

S&T POST

JUL- SEP 2021



innovation in Science

Breaking the language barrier with Marayum, the web dictionary for Philippine languages

PJS paper on urban buildups and agri land conversion of Laguna watersheds

Research Council to map PH Music industry

DOST-CALABARZON, DOST-Batangas help Taal Evacuees through S&T Bayanihan

DOST thanks Bb. Pilipinas International 2021 Hannah Arnold for raising science and technology flag



Innovation in Science

Innovation has, for several years now, become a buzzword for something new, something novel, something that is commonly associated with science and technology.

True enough, these

two disciplines mirror the very essence of what innovation is all about; where innovation is a process of creating and recreating a product through diligent research and experimentation.

The very dynamic nature of science and technology, fueled by innovative thinking, is reflected in this quarter's issue of the S&T Post where the articles tell stories of challenges and triumphs of various researches, experiments, and scientific studies that produced results of significant value in improving our daily lives.

We share with you the unique experiences of our scientists, researchers, forward-looking entrepreneurs, and dynamic leaders who chose to be different by taking the road less travelled.

As a result, they live to tell us their unique stories of creating, of recreating, of innovating. You will marvel and be inspired by the three Pinoy space engineers who gave birth to the Maya-2 cube satellite now orbiting the Earth. Our math wizards who bagged six medals in the International Math Olympiad will surely encourage our students to aim high. In these pages, you will also read how 'citizen science' empowered a coral reef community in Batangas. The research study on beneficial bacteria from the soil of Mount Mayon will affirm our faith in our local scientists. Then, you will surely take pride in knowing the Big 21 in 2021 disruptive technologies, innovative programs, and life changing projects of the DOST, launched on 7 September 2021, usher in our foray into the era of Industry 4.0.

All these are stories of innovation; stories that we believe have to be told, because they ignite hope and positivity for us to continue fighting in these trying times, armed with the power of innovation in science. Read on. Be inspired. And let innovation carry you to our future now!


NORLY B. VILLAR
 Executive Editor

**S&T
POST**
 VOL. XXXIX No. 3

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.

EDITORIAL BOARD

| | |
|-----------------------------|-------------------------------|
| Publication Director | RICHARD P. BURGOS |
| Executive Editor | NORLY B. VILLAR |
| Editor-in-Chief | RODOLFO P. DE GUZMAN |
| Associate Editor | JOY M. LAZCANO |
| Managing Editor | JASMIN JOYCE P. SEVILLA |
| Art Director | BENEDICT P. CAGAANAN |
| Layout/Graphics | JAMES B. INTIA |
| Editorial Assistant | ROSEMARIE C. SEÑORA |
| Proofreaders | ALLYSTER A. ENDOZO |
| | DAVID MATTHEW C. GOPILAN |
| Contributing Writers | DOST MEDIA CORE |
| Photography | AUDIO-VISUAL SERVICES SECTION |
| Circulation | ALLAN MAURO V. MARFAL |
| | FERDINAND D. CARTAS |



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

TANONG NG BAYAN!

MGA DATAP MONG MALAMAN TUNGKOL SA 50X REUSABLE FACE MASKS NG DOST-PTRI

INFO UPDATES

DOSTV DOSTV DOSTV

REUSABLE FACE MASKS

And DOST Philippine Textile Research Institute of DOST-PTRI sa pagkakatugon ng Tanyag LCD at mga pribadong sektor ay paglalaran ng 500,000 reusable face masks. Gagamitin ng textile-coating technology para sa treatment at finishing. Makikipagtugon din ito sa Power Fashion Inc. upang makapag-produce gamitin ang local fiber textiles.

DOSTV DOSTV DOSTV

SMART PHONE THERMAL SCANNER

Mas pinahusay pa ng Advance Science and Technology Institute O DOST-ASTI ang kanilang research sa pagdevelop ng smart na thermal camera na maaaring i-abit sa smart phone na magagamit bilang temperature scanner.

DOSTV DOSTV DOSTV

SCHOLARSHIPS ONLINE APPLICATION

Ang Science Education Institute o DOST-SEI ay mayroong available na online application systems para sa DOST Scholarships. Patalay din ang pagproseso nito sa pagbibigay ng allowances in advance sa mga iskolar nito.

DOSTV DOSTV DOSTV

GAMOT NGA BA ANG Saging SA COVID-19?

DOSTV DOSTV DOSTV

DID YOU KNOW?

Pareho lang ba ang SARS at COVID-19?

Hindi, Ang virus na nagdulot ng COVID-19 ay may kaugnayan sa SARS, genetically, ngunit bahagyang magkaiba ang sakit na dulot nila.

Ang SARS ay mas nakamamasyang ngunit bahagyang nakakaharap kumpara sa COVID-19. Wala ring naitalang outbreak ng SARS.

Source: World Health Organization (WHO)

DOSTV DOSTV DOSTV

FREE ONLINE TUTORIAL

www.itdi.dost.gov.ph

- HOME-MADE RUBBING ALCOHOL
- HAND SANITIZER
- ANTIBACTERIAL SOAP
- PROCESSED FOOD

DOSTV DOSTV DOSTV

STRESS KA BA?

Malungkot o balisa? Hindi mapakali? Sabi ng mga psychologists, ang estado ng iyong utak ay nakakaapekto sa iyong kalusugan.

Source: DOST-ASTI

#BeatsCovid19 #ScienceForAll #DOSTV

Covid-19 MYTH OR FACT

#StopTheGread

DOSTV DOSTV DOSTV

Healthy Food Options ngayong ECQ

Ang DOST ay nagbibigay ng mga rekomendasyon sa pagkain at pag-iimbak ng pagkain sa loob ng ECQ.

DOSTV DOSTV DOSTV

GOOD NEWS!

DOST-PRODUCED 3D-PRINTED FACE SHIELDS, NAIPAMAHAGI NA!

PRODUCED BY DOST-MREC

DOSTV DOSTV DOSTV

TIPS PARA SA MGA Bored AT HOME

DOSTV DOSTV DOSTV

ANO NGA BA ANG PACK OF HOPE?

Ang RTE (ready-to-eat) ay proyekto ng DOST-ITDI na layuning makatugon sa mga taong biktima ng sakuna. Tinatawag itong disaster food ready-to-eat at no preservatives added.

DOSTV DOSTV DOSTV

DID YOU KNOW?

106 RxBox for vital signs monitoring delivered to PGH

Isa ito sa mga paraan para sa vital signs monitoring. Data will be collected and there is the advantage of less physical contact for our health workers.

DOSTV DOSTV DOSTV

DID YOU KNOW?

1 test kit = 20 tests

Ang isang locally-made COVID-19 test kit ay maaaring makapagbigay ng 20 test.

One (1) test by the local COVID-19 test kit costs P1,320.

DOSTV DOSTV DOSTV

COVID-19 UPDATE

PRESIDENT DUTERTE HAS ORDERED AN ENHANCED COMMUNITY QUARANTINE OF ENTIRE LUZON.

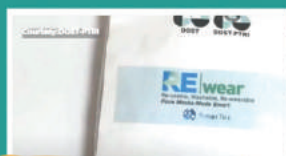
Strict home quarantine, transportation will be suspended and provision for food and essential health services will be regulated.

Source: OPM News Online

VIDEOS

PAGE 1/2

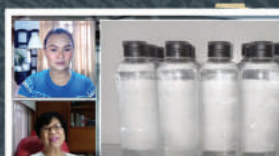
CLICK HERE



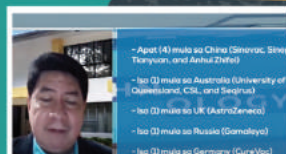
FACEMASK MADE SMART



PANDAN QUEEN (PANDAN AS ANTIVIRAL)



VCO CLINICAL TRIALS



BAKUNA LABAN SA CORONA



COVID-19 VACCINE, DAPAT NGA BANG KATAKUTAN?



SCAN HERE





WE'D LOVE TO HEAR FROM YOU!

Scan the QR code to send us your feedback or go to: <https://bit.ly/3BSGNHx>

CONTENTS

Technology and innovation

- 4 STARBOOKS: A decade of bringing library-in-a-box to communities
- 7 Breaking the language barrier with Marayum, the web dictionary for Philippine languages
- 8 Pinoy space engineers share their once-in-a-lifetime experience in building Maya-2 cube satellite
- 10 Research Council to map PH music industry
- 11 Invent School Program flourishes in their digital shift, educated over 400 students
- 12 PH ranks strong along with China and India in 2021 Global Innovation Index

- 13 Science chief speaks on regional development at the High-Level Policy Dialogue of DAP and UNDP
- 14 DOST-PCIEERD to build 3 new laboratories, funds 5 new R&D projects in the regions

Agriculture

- 16 DOST-CALABARZON continuously supports farmers and artist groups in Angono, establishes stronger partnerships through S&T
- 17 Science-based farming: the future of Caraga's coffee industry

Disaster Resilience

- 18 Movie Review": Disaster Movies
- 20 Batangas State U leads in the use of S&T in rehab plans for families affected by Taal volcano



ABOUT THE COVER

The cover design illustrates the theme “Innovation in Science” on a higher plane where advanced technology plays a major role in socioeconomic development and growth as visualized by photographs of laboratories, scientists, and leading personalities in the science community who are instrumental in spearheading innovation. The use of varying shades of blue as general color motif is consistent with the color blue in the DOST logo that signifies progress that can be attained through the use of innovation.

Education

- 21 The Philippines bags six medals at the International Math Olympiad
- 25 Pisay research adviser bags 2nd Place in DOST-PCHRD's 3-Minute Pitch to Policymakers Competition

Environment

- 26 Saving Dugongs in Palawan
- 28 Will the amphibians of Baguio lose their green sanctuaries?
- 31 “Citizen science”: empowering a coral reef community in Batangas
- 33 DOST makes R&D programs on sustainable water resources a major priority

- 35 Carbon storage, forest cover in Laguna watersheds are affected by land use and land cover changes, study says
- 37 DOST-MIMAROPA director wins BCYF Innovation Award for improving region's water security

Health and Nutrition

- 39 DOST expands Taguig and Bacolod food banks
- 40 How does the country's health research community act together amidst the pandemic?
- 42 Bacteria from Mt. Mayon soils found with potential antibiotic, anticancer properties

SETUP and Livelihood

- 44 DOST-II brings more S&T initiatives to CEST communities in Cagayan Province
- 46 Leathercraft gains ground in Masbate through SETUP
- 48 DOST-FPRDI, DOST-NCR team up to improve BJMP *parol*
- 49 DOST-IX assists food-based enterprises in Zamboanga del Sur
- 50 2021 National S&T Week goes virtual the second time around on November 22-28

STARBOOKS: A decade of bringing library-in-a-box to communities

By Joy M. Lazcano, DOST-STII



Former DOST Assistant Secretary and DOST-STII OIC Raymund E. Liboro was instrumental in the conceptualization and development of STARBOOKS

MUCH OF today's successful technologies had humble beginnings. In fact, these tech giants' early beginnings were bereft of all the comforts of a fully furnished office.

For instance, Google started out in a dorm at the Stanford University in California. Schoolmates Larry Page and Sergey Brin, despite their clashing ideas, developed its search algorithm called "BackRub" in 1996.

From their dorm room, they built the BackRub as links that determine the importance of individual pages on the World Wide Web. As its popularity grew among the Silicon Valley investors, funds came flowing in, and saw themselves raking in millions of investments that turned their start-up company into a billion-dollar business. BackRub, a play on the mathematical expression for the number 1 then followed by 100 zeros, became the unbeatable internet search engine.

Similarly, James Dyson, the inventor of Dyson vacuum cleaners launched his product after 5,127 iterations that were created over a period of five years in his garage.

Today, Google and Dyson earn hundreds of billions of dollars from what was once a backyard side project.

Although not all ideas could be a billion-dollar technology, but a simple idea could just be the solution that the world is looking for.

In the same manner, STARBOOKS or the Science and Technology Academic and Research-Based Openly Operated Kiosks, a mere side



project of the Department of Science and Technology- Science and Technology Information Institute (DOST-STII), was not conceptualized from a garage nor from a dorm room but had its share of plain and unassuming beginnings.

Known in its inception as an offline science library-in-a-box, STARBOOKS contains thousands of digital resources on science, technology, engineering, and mathematics (STEM) that are easily retrievable.

From a small offline kiosk standing in one corner of the DOST-STII library in Bicutan, STARBOOKS became an overnight sensation among the government initiatives that is touted to boost the country's stock on STEM.

Early beginnings

STARBOOKS was the brainchild of former DOST Assistant Secretary and DOST-STII officer-in-charge Raymund E. Liboro, now the current commissioner of the National Privacy Commission.

He noticed that only few people were going to libraries nowadays. "STARBOOKS could just be the simple solution that we need in raising the level of our aptitude in science and mathematics," Liboro said in one of his interviews.

This skunk work project was originally designed to be an offline-online S&T library information and resources tool. Its name was coined as a wordplay on the famous coffee beverage store, where a user can take his/her coffee while reading through different magazines.

In a simple launch in 24 June 2011, at the lobby of DOST-STII, then DOST Secretary Mario G. Montejo proudly described it as "our humble contribution to the world of education and science."

During its earlier years, STARBOOKS had only few first adopters, one of which was DOST Regional Office IX that got a fund to roll it out in the region.

STARBOOKS made the public debut during the 2011 Regional Invention Contests and Exhibits in Davao City as one of the highlighted technologies during the weeklong invention contest.

It was in the succeeding year that STARBOOKS had its first mass deployment in Region VIII through a partnership brokered by DOST Regional Office VIII and the Department of Education Leyte Division

under the project titled “Piloting of STARBOOKS in Selected Schools in Leyte”. The project benefitted 44 public schools in the province.

The novelty of STARBOOKS was its selling point. In 2014, all regions of the country had its own STARBOOKS installed in various provinces, as Liboro explained it “Library system as a platform is evolving. Digital is the way to go.” Soon, more digital library resources were added to the STARBOOKS system and its network had grown as many organizations in both private and public sectors opened their resources to STARBOOKS users.

Local and international recognition

The rollout was met with warm reception both from the government and private sectors as local government units recognized its impact to the students where several schools in the provinces and in remote areas lacked books and other learning resources.

It was not that long that several organizations took notice of STARBOOKS.

Following Typhoon Yolanda’s devastation in 2013, STARBOOKS gave everyone a glimmer of hope when it was presented at the World Library and Information Congress of the International Federation of Library Associations and Institutions (IFLA) in Lyon, France.

The presentation centered on STARBOOKS installation in public schools devastated by the typhoon as part of the government’s Building Back Better relief initiative. Prior to Typhoon Yolanda, DOST Region VIII bankrolled STARBOOKS in the region. Unfortunately, most of the units installed there were washed out by the typhoon and deemed unserviceable.

The following year, STARBOOKS received the Presidential Citation for Innovative International Library Projects from the American Library Association (ALA) at the San Francisco Public Library in the United States for “making science and technology materials available to the general public in remote areas that have few information resources, no libraries and little or no Internet connectivity.”

These recognitions affirmed STARBOOKS groundbreaking

contribution in educating the marginalized and underserved sector of society.

ALA is the world’s oldest and largest professional organization for librarians. It has played an active role in promoting access to information, opposing censorship and championing the libraries and librarians.

Back home, it was awarded the Outstanding Library Program for 2015 by the Philippine Association of Academic and Research Librarians (PAARL) during their 43rd Annual General Assembly.

After several deployments of the offline kiosks, DOST-STII leveled up and developed the online version to keep in step with the changing demand. This innovation improved its monitoring mechanism and made it easier to upgrade the content in each kiosk.

As the years went by, more awards and recognitions came to STARBOOKS.

In 2017, STARBOOKS bagged two Anvils namely the Silver Anvil for Public Relations Tool and the Gold Anvil for Public Relations Program. Moreover, STARBOOKS made it to the final round as among top three entries (out of 402) that vied for the Grand Anvil. The Anvil Awards of the Public Relations Society of the Philippines is the most prestigious award-giving body in the field of public relations.

That same year, STARBOOKS became a finalist in the 2017 Government Best Practice Recognition by the Development Academy of the Philippines.

Also, in recognition as the first science and technology library-in-a-box that works offline, the Presidential Communications Operations Office recognized STARBOOKS with the FOI Special Award at the Freedom of Information Summit on 12 December 2019.

Recently, STARBOOKS was honored as “Excellence in Government Communication Programs” in the 18th Philippine Quill Awards. The Awards commended its impact in bringing knowledge on science, mathematics, and technical fields directly to the people, especially to students in economically-challenged schools and communities.

International cooperation

Four years had passed and STARBOOKS was no longer a secret among select beneficiaries as it received the admiration of international organizations as an innovative tool for S&T learning.

The US Peace Corps in 2015 visited STARBOOKS to learn more about this innovation. Volunteer Ji Yusi from Chengdu, China praised STARBOOKS for its user-friendly interface and the vast collection of information and available videos. Ji was surprised to see how STARBOOKS was able to integrate a library system into a standalone kiosk that was unheard of in her hometown. “We are learning from your



Former DOST Assistant Secretary and DOST-STII OIC Raymund E. Liboro and Ms. Rosie C. Almocera, chief of the Information Resources and Analytics Division during the Presidential Citation for Innovative International Library Projects given by the American Library Association at the San Francisco Public Library in the United States.



STARBOOKS team at the 18th Philippine Quill Virtual Awards Night

TECHNOLOGY & INNOVATION

experience,” Ji added.

Meanwhile, Elizabeth Karr, a Peace Corps librarian described it as cutting-edge and advance as database resources are expensive to build and maintain.

Moreover, STARBOOKS was also invited to the Annual Kuala Lumpur Engineering and Science Fair (KLESF) in MINES International Exhibition and Convention Center at MINES Resort in Selangor, Malaysia as one of the Philippines’ exhibitors.

1000th STARBOOKS

From its initial run in 2011, STARBOOKS had its 1,000th site installation in 2016 in Calauan, a second-class municipality in the province of Laguna. This milestone also marked the launch of Super STARBOOKS, a much-needed product upgrade.



DOST Secretary Fortunato T. de la Peña (left) unveiled the marker signifying the STARBOOKS 1000th installation sites at Dayap National High School in Calauan, Laguna.

Dayap National High School was the first to have the Super STARBOOKS marking the shift to upgraded contents and terminals for additional users. It now provides students, researchers, and S&T aficionados with thousands of free S&T related materials in text, audio, and video formats. Among these were K-12 interactive courseware on mathematics and science developed by the DOST’s Science Education Institute, livelihood videos dubbed as “TamangDOSTkarte” that



Volunteers from the US Peace Corps visited DOST-STII to get a glimpse of this latest innovation from the Philippines.

provides parents and entrepreneurial students a thing or two about various livelihood opportunities within their sphere of interest, and other engaging videos.

As the new DOST secretary, Prof. Fortunato T. de la Peña shared how the Science Department “strives to cut boundaries so we can reach those who are in need of our services and assistance, alleviate poverty, and expand our local industries.”

Several innovations were also introduced as the offline system rebooted with a new and improved interface design and additional contents. Moreover, the solar-powered STARBOOKS was also introduced in Patong Elementary School in Barangay Malibago, Cateel, Davao Oriental thus breaking through infrastructure barriers.

At present, with the prevailing pandemic that has changed the work landscape, DOST-STII and STARBOOKS saw another opportunity -- the need to develop mobile applications, engaging websites, and alternative ways of engaging the public and various stakeholders. As a result, it was able to nimbly pivot to the demands and challenges of the ‘new normal’ by adding new and exciting mobile apps.

Last year, two mobile applications were launched -- the STARBOOKS Quiz Mobile App and the STARBOOKS Online App. It also produced four informational videos to provide additional information on STARBOOKS.

On its 10th year, with the theme STARBOOKS@10To!, STARBOOKS is not slowing down nor resting on its laurels. It has set its eyes on a grand vision with plans that are already in store for the public. In the age of Artificial Intelligence and autonomous technologies, the public is assured that STARBOOKS will continue to outdo and reinvent itself and remain relevant for the next 10, 20 years or more.

STARBOOKS Online and mobile applications

STARBOOKS GEOMAP APP

STARBOOKS Geomap shows all the sites where STARBOOKS is installed nationwide. STARBOOKS Geomap is now available on your android devices.

STARBOOKS QUIZ MOBILE APP

Challenge yourself by answering random questions on Math and Science topics. Try the STARBOOKS Quiz app with Barcode, QR Code and Google Play Store. Download the free app at the Google Play Store.

STARBOOKS

The Science and Technology Academic and Research Based Open-Access, Read-Only STARBOOKS, located in the first Philippine regional library, is designed to bring S&T information to the public. It aims to provide S&T-based information and learning resources to service farmers to business around the country.

For more information contact:

Department of Science and Technology
SCIENCE AND TECHNOLOGY INFORMATION INSTITUTE
DOST-STEI, General Science Research Division,
Taguig City

+6394 873 3344
info.starbooks@doe.gov.ph
www.starbooks.gov.ph
www.starbooks.ph

STARBOOKS is committed to bring Science, Technology, and Innovation (STI) information in both offline and online formats under the new normal!

STARBOOKS OFFLINE

STARBOOKS contains thousands of digital science and technology resources in various formats (text and video) placed in specially designed “kiosk” for easy digital viewing.

WHO SHOULD AVAIL?

- Local Government (LGU) Govt.
- Non-Government Organizations (NGOs)
- Academic Institutions

HOW TO AVAIL?

- Email us at starbooks@doe.gov.ph

STARBOOKS ONLINE

Access STARBOOKS content right at your home. Right at www.starbooks.gov.ph in a few thousand of online technology and innovation with easy navigation.

STARBOOKS MOBILE APP

STARBOOKS content is now accessible in Android mobile devices. Download the free app at the Google Play Store.

Breaking the language barrier with Marayum, the web dictionary for Philippine languages

By Glendel Nazario, DOST-PCIEERD

MOTIVATED BY a mission to preserve and save endangered Filipino Languages, a community-built online web dictionary platform was developed through Project *Marayum* by a team of computer scientists and linguists as led by Mr. Mario Carreon, Assistant Professor of the Department of Computer Science at the University of the Philippines – Diliman.

Funded by the Department of Science and Technology (DOST) and monitored by the Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD), the project sought to produce an online language dictionary which can be modified by registered members of a specific community who mainly utilizes the language.

During its initial development, the first dictionary uploaded was the Asi-English language dictionary. Revisions to the dictionary are allowed only to registered Asi language speakers with entries reviewed by a group of assigned language experts.

Project *Marayum* was built through a collaborative effort of different communities. As an online dictionary platform for Philippine languages, it aims to empower native language speakers to create and curate an online

dictionary of their language without needing to have technical expertise in website design, implementation, and maintenance.

On the other hand, DOST-PCIEERD Executive Director Dr. Enrico C. Paringit expressed support to the project which paved the way for further communication through innovative solutions. He underscored the project's importance in celebration of Buwan ng Wika.

"The national language is as symbolic as the country's own freedom, giving it its unique identity as a sovereign nation. This Buwan ng Wika, we can also celebrate other local languages in the country through this project," Paringit said.

The *Marayum* website is now available online at <https://marayum.ph> with an initial layout of four dictionaries: Asi-English, Cebuano-English, Hiligaynon-English, and Kinaray-a-English.

Other dictionaries are currently being collated using Marayum which include Bikol-Buhi'non, Bikol-Central, Bikol-Rinconada, Masbatenyo, Kapampangan, Chavacano, Gaddang, Inakyeanon, Waray, and Ilocano with corresponding English translations. All the dictionaries are being managed by their communities and assigned linguists.



Pinoy space engineers share their once-in-a-lifetime experience in building Maya-2 cube satellite

By Glendel Nazario, DOST-PCIEERD

IT IS all about grabbing the opportunities in front of them and to be part of something revolutionary for our country. These are all the common answers shared by Izrael Zenar Bautista, Mark Angelo Purio, and Marloun Sejera, the three student-engineers who developed the country's second cube satellite called Maya-2.

"Nagkataon lang talaga na nabigyan ng opportunity pero malaking factor kaya ko rin tinanggap ay iyong long-term impact na mage-gain ng Pilipinas if we enhance our space programs, and with that, it is a great honor to be one of the pioneers in this field sa atin," shared by Engr. Bautista.

[I am just fortunate that I get the opportunity but the huge factor in considering to be part of this project is the chance to enhance our country's space program and it is a great honor to be one of the pioneers in this field.]

On the other hand, Engr. Purio shared that during his time in college at Adamson University, this was when the Philippines started to invest in space technologies and programs. When the offer and opportunity came to be part of the Maya-2 cube satellite project, he saw the huge opportunity to learn a lot and share and apply it here in our country.

Engr. Sejera believes that the chance to exchange ideas and experience with other races was hard to pass up.

"To be honest, it is not difficult to accept the offer to be part of this project because it is an honor and privilege to pick the brains of the greatest experts and engineers abroad and witnessing firsthand how a country like Japan runs and implements its space programs that hopefully we can replicate here in the Philippines," said Engr. Sejera.

The three space engineers were selected to be scholars at Kyushu Institute of Technology (Kyutech) under the Space Technology and Applications Mastery, Innovation and Advancement (STAMINA4Space) Program. The program is implemented by the Department of Science and Technology-Advanced Science and Technology Institute (DOST-ASTI) and the University of the Philippines Diliman.

"Pinadala kaming tatlo, essentially para ma-train at matutunan namin ang paggawa ng cube satellite para in the long run, makapagdevelop na tayo ng sarili nating satellite rito sa Pilipinas and we can do that at a lower cost," said Engr. Purio.

CENTRONG AGTEK

BASTA USAPANG AGHAM AT TEKNOLOHIYA,
KAMI ANG NASA CENTRO

EPISODE 2:

**USAPANG SPACE:
THE MAYA-2 CUBE
SATELLITE**

JULY 16, 2021 • FRIDAY • 6PM

WITH GUESTS

ENGR. MARLOUN SEJERA

ENGR. IZRAEL ZENAR BAUTISTA

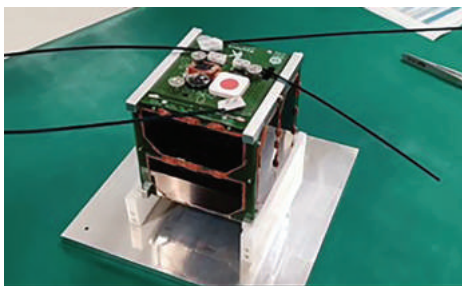
ENGR. MARK ANGELO PURIO

WATCH IT LIVE ON THE FOLLOWING FACEBOOK PAGES:
SCIENCE JOURNO AKO, CEU NEWS AND CURRENT AFFAIRS, CEU COMASSOC, CEU SELAMS

[Three of us were deployed essentially to be trained in developing cube satellites so that in the long run we can build on our own at a lower cost.]

Engr. Purio further explained that developing satellites are beyond giving the country a huge pride but it is more of investing

long-term as those captured images by these satellites could provide substantial information and data towards better decision and policy-making, particularly in the field of agriculture, disaster preparedness and management, national security, urban planning, and environmental conservation.



Maya-2 is a 1.3kg CubeSat equipped with a camera for image and video capture, an Automatic Packet Reporting System Message Digipeater (APRS-DP), attitude determination and control units for active attitude stabilization and control demonstrations, Perovskite solar cells and Latchup-detection chip.

The Maya-2 cube satellite just weighs 1.3 kg equipped with a camera for image and video capture, attitude determination and control units for active attitude stabilization and control demonstrations, Perovskite solar cells, Latchup-detection chip, and an Automatic Packet Reporting System Message Digipeater (APRS-DP).

Engr. Sejera shared that it was a great learning experience when all of them got the opportunity to work with students and experts from other countries. Despite their differences when it comes to work ethic and principle, they were able to blend all that character and personality to achieve their common goal, which is to build a satellite.

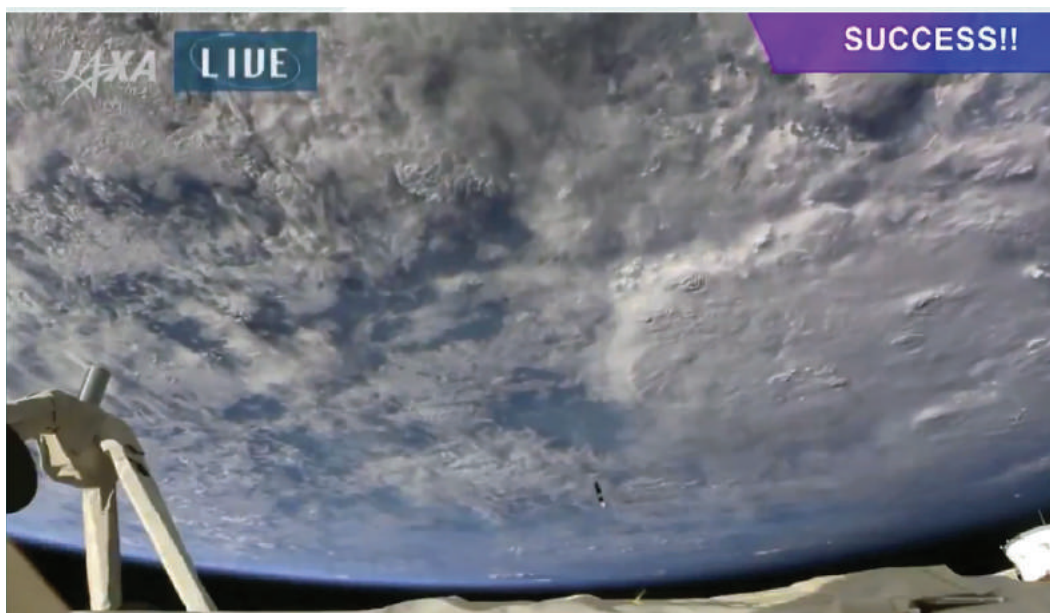
Engr. Purio agreed with Engr. Sejera. He added that as cliché as it sounds, building a satellite was a total team effort.

"Each team member was assigned to a specific component of the satellite and if you failed, it might affect the entire satellite," explained Engr. Purio.

He said that for the duration of the project, there were challenges and bumps on the road to building a satellite but they were able to draw strength from one another by leveraging the strength of others and compensating for their respective weaknesses.

For the student-engineers, it was a chance of a lifetime when they were granted scholarships and given the chance to work and build the Maya-2 cube satellite. Sharing and honing their knowledge and skills for a research project could have an enormous impact on various industries in years to come.

"Kaming tatlo, nagsimula lang din kami as normal students pero nangarap kami at noong nagkaroon ng opportunity, we grabbed it immediately. Sa lahat naman ng ginagawa natin, palagi naman may obstacle but you have to trust the process. May time na mahihirapan at mafrustrate ka pero iyong lesson from that will help you to grow and have better approach once the challenges come to you again," said Engr. Purio



The Philippines' second cube satellite (CubeSat), Maya-2, was successfully launched to the International Space Station (ISS) on 21 February 2021 aboard the S.S. Katherine Johnson Cynos spacecraft, the final step before the satellite goes through deployment by the ISS.

[We are just normal students in the beginning but we pursue our dreams. When the opportunity came, we grabbed it immediately. In all the things that we do, there is always an obstacle but you have to trust the process. There are times you will get frustrated but it will give you lessons that will help you to grow and have a better approach once the challenges come to you again.]

For Sejera, if you want to achieve your dream, you have to seek opportunities. If you cannot find that in your place, you have to explore somewhere else and believe in it; there are tons out there.

"Nothing worth doing is easy so kapag nahihirapan kayo, doon mo masasabi na worth it talaga ginagawa mo. Sa case namin when we are building the satellite, 16 hours a day kami nagtrabaho, halos walang tulog minsan, pero balewala iyon sa amin kasi nakikita namin na iyong end product na ito can help my country and that's the best feeling I could imagine," said Engr. Bautista.

[Nothing worth doing is easy. So, if we have a hard time in things that we do, it means that it is all worth it. In our case, when we are building the satellite, we have been working 16 hours a day but we don't care because we see the end product and we believe that it could help my country and that's the best feeling I could imagine.]

He also said that opportunity comes to those prepared, like what they did. They soak up all the knowledge that they can and take the courses for certain skills, so when the opportunities come, it is really for them because

they meet all the requirements. After all, they prepared.

The three Filipino space engineers were featured in Centrong AgTek (Agham at Teknolohiya), an experimental online show of the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) and Centro Escolar University (CEU) Media and Communication Department.

The show seeks to deliver fresh, informative, relevant, and entertaining content that would enable primarily young Filipinos to appreciate and understand the practical benefits of science, technology, and innovation in various aspects of our lives. This initiative is part of the Science Journalism advocacy of DOST-STII to nurture a culture of science in the country. To watch this episode, please visit the Science Journo Ako Facebook Page.

For more details on the Maya-2 cube satellite, you may visit <https://stamina4space.upd.edu.ph/upcoming-satellites/maya-2/>.



Engr. Mark Angelo Purio (right) was being trained at Kyushu Institute of Technology (Kyutech) to build the Philippines' Maya-2 cube satellite.



Research Council to map PH music industry

By Jenny Leigh A. Daquioag, DOST-NRCP

HOW MANY Filipino musical artists and songs do you know? Have you ever been into market or online shops to buy Philippine music and artists merchandise? Or do you really know about OPM or Original Pilipino Music?

How much really can we contribute in the economy if we patronize our own music, buy our own goods, and promote our own artists? Take that from Korean craze, the Hallyu wave, which is massively contributing to their economy.

The Department of Science and Technology - National Research Council of the Philippines (DOST-NRCP) continuously wires the music industry, and will now conduct a new policy research on the Philippine music industry in support of the proposed House Bill (HB) No. 8101 or the Philippine Creative Industries Act.

HB 8101, filed by Pangasinan 4th District Representative, Christopher “Toff” de Venecia, pushes for the promotion, protection and improvement of the creative economy, where music and the performing arts are important sectors.

“It is high time for us to finally give the music industry, among many other sectors of our creative economy, the support and attention it deserves,” said de Venecia in one of his privilege speeches.

The NRCP new policy research study, “MusikaPilipinas: Research and Mapping Towards Understanding, Scoping, and Defining the Philippine Music Industry”, aims to provide

a comprehensive baseline of the economic performance of the Philippine music industry of the country and the specific structure of its players, transactions and creative and production dynamics. It also intends to identify prospects and challenges for an effective reference on cultural policy to be utilized in the process of building a more vibrant and dynamic Philippine music industry.

Led by Dr. Ma. Alexandra I. Chua, member of the NRCP Division of Humanities, this study will produce a comprehensive mapping, scoping and defining of the Philippine music industry to provide an analysis of the country’s music market and its current state, particularly providing information and assessment of its baseline socio-cultural and economic data. This is undertaken to reveal opportunities and vulnerabilities in the country’s music ecosystem in order to suggest key areas for development for the future - including the kind of government intervention possible in support of the growth of the music industry.

The policy research also specifically aims to: (1) provide proper conceptual definition of the Philippine music industry together with the scope of its entire music ecosystem i.e., publishing, recording and live music in relation to the creation, production, distribution, consumption; (2) map out the music ecosystem and identify key players/ actors/ institutions for each of the sectors involved in the music industry (a preliminary database of key actors

in the Philippine music industry will, thus, be created); (3) determine the components of the value chain of the Philippine music industry, identifying strengths and challenges in each part of the value chain in order to determine the areas that would benefit government support and private sector collaborations, (4) identify and assess market capital of music goods particularly in the pivotal transformation to digital platforms/technologies related to its production, distribution, and consumption; and (5) determine prospects of growth for the country’s music industry, both domestically and internationally.

The target beneficiaries of the project include: (1) young talented artists, music agents, promoters, managers, and producers; (2) ailing music ecosystems that need and want to be revived; (3) professional artists, managers, and producers from more mature music industry ecosystems; (4) cultural policy makers and executives; and (5) allied personnel of the music industries.

The potential outcome of the project includes (1) data analysis and understanding of the economic value contributed by each part of the value chain and be able to utilize this for the strategic direction of the industry’s growth (2) creation of the database of key players and institutions in the industry (3) and creation of a website that will make the results of the study easily accessible to scholars, experts and practitioners.

The potential impact are as follows: (1) social well-being of Filipino music artists and other stakeholders of the music industry (2) cultivate sense of pride for Filipino composed music (3) creation of stable jobs for musicians, producers, and music managers (4) better support for artists in sustaining their livelihood in music and (5) economic growth for the country.

The research study utilizes the framework based on Cultural Institutions Studies (CIS) of musicologist Peter Tschmuck (2006) and the Network Value System proposed by Ricardo Alvarez (2017) to investigate the complex social and economic dynamics of the music ecosystem of the country. The baseline setting that will be presented will serve as the jump off point for the road mapping that will be the subject of a more holistic and comprehensive three-year Musika Pilipinas Research Program.



The Eraserheads. One of the most successful and influential Filipino rock bands in the '90s. Photo source: Wordpress

Invent School Program flourishes in their digital shift, educated over 400 students

By Danicah Faith Lagman, DOST-TAPI

“Powering Generation of Thinkers”

This has been the battlecry of the Invent School Program, an ideation program by the Department of Science and Technology - Technology Application and Promotion Institute (DOST-TAPI), which encourages students to learn and discover their potential as future scientists and inventors. In 2020, Invent School stayed true to its mission as it catered student learners using their newest platform - the online world.

Because of the pandemic, Invent School had to innovate beyond the traditional face-to-face workshops, which cannot be conducted due to varying community restrictions. As a result, the program explored webinars and tailored-fit its training using online platforms in order to deliver the same quality of service to its students.

The Invent School traveling gurus went to Sulu State College in November 2019 to conduct a series of seminar-workshops. This was one of their last training sessions before the lockdown due to the pandemic.

“Last year, we expected fewer students to join since we were facing a pandemic and several gaps had to be addressed. But this didn’t stop us. In totality, we were able to equip 492 highschool and college students from 68 schools in seven different regions all over the country,” shared Engr. Richelle Malaay, program manager of Invent School.



The Invent School traveling gurus went to Sulu State College in November 2019 to conduct a series of seminar-workshops. This was one of their last training sessions before the lockdown due to the pandemic.

This 2021, Invent School will continue its digital shift while continuously improving its delivery and content. It also plans to accommodate elementary pupils from Grades 4 to 6, once the dedicated modules for this age group have been finalized.

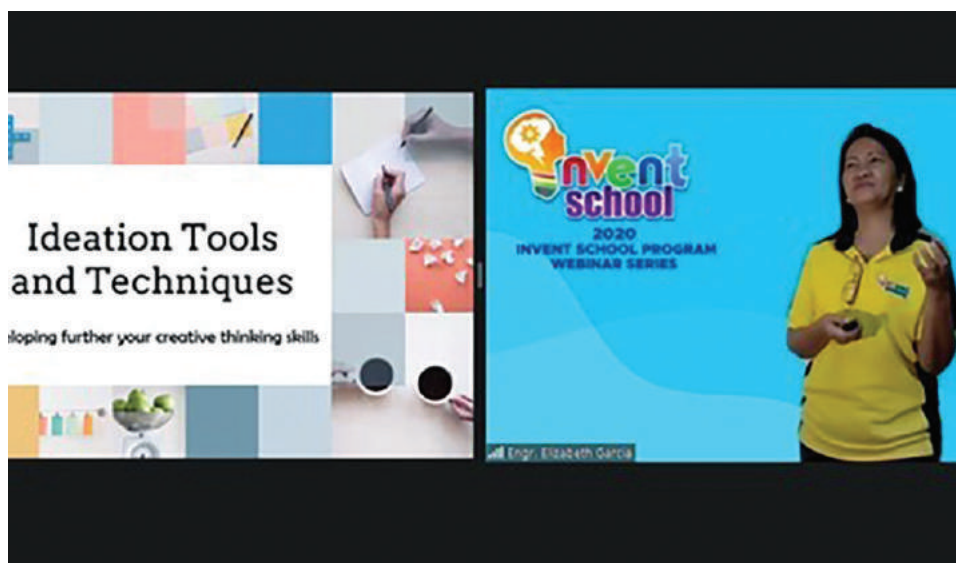
Like other DOST-TAPI’s programs, Invent School had to adjust and innovate from within in order to cope up with the demands of pandemic without sacrificing the caliber of its services. At its core, Invent School stands

with its vision to empower generations of aspiring young inventors with the knowledge needed to kick-start their journey in the field of science and technology.

For those interested in this free seminar-workshop, you may visit techtrans.gov.ph or tapi.dost.gov.ph for more information. Proposals may be directly submitted to info@tapi.dost.gov.ph. For social media updates, like and subscribe to the DOST-TAPI’s official Facebook pages @i-INVENTPH or @DOST.TAPI



IN ACTION: Participants from Sulu State College gather for a brainstorming of their output as part of their activity in the ISP training. Taken last November of 2019.



Engr. Elizabeth Garcia, Invent School Trainor, discusses Ideation Tools and Techniques to students from DOST Region IX in Zamboanga Sibugay during the digital Invent School last 13 October 2020.

PH ranks strong along with China and India in 2021 Global Innovation Index

By Joy M. Lazcano, *DOST-STII*



THE DEPARTMENT of Science and Technology (DOST), despite dropping one rank at 51st in the Global Innovation Index (GII) for 2021 from last year's 50th, maintains its strong bearing that "it remains committed in bringing science closer to society, empowering Filipino-made breakthroughs and innovations to increase productivity and drive prosperity."

World Intellectual Property Organization Assistant Director General Marco Aleman, emphasized that the country's 51st ranking puts the Philippines "together with China, Turkey, Vietnam, and India as part of the group of the only five countries, which made significant progress in the GI innovation rankings overtime."

Aleman added that the country continues to lead among the developing countries in setting innovation as a national priority.

In the GI 2021 report, the Philippines ranked 4th among the 34 lower middle-income group economies and 11th among the 17 economies in Southeast Asia, East Asia, and Oceania. With roughly 80 indicators, the Philippines considerably performed well as the GI ranks the countries in the world with their innovation capabilities.

In the last three years, the innovation inputs or the investments for these activities in the Philippines remain low, ranking at

72 compared to 70 in 2020 and 76 in 2019. However, despite the low input, the ranking for innovation outputs or the resulting programs and technologies from such investments, is rising, with the Philippines at rank 40 in 2021, a step higher from the 41st ranking in 2020. This reflects the efficient implementation of R&D programs that resulted in high outputs despite limited funding.

For his part, DOST Secretary Fortunato T. de la Peña underscored that the Science Department's R&D priorities have shifted due to the COVID-19 pandemic and has refocused its efforts on the development of diagnostic or test kits, biomedical devices, disease modelling and surveillance applications, among others.

He added that "the world seemed to be in a halt," describing the early months of the pandemic during the virtual presser held on 21 September 2021 in time for the launch of this year's global innovation report. "But despite the negative impacts in the implementation of [its] Science, Technology, and Innovation activities," said de la Peña, "the Department became flexible enough and has adopted timely strategies, enabling the country to respond to the situation at hand."

Despite the challenging times, de la Peña also mentioned that several initiatives

were done to ensure food security with programs and projects geared at improving crop, livestock and fisheries production. In addition, the Department strengthened its collaboration with stakeholders that allowed value adding activities to ensure food resiliency in the new normal. DOST also fast tracked its health research and development efforts and brought in the intensified Tuklas Lunas Program to support the country's drug discovery and development efforts.

Moreover, the science chief disclosed that in the last four years, DOST's scholarship programs produced over 500 MS and PhD graduates in the Science, Technology, Engineering, and Mathematics fields at different level per year and "awarded more than 10,000 MS/PhD scholarships across the country from which more than 4,000 scholars already graduated."

To sustain its pool of S&T experts, the DOST continuously engages 577 Balik Scientists across the 16 regions of the country, further strengthening the R&D efforts through the Science For Change and Balik Scientist programs.

And to ensure equitable R&D funding across the country, the DOST is strongly pushing for the passage of the Science For Change Bill to lawmakers which will "allow the establishment of more R&D and Innovation centers in the regions," revealed de la Peña.

This was affirmed by DOST Undersecretary for R&D Rowena Cristina L. Guevara who said that "the DOST is lobbying for the passage of the Science for Change (S4CP) Bill. Approval of the said bill would mean the continuation of the inclusive, equitable and sustained efforts for innovation, given the optimal use of our resources for R&D."

On a positive note, the House of Representatives recently approved in third and final reading the creation of the Virology and Vaccine Institute of the Philippines to serve as the country's premiere R&D institute in the field of virology and vaccine development. This health system infrastructure will contribute to the country's efforts in addressing possible future health issues.

In another front, Department of Trade and Industry (DTI) Secretary Ramon Lopez shared that this year the country continues

more on p. 13

Science chief speaks on regional development at the High-Level Policy Dialogue of DAP and UNDP

By Karen Lou S. Mabagos, *DOST-ITCU*

“THE NEEDS and opportunities are better known at the region, province, town, and community level”, Secretary Fortunato T. de la Peña said in his concluding remarks at the High-Level Policy Dialogue on Inclusive Innovation held on 17 September 2021.

The Dialogue titled “Accelerating COVID-19 Recovery through Inclusive Innovation” was jointly organized by the Development Academy of the Philippines (DAP) and the United Nations Development Programme (UNDP). It was participated in by high-level officials from the Philippine Government including Cabinet Secretary Karlo Alexei Nograles, Senator Sherwin Gatchalian, Senator Juan Edgardo Angara, and the DOST Secretary.

Panelists, presenters, and speakers discussed the current approaches on inclusive innovation in the Philippines at the legislative, policy, and institutional levels and their importance. Secretary de la Peña reiterated the points made by some of the esteemed panelists.

Secretary Nograles, on the other hand, cited the importance of public-private cooperation in developing innovations to be inclusive. Senator Angara highlighted the necessity for a good ecosystem while Senator Gatchalian emphasized the significance of connectivity. These are all basic requirements in our overall effort.

The DOST Secretary was invited to deliver the concluding remarks in the



High-Level Policy Dialogue. Secretary de la Peña reiterated that the needs and opportunities to speed up recovery through inclusive innovation are better known at the region, province, town, and community level. This is the rationale behind the DOST’s Science for Change Program.

Secretary de la Peña also pointed out that other sectors in society have crucial roles to play in the country’s recovery. He

said that industry or private sector can largely contribute to innovation which is also evident in the DOST’s Small Enterprises Technology Upgrading Program. He further stressed that there is the need for investment by local government units (LGUs) and national government agencies (NGAs) in innovative ventures such as local dairy plants, tissue culture laboratories, and inter-island transportation. If trained appropriately, the marginalized communities can be more independent, self-sufficient, and sustainable. In terms of connectivity, the science chief revealed that local community networks projects are underway.

The country needs to advance to Industry 4.0 and this could be done through revamping current programs, aside from developing new ones geared towards this objective. The science chief highlighted that the innovations should address productivity improvement in different fields like manufacturing, agriculture, and services. These are also reflected in the Department’s Food Innovation Centers, Mobile Food Processors, Metals and Engineering Innovation Centers, and Networked Services like OneLab, OneStore, and OneExpert.

Secretary de la Peña ended his remarks by saying that the Philippines’ different government agencies should adopt and practice the whole-of-government approach by collaborating with each other so as to avoid duplicating each other’s work.

to perform better in terms of innovation output compared to the innovation inputs.

He explained that the country is “able to produce more and higher quality innovation output despite our limited innovation resources and pandemic induced setbacks.”

This development reflected GII’s observations that the Philippines continues to be among the countries that perform above expectations given its current level of development.

Lopez further emphasized that the Philippines rank first in the world in both high

technology exports and imports as percent of trade while maintaining the 10th place in the creative goods export as percent of trade. He also pointed out that the domestic market scale, trade openness, firms offering formal training, and ICT services exports continue to be the country’s strengths.

“The 2021 GII highlights that many industrial competitiveness indicators remain to be our strengths,” Lopez continued. Incidentally, the DOST has established strategic partnership with the DTI to jointly

pursue harmonized initiatives to achieve economic development by using science, technology, and innovation.

The GII is an insightful data published by the World Intellectual Property Organization to help countries evaluate the innovation performance each year and help stakeholders map out plans for economic improvements and developments. It ranks the innovation ecosystem performance based on 80 key development indicators as its metrics.

DOST-PCIEERD to build 3 new laboratories, funds 5 new R&D projects in the regions

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) will be putting up three new laboratories and funding five research projects in various regions in the country. This initiative is aimed at helping strengthen regional development through S&T infrastructures and it will also encourage more researchers and scientists to engage in high-impact R&D projects.

Under the Institution Development Program (IDP), the three new research laboratories are:

1. Establishment of AI Research Center for Community Development (AIRCoDE) - This project will establish an AI Research Laboratory in Camarines Sur State Polytechnic Colleges to strengthen the research

capabilities of AI enthusiasts, faculty, and students in the field of Artificial Intelligence, such as deep learning, computer vision, etc. The establishment of the AI Research Laboratory will be a primordial step in the Philippines' continuous development to be at par with the current trends of Artificial Intelligence in other countries.

2. Establishment of ParSU Microbiology Testing Laboratory (MTL) - The establishment of the microbiology testing laboratory will complement and help in the existing research activities of Partido State University – Goa Campus in Camarines Sur. The acquisition of the requested equipment will increase the integrity of the university research outputs, improve the research skills of the faculty and students, and will increase scientific publications.

3. Establishment of Mindanao Natural (MinNa) Language Processing (LProc) Research and Development Laboratory - The project's main objective is to establish the Mindanao Natural (MinNa) Language Processing (LProc) Laboratory at the University of the Immaculate Conception in Davao City, which specifically aims to collect language resources needed in the development of the Multilingual Machine Translation (MT) System and Conversational Agent (CA) and develop a Web-based Multilingual MT System and CA, among others.

Under the Regional Research Institution (RRI) program, the projects that will receive funding support are the following:

1. Development of Halal Compliant Restructured Goat Meat Products - The

project, to be implemented by the Sultan Kudarat State University, aims to transform goat meat and milk into value-added and halal compliant products with an increased market value to suit customer needs.

2. Design, Development, Testing and Implementation of Fuzzy-Proportional Plus Integral (PI) Power Factor Correction Controller (PFCC) for 10 kw load – This project, to be implemented by the Iloilo Science and Technology University (ISAT-U), seeks to design, develop, test, and implement the Fuzzy-PI PFCC for 10 kW Load that will lower power loss and increase productivity.

3. Application of Blockchain Technology to the Guimaras Mango Supply Chain- This project, to be implemented by ISAT-U, aims to ensure the authenticity of the mango products exported. The proposed study will use the blockchain technology to trace the product origin until it reaches the consumers.

4. Development of Optimized Pineapple Fiber Scraping Machine - The general objective of this research study, to be implemented by Capiz State University, is to develop an optimized mechanical pineapple fiber extractor in terms of the extraction capacity.

5. Utilization of Banana Peel, Canistel Fruit and Brown Rice in the Development of Composite Flour – To be implemented by ISAT-U, the project seeks to utilize banana peel, canistel fruit, and brown rice in developing composite flour. This flour is targeted to be an ingredient in functional food.

DOST-PCIEERD Executive Director Enrico C. Paringit commended the project leaders in their zeal to uplift the R&D capabilities in these priority sectors in their respective regions in pursuit of improving S&T research through their projects.

“These capacity building programs under the Human Resource Development Program (HRDP) continues to advance and strengthen

Filipino R&D in keeping up with the times,” Paringit said.

Under the HRDP, the IDP provides support for upgrading of research laboratories and facilities of academic and research institutions where there is an inadequacy of research expertise and/or facilities. It prioritizes new institutions in the regions that have limited capacities to conduct R&D.

As part of its support, the initiative will upgrade and/or set up research laboratories, purchase laboratory equipment (including highly specialized software)/facilities, and provide small research grants aimed at developing research capabilities.

On the other hand, the RRI is designed for new researchers and new institutions in doing R&D in the regions. Its goal is to develop research capabilities and increase the available researchers, scientists, and engineers in the DOST-PCIEERD priority sectors through the regional consortia program.



DOST-CALABARZON continuously supports farmers and artist groups in Angono, establishes stronger partnerships through S&T

By Halyn Lunel Gamboa, DOST-CALABARZON
Photos from DOST-CALABARZON

DOST-CALABARZON, THROUGH its Provincial S&T Center in Rizal, hosted a back-to-back activity for the farmers and artist leaders in Angono, Rizal last 20 July 2021. This event showcased the “Ceremonial Turnover of Farm Tools, Equipment, and Vegetable Seeds to the Angono New Normal Farmers Association (ANNFA)” and the “Fusion of S&T and Arts in Angono” which aimed to capacitate farmers in promoting community vegetable farming and to establish possible partnerships with various artist groups in Angono, Rizal.

Turnover of farm tools, equipment, and vegetable seeds to ANNFA

The first part of the program was mainly attended by 26 ANNFA members and graced by DOST key officials, namely, Secretary Fortunato T. de la Peña; Dr. Juanito Batalon, Director of DOST-Philippine Council for Aquatic-Agricultural Resources Management Research Division (DOST-PCAARRD-ARMRD); Dir. Celia Elumba of DOST-Philippine Textile Research Institute; Dir. Marieta Bañez Sumagaysay of DOST-National Research Council of the Philippines; Dir. Richard P. Burgos of DOST-Science and Technology Information Institute; Dir. Lita Suerte-Felipe of DOST-Department Legislative Liaison Office; and Provincial Director Fernando E. Ablaza of DOST-Rizal.



Dr. Batalon discussed the GALING-PCAARRD Kontra COVID-19 Program comprising one of its livelihood projects called “Gulayan sa Pamayanan” which is aligned with ANNFA’s goal to increase productivity and efficiency in vegetable production.

Under this program, DOST-Rizal led by PD Ablaza, implemented the DOST-PCAARRD-funded project titled, “Employing Hydroponics and Community Vegetable Gardening Technologies to alleviate COVID-19 Threats to Food Security in Selected Municipalities in Region IV-A”. This aims to promote community vegetable farming and contribute to the national call for initiatives towards food security and pandemic resilience.

Meanwhile, Sec. de la Peña also extended his support by hoping for ANNFA’s continuous success in their farming ventures. He said, “Para sa miyembro ng ANNFA, hangad ko ang inyong tagumpay.”

Afterwards, Ms. Emy Briones of ANNFA, gave her heartfelt gratitude in her testimonial, on behalf of all ANNFA members. “Yung mga tools po na ibinigay sa amin, malaking tulong po ito, lalo na ‘yung grass cutter,” she tearfully shared, “Dahil operada po ako, hindi ko na po kaya magtabas dahil sa kalagayan ko...napakaganda po kasi kahit gasolina ay ipinagkakaloob po sa amin.” PD Ablaza, in his closing remarks, thanked the participants and especially the DOST Secretary himself for gracing the program.

(continue next page)



Science-based farming: the future of Caraga's coffee industry

By Dionard N. Mendova, *DOST-Caraga*

Photos from DOST-Caraga

"AGRICULTURE IS a science, hence the science-based approach is the way for us to compete," Mr. Mark Balahay, CAPE consultant to the Brgy. Durian coffee community.

In 2016, the Department of Agriculture identified the lack of quality materials among the weak points of Caraga's coffee industry. To help address the increasing demand and limited supply of quality coffee beans in the region, the Department of Science and Technology through DOST-Agusan del Norte and Consultancy for Agricultural Productivity

Enhancement (CAPE) program identified Brgy. Durian in the municipality of Las Nieves as one of the program beneficiaries.

On 8 April 2021, Mr. Mark Balahay, CAPE Consultant and Coffee Quality Institute Q Grader at Philippine Coffee Council trained the 15 members of the Durian Farmers' Association on Coffee Plantation Maintenance.

The consultant explained proven agricultural practices in planting density, fertilization, pest control, and rejuvenation cycle. He urged farmers to rejuvenate old coffee

trees by regularly pruning or cutting secondary and tertiary branches to give more space for primary ones to grow.

In contrast to the traditional farming belief of "more branches, more fruits," rejuvenation, including regular pruning and de-suckering decrease competition for nutrients resulting in more fruits and increase in yield up to 30% per season.

Although new technology results in viable coffee beans, Mr. Balahay pointed out that they don't want to exclude traditional practices in the community and encouraged the integration of practices.

He also explained that the flavor and aroma of beans reflect how farmers take care of the plantation. They give back their absorbed nutrients into organic acids transformed into flavor profiles.

Mr. Sindo, Durian Farmers' Representative, said achieving this will be a joint effort between the farmers and DOST Caraga to produce quality beans. Despite challenges, he said farmers are willing to commit and adopt new technology for increased farm yield.

DOST - Agusan del Norte Provincial S&T Director Ms. Meriam Bouquia committed to providing more technology interventions and equipment to increase quality and production.

FARM DEMO. The consultant, together with members of the Durian Farmers' Association examines coffee trees and how they can improve the plantation.



(continuation from *DOST-CALABARZON...p16*)

Aside from the provision of trainings to further promote sustainable vegetable production and enhance their marketability, DOST-Rizal, in coordination with LGU-Angono, also plans to establish a Weekend Fresh Market for ANNFA's harvests.

On the fusion of S&T and the Arts through DOST and various Angono artist groups

The afternoon session of the program involved a series of museum visits assisted by LGU-Angono led by its Mayor Jeri Mae E. Calderon. DOST Sec. de la Peña and guests met with Angono artists in Botong Francisco Ancestral House and Blanco Family Art Museum.

Dubbed as the "Art Capital of the Philippines", Angono shelters some of the

country's finest arts and artistry. Hence, through a meeting with representatives from LGU-Angono and various artists groups in Angono, DOST seized the opportunity to discuss points of collaboration for the fusion of S&T and the Arts.

DOST key officials present were Sec. Fortunato T. de la Peña, Dir. Celia Elumba of DOST-PTRI, Dir. Marieta Banez Sumagaysay of DOST-NRCP, Dir. Richard P. Burgos of DOST-STII, Dr. Juanito Batallon, Director of DOST-PCAARRD-ARMRD, Dir. Lita Suerte-Felipe of DOST-DLLO, Ms. Emelita P. Bagsit, OIC-Regional Director of DOST-CALABARZON, and Provincial Director Fernando E. Ablaza of DOST-Rizal. Angono Mayor Jeri Mae E. Calderon and Vice Mayor Gerardo Calderon also attended including the representatives from these artist groups: Angono Ateliers Association, Angono Artists Association, Lambana Angono,

ANGKLA, Grupo Sabado Agency, and Neo Angono.

Moderated by DOST-STII Dir. Burgos, the meeting started with selected presentations from some of the guests. DOST-PTRI Dir. Elumba presented their agency's projects including the NatDyes Center and the products like natural dyes and textiles which are "things that will be used by artists". This was followed by Dr. Sumagaysay's presentation of DOST-NRCP's current initiatives in the arts including research projects and proposals on visual arts and music.

Dr. Sumagaysay further echoed, "These are possible entry points by which NRCP can help and collaborate with the artists of Angono." Afterwards, artist groups were encouraged to ask questions and raise their concerns in the open forum.



MOVIE REVIEW:

DISASTER MOVIES

By Karl Raven A. Ramon, *DOST-STII*

One question strikes us when watching disaster flicks such as 2012, The Day After Tomorrow, and The Core—movies that depict extinction level events, could this really happen in our lifetime?

Disaster scientists like volcanologists, geologists, and weather specialists, were featured with their answers and take on the most intriguing questions about each scenario from different “disaster” movies in the DOSTv’s special feature commemorating the National Disaster Resilience Month last July. This expert exchange of views and scientific opinions were done in partnership with DOST’s Philippine Institute of Volcanology and Seismology (PHIVOLCS) and the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA).

Let’s take a glimpse of the most nerve-racking scenes from these movies and witness the candid reactions of our scientists on how they debunked and “unmythd” science misconceptions about disasters.

EARTHQUAKE and TSUNAMI

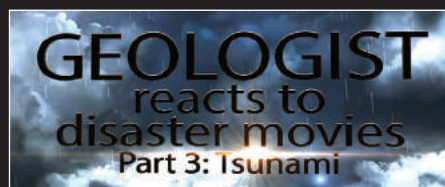
Did you know that you must not and cannot drive easily during a strong earthquake? Geologist Jeffrey Perez from



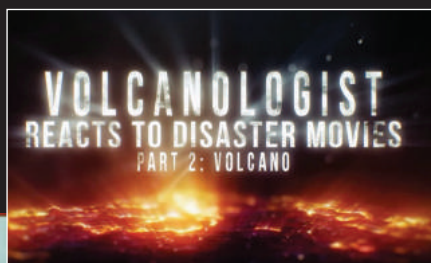
Scan this QR code for DOSTv playlist

DOST-PHIVOLCS hinted “it’s like you are driving with a flat tire”. This is his reaction to the movie ‘2012’ where an earthquake hits the city causing oscillated movements along the roads where the characters seemed to be escaping in a rush to escape.

In another scene from the same movie, the tsunami



reached the high alps of Himalayas, a sort of exaggeration. “In fact, recent tsunami records around the world only reached 40 meters (13-storey building) in the case of Japan in 2011. In the Philippines in 1976, the Moro gulf earthquake only generated 12 meters tsunami (4-storey building), one of the highest tsunamis recorded in the country. We don’t have to worry about a Mt. Everest-high tsunami as “this is impossible,” Perez added.



VOLCANO ERUPTION

"You cannot outrun pyroclastic density current

(PDC)," warned volcanologist Dr. Paul Karson Alanis of DOST-PHIVOLCS. PDCs are mixtures of fragmented volcanic particles (pyroclastics), hot gases and ash that rush down the volcanic slopes or rapidly moving outward from a source vent at high speeds (Source: PHIVOLCS). In some references PDC ranges from a speed of 70-300kph.

People really have the habit to escape disasters in a car, as protagonists in the movie 'Dante's Peak' where actors scrambled to avoid the PDC coming from the erupting volcano. His warning not to outrun volcanic hazards erupted from the preventive measures not to enter volcanic sites in the first place. In the Philippines, our most active volcanoes have their own Permanent Danger Zones (PDZ) wherein staying and residing inside that radius is prohibited, practically to avoid such scenarios.



Movies reviewed in this episode: "The Day After Tomorrow", and "Twister"



WEATHER SYSTEMS

You might be wondering why disaster movies from western countries describe seemingly violent typhoons as hurricanes and tornadoes. Weather Specialist Ariel Rojas from DOST-PAGASA differentiates these similar weather systems occurring in the United States and the Philippines. "Tornadoes in the Philippines are weaker, smaller, and easier to dissipate," clarified Rojas when asked about the movie 'Twister'. However, the Philippines is at risk of strong typhoons.

In one particular scene from the movie 'Twister', Rojas denied that a waterspout can lift up heavy objects like cows, but warned that strong tornadoes can.

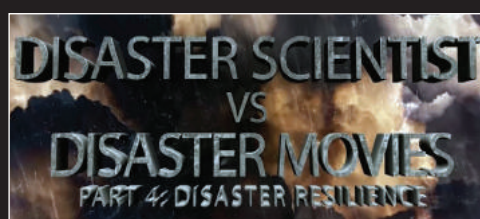
EXTINCTION EVENTS

End-of-the-world scenarios are the focus of the last feature for the month, Disaster Scientist Undersecretary Renato U. Solidum Jr. (with degrees in Geology and Oceanography) of DOST joined us to debunk the explanation from the movies that caused extinction level events.

While the '2012' movie, so far, had been the most controversial because of rumored predictions from various groups in the real world, the cause of the event that triggered the end of the world scenario in the movie is far more unrealistic and impossible. In the movie, the blame went to neutrinos from the sun that apparently, in the movie, interacted with the earth's

core, melting its core, and leaving the crust of the earth to move freely. Neutrinos have very little interaction with matter; however, they are incredibly difficult to detect (Source: Scientific American).

"If the heat of the sun is the cause, the first to be affected is our atmosphere



and not our earth's core," clarified Usec. Solidum, now a household name in the Philippines when it comes to disasters.

MOVIES ARE NOT REAL!

If movies are your basis for information about disasters, you better think twice. It can make us believe how a disaster would actually feel and look like, but nothing beats the good old science in disaster preparedness, mitigation, and response. Movies tend to exaggerate to heighten viewer's appeal. So, for honest-to-goodness science-based explanations, you better follow PAGASA, PHIVOLCS, and even DOSTv on Facebook for accurate and verified disaster information, coming directly from the experts, discounting cinematic spectacles and hyperbole of scenarios.

Batangas State U leads in the use of S&T in rehab plans for families affected by Taal volcano

By Joy M. Lazcano, DOST-STII



Bangon Batangas is a science-based project that aims to create positive intervention and effective rehabilitation plans to internally displaced population within the communities affected by the Taal volcano eruption. (Photo courtesy of Bangon Batangas project team)

A PREMIER state university in Batangas led a science-based initiative to help families living in the surrounding localities of Taal volcano return to productivity in spite of renewed unrest and activity.

The Batangas State University (BatStateU) recently launched the Bangon Batangas project dubbed S&T - based intervention to Taal Volcano's Internally Displaced Population (IDP) through a funding from the Department of Science and Technology-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (DOST-PCAARRD) that aims to assess the damages brought about by the Taal eruption in January 2020.

The project hopes to create positive intervention and effective rehabilitation plans focusing on the 151,386 families composed of 584,236 individuals across the provinces of Batangas, Quezon, Laguna, and Cavite. About 1,813 families consisting of 6,666 individuals were evacuated to temporary shelters during the January 2020 eruption.

The project implementer will assess the damages to their livelihood and the appropriate interventions in the municipalities of Talisay, Laurel, Agoncillo, San Nicolas, and Balete that are all in the province of Batangas and provide relief operations to affected families.

These municipalities were badly hit by the eruption and recently have been evacuated as Taal volcano had a "short-lived" phreatomagmatic eruption that occurred at

the main crater of Taal Volcano last 7 July this year. The short eruption that lasted for a few minutes prompted DOST-PHIVOLCS to raise the warning from Alert Level 2 to Alert Level 3.

According to DOST-Philippine Institute of Volcanology and Seismology, Alert Level 3 means there is a high level of volcanic unrest. There is sustained increase in the levels of volcanic earthquakes, some may be perceptible and occurrence of low-frequency earthquakes, volcanic tremor, rumbling sounds. Moreover, Alert Level 3 is characterized by forceful and voluminous steam/ash ejections; sustained increases in sulfur dioxide emission rates; and ground deformation/swelling of the edifice. Activity at the summit may involve dome growth and/or lava flow, resultant rockfall.

The project has two main components. Primarily it is tasked to conduct assessments and surveys of at least 39% or 2,600 families of the displaced population, who are mostly sustenance farmers relying on crops and livestock farming, fisherfolks, aquaculture farmers, and ecotour guides.

The project will be implemented by BatStateU in collaboration with Cavite State University (CSU) which will conduct a study on the eruption's damage to high value crops primarily coffee, while the Laguna State Polytechnic University will assess the damage to the aquaculture and fisheries.

According to the project leader Dr. Romel U. Briones of BatStateU Lobo Campus, initial study suggested that the affected residents

who are in the evacuation centers still want to pursue their livelihood prior to the eruption. "They still want to plant vegetables and other high-value crops," explained Briones.

In a recent pronouncement, DOST Undersecretary and DOST-PHIVOLCS Officer-in-Charge Dr. Renato U. Solidum Jr. expressed the need for a long-term development plan for surrounding locals as the active volcano showed renewed activity.

In an earlier news interview with the ABS-CBN News Channel, Solidum said that "There must be a long-term development plan that must consider the hazards and risks. Whatever investment, people in communities that are settled in the danger area must be considered and fully evaluated, so that if the volcano would frequently erupt from time to time, the economic development of an area would be less affected than presently what is happening."

Briones on the other hand suggested that the "development must be holistic and multisectoral. Hence the project targets to develop a recovery plan for agriculture and fishery for the IDPs of the Taal volcano eruption."

He added that in the group's initial studies conducted, the local government would need sustainable aquaculture and fisheries livelihood interventions, provide application of science-based soil amelioration to treat farmlands that were heavily affected by the ashfall, and ensure accessibility to

(continue next page)

The Philippines bags six medals at the International Math Olympiad

Text and photo from DOST-SEI

EVERY ONE of the six-member Philippine team to the recently concluded 62nd International Mathematical Olympiad (IMO) made the country proud by each winning a medal at one of the most difficult and most prestigious mathematics competitions in the world.

Immanuel Josiah Balete of St. Stephen's High School, Raphael Dylan Dalida of Philippine Science High School - Main Campus, Steven Reyes of Saint Jude Catholic School, and Bryce Ainsley Sanchez of Grace Christian College each won a silver medal in the Olympics of math competitions.

Meanwhile, Sarji Elijah Bona of De La Salle University - Senior High School and Vincent Dela Cruz of Valenzuela City School of Mathematics and Science each took home a bronze medal.

The team was led by Dr. Christian Paul Chan Shio (Leader) and Mr. Raymond Joseph Fadri (Deputy Leader), on behalf of the Mathematical Society of the Philippines (MSP). Training for the contestants was handled by professors from the University of the Philippines Diliman and the Ateneo de Manila University, and included past team officials such as Dr. Richard Eden (Team Leader, 2016-2019) and Dr. Louie John Vallejo (Deputy Leader, 2015-2017).

Altogether, the team ranked 23rd out of 107 countries, a monumental jump from 2020, when the Philippines ended the competition in 43rd place. Hosted by St. Petersburg, Russia, the 62nd IMO is the second competition in a row held online due to the ongoing COVID-19 pandemic.

"This is a very good year for waving the Philippine banner in the international arena," said DOST Science Education Institute (DOST-SEI) Director Dr. Josette T. Biyo. "These students are showing the world that Filipinos are achievers in anything they put their minds to, be it sports or intellectual pursuits."

"These medals are hard-earned and well deserved," added Dr. Chan Shio. "They're no strangers to the rigors of competition, and their commitment and dedication paid off. They made us and the country very proud."

"The Philippine Team did particularly well this year, even doing better than historically strong teams like Japan, France, and Romania," said MSP President Dr. Jose Ernie C. Lope. "Once again, the Philippines has shown that it is not far behind the world leaders in mathematics competitions. Huge congratulations to all our contestants and to lead coaches, Dr. Chan Shio and Mr. Fadri. On behalf of the MSP, I would like to thank DOST-SEI and HARI Foundation for generously supporting us in this important endeavor."



Photo support c/o Mathematical Society of the Philippines



The project team during a consultation with the communities. (Photo courtesy of Bangon Batangas project team)

(continuation from Batangas State U...p20)

market and other trading posts.

Aside from these, he underscored the need for "rehabilitation and recovery programs that are based on the building up of existing skills and resources which will ensure immediate social acceptance and sustainability, building back more resilient livelihood, and capacitating of residents to new skills.

Lastly, in a separate information, the Asian Development Bank pointed out the need for greater planning and resilience measures to counter natural disasters.

Meet our Binibining S&T: The Crowned Scientist

By Jachin Jane O. Aberilla, DOST-STII

Beauty and brains — we always hear these two words as the standard for beauty pageant winners in the Philippines. We have witnessed and admired the personal advocacies of several beauty queens, standing firm for women empowerment, against child labor, awareness campaign for HIV-AIDS, environment protection, and value of education.

Recently, the science community was awed when a newly crowned queen proudly announced her advocacy we seldom hear — support for science and technology (S&T).

"As a forensic science graduate, I would like to see our country invest in science and technology. Let us encourage our students to become scientists, and together we can prevent another pandemic," Hannah Arnold said during her speech during the Top 13 finalists round that made her the new Miss International Philippines!

Let us meet and get to know more of our Binibining S&T, Binibining Pilipinas International 2021 Hannah Arnold who was bestowed that prestigious crown last 11 July 2021. The beauty queen bested 33 other candidates for the crown. Her simple but elegant stance won for her the Jag Denim Queen special award and she will be the country's representative to the Miss International 2021 pageant, which will be held in Japan in November.

Getting to know our queen-scientist

According to Metro Style PH, Hanna Arnold's first attempt at pageantry was in 2019. Hannah isn't a first-timer on the Binibining Pilipinas stage. She sent in her application for the first time two years ago but didn't make the cut. Not to be discouraged, Hannah used this experience instead to become a better competitor and, more importantly, a much more well-informed, well-read, and cultured Filipino. Trained by Aces and Queens, she traveled locally, immersed herself in the diverse cultures, and got in touch with her Pinoy roots, all of which can now give



A science and technology advocate won 2021 Binibining Pilipinas Miss International.

her that competitive edge as our national representative to the Miss International pageant.

A Bookworm

Even before becoming the newly-crowned beauty queen, Hannah has been working hard for her advocacy. According to Metro Style PH, Arnold is a confessed bookworm and particularly advocates for children's education.

She said that she specifically wants to make books accessible to underserved Filipino youth and make them feel that the joy of reading is not a privilege reserved only for the rich. She loves books herself and knows the transformative power a good book can hold, and she would love to know that more children get to experience this, even for those with less in life economically. In fact, Arnold founded an organization called "Book of Tomorrow PH," to further this advocacy.

Science and Technology Advocate

The best thing about modern pageant girls is that they're not just a collection of beautiful faces matched with killer physiques; but there is a unique power underneath their looks, many of whom are intelligent and very driven. Hannah is not an exception.

In a webinar by the Department of Science and Technology-Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD) last 26 August 2021, Hannah said that she initially wanted to become a veterinarian. But when she saw the doctors working hard in the hospital when her grandfather got sick, she wanted to become a doctor to help her family and the community.

Hence, Hannah then graduated from the University of Canberra with a degree in Applied Science in Forensic Studies where she was trained to understand and view things from a scientist's perspective. She also worked as a sleep scientist for a short period of time. This appreciation for all things methodological and empirical made her an advocate of STEM (science, technology, math, and engineering) education for children.

"I may not be currently working as a scientist; however, my love for lab, wearing my lab coat, goggles, and the smell of the chemicals and the will never disappear. I will continue to raise the science, technology, engineering, and mathematics flag," said Hannah, who is now using her platform to put a spotlight on science.

and support our current and future scientists. Scientists discovered the COVID-19 virus, developed vaccines, and they are still fighting it. I want to see the younger generations believing that they can prevent whatever comes next," she added.

DOST's gratitude

The Philippines' science department commended Hannah for promoting her advocacy to improve science and technology in the country.

DOST-PCIEERD used social media to thank Hannah for encouraging students to become scientists and invest more in scientific research and development (R&D).



Photo from The Smart Local

Arnold graced the DOST-PCIEERD event called Science and Innovation Building Opportunities for Leverage or *SIBOL* and gave an inspirational message to scientists and researchers on 26 August 2021.

However, her priority changed when she was introduced to Forensic Science in Grade 12. She got very interested in the biology and physics of identifying and evaluating physical evidence.

According to Fair Beauty PH, Hannah hoped that joining the pageant would capture people's attention with her looks, voice, and particularly her messages. The beauty queen hopes to encourage more students to pursue science courses and urged the country to invest more in science and technology.

"I have always been a passionate advocate of education, especially in encouraging students to take science courses. This pandemic taught us that we need a greater spotlight on science

"Thank you, Ms. Hannah Arnold, for proudly raising the S&T (science and technology) flag and for encouraging the young generations to pursue a career in science," the DOST-PCIEERD said in a Facebook post.

Hannah supports DOST Invent School Program Hannah, ever grateful for the support of the Filipinos, also expressed her gratitude to the DOST for congratulating her and acknowledging her advocacy.

"I want to say thank you to the Department



(Photo from DOST-PCIEERD)

of Science and Technology for watching the coronation night and for acknowledging that we truly do need scientists' help to prevent another pandemic," said Hannah in a report by ABS-CBN News.

In a virtual press conference, Hannah also revealed that among the projects of DOST, she loves the Invent School Program the most, where students are given the right environment to create ideas and inventions through lectures and hands-on workshops. According to the beauty queen, the government program must encourage more students to continue creating inventions and innovations that can be vital in preventing future disasters and problems such as the pandemic.

Hannah hopes that she can have a chance to visit the students during her reign.

"They [students] go through a workshop with them [DOST] to encourage them to keep on going and to prevent future issues, disasters. I heard that the applications closed yesterday, so maybe with my reign, I can visit these students and see what they are making," she added.

The Invent School Program (ISP) serves as a platform for the youth to awaken their true ingenuity by stimulating their creativity and inventiveness. It is a trademarked program of the DOST-Technology Application and Promotion Institute (TAPI) that serves as a platform for the youth to stir their true ingenuity by stimulating their interest and passion in creating and inventing things of great value to people.

The ISP aims to teach creative thinking and bring about inventiveness among students to entice them to pursue activities such as solving industrial applications and raising awareness on Intellectual Property Rights and Protection. Students undertake training to enable them to do prototype development and entrepreneurship and the program also promotes and helps establish new young inventors' associations/clubs that are expected to further intensify campus creative activities. Hannah was very happy that her science degree helped her to show that pageant candidates are more than just pretty faces -- where talent, intelligence and noble personal advocacies tip the balance to become a winner.

"I am so glad they acknowledged it and showed that we all have beautiful backgrounds wherein [there is an] infinite variability of women, we have a lot to bring. We can also balance being a scientist and a beauty queen," she said in a report.

The DOST also hopes for more beauty queens to raise the science and technology flag. "Let's bring more science and technology presence on the international stage, even in beauty pageants," DOST-PCIEERD stressed.

SOURCES:

- https://interaksyon.philstar.com/trends-spotlights/2021/07/14/196022/dost-thanks-bb-pilipinas-international-2021-hannah-arnold-for-raising-science-and-technology-flag/?fbclid=IwAR11nWcKtJCz7ZFSch5zkOXHO_AyEtaZOJAFZypBsmJI_ATL0Z51A-J8WmM
- <https://mb.com.ph/2021/07/15/dost-to-bb-pilipinas-international-2021-hannah-arnold-thank-you-for-raising-st-flag-encouraging-youth-to-pursue-career-in-science/>
- <https://news.abs-cbn.com/life/07/16/21/bb-pilipinas-international-hannah-arnold-backs-invent-school-program-of-dost>
- <https://metro.style/people/society-personalities/bb-pilipinas-international-2021-hannah-arnold/30755>
- https://news.abs-cbn.com/life/08/10/21/hannah-arnold-hopes-more-students-will-pursue-science/?utm_campaign=sharedpost&fbclid=IwAR3pMI45SyjCHQIGyXMxz4x6jnVa9V6KcrHXG3qpOR8okAtompqc7AvYMo
- <https://news.abs-cbn.com/life/07/16/21/bb-pilipinas-international-hannah-arnold-backs-invent-school-program-of-dost>
- <https://news.abs-cbn.com/life/07/12/21/fast-facts-about-bb-pilipinas-international-2021-hannah-arnold>
- <http://fairbeauty.ph/real-majestic-hannah-arnold/>
- https://www.youtube.com/watch?v=CZaiF1-DPRE&utm_campaign=sharedpost&fbclid=IwAR3pMI45SyjCHQIGyXMxz4x6jnVa9V6KcrHXG3qpOR8okAtompqc7AvYMo
- <https://news.abs-cbn.com/life/07/16/21/bb-pilipinas-international-hannah-arnold-backs-invent-school-program-of-dost>
- <https://news.abs-cbn.com/life/07/12/21/fast-facts-about-bb-pilipinas-international-2021-hannah-arnold>
- <http://fairbeauty.ph/real-majestic-hannah-arnold/>
- <https://www.youtube.com/watch?v=CZaiF1-DPRE>

Pisay research adviser bags 2nd Place in DOST-PCHRD's 3-Minute Pitch to Policymakers Competition

By Noemi Lynne Visto, DOST-XI
Photos from DOST-XI

MICHAEL A. Casas, Special Science Teacher IV and Research Adviser from the Philippine Science High School Southern Mindanao Campus (PSHS SMC) won 2nd Place in the nationwide 3-Minute Pitch to Policymakers Competition conducted by the Department of Science and Technology-Philippine Council for Health Research and Development (DOST-PCHRD) on 10 August 2021.

Nine representatives from different regional health and development consortia participated in the event via Zoom and Facebook Live which is in line with the virtual celebration of the 14th Philippine National Health Research System (PNHRS) week on 9-13 August 2021.

The competition aimed to develop and cultivate the researchers' presentation and communication skills in pitching their completed health research studies and share their findings to the stakeholders and policy makers. The participants presented their completed research in a three-minute, one-slide presentation for a non-specialist audience based on set criteria.

Casas presented his policy proposition entitled "Positioning the Philippines as the Traditional Medicines Hub of the World with Chromatography" after the completion of his DOST-PCHRD funded research entitled "Chromatographic Approaches in the Analysis

of *Blumea balsamifera* (Sambong) and *Vitex negundo* (Lagundi). In his policy pitch, Casas said that his research can be a basis for the need to upgrade the Philippine Pharmacopeia, the official book of standards and references for the determination of identity, purity, and quality of pharmaceutical products and crude plant drugs in the Philippines, to include advanced techniques in the standardization and analysis of herbal plants and medicines.

He will be receiving Php 20,000.00 cash from DOST-PCHRD after placing second in the competition. Dr. Glory V. Baltazar from Bataan General Hospital and Medical Center bagged 1st prize, while Ms. Dessa Jean O. Casalme from De la Salle Medical Health Sciences Institute landed third spot.

Casas, a recipient of the BPI-DOST Science Award in 2010 and 2nd-runner-up for the Best Project of the Year competition, currently teaches research, coaches award winning students in international research competitions, and serves as the coordinator of the Innovation and Technology Support Office and Chief of the Student Services Division of PSHS SMC.

Additionally, two members of the Regional Health Research and Development Consortium XI (RHRDC XI) also participated in the Research Poster Contest, one of the activities during the PNHRS week celebration. Dr. Elsa Baron from

San Pedro College and Ms. Nicci Orcena from Tagum Doctors College Inc. pre-qualified in the Poster Competition for Professional and Student categories, subsequently. Both were winners from the 9th health R&D Expo of RHRDC XI.



Saving Dugongs in Palawan

By Karl Raven Ramon, DOST-STII
Photos from DOSTv



Did you know that Dugong can drown despite being a marine creature?



Palawan – Marine mammals like dugongs (with scientific name: *Dugong dugon* under the Sirenian Family) need to breathe every four to six minutes. "Thus, they are prone to drowning or suffocation when entangled in fishing nets and gears", warns Erina "Ina" Pauline Molina, a Pisay graduate, a National Geographic Young Explorer, and a marine environment advocate.

Ina is diving into Palawan, the last ecological frontier of the Philippines to study and identify feeding areas and calving areas of dugongs in Calauit, Palawan in order to know what areas need to be protected by ordinance and policies.

While the Department of Environment and Natural Resources (DENR) already issued Administrative Order No. 2004-15 declaring dugongs as critically endangered species, Ina stresses the vulnerability of the dugongs and its slow reproduction rate. "Every three-seven years, posibleng isa lang yung nadadagdag na population ng dugong", not to mention the slow sexual maturity of female dugongs ranging from 3-17 years, long gestation period of 13-15 months, and average of only one offspring per gestation.



Ina strategically involved the Tagbanua Tribe to join her study as this tribe directly encounter dugongs in their community and shallow waters. The said tribe also have high respect to this magical creature rooting back to their ancestors and even used dugongs as a way of telling sea condition and bad weather.

Tribe Leader Fidel Mondragon positively believes in science while still preserving their traditions, "ang pagaaral na ito sa aming kaalaman ay hindi namin maintindihan at malalaman, kamukha noong pagpapahalaga sa *halophila* sp. na hindi namin alam na ito pala'y napakahalaga sa dugong so lahat ng mga

areas na mayroon kaming makita nito tinuturing naming habitat ng dugong".

Being a stronghold of dugongs in the Philippines, Palawan became a tourist destination wherein they can watch the friendly dugongs, at least 25 dugongs are taking shelter in the area. Arman Vergara once a fisherman, now a Bantay Dugong shared the financial security the tourism brought comparing when he was still a fisherman.

Ginelle Gacasan, a DOST scholar and now a researcher from C3 Philippines (an NGO focusing on conservation of endangered dugongs) boasts the continues efforts led to the establishment of the

617 hectares of dugong conservation area in Palawan which is the first and only established dugong conservation area in the country.

Want to get in close with the dugongs? Scan these QR codes and travel to Palawan and experience Science with Sinesiyensya.



Will the amphibians of Baguio lose their green sanctuaries?

By Allyster A. Endozo, *DOST-STII*

THE PROUD people of the north who called themselves the “house-dwellers” once told the tale of Kabigat, a deity who brought trees that grew only in the underworld for the benefit of those living on the surface. Centuries later, their descendants tell the legend of a female apparition who inhabits a tree where she was killed and hanged. Having cut the haunted tree that was blocking a path, a logger supposedly died as a massive timber fell onto him.

It was in a nearby tree clearing or *kafagway* that these people, the Ibaloi, built the “city of moss” or *bag-iw*—known to many as the City of Baguio. The Summer Capital is famed for its cool climate and scenic terrain but less so for its history. Founded as a Spanish military garrison, the city underwent aggressive development under the Americans as a “haven” peppered with slews of fruit and vegetable farms, mining sites, and country clubs.

Baguio is a key contributor to the provincial food basket that is Benguet, which produced

308,219 metric tons or around 84% of the Cordillera Region’s fruit and vegetable harvests in 2019. Also, during its heyday, as much as 31.5 M ounces of gold and 2.6 M tons of copper were extracted from its “mineral districts.” And with over 60 lodging establishments plus a 345-km road network, the city hosted more than 1.5 M foreign and local tourists in 2017.

Driven by numerous livelihood opportunities, Baguio has since become one of the fastest-growing cities in the country as the Ibaloi and other Igorot communities like the Balangao, Bontoc, and Kankanaey mingled with migrants from regions as far as Ilocos, Southern Tagalog, Bicol, Visayas, and Bangsamoro. From only 5,464 in 1918, the city’s population kept on swelling from 252,386 in 2000 to 345,366 in 2015 or nearly 2.5% every year.

Beyond its bustling economy, Baguio—and the Cordillera Region in general—is also rich in wildlife diversity. In fact, the Philippines itself is home to at least 107 amphibian

species, 85% of which inhabit forests, and 79% are deeply integrated into their ecosystems. Sadly, this irreplaceable native wealth is now being threatened with extinction amid steady forest destruction, water pollution, and climate change in the name of commercial development.

A 2012 study had predicted that until 2020, Baguio’s forest cover would shrink from 910 to 607 hectares, while its built-up land would expand from 2,985 to 4,090 hectares. This estimate may not be far from the truth as in 2015, SM Supermalls was given clearance to cut 60 pine trees for its Sky Park expansion despite petitions from local residents. In May 2020, Vista Residences Inc. secured a permit to cut 54 more for its condominium project.

Piling even more pressure on its amphibian community is heavy pollution in Baguio’s Balili and Bued rivers, which are replete with fecal sludge discharged by hog raising farms and



The conversion of Baguio City’s forest cover into built-up areas, along with water pollution and climate change, constitutes a serious ecological disturbance that may drive some of its amphibian species towards extinction (Photo from nolisoli.ph).

the city public market, as well as phosphate and ammonia from fertilizers and laundry. A creek that flows into Bued near the Lion Head landmark along the Kennon Road is also contaminated with heavy metals amid mining and quarrying operations in nearby areas.

Perhaps the most critical for the survival of Baguio's cold-blooded animals would be the temperature, which the Department of Science and Technology (DOST)-Philippine Atmospheric, Geophysical, and Astronomical Services Administration projected to rise nationwide by 0.9–1.4 °C year-on-year in 2020 and 1.7–2.4 °C in 2050. As Mother Nature perishes in humanity's fiery hands, will Kabigat and the cursed tree spirit that the Ibaloi once spoke of unleash their ultimate revenge one day?

Resilient yet vulnerable?

Two young biologists recently co-published in DOST's Philippine Journal of Science a zoological survey on the amphibian species of the Baguio-Benguet area based on their undergraduate thesis at the University of the Philippines (UP) Baguio. Mr. Arthien Lovell Pelingen recently finished his master's degree in biology at Ateneo de Manila University. Ms. Camille Andrea Flores currently pursues a master's degree in microbiology at UP Diliman.

- *Kindly describe each of the five localities in which the visual encounter survey was done. On the surface, how severe is the level of ecological disturbance in each area?*

Most of the study sites were disturbed or near a disturbed area, either due to agricultural activities or urban sprawl. The Soroptimist Compound and Loakan Airport are small green patches of land in the middle of Baguio City. Camp John Hay is a watershed and should be protected but anthropogenic activities which promote tourism cause forest fragmentation inside the forest watershed reservation, as the John Hay Management Corporation assures its sustainable use. In Nangalisan, Tuba, the rice fields dominate the area close to our collecting site. Among all the sites, the Master's Garden is the least disturbed except for the small farms and houses situated near the stream.

- *What are the amphibian species that your team encountered during the survey? Are they found exclusively in the Philippines? If not, how did they find their way here?*

We documented three Luzon-endemic species of frogs—namely, *Kaloula rigida* of the Family Microhylidae, *Sanguirana luzonensis*

of the Family Ranidae, and *Limnonectes macrocephalus* of the Family Dicroglossidae; one Philippine-endemic species, *Kaloula picta* of the Family Microhylidae; and an invasive species, *Rhinella marina* of the Family Bufonidae. *Rhinella marina* or the cane toad—also locally known as “baki,” “karag,” or bullfrog—was first introduced into the country in 1934 as a biological pest control agent of sugarcane plantations. Since then, cane toads became the most widely distributed invasive amphibian species in the country, which are present in at least 27 islands.

- *What was the purpose of sterile swabbing of each amphibian specimen's skin during the survey? What was your team seeking to analyze and by what methods?*

Aseptic technique is a common practice in microbiology as also applied in our study. It was important to observe sterile swabbing of amphibian integument to ensure that the fungi to be isolated will only come from the integument and not from the existing microbes initially in the swabs or its container. We were trying to detect if the threat of the pathogenic fungus *Batrachochytrium dendrobatidis* already reached the Cordillera region by both culture-dependent method and molecular analysis so this step at the start of sample collection is important.

- *What were the fungal species that your team identified? Are any of them (or some other species) deemed threatening to the survival of the amphibians, and in what way?*

The fungal species isolated in our study were *Penicillium spp.*, *Cladosporium sp.*, *Talaromyces sp.*, *Mucor sp.*, and *Rhodotorula sp.* These are all cosmopolitan species that are generally present in the environment such as soil, air, and water, while some are endophytic (living inside plant tissues). The threat of *B. dendrobatidis* was not detected in the study, for which we are glad, because this fungus can harm the amphibians by blocking the integument. The frog integument or skin is the main organ used for water absorption so once their skin is blocked, the normal physiology of amphibians will be disrupted, leading to death.

- *Has there ever been any prior study on amphibian biodiversity in this part of the country? If so, how similar or different were the findings of this earlier study?*

Dr. Edward H. Taylor's study in 1922 and Dr. Robert F. Inger's study in 1954 mentioned frog sightings of *K. rigida*, *L. macrocephalus*,

and *R. marina* in Baguio City and Benguet Province but recent literature did not cover Baguio City specifically. The most relevant research concerning amphibian biodiversity in the Cordillera includes those of

- *How significant are studies of this sort on the fate of amphibian biodiversity in our nation? Do they carry implications on the government's conservation policies and programs?*

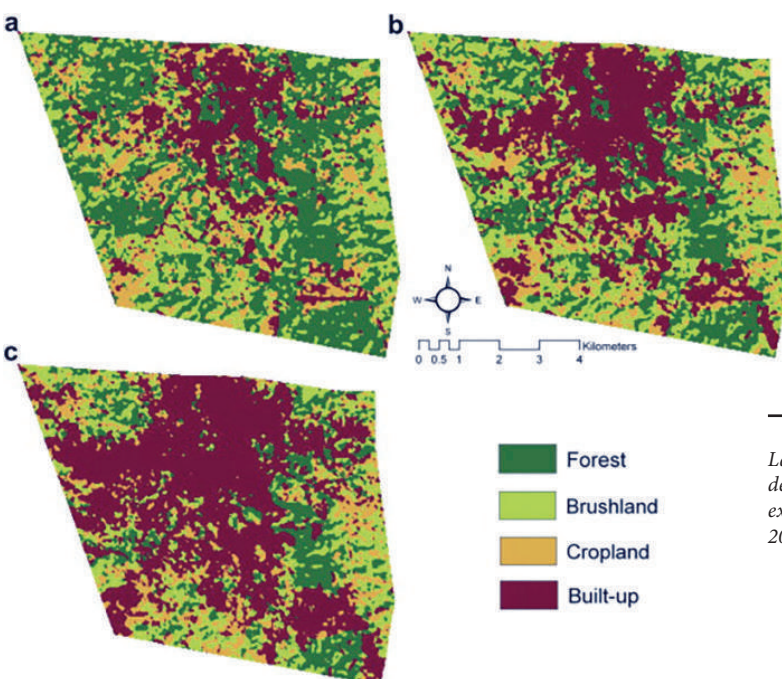
To reiterate our conclusion in the study, regional surveys are as important as major biogeographic surveys, particularly in highly threatened urbanized areas where species richness is still understudied. In this study, we have established that several Luzon- and Philippine-endemic species thrive in vulnerable areas. However, anthropogenic factors that lead to habitat degradation continue as threats to the survival of these endemic frog species, and biodiversity conservation remains urgent imperatives. Studies like this can help the government's policy-making. For example, the rampant cutting of trees in Baguio City and nearby areas should be stopped or at least heavily regulated. The remaining forested areas in the city serve as habitat patches not only for amphibians but also for all other flora and fauna. The fact that we found Luzon- and Philippine-endemic frogs in the heart of the city should be enough justification that we should preserve these remaining forest patches. Moreover, the recent reintroduction of the highly invasive *Rhinella marina* by some local government units in the country as a biocontrol agent for mosquitoes shows the need for correct information and regulation from the government to prevent the unintentional spread of invasive species.

- *Can you say that Philippine amphibian species are “resilient” to some degree? Is urban development in various localities forcing our amphibians to adapt?*

It is not easy to say or conclude that Philippine amphibian species are resilient at present and if urban development in one way or another causes such behavior. It always depends on the context. In the case of the Baguio-Benguet area, deforestation is the main problem. I guess we have to stick with the right kind of balance in existing spaces in cities and ask key questions. To whose benefit are these infrastructures? How do we utilize it efficiently? Is it inclusive for everyone's use? How do we conserve and restore urban biodiversity? Are the road kills just accidents or a result of poor



Amphibian species of the Baguio-Benguet Area: A) *Rhinella marina* or the cane toad, B) *Limnonectes macrocephalus* or the giant Philippine frog, C) *Kaloula rigida* or the Luzon narrow-mouthed frog, D) *Kaloula picta* or the painted narrow-mouth frog, and E) *Sanguirana luzonensis* or the Luzon frog [from Pelingen et al. 2021].



Land cover/use maps in a) 1988, b) 1998, and c) 2009 showing the deterioration of Baguio City's forest cover (dark green) and concurrent expansion of its built-up area (brown) [from Estoque and Murayama 2012].

mobility designs? Simple questions like these will develop a fruitful discussion among varying city stakeholders.

- Supposing that incessant urban development continues unabated in many parts of the country, could some of our amphibian species be eventually driven toward extinction?

There are a lot of factors that can drive amphibian species decline or extinction. Dr. David B. Wake and Dr. Vance T. Vredenburg in 2008 made a case report of the impending sixth mass extinction using the context of amphibian populations. In a comprehensive report eight years ago, one of the leading causes of vulnerability towards these species decline or extinction is habitat change. As it happens, habitat changes occur continuously in urban areas or developing urban areas. There are possibilities that some species might be driven out of the area, some might perish, and some might adapt. We do not know the full picture yet. The importance of taxonomic surveys in conservation management highlights which of the species we should give priority to monitoring, given that the biology of these organisms has already been established or studied.

References

- Estoque R.C., Murayama Y. 2012. Examining the potential impact of land use/cover changes on the ecosystem services of Baguio City, the Philippines: a scenario-based analysis. *Applied Geography* 35(1–2): 316–326.
- Pelingen A.L., Flores C.A., Briz A.J., Hipol R., Austria C. 2021. Rapid Survey of Anuran Species in Baguio-Benguet Area and Isolation of Their Fungal Symbionts. *Philippine Journal of Science* 150(S1): 303–308.

“Citizen science”: empowering a coral reef community in Batangas

By Allyster A. Endozo, *DOST-STII*



Coral reef of Talim Bay in Lian, Batangas (image from globalgiving.org).

“MUTUAL AID is as much a law of animal life as mutual struggle.” This was the conclusion made by Pyotr Kropotkin, a Russian zoologist and sociologist who argued in his essays that cooperation—not competition—was the driving mechanism behind evolution. None has ever displayed this idea in action more evidently than humanity itself, as communities worldwide have mobilized time and again to aid victims in times of crisis and disaster—even more so during the COVID-19 pandemic.

Animals have likewise proven this tendency despite their apparent lack of capacity for advanced reasoning. The ever-vibrant “lungs of the ocean” known as corals, for instance, nurture a special connection with single-celled zooxanthellae. These algae, which provide nutrients and coloration to corals, in turn receive carbon dioxide (CO₂) and ammonium that they need for photosynthesis. Sadly, this symbiotic harmony is being devastated as marine conditions worsen across the world.

In an event known as “bleaching,” corals turn white, frail, and sickly once these algae leave their tissue. A number of human-induced factors have accelerated this process in recent decades. Since 1970, water temperatures have risen at a rate of around 1 °C per year. The world’s oceans have turned more acidic as atmospheric levels of CO₂, which is water-soluble, hit 412.5

CS volunteer taking coral reef photos.



parts per million in 2020. Here in the Philippines, some 2.2 M tons of organic pollutants are released into the sea annually.

This trend warrants much concern for our nation’s coral reefs, which span roughly 26,000 km²—the second-largest in Southeast Asia. They are part of the so-called “coral triangle,” which is home to 76 and 37% of all known coral and reef fish species, respectively. Globally touted for its prolific biodiversity, our area hosts nearly 500 species of “stony” corals and 3,053 species of fish—1,658 of which are reef-associated, 693 dwell near the shore, and 177 occupy the mid-zone waters.

In a country where about 60% of its population lives in coastal areas and fish accounts for 70% of the total animal protein intake, the value of our coral reefs cannot be underestimated. In fact, coral reef fisheries provide a livelihood for over 1 M small-scale fisherfolks who contribute almost USD 1 B yearly to our economy. In 2006, for instance, the

subsector generated PHP 960.5 M in net value from 195,570 tons of output—a sizable portion of our coastal catch at 1,551,430 tons.

Amid rising demand driven by an ever-growing population, overfishing has proven to be the norm in Philippine reef sites, over half of which were reportedly exploited from 1991–2004. This persists despite the issuance of an administrative order in 1986 that outlawed muro-ami, a destructive fishing practice that involves pounding corals. Live hard coral cover had fallen by 3–5% compared to levels seen in the 1980s, leaving less than 1% as areas with excellent cover in 2000–2004.

Militarization of our local waters amid geopolitical disputes has further aggravated reef destruction in the past decade. In 2013, a United States Navy minesweeper caused PHP 87 M in damages to over 25,240 ft² of corals at the Tubbataha National Marine Park in the Sulu Sea. The incessant build-up of artificial islands and harvesting of clams enabled by Chinese



authorities have inflicted nearly PHP 33.1 B/yr in damages to around 1,850 ha of corals in the West Philippine Sea so far.

Serious gaps can, thus, be seen in our protection of these national treasures. Since the enactment of the National Integrated Protected Areas System Act in 1992, only 1.6% of our 1,971,033 km² total marine area holds a “protected” status, with less than 1% or 1,005 km² being “fully or highly protected.” As little as 1% of the development fund of a given local government unit is allotted to marine protected areas, leaving management initiatives largely under-equipped and understaffed.

Mutually assured salvation

Dr. Wilfredo Y. Licuanan, a biology professor at De La Salle University (DLSU) Manila and the founding director of the Br. Alfred Shields FSC Ocean Research (SHORE) Center, shared his firsthand experiences with the “citizen science” (CS) team that monitors the coral reefs of Talim Bay in Lian, Batangas.

- *What were the circumstances that led to the formation of the CS team in Talim Bay? Who were the people responsible for this initiative?*

Many members of the team are part of a people’s organization—the Lian Fisherfolk Association registered with the Department of Labor and Employment—and originally trained under a DENR (Department of Environment and Natural Resources) sponsored coastal enhancement program of the local government of Lian.

- *What are the team’s duties and responsibilities? Who is its leading figure?*

As volunteers, the team does not have a fixed list of duties and responsibilities. However, the team leader, Alvin Jonson, is the Municipal Environment and Natural Resources Officer of the local government of Lian, Batangas.

- *Is the participation in this team professional or voluntary in nature? On which aspect of marine science and technology are the members trained?*

The team is made up of volunteers. The team leader has been trained in basic coral biology and taxonomy. Everyone in the team is a licensed Reef Check Ecodiver® before being trained under a research project led by the DLSU–SHORE Center and funded by the Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc. The training also includes the basics about the use of masks and snorkels, fins, action cameras (GoPro units), and sports cameras (Olympus TG series).

A newer project financed by the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development of the Department of Science and Technology seeks to expand citizen science for reef monitoring to the rest of the country through regional institutions of higher learning.

- *How positive has been the feedback of the local community and officials on this initiative? What are their perceived benefits that can be cited?*

The local community and officials know the benefit of regular monitoring, especially in quantifying impacts such as mass coral bleaching. Everyone trained and their supervisors are made aware of the value of monitoring in assessing whether reef management initiatives and measures are successful, and to provide early warning of stressors affecting coral reefs such as mass coral bleaching. This awareness was evident in the follow-up monitoring in October 2020 and March 2021, where there were discussions on the ideal frequency of CS monitoring. The team expressed their willingness to collect data voluntarily.

One benefit they get in CS monitoring is their ability to document changes, especially in the Kay Reyna MPA (marine protected area), which they usually nominate in Para el MAR (MPA awards and recognition).

- *What was the biggest challenge that the team confronted during the past year? How severe was it and was it eventually resolved?*

The pandemic has affected the livelihood of most members of the team. The local government of Lian also reallocated funds to prioritize the local response to COVID-19. Because of the shortage of funding for regular CS monitoring, DLSU–SHORE Center and the DLSU Center for Social Concern and Action stepped in to provide financial and technical assistance to continue the CS initiative in the area.

- *Had problems of this magnitude been encountered in other coral reefs of the country in the past decade? Are they expected to worsen in the coming years?*

Most reefs experienced severe mass coral bleaching in 2010 and, to a lesser degree, in 2016. Bleaching events are becoming more frequent as the impacts of climate change unfold.

In mid-2020, the coral reefs of western Luzon were exposed to unusually warm waters of up to 4.3 degree-heating weeks. About 9–42% of the average hard coral cover in each of six monitoring stations was bleached by July 2020. The hard cover in the six stations in October 2020 was not significantly different from the sum of hard and bleached coral cover in July, but the coral cover was mostly higher in 2019. These results suggest that loss of hard cover happened earlier in the bleaching event of 2020, and the bleached corals in July had all recovered by October.

- *Can you identify any social, political, or economic gaps in the protection of our coral reefs? What can you recommend as a marine scientist to ameliorate this issue?*

There is a need to implement statistically robust yet methodologically sound monitoring of reefs throughout the country, coupled with local and national government action to manage and protect reefs from the direct impacts of human activities. We cannot manage what we cannot count or measure. The main message is to encourage scientists to consider the application of CS methods in involving others in the monitoring of coral reefs.

DOST makes R&D programs on sustainable water resources a major priority

By Allan Mauro V. Marfal, DOST-STII



In his message, DOST Secretary Fortunato T. de la Peña assures that the improvement of our water resource management is among the priorities of the science department, particularly in their research and development (R&D) programs. (Screenshot from DOST-Science for Change Program Facebook Page)

WATER IS a very valuable resource that greatly affects the quality of life of all and its use should be managed well for sustainability.

In the 2018 report of the National Economic Development Authority (NEDA), 12.32% out of 22.7 million households have no access to safe water supply, mostly from the indigenous and remote communities. Then, the concern on water sanitation also rises every rainy and typhoon season.

During the Wave of Action: Forum on Ensuring Water Sustainability through S&T held on 27 July 2021 via DOST-Science for Change Program Facebook Page, Secretary Fortunato T. de la Peña shared that the Department of Science and Technology (DOST) is putting water resource management as one of major priorities in their research and development (R&D) programs through partnership with both public and private sectors.

“We (DOST) have been able to contribute to the development and application of technology and systems that could help to improve our water resources management in the country,” said DOST Sec. de la Peña.

Sec. de la Peña cited the collaboration of DOST-Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) with the National Water Resources Board (NWRB) have been collaborating in monitoring the conditions of our water resources. Additional to that is their Climate Resilient Initiative which provides scientific information on planning, critical infrastructure, particularly concerning climate change adaptation and disaster risk reduction.

The science chief also shared the partnership of DOST Regional Offices with local agencies and local government units to address this concern. He mentioned the application of solar-powered pumps in areas that are beyond

reach of power lines like the ones installed in the Cordillera Administrative Region and MIMAROPA. This initiative aims to supply the domestic needs for livestock production and irrigation.

The DOST Region X is piloting a vertical helophyte filter system that filters pollutants in wastewater so that they can be recycled. Also, a forecasting model for complex water supply systems is being tried using the East Manila area as a pilot that was developed through the DOST’s Collaborative Research and Development to Leverage Philippine Economy (CRADLE). This is being done in cooperation with the Asian Institute of Management.

“We hope and foresee that shortly with the appropriate policies and management systems and technologies, we will be able to secure sustainable water management and sanitation for the benefit of all Filipinos,” said DOST Sec. de la Peña.



In a virtual forum on ensuring water sustainability held on 27 July 2021, DOST Undersecretary for Research and Development Dr. Rowena Cristina L. Guevara provides the overview of the water sustainability landscape in the country. (Screenshot from DOST-Science for Change Program Facebook Page)

Water sustainability towards a better future

In the same forum, DOST Undersecretary for Research and Development Dr. Rowena Cristina L. Guevara shared the water sustainability landscape in the country.

“Water can be easily thought of as an abundant resource, however, according to the World Wildlife Organization, only 3% of countries’ water is freshwater that is suited for human use and consumption”, said DOST Usec. Guevara.

Usec. Guevara stressed that it is imperative to maximize its use and consider its accessibility for everyone. In the Philippines, it is estimated that we have only used 6% of the available water, almost 4.5 times lower in terms of utilization compared to other countries like Chinese-Taipei and Japan.

Recognizing this urgent need, the DOST initiated programs and projects related to water resources management, according to Usec. Guevara.

In the industry sector, the DOST-PCIEERD implemented over 30 projects amounting to 300 million since 2016 while in the agriculture sector, DOST-PCAARRD invested over 500 million over 40 projects that produced useful technologies for the environment, industry, and governance.

Lastly, to accelerate these water initiatives, DOST also supports 22 projects with funding of over 270 million through the establishment of the Niche Centers in the Regions through R&D project or NICER and academic industry partnerships under the Science for Change Program.

Usec. Guevara also presented some of the department’s supported projects which have contributed significantly in ensuring water sustainability through science, technology, and innovation.

She shared that DOST has deployed technologies that address water concerns in areas with high socio-economic importance, an example of which is the integrated system for monitoring water quality of Manila Bay that is one of our efforts in restoration. For Laguna Lake, the researchers are optimizing methodologies to determine organic compounds and heavy metals for better water quality management particularly in the aquaculture sector. Moreover, in Boracay, a science-based guideline for water resource assessment in a tourist island was also developed.

Usec. Guevara further emphasized that there are DOST-supported R&D projects that focus on the development of water technologies to improve crop, animal, and fisheries

production. This initiative includes the drift irrigation technology for onion, peanut, garlic, and sugarcane.

“Also, we supported numerous projects related to watershed management and climate change which are needed to come up with science-based policies and decisions. One of these is the WAIS program or Water-Based Assisted Irrigation Decision Support System,” said Usec. Guevara.

According to her, the DOST’s NICER program serves as a platform for more R&D projects that address water related concerns. Two of these projects are the Mountain Engineering Centers that enhance the industrial competitiveness of Cordillera through the development of artificial groundwater recharge facilities for drought and flood mitigation and the Smart Water Infrastructure and Management in the Cagayan Valley that provides disaster resilient Infrastructure.

Lastly, there is the Center for Environmental Technologies and Compliance in Metro Manila which aims to support the local industries to comply with the environmental standards and centers for lakes. This project will also provide strategies for effective management and sustainability of lakes.

Carbon storage, forest cover in Laguna watersheds are affected by land use and land cover changes, study says

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

LAND USE and land cover models generated by researchers from the University of the Philippines Los Baños (UPLB) and Kyoto University, Japan have shown that watersheds in Laguna are becoming either agricultural lands or urban communities, which have major effects on carbon storage, an important ecological process.

Agricultural lands in Silang-Santa Rosa watershed have turned into residential and industrial built-up, shrinking its already dire forest cover on the margins. This was attributed to the rapid urbanization happening in the area caused by years of land cultivation and cutting of trees, the authors explained while referring to another study.

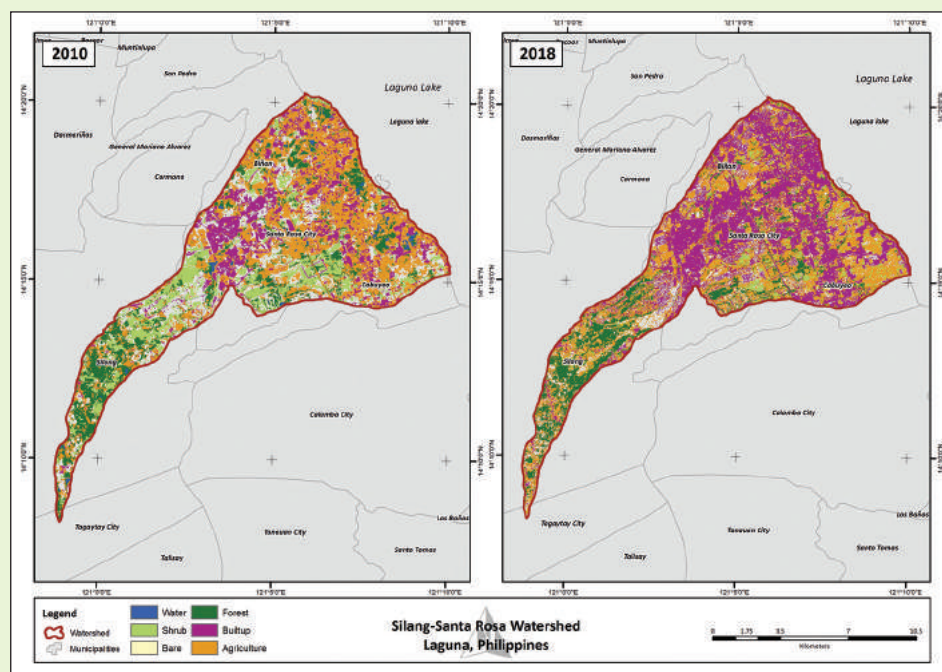
Meanwhile, the Pagsanjan-Lumban watershed has its forest cover converted into agricultural lands. Citing another study, the authors wrote that this change has affected the water quality in Laguna's capital, Sta. Cruz.

Lead researcher Jan Joseph V. Dida of UPLB explained that they used a software called Integrated Valuation and Ecosystem Services and Tradeoffs to estimate the potential carbon storage of the two watersheds based on satellite images and carbon pool values from references.

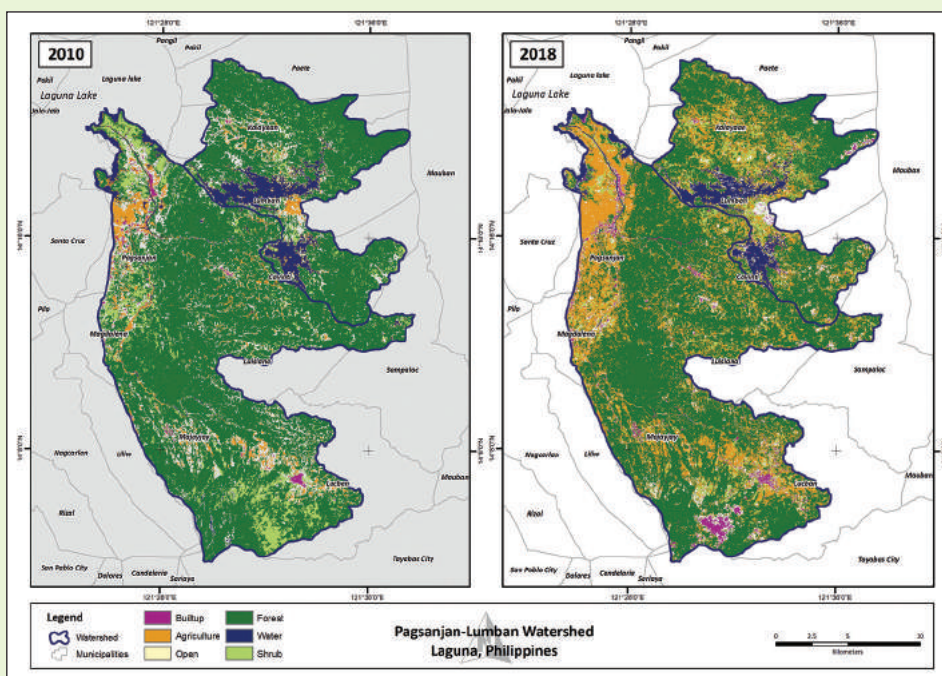
"The Scenario Generator model was then used to generate a land use and land cover scenario where the agricultural and built-up areas have replaced a portion of the adjacent land use types," Dida said.

The Silang-Santa Rosa Watershed has an estimated total carbon stock of 120,113 tons in 2010 and lost 37,885 tons in eight years. As of 2018, the watershed only has 82,228 tons of estimated total carbon stock. As for the Lumban-Pagsanjan, it has 1,612,309 tons of estimated total carbon stock in 2010. Then it turned into 1,374,340 tons in 2018, losing 237,969 tons of estimated total carbon stock.

Writing in the Philippine Journal of Science, the peer-reviewed publication of the Department of Science and Technology, the researchers explained that the Philippine forests can sequester about 109 million tons of carbon dioxide, but these green spaces are slowly declining due to human activities. Laguna is no exemption to this given the decades of industrialization and urban sprawl happening in the province, south of Metro Manila.

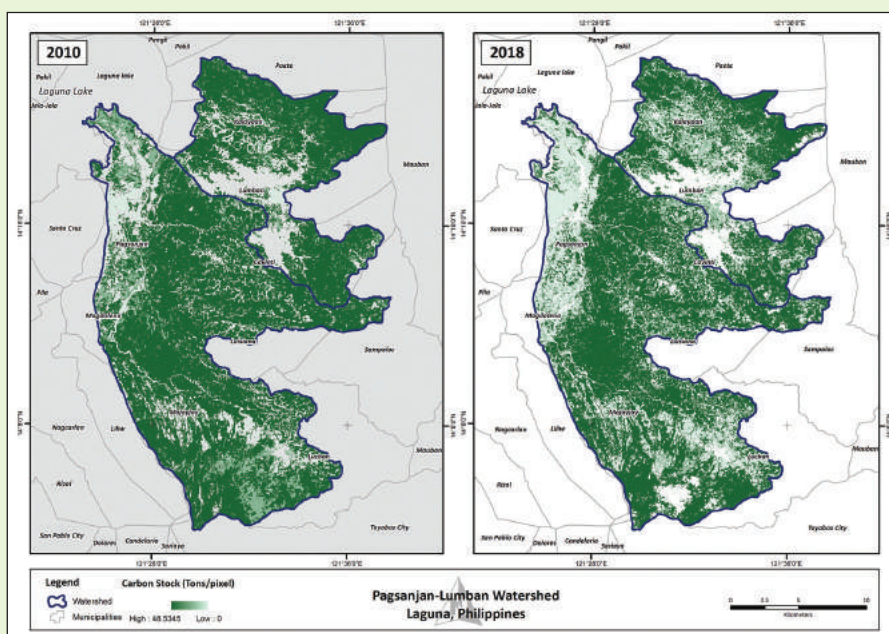
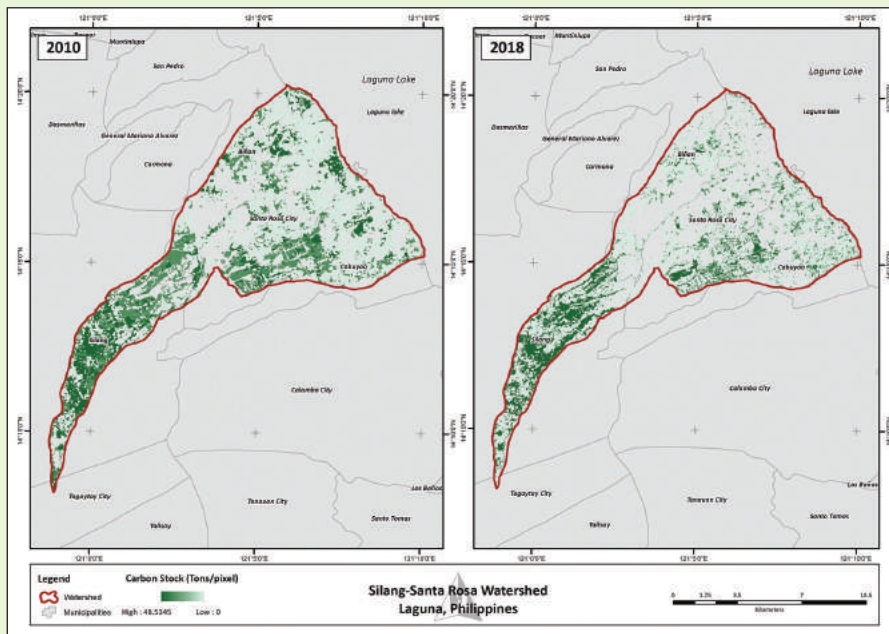


The already small patches of forests and trees (green) and agricultural lands (orange) in Biñan, Santa Rosa City, Cabuyao, Laguna and Silang, Cavite have turned into residential or commercial areas (red violet). (Photo from JJV Dida)



Conversion of forests and trees (green) into agricultural lands (orange) is widely pronounced in the towns of Pagsanjan, Magdalena, and Majayjay in Laguna. Even areas near the bodies of water (blue) are either shrinking or turning into open or agricultural lands. Same changes are also happening in the other towns. (Photo from JJV Dida)

Jan Joseph V. Dida
(person in pink)
presenting the initial
results of his study with
their collaborators from
Kyoto University, Japan.



The capacity of Silang-Santa Rosa and Pagsanjan-Lumban Watersheds is declining. (Photos from JJV Dida)

Why is carbon stock important?

Forest trees capture carbon dioxide from the atmosphere through photosynthesis and store them in their stems, leaves, and roots, a long-term process called carbon sequestration.

"The quantity of carbon stored in the plants and below ground is referred to as carbon storage. The increase in atmospheric carbon is one of the contributors to global warming. Thus, the assimilation of atmospheric carbon through the growth of trees and other vegetation becomes important," Dida explained.

If carbon dioxide stays in the atmosphere, it can trap heat and aggravate the trend of global warming. And if global warming is not limited, it can worsen sea level rise, influence the strength of typhoons in the Pacific Ocean, and induce coral bleaching under the seas, to name a few.

"In addition to the increase in atmospheric carbon, the loss of carbon stock or terrestrial carbon as a result of the permanent removal of trees and other woody vegetation leads to ecosystem disturbance, changes in the microclimate, and even loss of aesthetic value," Dida mentioned.

While developing countries like the Philippines should contribute to global efforts in reducing carbon emissions to mitigate climate change, most emissions primarily happen in industrialized countries like China, USA, UK and Brazil.

Right now, Dida and his colleagues are proposing to local government units to include carbon stock mapping in the management of watersheds. "The maps can also be used to estimate the total quantity of potential carbon stock that will be affected by proposed development projects," he said.

"Furthermore, the carbon information and location can be used as one of the inputs for delineating the different zones inside the watershed," Dida remarked.

DOST-MIMAROPA director wins BCYF Innovation Award for improving region's water security

By: Charlotte F. Pizarra, DOST-MIMAROPA



Water technologies provided by DOST-MIMAROPA

DR. MA. Josefina P. Abilay, Regional Director of the Department of Science and Technology-MIMAROPA (DOST-MIMAROPA), has won the Benita and Catalino Yap Foundation (BCYF) Innovation Award (BIA) for Government Service category for its excellent leadership in advancing water security in the MIMAROPA region.

The award was virtually presented by the BCYF at the 2021 BCYF Innovation Awards last 23 July 2021.

Abilay was recognized for her smart decisions in bringing innovative water technology solutions to overcome water scarcity in the region, particularly to the hardly affected Geographically Isolated and Disadvantaged Areas (GIDA). These communities have long struggled with the lack of access to safe water for drinking, sanitation, cooking, and growing food, creating a knock-on effect on their health and development.

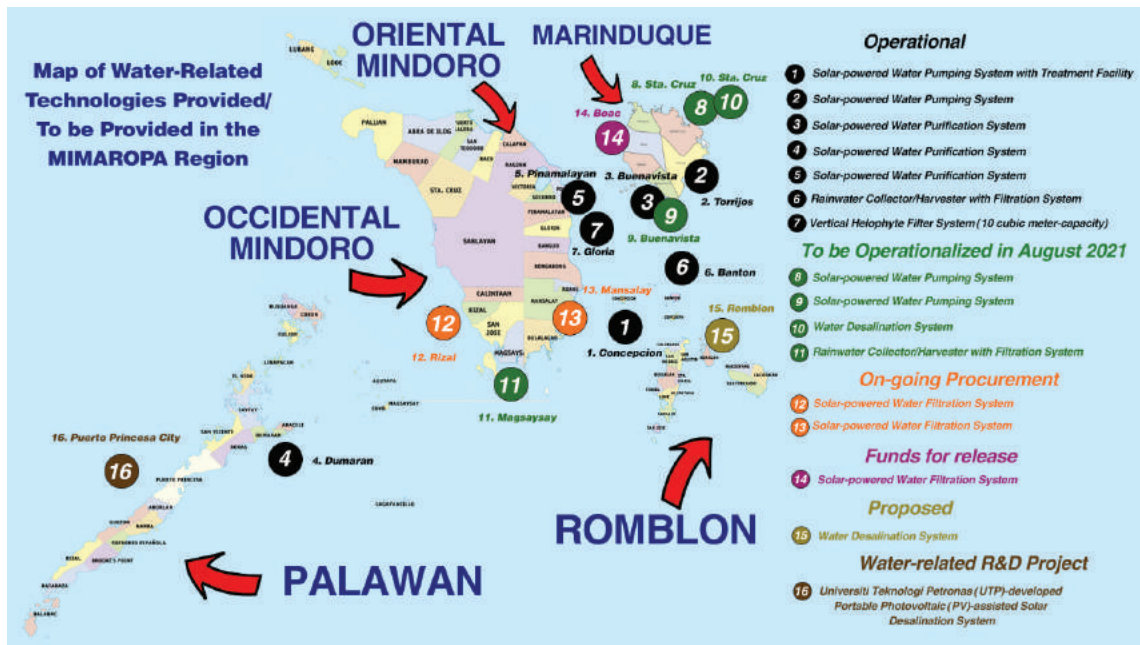


Dr. Abilay as she shares a short message during her acceptance speech at the 2021 BCYF Innovation Awards.

"The impacts of water scarcity affect families and their communities far beyond the stories we hear and see. Without easily accessible basic water services, our people's true potential to be productive citizens are limited, and they can become trapped in poverty for generations," explained Abilay.

To address this problem, DOST-MIMAROPA, through her leadership, has provided GIDA communities with water technologies, including Solar-Powered Water Pumping, Purification and Filtration Systems, Rainwater Collector/Harvester with Filtration System, and Water Desalination.

There are already ten communities, more than 1,900 households, or 9,500 individuals in the region who have benefited from the agency's interventions. Some of these communities have saved about PhP 91,000 per month, equivalent to the transport cost of having their daily water requirement for



Map of water technologies provided and to be provided in the MIMAROPA region.

domestic consumption delivered.

She stressed that ensuring clean, safe, and affordable water for all is a critical tool to break the cycle of poverty. "When a community gains access to clean water, more time will be spent to focus on education and livelihood, and people are free from water-borne diseases," she said.

She also added that DOST-MIMAROPA is now working towards scaling up its interventions to provide appropriate innovative water technologies to more people and communities in the region. She said that the agency has partnered with the Universiti Teknologi Petronas (UTP) Malaysia and Palawan State University to conduct a research and development (R&D) optimization project on Photovoltaic (PV)-assisted Solar Desalination System to explore the possibility of using local and low-cost parts well-suited for small island communities and coastal areas.

"To drive greater impact, we made sure to work with the local government units, academe, and even local and international organizations to combine our areas of expertise," she said.

In 2017, Abilay was also one of the finalists for the award for promoting the Solar Energy System to enhance healthcare services while mitigating the impacts of climate change in the region.

The BCYF Innovation Awards aims to recognize organizations and individuals in the areas of government service, small and medium enterprises (SMEs), education, technology, and industry, which have made a difference in the

lives of others through innovations. It is part of BCYF's Comprehensive Social Development Program, which consists of research, education, events, and developmental social enterprise.

"Being recognized by BCYF, I hope that this can further inspire other organizations, particularly government agencies, to instill deeper involvement in innovation in serving the people," she said.



Screenshots from the BCYF Innovation Awards Awarding Ceremony.



Dr. Ma Josefina P. Abilay receives a plaque for being one of the finalists in the 1st BCY Foundation Innovation Awards for Government Service Category held in 2017.

DOST expands Taguig and Bacolod food banks

By Dannieline Solis, *DOST-PCIEERD*

THE DEPARTMENT of Science and Technology (DOST) expands its food banks in Taguig and Bacolod City to provide a more scientific approach in addressing food security and malnutrition of the most vulnerable Filipinos.

Dubbed as the Good Food Grocer, the first food bank was opened in May 2018 in Taguig and has now expanded to Bacolod City with Mingoy mobile food bank to improve food security, dietary diversity, and caloric intake of nutritionally at-risk pregnant and lactating women, children, and indigent families under the dietary supplementation program (DSP).

This was made possible through Rise Against Hunger Philippines (RAHP) organization with support from the DOST amounting to PHP9.4 million and in partnership with the Negrense Volunteers for Change Foundation (NVC).

Food banks accept food donations from food manufacturers and retailers, hotels, restaurants, farms, as well as good Samaritans and then distribute these goods to the individuals who are enrolled under the DSP. Each food bank has a kitchen with ample space for proper storage of raw and stock ingredients so that volunteers can cook food for their daily distribution to food pantries, feeding programs in schools, orphanages, emergency shelters and even the homeless people. Additionally, food banks have grocery stores with nutritious food products at an affordable price.

On the other hand, the development of food donation mobile phone application is currently ongoing to reach a wider variety of donors. The app permits the donors to post the details of their donations and let the food pantries either accept or deny the goods.

For sustainable food banking system, RAHP supports the urban farming project in Taguig City known as Good Food Farm (GFF). The urban farm celebrated its first-year anniversary last January and has since expanded its produce. It serves as a source of income diversification activity for the target beneficiaries of food bank and dietary supplementation program.

DOST Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) Executive

Director Dr. Enrico C. Paringit expressed optimism over the impact of the food banks.

"We are confident that these food banks will help improve the nutritional needs of the communities they serve and contribute to alleviate the hunger of those who are adversely affected by the pandemic," he said. "We hope for more technology-based and systemic solutions to achieve zero hunger in the Philippines," Paringit continued.

Ensuring food security, RAHP has also joined Pilipinas Kontra Gutom (PKG). It is a national, multi-sectoral anti-hunger movement composed of more than 70 private and public sector partners that will work together on

and cereals, followed by milk, dairy products, and egg. Other food donations include canned goods and snacks.

During the first quarter of 2021, the project team has received cash and in-kind donations amounting to PHP 22M allowing them to serve at least 40,104 families, with 2,344 children.

The RAHP foodbank is the only foodbank in the country that is a member of the Global Foodbanking Network. GFN is an international nonprofit that works towards a hunger-free future in more than 40 countries by sustaining, uniting and strengthening food banks. GFN believed that food banks are an integral and viable solution in empowering the world to defeat hunger and change lives.

RAHP Director Jose Mariano Fleras said that amid the public health emergency announcement, project activities were still implemented by integrating COVID-19 protocols to all activities such as online courses and distribution of goods for beneficiaries who lost their access to food due to the current pandemic.

"As the pandemic adds fuel to the fire of this growing hunger crisis, our food banks will continuously provide the needed assistance. We are mobilizing food manufacturers to donate their surplus inventory and distribute it to those in need. We are currently distributing food in different areas of Metro Manila and the provinces of Isabela, Laguna, Pangasinan, Negros Oriental, Cebu, Iloilo, Misamis Oriental, and Davao," he said.

RAHP ensured that food distributed in DSP areas and other food bank beneficiaries are safe to eat by following the nutrition and food safety guidelines for food banking system.

"In many parts of the world, food banking has been proven as effective in addressing food and nutrition insecurities. This research grant from DOST will be able to scientifically prove the impact of food banking," Fleras added.

In the coming months, the team targets to enhance their food distribution system and forge new partnerships with possible donors and organizations. To engage with them, send an email to jfleras@riseagainsthunger.org.ph.



various programs with a common goal to addressing involuntary hunger and malnutrition in the Philippines.

The project team has also partnered with San Miguel Foundation, Del Monte Philippines, Century Pacific Food, Inc., Mondelez, Zendesk, Conrad Manila, Golden Acres, Coca-Cola Foundation, Alaska Milk Corporation, Unilever Philippines, Monde Nissin, Rebisco, Gamesys, and the local government units (LGU).

In 2020, RAHP received a total of PhP 191 million with 50% coming from the food manufacturing industry. Majority of food donations are on rice, bread, noodles, tubers,

How does the country's health research community act together amidst the pandemic?

By Allan Mauro V. Marfal, DOST-STII



DOST-PCHRD Executive Director Dr. Jaime C. Montoya shares how the PNHRs played a significant role and thrived despite the circumstances brought about by the COVID-19 pandemic.

INNOVATIVE RESEARCHES, sharing of expertise, and policy creation are how the country's health research community responded to the challenges brought by the Coronavirus-19 pandemic to every Filipino.

This was shared by the officials of the Department of Science and Technology (DOST) during the last day of the 14th Philippine National Health Research System (PNHRs) Week held on 13 August 2021 at Zamboanga City.

"In this year's celebration, we emphasize the role of research and development in supporting our communities and in aiding our institutions for the successful implementation of the UHC Law, especially during the time of the pandemic," said DOST Secretary Fortunato T. de la Peña.

The Science chief acknowledged the significant inputs and contributions provided by PNHRs especially in compelling the science community to work together to ensure that they can facilitate the implementation of UHC law, particularly during the pandemic season, for the maximum benefit of the Filipino people.

"It is evident in the past year, as we had to face a pandemic which, until now, threatens our health, livelihood, and economic security, among others. With this pressing health challenge, we believe that the System has shown excellence, perseverance, and commitment to contribute to the country's pandemic response," said Sec. de la Peña.

Sec. de la Peña shared that even before the pandemic, the local scientific community leveraged partnerships and built on each

other's strengths to generate solutions for every region in the country.

He cited specifically that the DOST, through the Philippine Council for Health Research and Development (PCHRD) has supported a total of 36 COVID-19 related projects in 2020 alone. It includes the development of our very own COVID-19 test kits, the GenAmplify™ Corona Virus 2019 rRT PCR Detection Kit, which is now approved for commercial use by the Philippine Food and Drug Administration (FDA); the enhancement of the Feasibility Analysis of Syndromic Surveillance Using Spatiotemporal Epidemiological Modeler (FASSTER) for Early Detection of Diseases which is now adopted by the Department of Health (DOH) as the official monitoring tool for COVID-19 in the country; and the development of the Specimen

Collection Booths (SCBs) for sample collection, the design of which reported to be downloaded and now being used in Africa.

“Deriving from these experiences, I’d like to reiterate that our projects and initiatives are made possible through the support of our network, locally and internationally. By building on our diverse expertise and by continuously assessing the areas where we can collaborate, we are able to generate solutions that are attuned to the needs of our communities and carry out projects that bring significant change and impact,” said Sec. de la Peña.

Meanwhile, DOST-PCHRD Executive Director Dr. Jaime C. Montoya shared that by leveraging the strength in health research partnerships, the PNHRs has been playing an active role in contributing to the country’s pandemic response, and in the growth of the health research landscape as a whole.

He shared that the World Health Organization published the Health Evidence

Network (HEN) report, which cited the Philippines as a model for low-to-middle-income countries with a comprehensive national strategy for health research in line with the institutionalization of the PNHRs.

Even during the most pressing health crises, ensuring that every health research is conducted ethically is equally important as swiftly generating health solutions. As a contribution to the country’s COVID-19 response, PNHRs through Philippine Health Research Ethics Board (PHREB) served as a consultant of the DOST Vaccine Expert Panel on the conduct of the World Health Organization (WHO) Solidarity Trials and the independent vaccine trials, where they provided advice on the recruitment of participants in the trials and compensation of trial participants. PHREB also developed an infographic on the ethics of vaccination to educate the public on the role of vaccines in controlling the pandemic.

Dr. Montoya also added that Research Agenda Management, Capacity Building, Research Utilization, Resource Mobilization, and Structure, Organization, Monitoring, and Evaluation are other areas where the System has thrived despite the circumstances brought about by the COVID-19 pandemic.

The PNHRs is celebrated every second week of August following Presidential Proclamation No. 1309 of June 2007. It serves as a venue for different stakeholders to share their best practices and experiences in pursuit of healthier lives for the Filipinos through health research and development. The event also showcases new emerging partnerships to address the country’s current challenges on health issues.

For this year, the PNHRs week was hosted by Zamboanga Consortium for Health Research and Development (ZCHRD) with the DOST Regional Office No. IX anchored on the theme of Health R&D in the New Normal: Moving Towards Universal Health Care”.



DOST Secretary Fortunato T. de la Peña acknowledged the significant inputs and contributions provided by PNHRs especially in compelling the science community to work together to ensure that they can facilitate the implementation UHC law, particularly during pandemic season, for the maximum benefit of the Filipino people.



Finding Microbes on a Volcanic Slope. With the slope of the majestic Mt. Mayon behind them, the authors are taking soil samples from the active volcano in Malilipot, Albay. (Photo from the researchers)

Bacteria from Mt. Mayon soils found with potential antibiotic, anticancer properties

By David Matthew C. Gopilan, DOST-STII

FROM NOW on, Mt. Mayon will be known not only for its perfect cone shape and eruptive past but for its soils that host bacteria that has potential antibiotic and anticancer properties.

Researchers from the University of the Philippines Los Baños (UPLB) have identified a specific bacterial species from the soils of Mt. Mayon that has shown potential antibiotic and anti-colorectal cancer activities.

This specific bacterial isolate identified as *Streptomyces* sp. A1-08 has shown antibiotic activity against numerous potentially pathogenic microorganisms and anti-colorectal cancer potential. It is one of the 30 bacteria that were isolated from soil samples of Mt. Mayon in Malilipot, Albay.

"We have high hopes of getting new and novel species because this is a less explored environment, a volcano," said Kristel Mae P.

Oliveros, the project leader and an assistant professor in UPLB Microbiology Division. "We were totally surprised and excited," she added while describing how they felt upon finding out the results of their experiments.

Once the researchers have confirmed that *Streptomyces* sp. A1-08 is a new species, they will name it "*Streptomyces mayonensis* A1-08" in honor of our country. This was explained by Asst. Prof. Oliveros' coworker Albert Remus R. Rosana who is currently a PhD student at the University of Alberta, Canada.

The researchers have initially isolated 30 bacterial species from Mt. Mayon's volcanic soils. Thirteen of them have shown varying antibiotic activities in different test organisms that were known as pathogenic to humans or plants. The test organisms are *Salmonella enterica* serovar Typhimurium, *Klebsiella pneumoniae*,

Staphylococcus aureus and its methicillin-resistant variant, *Candida albicans*, *Aspergillus niger*, and an unspecified *Fusarium* species.

"One of the objectives of the study is to screen actinomycete isolates for antimicrobial activity. Therefore, we ensured that our selected test organisms would represent some of the major groups of microorganisms, including bacteria, yeasts, and molds to capture a broader antimicrobial spectrum result," Asst. Prof. Oliveros mentioned.

"The choice of test organisms was also associated with World Health Organization's (WHO) list of human pathogens that pose eminent danger to human health by 2050, mainly due to antibiotic resistance," Rosana added.

The research team assumed that since those 30 isolates thrive in a unique environment such as Mt. Mayon's volcanic soils, they most



On Petri dishes. Different observable traits of *Streptomyces* sp. A1-08 on different media. (Photo from Philippine Journal of Science)

likely produce unique chemical compounds that may have medical, pharmaceutical, and even cosmeceutical uses. Moreover, *Streptomyces* species in general are known to produce medically and pharmaceutically important products.

But *Streptomyces* sp. A1-08 stood out because it has shown antagonistic effects on all test microorganisms and the methicillin-resistant *Staphylococcus aureus* or simply MRSA. Abundant in hospitals, MRSA is strongly resistant against antibiotics which makes treatment of infections more difficult. In fact, the WHO has declared antimicrobial resistance as one of the top 10 global threats to public health.

ANTICANCER, GENOMIC TESTS

Because *Streptomyces* sp. A1-08 seems to fight off MRSA, this prompted Asst. Prof. Oliveros and team to study *Streptomyces* sp. A1-08 further using the anti-colorectal cancer test and genomic analysis.

Their anti-colorectal cancer test indicates that crude extracts from *Streptomyces* sp. A1-08 suggested low potency when compared to a doxorubicin, a chemotherapy drug.

"It is good to remember that the positive control doxorubicin is a pure, proven and tested commercially available chemotherapy drug. In contrast, the ethyl acetate extract of [*Streptomyces* sp.] A1-08 which we have used in the study, [is] a crude extract, and therefore still a complex mixture and may contain multitude of raw compounds at different concentrations," Asst. Prof. Oliveros explained.

Those raw compounds can be purified further to develop an exact anticancer drug.

To identify the specific genes of *Streptomyces* sp. A1-08 responsible for producing antibiotic and anticancer compounds, the researchers conducted genomics analysis – or the study of the organism's complete set of DNAs. It also helped them zero in on the specific identity of *Streptomyces* sp. A1-08.

Rosana likened genomics to a blueprint of a house or different Lego pieces that a person can assemble to build their favorite character. "In our genomics work, we use computer software to

build the correct sequence of the Lego pieces and predict target outcomes, which in our research are the different antibiotics and potential anti-cancer molecules," he added.

DISCOVERY IS NOT THE END

Asst. Prof. Oliveros defined their findings as a "jackpot" but pointed out that their discovery must lead to more research.

"Way forward, further studies should be made for us to establish that this novel species can likewise produce novel bioactive compounds," she mentioned.

"Future rigorous research in drug chemistry combined with metabolomics are vital to claim that the secondary metabolites produced by our isolate is totally new and hopefully effective as a chemotherapy drug," said Asst. Prof. Oliveros.

Metabolomics is the study of metabolites involved in chemical processes happening in an organism.

"This is also our dream, to put this project forward in the large-scale cosmeceutical and

pharmaceutical pipeline!" the UPLB researcher added.

She finds it honorable to pioneer extending their discovery to industrial applications, and "to showcase the known and great potential of the Philippines as a promising land that harbor natural products for drug discovery".

This paper was recently accepted in the Philippine Journal of Science (PJS), a peer-reviewed publication of the Department of Science and Technology. Although the paper is lined up on the PJS' December 2021 issue, its full copy will be uploaded immediately on the journal's website (philjournalsci.dost.gov.ph) as soon as its ready for public reading.

Joining Rosana and Oliveros in their groundbreaking work are Andrew D. Montecillo, Dr. Rina B. Opulencia, Arian J. Jacildo, Dr. Asuncion K. Raymundo, and the late Dr. Teofila O. Zulaybar, who are all from UPLB.

This study was funded by the UPLB Basic Research Grant and scholarship grants given to Albert Rosana.



Albert Rosana from the University of Alberta, Canada.

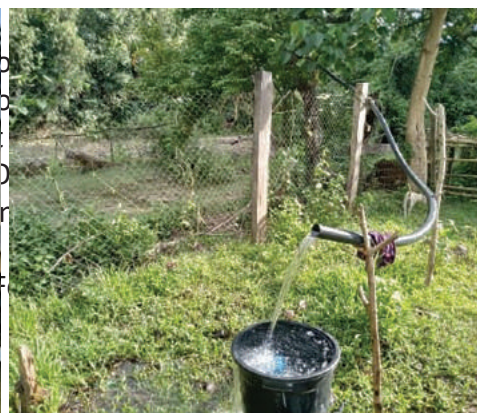


DOST-II brings more S&T initiatives to CEST communities in Cagayan Province

By Dave Masirag, *DOST-II*

Photos from DOST-II

To alleviate poverty and armed conflicts in the region, the Department of Science and Technology (DOST) Region II thru the program Community Empowerment thru Science and Technology (CEST) partnered with the Police Regional Office-II (PRO-II) to reach out to poor and conflict-stricken municipalities in Cagayan Valley. In Cagayan, DOST-II funded projects amounting to Php 1 million in three identified CEST areas namely; Sitio Lagum and Sta. Felicitas in Sto. Nino and Cabuluan in Alcala.





Across the river of Sta. Felicitas

Another community visited under CEST was the barangay of Sta. Felicitas in Sto. Niño Cagayan. The main problem in the community is the access to clean and potable drinking water. Their main source of water is through the use of deep wells. During the months of April – June, their water supply could dry up without warning due to drought. It is also not safe for them to drink because of the presence of muds and other microorganisms.

To improve their access to quality drinking water, DOST-II conducted site assessment and community project inception meeting on 7 July 2021 for the implementation of the Potable water system project under the CEST program. About 130 families will benefit from this project. DOST-II will also ensure the sustainability of the project through a

package of training for the maintenance of the equipment and the facility forms as part of the technology intervention. Teachers in the barangay will also be linked to the STARBOOKS online training conducted by DOST-II. This will help them upgrade their S&T knowledge and instructional materials.

As part of the CEST program in Cagayan, DOST also visited barangay Cabuluan in the municipality of Alcala. DOST-II funded the implementation and the establishment of income-generating livelihood projects in the community. The project focuses on the livestock and poultry production to help the farmers and the community recover from the loss of jobs and unemployment due to the COVID-19 pandemic and those whose poultry stocks were depopulated. DOST-II will also help them with appropriate S&T training and the maintenance and sustainability of the intervention that can endure driest or wettest days.

Reaching out to Isolated Communities in Cagayan

Sitio Lagum is situated in the mountainous Barangay of Lipatan, Santo Nino Cagayan. It is one of the most isolated sitios and accessible by a three-hour walk across water and land. Additionally, 56 households in the community do not have access to electricity and potable water supply. The residents still need to fetch water from the mountain and use cloth as their water filter.

DOST-II in partnership with the Cagayan Police Provincial Office (CPPO) provided water distribution system from the mountain going to their households with the use of pipelines to lessen their burden. They will be also given solar panels with complete sets of battery and inverter for the electricity in the said community. Moreover, residents who are not capable of sending their children to school sometimes join guerrilla groups. The result is more poverty and more conflicts in the area. With this, DOST planned to conduct S&T training and the install STARBOOKS to prevent these.





Inside Ayos Sapatos' display area at Quezon Street, Masbate City.

Leathercraft gains ground in Masbate through SETUP

By Josie D. Albao & Michael L. de La Cruz, PSTC-Masbate

Photos from PSTC-Masbate

Leathercraft gradually takes a firm foothold in the undisputed Rodeo Capital of the Philippines, the Province of Masbate, thanks to Ayos Sapatos, a local manufacturer of leather products such as bags, belts, keychains, purses, and slippers. Ayos Sapatos has pioneered the adoption of modern technologies as a result of the innovation support provided by the Department of Science and Technology Regional Office V (DOST-V) through the Small Enterprise Technology Upgrading Program or SETUP.

Ayos Sapatos is a homegrown business established by Precioso R. Baes, a registered nurse working in a local government hospital since 2006. In 2013, he heeded the call of entrepreneurship to augment the family's income, rather than take the risk of going abroad. Inspired by relatives engaged in shoes and bag-making business in Laguna, he established a shoe repair shop to complement his wife's store selling various food and non-food products and shoes produced by their Laguna kin.



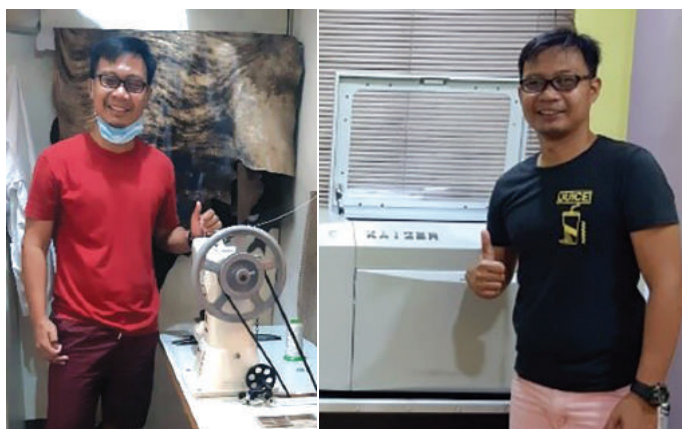
PSTC-Masbate staff conducts technology needs assessment with Mr. Baes.

Ms. Baes was overseeing a staff of three in a 12-square meter shop with basic manual tools and second-hand sewing machine just before the pandemic hit the nation. Next to the shop right in his own home is the 38-square meter near-completed future workshop. The limited and time-worn equipment used for engraving, cutting and sewing operations was a great bottleneck to level-up business he had come to love. Churning out better quality products seemed impossible without the right equipment.

PSTC-Masbate personnel conducted the Technology Needs Assessment for the firm. As if on cue, they came in with the key: SETUP. On 4 December 2020, Mr. Baes officially became a cooperator upon signing the Memorandum of Agreement for the project “Upgrading Production Operations of Ayos Sapatos”.

SETUP is a flagship program of DOST that provides innovation fund assistance to encourage micro, small and medium enterprises (MSMEs) to adopt technological innovations to boost productivity and market competitiveness.

In less than two-months’ time from the fund release on 23 February 2021, Mr. Baes procured one unit each of laser engraving cutting machine with desktop printer, and electric leather sewing machine. The firm now creates product after product with customized and improved designs. The laser engraving equipment turns out higher outputs from one to two bags per week to two bags per day, and afforded to use of other media such as wood for bag-making and other product lines such as trophies.

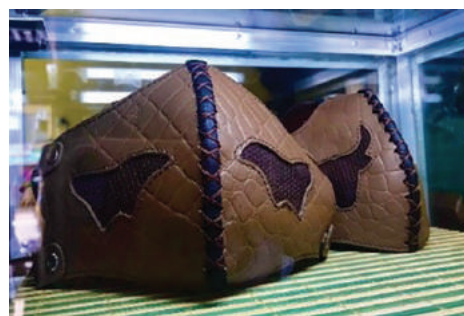


Mr. Baes beams with joy and gratitude for the advanced leathercraft production equipment he received through DOST’s SETUP

The firm shifted from manual sewing of thick leather to a more efficient process with the new electric leather sewing machine. Two additional workers were also hired. The firm continues to level up production to serve its fast-growing network of homegrown customers who have come to love and appreciate Ayos Sapatos’ truly Masbate-made creations.

Now, Mr. Baes has never been more optimistic of the firm’s future as his products sell from the shelves faster than before! Delighted and proud of the firm’s contribution to Masbate’s tourism industry, Mr. Baes’ goal is to produce more items and expand market reach to include the cities of Legazpi in Albay and Naga in Camarines Sur.

Dried fish and pastillas – before, these are the only pasalubong items whenever visitors come to the island province. But now, they can take home world-class leather products manufactured by Ayos Sapatos, with the brand Rodeo Leathercrafts, or RL Crafts for short.



Some of the Ayos Sapatos’ leather products, made using the upgraded technologies from SETUP

DOST-FPRDI, DOST-NCR team up to improve BJMP *parol*

By Apple Jean C. Martin- de Leon & Maria C. Reyes, DOST-FPRDI
Photos courtesy of DOST-NCR

The Christmas season promises to become a brighter time in the coming years for Persons Deprived of Liberty (PDLs) in San Juan City. This, as the city's Bureau of Jail Management and Penology (BJMP) participated in a Virtual Consultative Dialogue with DOST-Forest Products Research and Development Institute (DOST-FPRDI) last 20 August 2021.

According to City Jail Warden Mr. Jose Marie D. Sabeniano, the *parol*-making project is a source of livelihood for the PDLs and their families. Among San Juan City-BJMP's concerns were the tools or equipment needed to speed-up production; preservative treatment to improve



durability and quality; skills upgrading; and possible sources of bamboo.

Meanwhile, for next year, DOST-FPRDI's possible interventions may include trainings on the following topics for the San Juan City PDLs: Handmade Paper Making; Treatment and Preservation of Bamboo and other Raw Materials; Bamboo Furniture/ Handicrafts Processing Technology; and the Operation of Wood/Bamboo Processing Equipment.

"We are excited to share our technologies with the BJMP," said Dr.

Maria Cielito G. Siladan, OIC Chief of the Technical Services Division. "Hopefully, thru these capacity building activities, the Institute could help develop higher-value products and handicrafts, and introduce other livelihood ideas to PDLs. They will also be invited to several FPRDI training webinars this month."

The consultative dialogue was initiated by the DOST-National Capital Region, which will also prepare the Memorandum of Agreement for the upcoming technical assistance services.

DOST-IX assists food-based enterprises in Zamboanga del Sur

By Jeyzel P. Aparri, DOST-IX

Photos from DOST-IX



The Department of Science and Technology IX through its Small Enterprise Technology Upgrading Program (SETUP), recently approved innovation funds to three firms in Zamboanga del Sur. The total innovation funds released amounting to PHP 2,321,527 for the first semester of calendar year 2021.

Among the projects approved were Nonay's Foodhaus in Pagadian City which got a total fund amounting to PHP 1.17M for the implementation of charcoal briquetting production in support to their major product produced, the roasted pig or lechon.

Another is the Shinelo's Cake Creations located in the Municipality of Molave, Zamboanga del Sur with about PHP 651,952 for the upgrading of bakery facilities and ICT system that will support the increase in production capacity of customized cakes and provide effective

inventory and sales tracking system for the smooth operation of the firm.

Lastly, Liana's Food Products and Manufacturing in Molave, Zamboanga del Sur with funding of about PHP 500,000 or PHP 499,575 for the enhancement of tablea and chocolate production thru acquisition of industrial grade melanger machine.

DOST interventions such as product testing, consultancy on proper production lay-out, and human resource development through the conduct of food safety and SS

training are part of the lined-up activities for the newly approved projects.

The Department supports local food producers, allowing them to reinvigorate the economy by providing enough food-based supply and demand in the market, and sustaining employment opportunities for the locals especially during the pandemic.

For more information, regarding the DOST-SETUP program, please contact us at (062) 991- 1024 or 955- 1838 or 09177184284 or email us at dost9info@gmail.com. To be updated on the latest happenings, please follow our Facebook page at www.facebook.com/DOSTRegion9.



2021 National S&T Week goes virtual the second time around on November 22-28

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

Despite the absence of mass gathering and face-to-face interaction, the staging of the first-ever virtual celebration of the National Science and Technology Week (NSTW) in 2020 became a resounding success, not only for the local scientists and researchers but, for the public who participated and watched it as well.

Living in a digital era wherein gadgets and social media platforms are new communication tools and content creators become instant celebrities, the access to many relevant S&T information, knowledge, and services for more and more Filipinos has become so easy, thereby paving the way to show how science works for the people.

As people movement is still restricted due to the COVID-19 pandemic, for the second year in a row, many Filipinos will continue to enjoy the many offerings of the NSTW right at the comfort of their respective laptops, desktop computers, and mobile phones from 22-28 November 2021.

This year's celebration carries the theme, "Agham at Teknolohiya: Tugon sa Hamon ng Panahon". The 2021 NSTW will highlight all the research and development (R&D) outputs as well as innovative products and services developed and offered by DOST agencies and regional offices that helped address the challenges brought about by the pandemic and climate change. Furthermore, the virtual celebration will highlight the many DOST innovations that respond to the pressing needs of various sectors and stakeholders toward attaining development and inclusive growth.

The seven-day S&T virtual festivity will feature lectures and discussions related to agriculture, disaster preparedness and management, science education, enterprise, publishing research journals, and health and nutrition, among others. The final lineup of virtual activities for this year's NSTW celebration will be announced in the coming weeks.

Before the nationwide festivity kicks off, each region has already started their own virtual celebrations dubbed as the NSTW in the Regions. These regional events give opportunities for each region to highlight their latest local innovative technologies and researches through webinars, technology demonstrations and product and project launches.

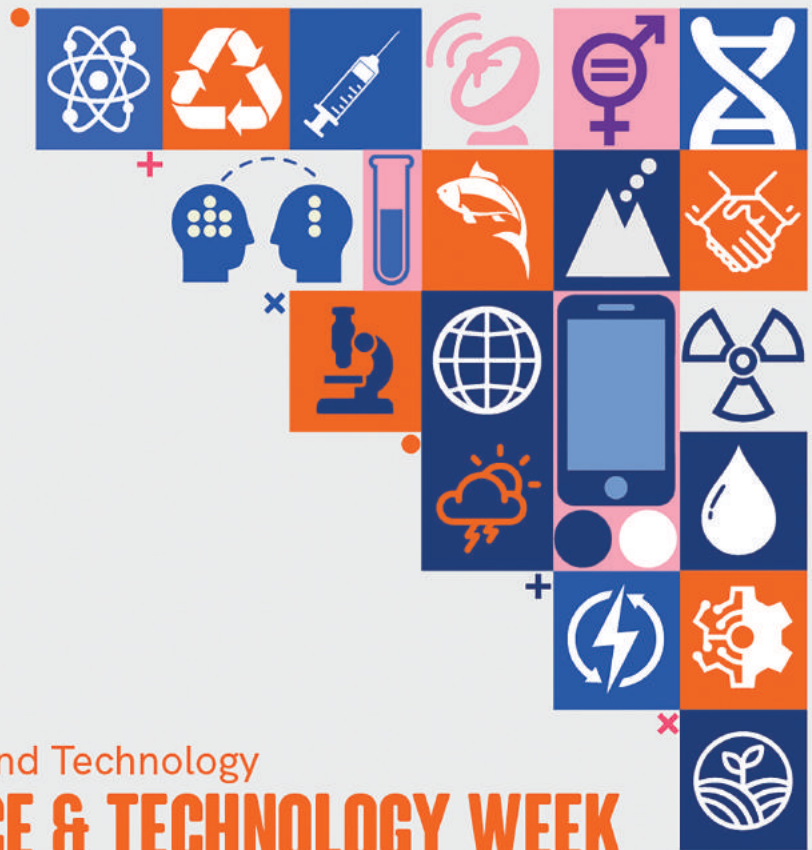
In addition, this is the first time that several national government agencies and state colleges and universities will stage their own NSTW virtual celebration.

Meanwhile, a series of build-up virtual activities heading to the nationwide celebration in November will be conducted by the different DOST agencies and their partner institutions.

Moving the annual NSTW celebration from July to November

From 1993 until 2019, the NSTW has been celebrated every third week of July pursuant to Proclamation 169. However, in August 2019, by virtue of Proclamation 780 signed by President Rodrigo Roa Duterte, the NSTW celebration is now celebrated every fourth week of November. The change of date was meant to ensure maximum participation of schools, students, stakeholders, and the public during the week-long celebration due to the change in the academic calendar of most universities, schools, and educational institutions.

For more information and updates regarding the 2021 NSTW virtual celebration, please visit www.nstw.dost.gov.ph and its official Facebook page or send your inquiries to the 2021 NSTW Secretariat at nstw.secretariat@gmail.com and nstwpromotions@gmail.com.



Department of Science and Technology

NATIONAL SCIENCE & TECHNOLOGY WEEK

AGHAM AT TEKNOLOHIYA: TUGON SA HÀMON NG PANAHON

22-28 NOVEMBER 2021



www.nstw.dost.gov.ph



NSTWDOST

#2021NSTW #DOSTTugonSaHamon #ScienceforthePeople

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.

TUESDAYS | 5PM



BANTAY BULKAN

DOES THE VOLCANO AND EARTHQUAKE INFORMATION YOU READ PUT YOU IN A LOT OF STRESS? TRUST ONLY THE PH'S PREMIER INSTITUTION THAT GIVES YOU ONLY THE INFORMATION YOU NEED ABOUT VOLCANOES AND EARTHQUAKES. DOST-PHIVOLCS UPDATES-BANTAY BULKAN GIVES YOU A CLEAR WEEKLY REPORT OF THE PH VOLCANOES WHICH ARE ON HIGH ALERT.

WEDNESDAYS | 5PM



EXPERT TALK 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.



f i t @DOSTVPH

▶ dostvscienceforthepeople

www.dostv.ph



Science Journo Ako is an advocacy of the Science and Technology Information Institute of the Department of Science and Technology to help in popularizing a new space in journalism to the grassroots that is apolitical in views but rather discusses the many benefits of science and technology in the everyday lives of every Filipino

#sciencejournoako

sciencejournoako@gmail.com

Philippine Journal of Science

The Philippine Journal of Science

Publishing original, peer-reviewed research works since 1906

- ✓ Rigorous, constructive, and prompt peer-reviewed process
- ✓ Multidisciplinary coverage and audience
- ✓ Open-access publication
- ✓ Under SCOPUS coverage
- ✓ No publication charges
- ✓ Bimonthly release



Be a part of the country's
historical publication

Direct your queries and manuscripts submissions at philjournalsci@gmail.com
Submission guidelines are available in our website: philjournalsci.dost.gov.ph