existing proposal in the lower house that proposes a framework of buildings that is resistant to earthquakes, typhoons, and climate change. However, the changes in technology and the standards will be separated from this new law.

"In terms of the structural code of the Philippines, pwede kang maging flexible sa paggamit ng new technology. Kahit hindi pa updated ang batas, puwede na gumamit ng new technology," Solidum added.

The DOST Undersecretary for Scientific and Technical Services also emphasized the need to educate people on the standards of construction for the safety against earthquake shaking and wind forces.

"Unless the people are educated on the basic standards, then we will see a lot of houses using below standard materials like hollow blocks at bakal. Alam n'yo po ba na ang dapat na minimum standard size ng hollow blocks ay six inches. Pero marami po d'yan na four inches lang ang ginagamit. At ang bakal dapat ay 10 millimeters. Marami po dyan, 6 millimeter lang ang lapad," the DOST-PHIVOLCS OIC shared.

USec. Solidum proposed that the basic information on building structures should be taught in school. This is for people to know the safety standards for the construction of their houses at a young age. Students should also know if the structures of their school buildings are safe in times of disaster.

Solidum also proposed to provide those who cannot afford the services of engineers and architects, simple building and house designs resistant to earthquakes and strong winds for them to follow. A list of the appropriate materials to be used should also be provided.

"We need to be innovative in dealing with this, otherwise, we will see a lot of low-income houses affected by earthquakes," Solidum stressed.

TO PAGE 25

DOST gets nod from UNCTAD for S&T advocacy in spite of pandemic

By Joy M. Lazcano, *DOST-STII*

A United Nations high-ranking official admired the country's efficient use of frontier technologies and support for science and technology.

Frontier technologies are the next generation technologies that hope to bring an inclusive and sustainable development across all economies. These technologies, which include 5G internet, artificial intelligence, 3D printing, big data analytics, robotics, and internet of things herald the dawn of the Fourth Industrial Revolution as new products and services will eclipse the traditional global market.

During the opening of the 2020 National Science and Technology Week (NSTW), Dr. Shamika Sirimanne, director of the Division on Technology and Logistics of the United Nations Conference on Trade and Development delivered her message commending the Department of Science and Technology (DOST) for successfully holding the annual science and technology fair featuring locally-developed technologies despite the challenges brought about by COVID-19 pandemic.

She said that "the commitment to advocating the role of S&T in the Philippines particularly in this challenging time is commendable."

Dr. Sirimanne pointed out that second only to India, the Philippines is considered as one of the overperformers in the adoption of so-called frontier technologies relative to its per capita Gross Domestic Products (GDP).

According to Pew Research Center, "Countries with a higher GDP per capita generally have higher rates of smartphone ownership and internet and social networking use."

She also mentioned that the Philippines has a "high-ranking industry" that reflects the high-level Foreign Direct Investments on high-tech manufacturing particularly electronic products. Incidentally, the DOST aligns its programs to this strategy with the creation of world-class facilities like the national testing laboratory called Advanced Device and Materials Testing Laboratory (ADMATEL) and the Electronic Products Development Center (EPDC).

On the other hand, DOST Secretary Fortunato T. de la Peña welcomes this development. In fact, the science chief underscored the importance of innovation with the many contributions of the different research and development institutes (RDIs) under its wings during the time of pandemic; technologies developed and featured in the 2020 NSTW exhibits that range from remote health devices, nutrition, alternative energy to mobile apps and other initiatives that address not only COVID-19 but also other socioeconomic problems in the country.

In fact, just last September, the DOST reported the results of the Global Innovation Index 2020 which saw the country rose to 50th rank, up by four notches from the previous year and climbed 23 steps from the 73rd position in 2018.

De la Peña, in his message, shared that "We are also looking ahead for the years to come. We are now at the so-called Fourth Industrial Revolution. And with the things happening around us, masasabi ko na narito na tayo, handa, at buong lakas na hinaharap ang kinabukasan. Dahil ang kaunlaran natin bilang tao, bilang isang bansa, ay nakasalalay sa agham, teknolohiya at inobasyon."

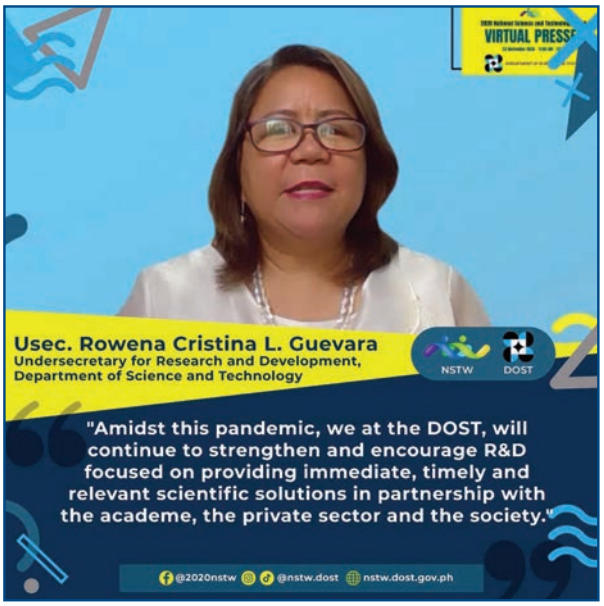
The DOST is the premier government body that provides the central direction, leadership and coordination on both scientific and technological initiatives of the country through its research and development thrusts. The DOST ensures that these initiatives bear fruit to ultimately benefit the Filipino people.

This year, the celebration was in virtual mode as restrictions to mobility and public gatherings are still implemented in the National Capital Region.

The virtual S&T exhibits and live webinars were viewed via NSTW website at www.nstw2020.dost.gov.ph or log on to the NSTW Facebook page at www.facebook.com/2020nstw.

DOST unveils virtual S&T exhibits at the 2020 NSTW presser

By Lanquin Seyer R. Gacusan, *DOST-STII*



The Department of Science and Technology (DOST) held a virtual presser in light of the 2020 National Science and Technology Week (NSTW) celebration, broadcasted via the 2020 NSTW official Facebook page on 23 November 2020.

In the presser, Undersecretary for Scientific and Technical Services and 2020 NSTW Steering Committee Chairperson, Dr. Renato U. Solidum Jr. encouraged the public to look at the brighter side despite the sudden change the pandemic brought to everyone's lives. He stressed that the virtual platform has opened many doors and opportunities for DOST to share the benefits of science and technology to the public, with or without the pandemic, from the comfort of everyone's offices or homes. Moreover, the virtual means of holding events nowadays, Usec. Solidum believes, enabled the NSTW celebration to reach more audience and participants both locally and internationally, and people can watch the webinars and activities on demand since the entire event was recorded.

On the one hand, DOST Undersecretary for Research and Development Dr. Rowena Cristina L. Guevara added that research and development, more than ever, played a major role during the pandemic and have been at the forefront of looking for solutions.

"The COVID-19 pandemic will not stop DOST from bringing the National Science and Technology Week to you. Like before, NSTW includes various awards for research, technology transfer, and S&T promotion; scientific meetings; technical and investment forums; tech demos; and virtual tours," Usec. Guevara shared.

This year, the technologies funded and assisted by DOST are featured in four clusters, dubbed as 4Ks: *Kalusugan, Kabuhayan, Kaayusan at Kinabukasan.* These innovations respond to the government's national plan to heal, recover, and rise as one, as embodied in the Bahayanihan Act.

USec. Guevara further explained that the projects and innovations that fall under each cluster were designed to show the different areas where R&D is greatly needed and where the DOST and its research and development institutes were able to pivot immediately and respond to demands needed to fight COVID-19.

For one, the *Kalusugan* cluster featured technologies like the RxBox and the Rapid Test Kit developed by Dr. Raul Destura of the University of the Philippines Manila and developments for health and wellness; including those that were relevant to COVID-19 response, occupational therapy and nutrition, to name a few.

Innovations that help sustain our country's foundation for growth and stability, and of improving livelihood were also featured under the Kabuhayan cluster. A vast selection of digital applications and platforms, physical hubs, food production, and food processing equipment and techniques, were viewed in the virtual exhibits.

Smart technologies for disaster response, traffic and community management were further showcased in the *Kaayusan* cluster. These were applications, systems, portals and even food that mitigate disaster, and also increase capacity for disaster preparedness and management. Also included under this cluster were Smart and Sustainable Textiles, Electronic Products Development Center and the nuclear facilities of the Philippine Nuclear Research Institute.

Lastly, the *Kinabuksan* cluster focused on future forward and ready technologies for career development and sustainable future. One was a hub for developing technologies and innovations that will respond to needs of industries to adapt to the changing trends in manufacturing/production. Other innovations addressed needs on renewable energy, mass transport, mobile/distance learning, and genomics.

"Amidst this pandemic, we at the DOST, will continue to strengthen and encourage R&D focused on providing immediate, timely and relevant scientific solutions in partnership with the academe, the private sector and the society," Usec. Guevara emphasized.

She added that the NSTW is the best platform to promote the results of research and development in order to make sure that our lawmakers and budget departments take notice of R&D's valuable contribution to socioeconomic development and inclusive growth.

The 2020 National Science and Technology Week was held virtually from 23-29 November 2020. To view the abovementioned technologies and innovations, and for more information head on to www.nstw.gov.ph or visit its Facebook pages or use the hashtag #2020NSTW and #ScienceForThePeople.

DOST awards SETUP beneficiaries that continued to excel during the pandemic

By Lanquin Seyer R. Gacusa, *DOST-STII*

For 18 years, the Department of Science and Technology (DOST) has been assisting thousands of micro, small, and medium enterprises (MSMEs) increase their production and technical capacities and capabilities through the Small Enterprise Technology Upgrading Program (SETUP), one of the flagship programs of the department.

SETUP encourages and assists MSMEs implement technological innovations in their respective industries by upgrading their product quality and market competitiveness through various trainings and seminars on technology adoption to energy utilization to good manufacturing practices.

This year, with the National Science and Technology Week (NSTW) celebration in full swing, the DOST through its Regional Office in Leyte held its annual SETUP forum virtually. For the past years, DOST recognizes the best technology adapters or beneficiaries of the SETUP program through this activity. Moreover, despite the pandemic and grave economic shutdown of many businesses, a lot of SETUP beneficiaries continued to thrive during the crisis. Hence, DOST altered the award from best adapter to PRAISE.

Thus, the SETUP PRAISE awards acknowledged MSMEs that showed productivity, resilience, agility, innovation, sustainability, and excellence that led to expanding their market reach in the midst of the challenges brought about by COVID-19.

In addition, the SETUP program adapters also played their "big brother or sister" part in helping other businesses in adjusting to the new normal. DOST Secretary Fortunato T. de la Peña said, "Our own SETUP beneficiaries have also been assisting other smaller firms, and I am very proud of that. They are people who are willing to help other companies [to increase and innovate]".

Sixteen beneficiaries representing their regions have been recognized for their success in their respective industries and received PhP 20,000.00 in recognition of their performance. The SETUP PRAISE Regional Awardees were:

- NCR - DJM Grandeur Corporation
- CAR - Health 100 Restaurant
- Region 1 - Bakers PH
- Region 2 - Agri-Component Machineries and Construction Corporation (AMCC)
- Region 3 - I-Provide Health Food Manufacturing
- Region 4A - Amstature Foods
- Region 4B - Red Gate Farm Supplies
- Region 5 - Pan de Masbate
- Region 6 - RU Foundry and Machine Shop Corporation
- Region 7 - Southern Negros Agri-Fisheries Multipurpose Cooperative (SONAMCO)
- Region 8 - GTC Poultry Farm

- Region 9 - VMD Rice Mill
- Region 10 - NJ Duct Works
- Region 11 - CPRP Manufacturing
- Region 12 - Kablon Farm Foods Corporation
- CARAGA - Millenium Ricemill

Out of the sixteen beneficiaries, five companies received special awards, each receiving a plaque of recognition and additional PhP 30,000.00.

- Most Resilient - Millenium Ricemill (CARAGA)
- Most Agile - GTC Poultry Farm (Region 8)
- Most Productive - Agri-Component Machineries and Construction Corporation (Region 2)
- Most Innovative - Kablon Farm Foods Corporation (Region 12)

Lastly, NCR representative DJM Grandeur Corporation bagged the National SETUP PRAISE Award that exhibited outstanding operational performance resulting from their adoption and utilization of DOST's technological innovations and technical assistance. DJM Grandeur Corporation received PhP 100,000.00.

"From Region 1 to Caraga, we can see that the winners are stories of how we can succeed and be resilient even during these abnormal times," Sec. de la Peña stressed. He added that, "The more success stories we see among our MSMEs, the more confident we are—that we are indeed progressing, and that the technology assistance [through SETUP] helped a lot."

Criteria for judging in selecting the best SETUP beneficiaries for 2020

SETUP also launched its program upgrade during the forum and awarding ceremonies. The original SETUP (2002-2017) offered firm-level assistance to upgrade existing technologies and products of SMEs. The current SETUP 2.0 (2018-2020), on the other hand, provided S&T assistance to further boost enterprise and productivity on a more focused industry approach. SETUP 2.0 also initiated the development of industry-S&T roadmaps.

Paving the way for the acceleration of new and disruptive technologies despite the pandemic, SETUP evolved to address the bigger pressing needs of the times and shifted to high gear with the launch of SETUP 4.0.

In levelling up, SETUP 4.0 directed its focus on more cutting-edge technologies such as the internet of things (IOT), big data analytics, augmented reality, artificial intelligence, robotics, new materials, additive manufacturing, cloud computing, and more that have become mainstream innovations not only in the manufacturing and industry sectors but also in the service sector.

SETUP is a program that was designed to assist MSMEs address operational challenges through a holistic approach on the different aspects of running a business. These include the following: human resource development or technical training, technical advisory and consultancy services, access to free technical advice from experts, product development, calibration and testing, support in the acquisition of appropriate technology and innovation, and seed funding for technology acquisition and equipment upgrading.

The new brand of SETUP on its upgrade to 4.0

DOST-FNRI conducts 'Nutriflix' in celebration of the 2020 National Science and Technology Week

By John Iris Tambago, *DOST-STII*

As we adapt to the "new normal," the 2020 National Science and Technology (2020 NSTW) pushes through with the celebration but this time, in virtual mode. The Department of Science and Technology Food and Nutrition Research Institute (DOST-FNRI) introduced Nutriflix — an interactive trivia game on food and nutrition.

It was a fun and exciting way of learning more about food and nutrition by watching audio-visual presentations (AVP). Trivia questions were posted after each AVP and each of the first five people to give a correct answer received Php 100 worth of cellphone load as their reward. This way, the participants learned more about proper nutrition and the different programs of DOST-FNRI that provided benefits to maintain a healthy lifestyle, especially during the pandemic.

The bigger and better iFNRI is your all-in-one hub for food and nutrition data services. More reliable nutrient data at your fingertips, the fun way and at your own pace.

Dr. Milflor S. Gonzales, Chief Science Research Specialist and OIC for the Office of the Director of DOST-FNRI, delivered her welcome remarks by encouraging the participants to recognize and appreciate the importance of science, technology, and proper food and nutrition for healthier living.

"Kayo po ay matututo at mag e-enjoy. After our Nutriflix, sana po ay maging kaisa namin kayo sa pagsulong ng wastong nutrisyon at tamang pagkain, para lahat po tayo ay maging malusog." she said. Undersecretary for Regional Operations Brenda L. Nazareth-Manzano and DOST Secretary Fortunato de la Peña also attended the institute's Nutriflix in support of the said event.

In line with this year's National Science and Technology Week carrying the theme "Siyensya at Teknolohiya: Sandigan ng Kalusugan, Kabuhayan, Kaayusan at Kinabukasan.", Nutriflix featured the five DOST-FNRI AVPs for the trivia games:

- *Pinggang Pinoy*
- DOST-FNRI MTV: Nutrition Tips
- The 2012 Nutritional Guidelines for Filipinos
- Indigenous Vegetables *(Mga katutubong gulay)*
- DOST-FNRI MTV: Local Fruits

The participants watched, listened and actively participated in the entire activity, providing them with valuable information and at the same time and allowed them to enjoy the game.

Before the program ended, the DOST-FNRI invited participants to attend the relaunch of iFNRI — an umbrella program that develops, integrates and harmonizes the different ICT projects of the Institute, that was conducted on 27 November 2020 at 9AM.

Visit https://i.fnri.dost.gov.ph/ and follow DOST-FNRI's social media pages for more updates.

Pisay rolls out new learning strategies amid COVID-19 pandemic

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

The disruptions caused by COVID-19 pandemic in the education sector challenged the schools in the country to continue providing quality education to every student. The Philippine Science High School System (Pisay) of the Department of Science and Technology is not exempt from these challenges.

However, Pisay was able to pivot and adapt to the new normal as mirrored from the webinar held during the 2020 National Science and Technology Week celebration, where it shared the strategies on how to continue providing quality science education to the country's future scientists despite the pandemic and the challenge posed by slow internet connection.

Multisectoral task force

Pisay Executive Director Lilia T. Habacon explained that Pisay set up a task force with 26 committees that allowed them to customize and holistically respond to every issue they faced. This task force is made up of Pisay constituents who brought diverse perspectives in the system. Likewise, they consulted the faculty, parents, students, industry and other sectors on issues on administrative concerns, curriculum development, teacher education, information technology, and student services, among others.

DOST-Philippine Science High School Executive Director Lilia T. Habacon

Different committees to protect the overall health of the students, teachers, and staff; academic learning integrity; and emotional support for students and faculty were also set up. "A committee coordinates with public health authorities so that education actions are in synchrony and help advance health goals and strategies," Habacon explained.

Academic breaks

Pisay also implemented academic breaks, a period when students can recharge their physical and emotional 'batteries'. Habacon explained that during academic breaks, students are not expected to submit any home works, exams, and any other means of performance assessment.

Meanwhile, Pisay teachers enjoyed professional development programs to support learners in the new modality of education. Also, those students and families belonging to the most vulnerable sector have received the necessary support while Pisay is adopting remote learning.

Bridge classes

Further, Pisay offered a bridging program to fill in the lessons missed by students when classes last school year were suspended. This was due to the initial community quarantine that was implemented earlier this year.

Dr. Ronnalee Orteza of DOST-Pisay Ilocos Campus

Bridge programs focuses on essential topics and skills required for the following school year, according to Pisay Ilocos Region Campus Director Dr. Ronnalee Orteza.

Orteza explained that last August, students and teachers were able to experience online learning which served as a trial period. This was crucial since Pisay is shifting to online learning for the next school year. She added that they were able to explore different strategies, materials, and platforms that are suitable for their learning.

"At some extent, the bridging program prepared them for the demands of remote learning," Orteza said. "Teachers were able to practice remote teaching and to create instructional materials that they believe to be relevant to their students."

DOST Pisay Bicol Region Campus Director Engr. Lorvi Pogorogon

Pisay Knowledge Hub

The Pisay community also implemented, for the first time, the Pisay Knowledge Hub. K-Hub for short, it is an online learning management system featuring learning materials for students and assessment tools for teachers. It has supplementary materials that students can download and then study offline, at their own pace, provided they still abide by the set deadlines.

Incidentally, Pisay Bicol Campus Director Engr. Lorvi Pogorogon added that even before the pandemic, Pisay has been looking for ways to make its top science education accessible through digital technologies. Because of this, both the students and teachers, were able to adapt to the new modalities.

Check-and-balance system

Pisay MIMAROPA Campus Director Edward Albaracin, on the other hand, emphasized the importance of quality control of instructional materials. According to him, all materials underwent peer reviews and revisions to ensure that they meet the quality standards before reaching the students.

Pisay also took seriously the suggestions and grievances they received from parents, teachers and students. They analyze emails, social media posts, and news from various media outlets to get feedback on the implementation of remote learning.

In the end, all of these innovative learning strategies helped Pisay continue providing quality science education to its students. Pisay hopes that other schools can learn as well from their strategies and experiences.

DOST-Pisay MIMAROPA Campus Director Edward Albaracin

from page 18....

During the open forum, DOST Secretary Fortunato T. de la Peña also asked about the prospective research and development projects with the Department of Public Works and Highways (DPWH) in addressing the above concerns.

Usec. Solidum suggested that DPWH, National Housing Authority, and the Department of Human Settlements and Urban Development can collaborate for a program ensuring that we can take care of the low-income to middle-income families who wanted to build houses that are economically friendly but still earthquake resistant.

"I've been proposing that we need to look at new materials and new designs of buildings that are light enough but still earthquake resistant and hindi masyadong mahal," Solidum expressed.

Sec. de la Peña added that the DOST is now looking at sponsoring an R&D program to develop innovative designs for low-income families.

"We should push for a research program and call for proposal related to the adaptation to global warming and climate change. Building resilient houses is a high priority," the DOST Secretary added.

The Disaster Resilience Summit is in line with the National Science and Technology Week (NSTW) was held on 23 to 29 November 2020 with the theme "Agham at Teknolohiya: Sandigan ng Kalusugan, Kaayusan, Kabuhayan, at Kinabukasan."

DOST-PHIVOLCS has also developed the "How Safe is My House Questionnaire" to empower people to be able to evaluate the safety of their house with regards to an earthquake.

Download here: https://www.phivolcs.dost.gov.ph/vault/pdf/Publication_Earthquake%20Preparedness/Flyer-How-Safe-Is-Your-House.pdf

DOST-PTRI brings International Textile Sustainability Initiatives through a webinar

By Lanquin Seyer Gacusan, *DOST-STII*

When the COVID-19 pandemic hit the world, industries from smallest to the largest scales shifted to coping with the new normal. The textile and fashion industry, likewise, grew and pivoted to massive production of personal protective equipment (PPE) and face masks in response to health and safety requirements against the virus. Further, as the need for these protective clothings continues to rise, so are their effects on the environment when thrown away after single use.

For the health sector alone, the World Health Organization (WHO) estimates a need for around 89 million disposable masks, which amounts to 100 billion masks a year, and a staggering 129 million face masks every month of single use across all industries worldwide. This is only one facet of the environmental effects of fast fashion and single usage in textile, placing it as the second or third pollutant in the world.

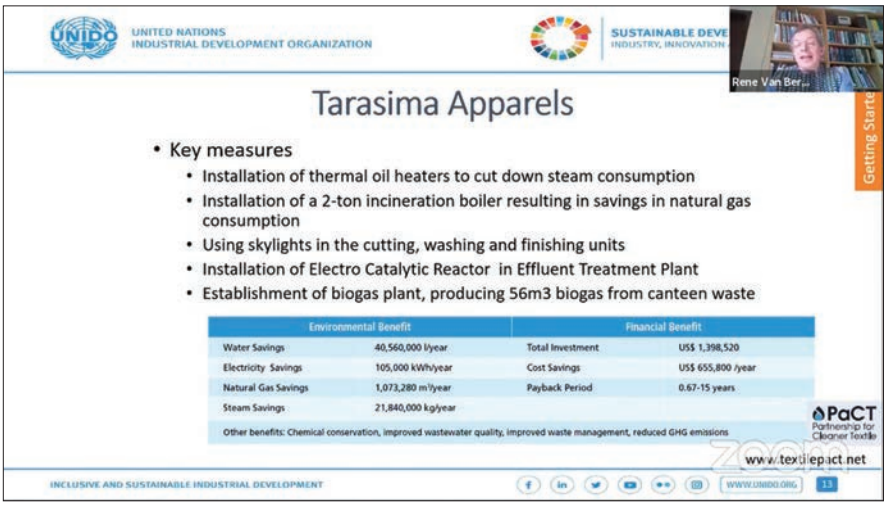
Taking its part in helping the environment, the Department of Science and Technology (DOST) through its textile arm, the Philippine Textile Research Institute (PTRI), puts its best foot forward to develop products, processes and innovations that promote sustainability in the textile and related industries. Also, in light of the 2020 National Science and Technology Week celebration, DOST-PTRI held a webinar that brought together advocates and innovators from Asia who shared their programs and developments in promoting textile and fashion sustainability.

The webinar became a space for participants to learn, share and be inspired on the current global situation and developments in textile and fashion, specifically efforts made through science, technology and innovation, geared towards the attainment of sustainability in textile production and recyclability.

In the first presentation, United Nations Industrial Development Organization (UNIDO) Regional Director and Environmental Scientist Dr. Rene van Berkel stressed that sustainability is not only highlighted on the rising need to massively produce protective clothes these days, but has been an issue even prior to the pandemic due to the ongoing concerns on industrial pollution, where textile is included.

While sustainable development goal (SDG) opportunities have not yet been mapped out for the textile industry in UNIDO, Dr. van Berkel shared that it obviously addresses 11 of the 17 UN General Assembly targets. He proposes to improve efficiency in the usage of materials—chemicals, water, and energy, for example—in textile development and production, and to decrease the polluting effects of wastes from textile processing by improving innovations on energy and water disposal, treatment and recycling.

Further, proving the viability of Dr. van Berkel's proposal were some textile manufacturing companies around Asia alone that have invested, innovated on



Dr. Rene van Berkel of UNIDO presenting one example of the tangible benefits on industry practice on textile sustainability.

Dr. Lei Yao of HKRITA explains their innovation for textile recycling.

and applied solutions to attain textile sustainability that have in fact not only gained environmental benefits such as savings in water, energy and natural gas, but also experienced increase in investments, cost and payback.

Helping achieve these efficiencies in use of natural and chemical resources, and sustainable textile production were innovations such as advanced digital production, additive manufacturing/3D printing, recycling hacks and technologies, sustainable clothing, solution dyeing, and finishing technologies, to name a few.

Another innovation developed by The Hong Kong Research Institute of Textiles and Apparel (HKRITA) presented by its Project Development Director Dr. Gloria Lei Yao was the hydrothermal recycle system which separates and turns polyester and cotton blended fabrics from used clothes into new fiber for reuse on new textile production, as one of its many unique and key features. In fact, this technology has been recently tested and used by mainstream brands such as H&M and Monki.

HKRITA has also partnered with a local Hong Kong textile company to test their upcycling system for handling post-consumer textile waste for reuse on textile production, and their client attested to the quality the system still produced despite using recycled materials. The upcycling is now starting to be known as The Billie System in Hong Kong.

Lastly, DOST-PTRI Director Celia B. Elumba talked about the Philippines' community scale perspective for sustainable textile developments through DOST. One is the Institute's flagship program on the development of natural textiles from plant and nature-based resources, where the Philippines is rich with, which addresses issues in synthetic materials that took time to decompose completely, not to mention its unnatural components that are harmful to the environment.

DOST-PTRI, together with its strong stakeholder partners, also boasted on its continuous efforts in establishing Regional Yarn Production and Innovation Centers (RYPICs), Regional Handloom Weaving Innovation Centers (RHWICs), and NatDyes Hubs and Facilities that promote and utilize natural resources and processes all over the country.

"The Perfect Fit" is another project by DOST-PTRI that has a component, 3D scanner that gives textile designers, artists, retailers, and manufacturers easy access in the prototyping of their designs and products for evaluation before public offering. This project is part of the Institute's move to introduce modern technologies and innovations with the aim of becoming the first textile R&D laboratory in the Philippines.

"Traditional know-how, talent and skills are important but raw materials are critical. The goal is to link all of these programs for complete integration of the community and the textile ecosystem [and towards sustainability in textile and fashion]," Director Elumba stressed.

PTRI is part of the rich community of DOST that showcased science, technology and innovation during the 2020 National Science and Technology Week celebration.

DOST-PTRI Director Celia B. Elumba shares textile innovation and industry overview in the Philippines.

Electronic products hub showcased in DOST-ASTI webinar

by Allyster A. Endozo, *DOST-STII*
(Screenshots from EPDC webinar)

The world-class collection of equipment and services offered by the Electronic Products Development Center (EPDC) was recently highlighted through a webinar, which was broadcast on 26 November 2020 at 01:00 PM.

The event, which was organized by the Advanced Science and Technology Institute (ASTI) of the Department of Science and Technology (DOST), was held in celebration of this year's National Science and Technology Week.

As an initiative of the DOST to support the local electronics industry, the EPDC provides previously unavailable, unique, and high-tech services that are critical to the conceptualization, design, development, and testing of new electronic products.

"We strongly believe in the creativity of the Filipino, and that technology and innovation is our way forward towards greater national competitiveness and economic recovery," said Engr. Peter Antonio Banzon, chief of DOST-ASTI's Research and Development Division.

Earl Qua, the EPDC's project head, hopes that the ISO-certified facility would serve as the Philippines' "bedrock" in creating new technologies in the "age of the Internet of things" as it prepares for the global shift towards IR 4.0 (Fourth Industrial Revolution).

The EPDC's PCB design services include circuit layout, circuit simulation, and Gerber file generation.

The EPDC's PCB fabrication services include drilling/milling, pro conduct process, and pro mass process.

The EPDC's PCB assembly services include SMD (surface mount device) assembly and THT (through-hole technology) soldering.

The EPDC's prototyping services include 3D (three-dimensional) scanning, design simulation, enclosure design, and enclosure prototyping.

The EPDC's EMC testing services can support a one-ton load weight and utilizes a 3-m turntable and a 10-m anechoic chamber.

"One key takeaway from COVID-19 is that digital transformation has become essential to survival," Qua stressed as he banks on this "bridge" between the public and private sectors "to get Filipino technology off the ground and into commercial success."

The EPDC's key services include PCB (printed circuit board) design, fabrication, and assembly; product concept prototyping; and product safety testing. Upcoming services include wet PCB fabrication for independent or "do-it-yourself" product development.

Such capabilities are supported by a myriad of equipment housed in the EPDC. These include the largest anechoic chamber in the country, as well as analyzers, generators, loggers, kits, meters, ovens, probes, and testers of various sizes and specifications.

Notable clients of the EPDC include Mark Energy Revolution Corporation; Ionics EMS, Inc.; Philippine Center for Postharvest Development and Mechanization; and the ROBOTractor team of the University of Santo Tomas' Civil Engineering Department.

Private firms, academic/training institutions, engineering associations, government institutions, venture investors, original equipment manufacturers, and independent designers are some of the EPDC's potential beneficiaries and partners moving forward.

DOST-ASTI is one of seven research and development institutes of the DOST and is mandated to conduct long-term research on ICT (information and communications technology) and electronics.

PH scientists inspire youth at DOST-NAST web symposium

by Allyster A. Endozo, *DOST-STII*
screenshots from ScienTeach symposium

ScienTeach speakers addressing a query from a student-participant: National Scientist Angel C. Alcala (upper row, center), DOST-NAST Corresponding Member Francis L. de los Reyes III (upper row, right), and Academician Windell L. Rivera (lower row, left).

Three Filipino scientists recently shared their research expertise and inspirational messages to youth-participants at the third episode of "ScienTeach: A Virtual Symposium for the Youth" on 26 November 2020 at 11:00 AM.

The event, which was organized by the National Academy of Science and Technology (NAST) in partnership with the Department of Science and Technology National Capital Region, was held in celebration of this year's National Science and Technology Week.

The invited speakers included DOST-NAST Academician Windell L. Rivera, a medical microbiologist; DOST-NAST Corresponding Member Francis L. de los Reyes III, a biotechnologist/engineer; and National Scientist Angel C. Alcala, a marine scientist.

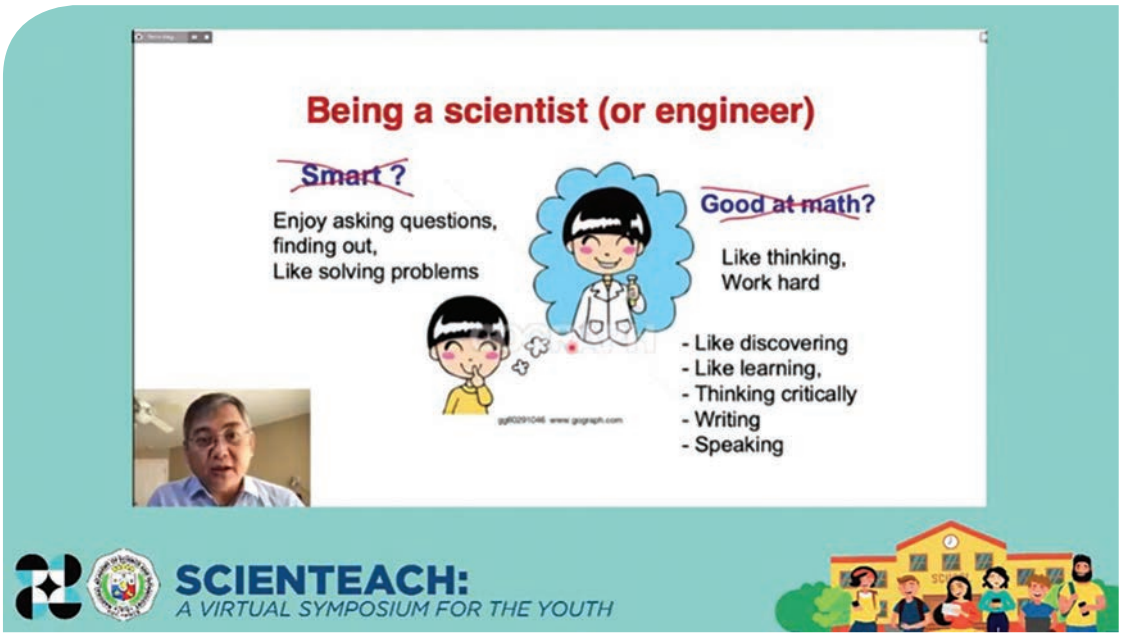
Dr. Rivera, a postdoctoral fellow at Tokai University, developed a diagnostic tool that can differentiate the infectious *Entamoeba histolytica* from the non-infectious *E. dispar*. He also worked on the redescription of a diverse grouping of protozoan species.

When asked about ways to make science more interesting among young students, Dr. Rivera underlined the importance of communicating research findings through layman's language. One way of ensuring this, he said, was through the use of well-written books.

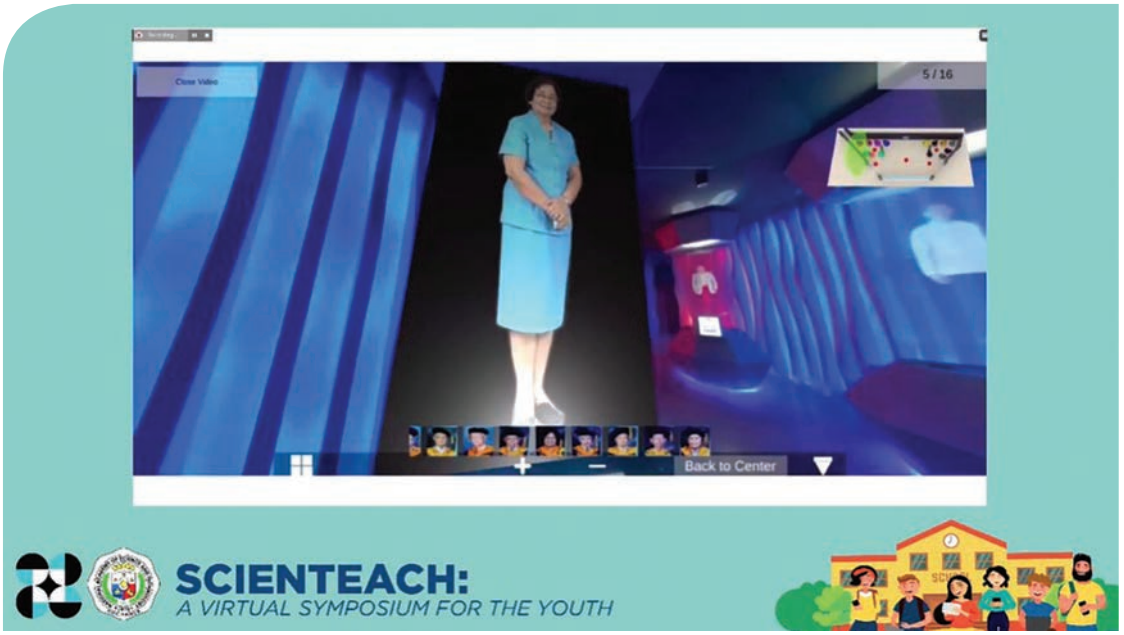
Dr. de los Reyes, a doctorate degree holder at the University of Illinois, co-invented a machine that empties human wastes from latrines. The Pisay graduate also focuses on generating energy fuels like diesel from algae and methane from cooking grease.

Being a good scientist, Dr. de los Reyes shared, involves being passionate about asking questions and coming up with solutions. "You don't have to be the smartest person in your class. A lot of it is hard work and enjoying what you're doing," he said.

Dr. Alcala, a former secretary of the Department of Environment and Natural Resources, studied the longshore current in the Bohol Sea and how it "destroys" the coastline integrity of Negros Oriental, particularly in numerous reclamation sites.



NAST Corresponding Member Francis L. de los Reyes III (lower-left inset) during his lecture on the key qualities of a good scientist or engineer.



A preview of the free mobile application for the PSHC virtual tour featuring National Scientist Dolores A. Ramirez.

In light of this information, Dr. Alcala supports halting the transfer of dolomite from Cebu to the Manila Bay coast. He opined that the project must not be continued as "the dolomite particles do not perform their functions because they are lost by wave action."

Academician Jaime C. Montoya, the executive director of the DOST-Philippine Council for Health Research and Development, presided over the soft launch of the free mobile application for the Philippine Science Heritage Center (PSHC) virtual tour.

The PSHC was established to serve as a public resource center for the works, ideas, and other achievements of Filipino scientists who have significantly contributed to the global advancement of science and technology.

ScienTeach is a collection of live-streamed episodes that highlight varying topics and feature NAST members and awardees. It aims to promote S&T, bring scientists closer to the youth, and inspire and encourage students to pursue a career in science.

Independent regulatory body to increase public trust on nuclear use, DOST exec says

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

The Department of Science and Technology-Philippine Nuclear Research Institute (DOST-PNRI) is pushing to create an independent regulating body in the country, believing it would help change the public's perception about nuclear technologies, which is usually destructive and harmful.

In an online forum titled "Regulating Nuclear Facilities and Activities in the Philippines" DOST-PNRI Director Carlo A. Arcilla pointed out that synchronizing all regulatory activities on ionization radiation under one roof is very vital.

"There is a prevailing myth in many people's minds about nuclear. They think nuclear is the bomb and destructive and the only way public trust can be earned if there is an effective and independent nuclear regulating body", said Dir. Arcilla.

In the current organizational structure, regulatory division and other divisions that promote nuclear researches and applications are all under the jurisdictions of DOST-PNRI.

DOST-PNRI is one of the research and development institutes of DOST that is mandated to promote and regulate the safe and peaceful use of nuclear science and technology.

As the center of all nuclear science and technology activities in the country, DOST-PNRI has performed several functions such as R&D on nuclear and radiation applications, materials, and processes, nuclear and radiation-based services for various clients and the general public, licensing and regulations involving the possession and application of all nuclear and radioactive substances, and transfer of technologies and results to end-users.

"If we have a separate regulatory body, it makes checks and balances more effective. Currently, the director of DOST-PNRI is promoting and regulating at the same time, which is very complicated and not an ideal situation," Dr. Arcilla said.

The separation of the promotional to the regulatory is just following international practice, as Dr. Arcilla added.

Dr. Arcilla also stressed that decisions could be made without pressure from interests if there is an independent regulatory body.

"For example, if there is a nuclear power plant operating, for the sake of economy, if there is a defect in some place; okay, let's continue to operate despite it as unsafe because the huge amount of money will be lost. In this situation, safety is compromised. But if there is an independent regulator, the regulator can say, even we lost a lot of money, our top priority is safety. That's an important consideration," Dir. Arcilla explained.

The Department of Science and Technology-Philippine Nuclear Research Institute (DOST-PNRI) Director Carlo A. Arcilla shares in a webinar that an independent regulatory body helps maintain public confidence in the safe use of nuclear science and applications as it makes checks and balances more effective. (Photo by Henry A. de Leon, DOST-STII)

Creation of Philippine Atomic Regulatory Commission

There are currently pending bills filed, both in the Philippine Senate and the House of Representatives, about the creation of an independent nuclear regulatory body.

Basically, these pending bills aim to merge the Nuclear Regulatory Division of DOST-PNRI and Centre for Device Regulation Radiation Health and Research (CDRRHR)-Radiation Regulation Division to form the Philippine Atomic Regulatory Commission. It would serve as an independent regulatory body consistent with international standards for regulating all practices and facilities involving ionizing radiation sources, including nuclear and other radioactive materials, facilities, and radiation generating equipment.

In a separate interview with the online show TechTalk later that night, Dir. Arcilla further explained that many sectors and industries in the country had reaped various nuclear-related research benefits.

It includes that in the area of medicine, wherein he cited it could help in early cancer diagnosis. He also shared that nuclear application had helped the country produce a plant growth promoter developed from seaweeds, increasing rice yields by as much as 30 percent. It was subjected to irradiation with gamma rays at the DOST-PNRI facility.

"There is more to nuclear science than just bombs, explosions, and destructive images we have in our minds or what we usually see. We would like to highlight that even in food, medicine, and agriculture, nuclear science can be applied and be game-changers," said Dir. Arcilla.

Regulating Nuclear Facilities and Activities in the Philippines webinar was part of the 2020 National Science and Technology Week (NSTW) virtual celebration which ran from 23-29 November. It carried the theme "Agham at Teknolohiya: Sandigan ng Kalusugan, Kabuhayan, Kaayusan, at Kinabukasan."

DOST math and science courseware are also for tito's and tita's

By Geraldine B. Ducusin, *DOST-STII*

"I am downloading the app and the desktop version para magamit ng pamangkin ko at mga bata sa barangay namin. Hope I am allowed to use this to informally teach kids para ma-appreciate nila ang math and science," Jeffrey Cudillo said in his comment in Facebook Live during the recently concluded webinar of the Department of Science and Technology-Science and Education Institute (DOST-SEI).

Through the webinar entitled "DOST Courseware for Science and Mathematics for e-Learning", DOST-SEI encourages the use and dissemination of the courseware so it can help more students and teachers easily understand and appreciate these subjects.

The DOST courseware for science and math, which are available in various platforms, can be downloaded for free, and once downloaded, it can run and be used offline, so the students and teachers can actually study the module at their most convenient time.

"I tried using the Courseware in Science last school year with my grade 8 students. I find it very useful in reinforcing the concepts that we discuss in class," Jason Madronero, a teacher said. He added that many of his students got good scores in their written assessments.

The Windows version of the DOST Courseware already registered 66,433 hits, while the mobile application from Grades 1- 8 now has 80,784 installations for the Android version, and 1,961 for the Apple version as of October this year.

Josephine Feliciano, the program manager and lead developer suggested downloading the courseware during off-peak hours, night time or early morning.

"These are large files and for the windows version, it might take you an hour to download the whole package, if your connection is good enough," Feliciano said.

There are three platforms of the DOST Courseware - the MS Windows, Android and Apple IOS. For MS Windows there are 413 lessons from Grades 1 to 8 science and mathematics that may be downloaded from the DOST-SEI website at www.sei.dost.gov.ph. For mobile devices, there are 112 lessons available in Google Play and 20 lessons in Apple Store. Likewise, the mobile applications are also available for download at DepEd Commons portal. Instructions on downloads can be found at the SEI website and also from the NSTW DOST Courseware presentation last 29 November 2020.

Mabel de Leon, a part-time academic tutor for eight years also said, "Sana matagal ko ng nalaman tong courseware malaking tulong sa pagtuturo ko sa tutorial."

De Leon also plans to use the courseware for her niece who is in Grade 7 and has been having a hard time in math.

The DOST Courseware, which is intended to assist teachers and learners to understand math and science topics easily and in their own pace, has actually been around for over ten years. But it hasn't gained much popularity until recently when the Department of Education allowed the use of blended-learning, due to COVID-19 pandemic which requires students to learn from their homes.

Tourism workers try to cope amidst impact of COVID-19

By Geraldine Bulaon-Ducusin, *DOST-STII*

The jobs and livelihood of at least 15.3 million workers in the tourism sector in 14 countries, including the Philippines are affected by the COVID-19 pandemic, according to the International Labor Organization (ILO). Of those affected 6.4 million are women and 8.9 million are men.

Locally, a survey of 247 decision makers, conducted last May 2020, by the Price Waterhouse Cooper, and the Department of Tourism, shows that across the different subsectors investigated on the impact of COVID-19 in the country's tourism industry, 97% say that COVID-19 can potentially impact on their business operations, and this poses major concern.

Given the travel restrictions and closure of businesses, 88% of the respondents expect losses of over 50% of their 2020 revenues. To cope with the low demand and restrictions, majority of the respondents say that they temporarily stopped offering a service/product, reduced their level of operations, and reduced the employee headcount.

In a webinar on "Ecotourism in the Time of Covid-19 Pandemic: A Rapid Assessment of the Impact of the Pandemic on Ten Ecotourism Sites in the Philippines," presented by Dr. Belinda F. Espiritu, a professor from the University of the Philippines Cebu, during the sixth KTOP-COVID (Kapakanan ng Tao sa Oras ng Pandemya – COVID) and organized by the Department of Science and Technology - National Research Council of the Philippines (DOST-NRCP), one ecotourism site reported that during the pandemic, 70% of their service staff were terminated after two months, job order's work was reduced to 10 days, and staff was no longer allowed to work (no work, no pay).

Dr. Espiritu researched on the 10 ecotourism sites located in Laguna, Bataan, Isabela, Sorsogon, Rizal, Davao, Bohol, Iloilo, Surigao del Sur, and South Cotabato, and looked into the impact of COVID-19 on the management and operation of the ecotourism in the different parts of the Philippines.

The study found that except for the very few, most tourism sites had no contingency plans for epidemic outbreaks. On a positive note, though, the quarantine succeeded in bringing out people's resiliency as exemplified by urban and rural agriculture, cultivation of ornamentals plants for sale, entrepreneurship development, creativity in creating products that sell, and development of livelihood skills.

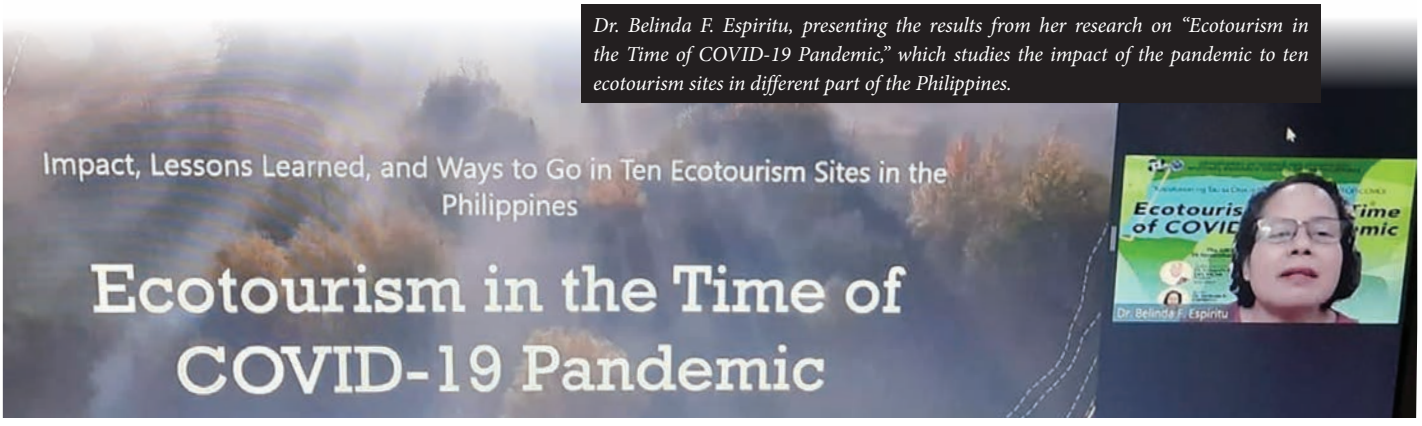
Another good thing is that the management spent the quarantine period improving the facilities and making COVID-19 responses.

The research suggested that the regional offices of the Department of Tourism should work hand in hand with the local governments units to guide and require tourism industries nationwide to formulate contingency plans in cases of epidemic outbreak, which should include plans for alternative livelihood projects and backup funds for crisis situation like the COVID-19.

According to Dr. Espiritu, the lockdowns brought tourism operations to a grinding halt during the community quarantine period, until some sites reopened to residents or local tourists. The cessation led to the laying off of some staff, reduced working hours or days, and work-from-home arrangement, with the skeletal workforce reporting on specific working days.

Based on the report from the Journal of Sustainable Tourism, the unprecedented global travel restrictions and stay-at-home orders are causing severe disruptions of the global economy since World War II. Tourism largely ceased in March, with the international travel bans affecting over 90% of the world's population and wide-spread restriction on public gatherings and community mobility.

The webinar was a part of the 2020 National Science and Technology Week (NSTW) of the Department of Science and Technology (DOST). For more information and updates regarding the 2020 NSTW and DOST-NRCP's webinars, please visit the www.nstw.dost.gov.ph and its Facebook page or at DOST-NRCP's Research Pod page on Facebook.



Dr. Belinda F. Espiritu, presenting the results from her research on "Ecotourism in the Time of COVID-19 Pandemic," which studies the impact of the pandemic to ten ecotourism sites in different part of the Philippines.

Musikang Kawayan: A rare musical concert

By Joy M. Lazcano and Jasmin Sevilla, *DOST-STII*

DOST Secretary Fortunato T. de la Peña and DOST Usec. for R&D Rowena Cristina L. Guevara perform the traditional music tinikling during the virtual concert. (Photo courtesy of DOST-FPRDI)

In a very rare occasion, the scientific community has put together a collection of artists and performers through a virtual concert to showcase the country's masterly crafted bamboo musical instruments in an effort to revitalize this modest but resilient industry through science and technology.

The virtual concert dubbed as Musika ng Kawayan, Yaman ng Bayan, organized by the Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI), lined up various performances from individuals and groups that have sustained its existence amidst the pop culture that have alternatively replaced our cultural traditions with streamed music and movie binges.

According to DOST-FPRDI Director Romulo T. Aggangan, "The concert was a celebration of science, the creative arts, and Philippine culture."

To turn things around, DOST-FPRDI stepped in to help the bamboo musical instrument makers to further enhance their craft by introducing the latest techniques to complement their artistry. Earlier, DOST-FPRDI has rolled-out its Bamboo Musical Instrument (BMI) Innovation Research and Development program to address the various concerns around the industry. Among these are the quality of the bamboo instruments, design and aesthetics, process standardization, and raw materials sourcing.

On the other hand, the virtual concert hopes to reintroduce the beauty of the indigenous bamboo music and instruments to gain more support from the public as redesigned and improved bamboo musical instruments are coming in the years ahead.

Virtual concert

One of the highlights of the virtual concert was the performance of DOST's top officials. Performing the traditional music tinikling, DOST Secretary Fortunato T. de la Peña and DOST Undersecretary for Research and Development Rowena Cristina L. Guevara played the *kawagong*, a term coined by Sec. de la Peña describing the gong sounding tubular *kawayan* (bamboo) poles, while Usec. Guevara played the bamboo marimba designed and developed by DOST-FPRDI.

The performance showcased the first two bamboo instruments that went further improvements under the innovation DOST-FPRDI R&D program.

The concert also featured a very interesting group from Dulag, Leyte's *Karatong Festival.*

Karatong is the Waray (a native of and language in Leyte) word for bamboo. In the olden times, way before the Spaniards came to the Philippines, the people in Dulag used bamboos to warn the town from enemies who wanted to invade their lands.

The street dance festival featured an all-bamboo musical ensemble from drums to shakers. Some of the instruments were improvised to add the distinct sound that is purely *Karatong Festival.*

Orlando L. Cagara, vice chairman of the *Karatong Festival*, explained that previously

Joey Ayala together with DOST-FPRDI Chorale, Dipolog Community Rondalla, and Philippine Society for Music Education topped the virtual concert with the song Pamilyang Magsasaka. (Photo from the Musika ng Kawayan: Yaman ng Bayan, A Virtual Concert)

their festival lost its original flavor as loud percussion music obfuscated its unique earthy sound that is distinct from other regional festivals. "The trumpets, the bugle, the steel xylophone, they are really loud, this is not karatong," added Cagara.

This prompted the local organizers to return to the roots of the festival and actively encourage participants to explore the possibilities of developing new sounds out of bamboo materials. Consequently, one of the winners in last year's celebration was a group from Labiran. They used karatong or a bamboo slit drum, katatoktok (lyre), hagughob (open tube drum), pagakpak (clappers), and bamboo marimba and play their rendition of the Dulag Festival song.

The marimba bars developed in DOST-FPRDI Bamboo Musical Instrument Innovation Research and Development Program. (Photo from the Musika ng Kawayan: Yaman ng Bayan, A Virtual Concert)

Perhaps the most popular BMI in the country is the Bamboo Organ of Las Piñas. Played by Prof. Armando Salarza, the nearly two century old bamboo organ has endured the test of times as it remains to be playable.

The bamboo organ also became the centerpiece of the International Bamboo Organ Festival held every year in the country.

The Bamboo Organ, declared in 2003 as the National Cultural Treasure, was created by Father Diego Cera in the 19th century. According to Celwyn Tagle of the Las Piñas Bamboo Organ Foundation, the bamboo pipes from the bamboo organ are harder to play than the conventional metal pipes as its upper lip and languid are both rigid and curved unlike metal pipes that have consistent upper and lower lips that make the air flow easier. Currently, the Bamboo Organ retains 70-80% of its original parts as curators believe is attributed to the Filipino intrinsic knowledge in bamboo preservation.

We also saw other performers like Professor Beni Sokkong, a Kalingan artist and BMI maker, performing a native Kalingan music Annowoy using Tongali, a bamboo nose flute. He also performed tupayya, a traditional instrumental solo using the polychordial zither called *kolitong* that emulates the musical patterns from gangsa flat brass gongs.

The famous *Pangkat Kawayan* also performed their version of the song popularized by Ruben Tagalog, *Panaligan Mo Sinta* using the bamboo instruments *angklong*, *tipangklong*, and *bumbong* while

Bamboo poles are subjected to thermo-modification to enhance the durability and dimensional stability. (Photo from the Musika ng Kawayan: Yaman ng Bayan, A Virtual Concert)

the Philippine Normal University *Himig Kawayan* played Pobreng Alindahaw.

As the orgranizer of the virtual concert, DOST- FPRDI Himig Kawayan performed a Filipino folksong medley followed by Cebu's talented singer-composer Joseph Gara showcasing the Huni Ukelele. Topping the concert was a performance from Dipolog Community Rondalla with their rendition of the Peruvian Waltz and Joey Ayala's Walang Hanggang Paalam and Pamilyang Magsasaka.

Science in creative arts

With the need to strengthen the bamboo industry and at the same time promote the Filipino culture, DOST-FPRDI laid the initial steps to develop the industry through the Bamboo Musical Instrument Innovation Research and Development Program.

The program will support the growth of the local BMI makers in the country that has been underdeveloped for several decades but is seen to provide livelihood as it has steady demands from local and international markets.

However, certain challenges need to be addressed by the industry and the government as gaps in the production impedes its growth. Among them are the poorly made instruments that are susceptible to insects and fungi attacks that not only mar its appearances but also decreases the sound quality of the bamboo instruments therefore resulting to instability in sound quality.

To induce life into the industry, DOST-FPRDI used the latest techniques in the drying process, design, and tuning among others to develop the production standards on certain bamboo instruments. For example, DOST-FPRDI used the engineered bamboo for the frame in making the bamboo Marimba used by the DOST officials in their performance.

Engineered bamboo is produced by binding together fibers, particles, strips or slats of bamboo with the right adhesive. Used worldwide to make attractive panels, floors, furniture and handicrafts, it is often stronger and less prone to warping than equivalent solid woods.

The marimba bars were subjected to thermo modification to enhance the dimensional stability and durability by undergoing heat process to remove moisture that affects its durability and sound quality.

BMI R&D Program

The Bamboo Musical Instruments (BMI) Innovation R&D Program was spearheaded by DOST-FPRDI in 2019 with the goal of improving the quality of locally-made BMIs.

"The DOST-FPRDI program aims to provide science-backed solutions to BMI problems on sound and structural qualities, playability, tuning, and durability," program leader Aralyn L. Quintos emphasized.

Specifically, the program aims to develop R&D technologies that will not only improve the life and quality of bamboo but also prevent it from affecting the musical instrument's sound quality. Aside from this, the program also targets to standardize the production of selected BMIs and to potentially build a BMI processing facility.

"As an off-shoot, we hope to raise public awareness and appreciation for the cultural importance of these musical instruments," Quintos added.

The marimba bars are sanded and tuned to perfection. (Photo from the Musika ng Kawayan: Yaman ng Bayan, A Virtual Concert)

Under the program, DOST-FPRDI hopes to enable producers of BMI to collaborate on new designs to adopt to the changing times. It will also put up a bamboo musical instrument museum to help in educating the public to increase their knowledge and appreciation of the traditional bamboo musical instruments.

With these developments in the BMI industry, DOST Usec. Rowena Cristina L. Guevara is hopeful that through the DOST initiatives and with the support of its partners, "we have good reason to look forward to an invigorated BMI sector in the future."

DOSTv Host Gel Miranda releases the freshly hatched pawikan (in red shirt) to the beach in Romblon.

DOSTv Host Gel Miranda

2 DOSTv programs named finalist in Catholic Mass Media Awards

By Karl Raven A. Ramon, *DOST-STII*
Photos from DOSTv

DOSTv received early their Christmas bonus this year when it entered the final roster of nominees for the 42nd Catholic Mass Media Awards (CMMA), one of the prestigious award-giving bodies in the country.

Two DOSTv programs caught the attention of jurors, namely: DOSTv: Science for the people (previously aired on PTV4) and DOSTv sa Radyo (previously aired on Radyo Pilipinas 738khz). The science and technology-oriented programs were recognized as finalists for the BEST NEWS MAGAZINE PROGRAM (TV category) and the BEST NEWS PROGRAM (Radio category), respectively.

The Pawikan Conservation episode titled "Biyaya ng Dagat: Pawikan" of DOSTv: Science for the People earned recognition as finalist for Best News Magazine Program while the Taal Updates (Jan 2020) of 'DOSTv sa Radyo' made it to the finalist roster for Best News Program.

DOSTv, being a neophyte in the industry, welcomed the opportunity to be among the finalists in the CMMA for 2020 but has set its dream to bag the title awards next time around since media giants still dominates the award titles.

The prestige of being among the best is an honor in itself and DOSTv is more inspired now to create the best of the best science content for the people.

"A nomination in a prestigious award-giving body such as the CMMA is a huge honor since it is a testament to the improved quality of content from our hardworking DOSTv production team. Being nominated is like earning an award itself," shared Mona Carina E. Montevirgen, one of the Executive Producers of DOSTv.
Grateful for the nomination, DOSTv host Gel Miranda also shared, "With our tagline, Science for the People, we make sure we gather and deliver a worthy television program to discover new knowledge and to improve science learning and appreciation."

"As one of the creative writers of DOSTv myself, we promised to put the best of our efforts to communicate science with the people, and this means new content, new programs, so you just wait."

CMMA is organized by the Archdiocese of Manila to highlight the importance of mass media and its role to instill a sense of responsibility to communicators who serve as instruments of delivering relevant information to the public.

Incidentally, DOSTv recently shifted to online streaming because of the pandemic and the shows can be watched on social media platforms via Facebook @DOSTvPH and DOSTv Youtube Channel.
For those who wish to know more of the entries submitted, kindly scan the QR code below and watch the CMMA recognized episodes of DOSTv: Science for the People and DOSTv sa Radyo.

DOSTv: Science for the People
Pawikan Episode

DOSTv sa Radyo
Jan 17 2020 Episode: Taal Updates

COVID-19: A public health crisis fought with additive manufacturing

By Adele M. Guevarra, *DOST-ITDI*
Photos from DOST-ITDI

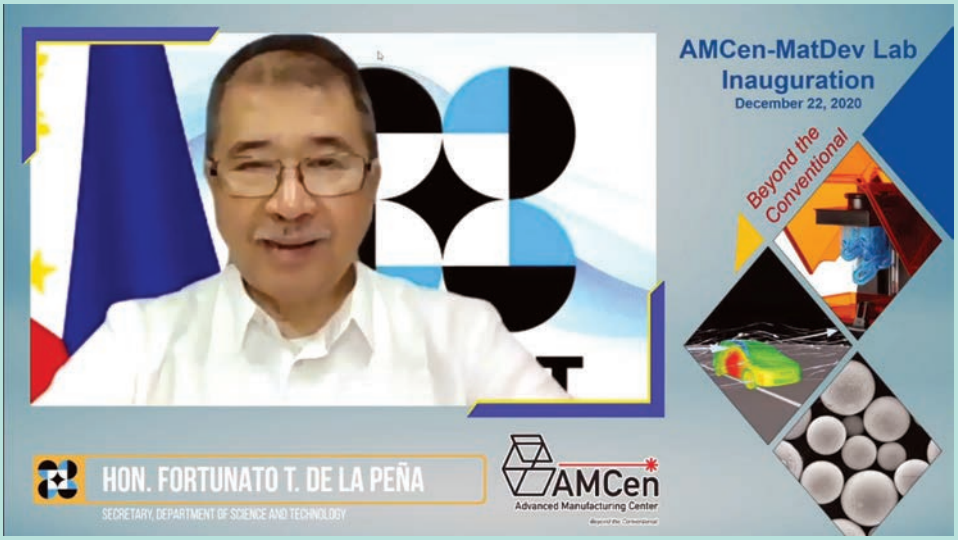
It was a fateful day. In a blink of an eye, the world's view of how things are and will be radically changed.

The date? It was 11 March 2020 when the World Health Organization officially declared a pandemic due to COVID-19, the disease caused by SARS-CoV-2 virus. But what was frightening about the repercussions of the pandemic, was an even more critical local and global issue which is the impact of the health crisis on the economy. There were whispers going around hospital halls. Rumors easily circulated that many companies have already stopped production, resulting in an increase in unemployment.
But all hope was not lost, and more than 300 days later, the technology called additive manufacturing has been utilized by the Department of Science and Technology (DOST) to fight COVID-19.

The Industrial Technology Development Institute of the DOST (DOST-ITDI) under the stewardship of Director Dr. Annabelle V. Briones launched several initiatives to mitigate the negative impact of the pandemic. The MATDEV (Multiple Materials Platform for Additive Manufacturing) Project Team was immediately mobilized by Materials Science Chief Dr. Blessie A. Basilia on 26 March 2020 - eight days after President Rodrigo Roa Duterte placed the entire Luzon Island under enhanced community quarantine.

'AMabling' medical devices thru MATDEV-AMCEN

The MATDEV Laboratory is one of two facilities of the Advanced Manufacturing Center or AMCen, a shared facility between DOST-ITDI and the Metals Industry Research and Development Center (DOST-MIRDC), which was established under the auspices of the Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD). The second project is DOST-MIRDC's RAPPID-ADMATEC (Research on Advanced Prototyping for Product Innovation and Development using Additive Manufacturing Technologies). Working on a 24-hour shift, MATDEV-AMCEN, or simply MATDEV, later delivered 100 3D-printed frame and shield assemblies to Dr. John Yam, a cardiac surgeon at the Philippine Heart Center while the Perpetual Help Medical Center in Las Pinas City received its own set on 14 April 2020.



DOST Secretary Fortunato T. de la Peña expressed his satisfaction on the high public approval of 3D designed and printed medical devices distributed by the MATDEV Team during the early part of the pandemic.

DOST-ITDI Director Dr. Annabelle V. Briones as she welcomed guests during the inauguration of the MATDEV Laboratory on 22 December 2020.

To date, MATDEV has donated more than 1,200 sets of 3D-printed face shield assemblies and 1,270 3D-printed ear relief bands to 14 other hospitals in Metro Manila. MATDEV, however, not only employs additive manufacturing but also undertakes research and development on materials for use in additive manufacturing-abled or AMabled products. Their aim is to reduce the cost of raw materials by using local resources and increase the effective use of AMabled products.

While MATDEV was printing face shield assemblies it was also helping the National Children's Hospital in Quezon City in developing respirator venturi valves. These valves connect patients in intensive care to breathing machines. On 14 April 2020, MATDEV delivered two prototypes of 3D printed respirator venturi valves to test fit in their existing respirator.

On the other hand, the University of Santo Tomas (UST) Hospital in Manila sought technical assistance in evaluating the characteristics of alternative types of air filtration materials that they can use as replacement part in their respirators. A critical piece, an air filter in a respirator is designed to protect wearers from inhaling hazardous fumes and particulate matter such as airborne microorganisms. According to Dr. Meyvell G. Atanoso, a certified anesthesiologist at the UST Hospital, they typically use bacterial/viral filter, also known as a Heat and Moisture Exchange (HME) filter in their ventilators and respirators. However, trade and transport restrictions during quarantine made securing HME filters difficult. This prompted the hospital to seek the help of MATDEV in search for alternative filter that performs similarly to HME filters.

However, while a material from three commonly available filters showed similar functionality with HME filters, MATDEV recommended instead the use of electrostatic filters because of its electrostatically charged fibers.

AM devices breathe life anew to COVID-19 patients

Meanwhile, because of the increase in COVID-19 cases in April 2020, hospitals soon ran out of ventilator parts. MATDEV immediately worked on 3D printing prototypes of parts of the Multiple Patient Ventilator Splitter and Mechanic Ventilator- Mini-War Zone - equipment listed by the Department of Health (DOH) as badly needed for COVID-19 treatment. Ventilators are machines that help patients get more oxygen into their lungs and take carbon dioxide out. It is designed to assist patients to breathe formally. To date, five hospitals in Metro Manila have already received their 3D printed prototypes of ventilator parts.

Furthermore, the nebulizer mask, a support attachment, was also improved. MATDEV developed a 3D printed filter attachment for use in commercially available masks such as the Modified Oxygen Concentrator Mask. The attachment allows for a more efficient way for patients to breathe under medication.

When medical hints of nebulizers were reported to have contributed to the increase droplet dispersion of medications, the Philippine Children's Medical Center (PCMC) in Quezon City sought MATDEV's expertise in the development and printing of a prototype of the aero chamber/diffuser for metered dose inhalers.
The diffuser is used for direct delivery of medication to the patient's lungs, thus, decreasing chances of virus dispersion in the air.

One of the prototypes of medical accessories made by MATDEV was the prototype 1 of the co-polyester (CPE) filament that was printed using the Fused Deposition Modelling (FDM) 3D Printer. The second prototype was made of photopolymer grey resin and printed using the Stereolithography (SLA) 3D Printer. The SLA 3D Printer produces prototypes with higher resolution compared to the FDM 3D Printer. The prototypes were sent to PCMC for fit testing and evaluation.

Also, MATDEV designed a mask similar to the N95 with optimized functionality. The mask consists of two layers; the main layer is made of nano-enabled filament material with flexible lining stitched on the edges of the mask. The second layer consists of an antiviral filter cloth.

There are a host of other AMabled products that the future medical and industrial may require from MATDEV. With this scenario, the MATDEV Team is ready to meet the challenges in creating design of form and function, production, and distribution of such products.

Lastly, through collaboration, innovative thinking, and application of research and development advances, MATDEV and the rest of the science community are poised to continue finding solutions that will help people in reducing the burdens of the pandemic, of helping save lives, and impacting change.

DOST's Advanced Additive Manufacturing R&D Program established the facility called Advanced Manufacturing Center or AMCEN which is a shared facility between of DOST-ITDI and DOST-MIRDC that was established under the auspices of DOST-PCIEERD. It houses DOST-ITDI's MATDEV Laboratory and DOST-MIRDC's RAPPID-ADMATEC.

DOST Isabela brings E-Nutribun to victims of Typhoon Ulysses

By Angel Gorospe, *PSTC-Isabela*

Amid the onslaught of Typhoon Ulysses, the Cagayan Valley almost turned into a river valley and thousands of school children were stranded; left without access to nutritious food badly needed by their body during their growing stage.
To the rescue was the enhanced nutribun or E-Nutribun, an innovative product developed by the Food and Nutrition Research Institute of the Department of Science and Technology (DOST-FNRI). Together with the Department of Education (DepEd), the E-Nutribun was distributed to 39,053 school children in seven municipalities in Isabela.

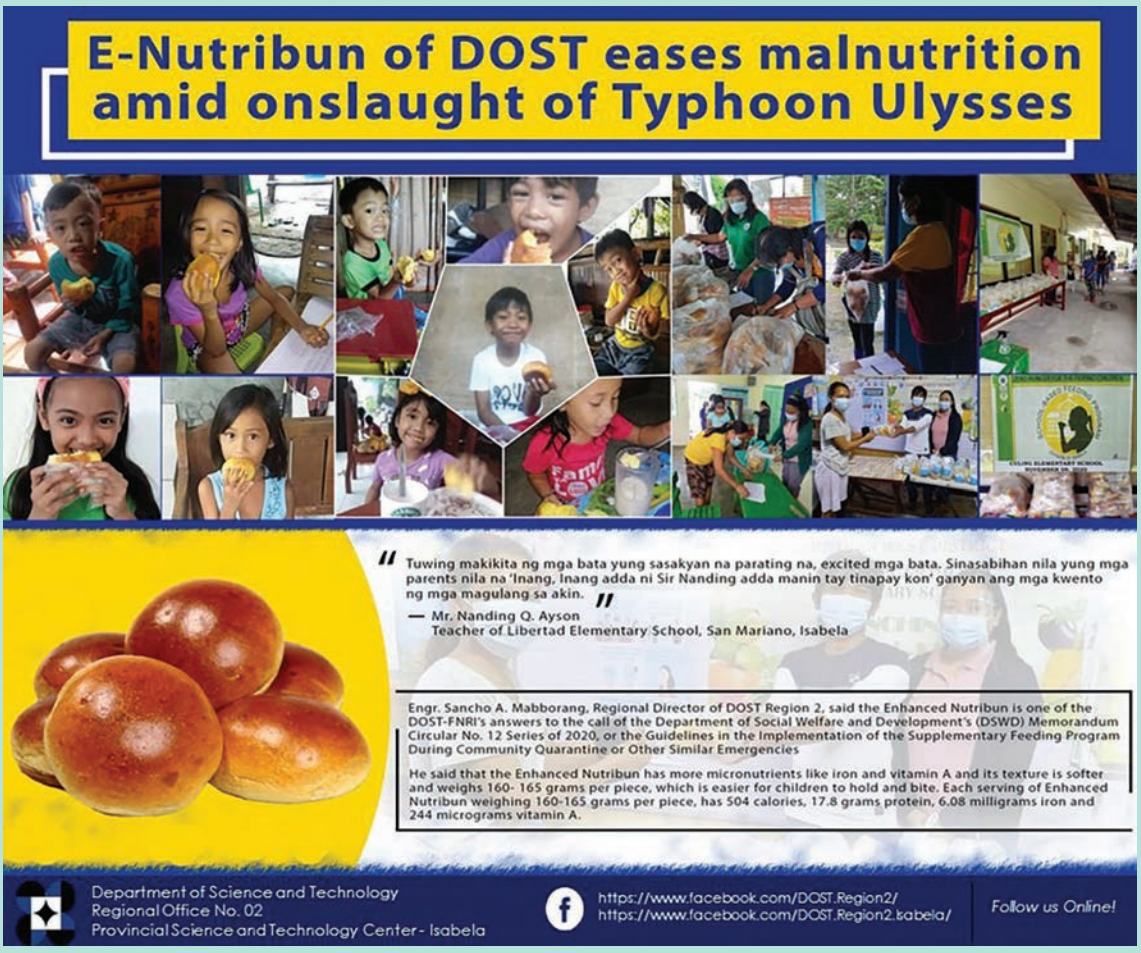
This quick response was made possible because of the recently executed MOA signing by the Department of Science and Technology (DOST) Regional Office II with the following agencies: the Department of Social Welfare and Development (DSWD), the National Nutrition Council and the DepEd that adopted the enhanced nutribun that targets the day care pupils from 26 pilot municipalities.

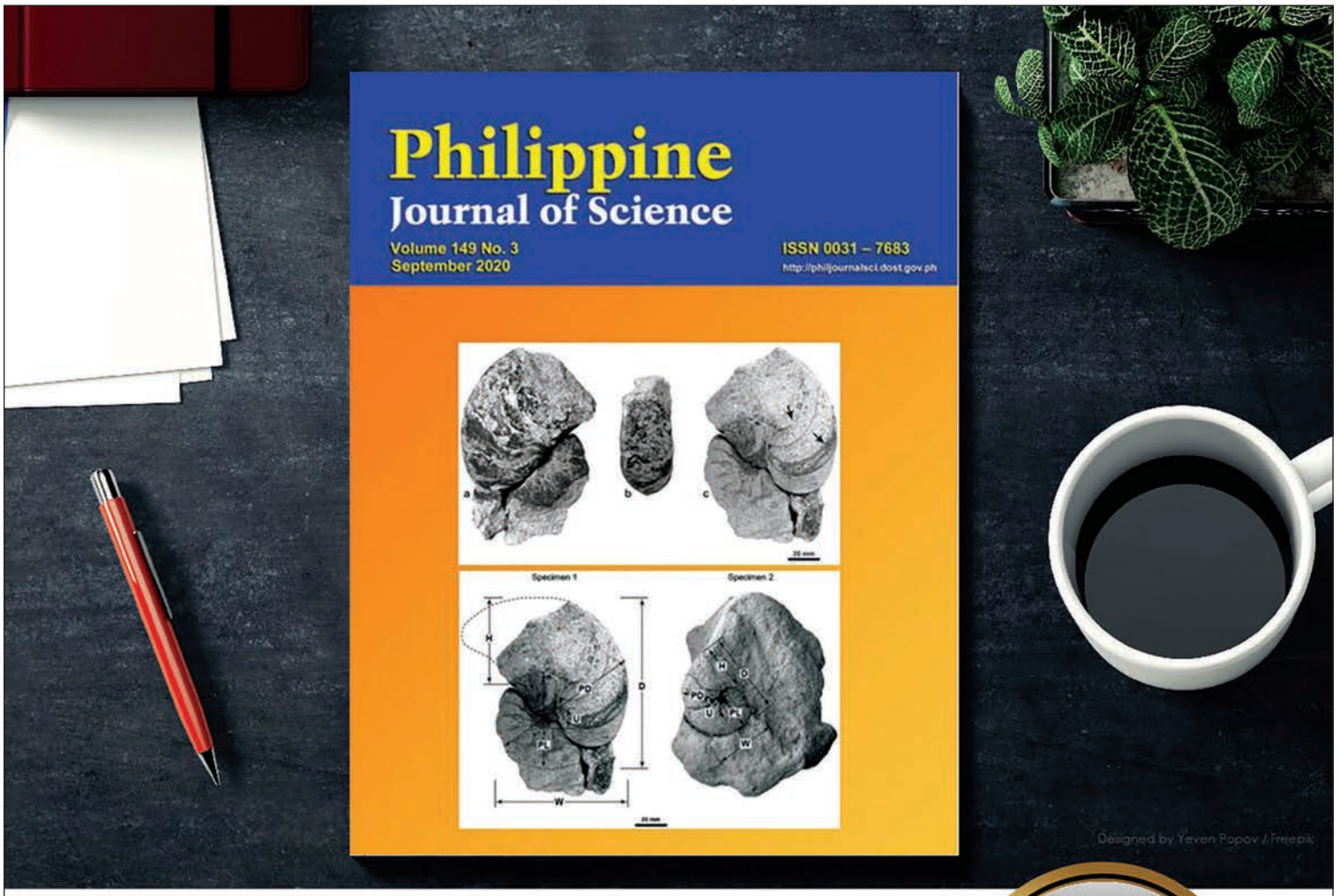
"Tuwing makikita ng mga bata yung sasakyan na parating na, excited mga bata. Sinasabihan nila yung mga parents nila na 'Inang, Inang adda ni Sir Nanding adda manin tay tinapay kon' ganyan ang mga kwento ng mga magulang ma'am sa akin. (Every time they see our vehicle coming, the children were always excited. They will tell their parents, 'Mom, mom, Sir Nanding is here. My bread again is here.' That is the story of the parents to me.)," said Nanding Q. Ayson, teacher at the Libertad Elementary School, San Mariano, Isabela.

For her part, Lydia T. Morante, technology licensee of the Enhanced Nutribun said that they were working 24/7 just to meet the demands of DepEd in delivering the 'golden bun'.

"The efforts of teachers delivering the E-Nutribun house-to-house, even risking their lives, inspire us to produce the real Enhanced Nutribun," added Morante.
Engr. Sancho A. Mabborang, Regional Director of DOST Region II said that the Enhanced Nutribun is one of the DOST-FNRI's answers to the call of the DSWD's Memorandum Circular No. 12 Series of 2020, or the Guidelines in the Implementation of the Supplementary Feeding Program During Community Quarantine or other similar emergencies.

He further said that the Enhanced Nutribun has more micronutrients like iron and vitamin A and its texture is softer and weighs 160- 165 grams per piece, which is easier for children to hold and bite. Each serving of Enhanced Nutribun, weighing 160-165 grams per piece, contains 504 calories, 17.8 grams of protein, 6.08 milligrams of iron, and 244 micrograms of vitamin A.





The Philippine Journal of Science

Publishing original, peer-reviewed research works since 1906

- Rigorous, constructive, and prompt peer-review process
- Multidisciplinary coverage and audience
- Open-access publication
- Under SCOPUS coverage
- No publication charges
- Quarterly release

114 years

Be a part of the country's historical publication

Direct your queries and manuscripts submissions at **philjournsci@gmail.com**

Submission guidelines are available in our website **philjournalsci.dost.gov.ph**

DOST DOST-STII

Download the PJS mobile app to access the latest, previous, and upcoming issues on all your devices anytime, anywhere.

ANDROID APP ON Google play

PJS

DEPARTMENT OF SCIENCE AND TECHNOLOGY

National Science & Technology Week

Agham at Teknolohiya:
Sandigan ng Kalusugan, Kabuhayan, Kaayusan at Kinabukasan

23-29 November 2020

nstw.dost.gov.ph/

/2020nstw

science for the people 2020