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# S&TPOST

ISSN0116-7766

VOL. XL NO.4 OCT-DEC 2022



**AGHAM AT TEKNOLOHIYA**

## **Kabalikat sa Maunlad at Matatag na Kinabukasan**

**PBBM assures full support to all DOST programs, services, and efforts *p.32***

## One DOST, One Science, One Bright Future



One DOST, One Science, One Bright Future Science, as enabler of positive change, can usher in a bright future for the Filipinos and it is paramount in making our dreams a reality. This aspiration is what fuels the hearts and minds of our science

workers, and as One DOST, the Department of Science and Technology is continuously pushing the science agenda to the core – to make research and development, innovations, inventions, development programs and projects as one indispensable component of achieving prosperity and growth.

This aspiration is manifested in the many accomplishments of the department, through the years, with the projects and programs being implemented that were featured during the celebration of the National Science and Technology Week at the World Trade Center, Pasay City from 23-27 November 2022, with the theme titled, “*Agham at Teknolohiya: Kabalik sa Maunlad at Matatag na Kinabukasan*”.

Again this 4th quarter issue of the Post is dedicated to showcase the empowering innovations of our researchers and scientists that are anchored on the four strategies of the department: wealth creation, wealth protection,

human well-being, and sustainability, some, if not all, were showcased during the 2022 NSTW.

The stories during the science week celebration were testament to the DOST’s resolve to put the welfare of the Filipinos and our communities upfront. We hope to inspire you with the stories on women micro-entrepreneurs from Bicol, on the outstanding MSMEs from the regions that vied for the national prize, the Balik Scientist who discovered an alternative cooking fuel as substitute to LPG, and the Pinoy-made mobile lab to detect animal diseases in Bukidnon. We will try to influence you to take environment issues to heart with the stories on agro-forestry and eco-tourism technologies in Caraga, on finding solutions to plastic wastes, and in investing in green economy as a game changer. Then, lift through the pages of the Post and discover the wonders of emerging technologies in the stories of cashless payment system for public transport, Project COBRA to enhance the country’s defense, the birthing of the Virology Institute, peaceful use of nuclear energy, water and sanitation technologies presented at the United Nations, and many more.

Truly, science has the disruptive power to change the way we do things and the way we live. And as a communication tool, we will ensure that the Post will always deliver the science stories that will touch your hearts, inspire your thoughts, and engage you to act to make science relevant, now and for all.

**RODOLFO P. DE GUZMAN**  
Executive Editor

# S&TPOST

VOL. XL No. 4



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.

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## ABOUT THE COVER

This fourth quarter issue of the S&T Post highlights the technologies featured during the celebration of the 2022 National Science and Technology Week (NSTW). No less than President Ferdinand R. Marcos Jr. himself graced the 2022 NSTW and likewise, expressed his utmost support to DOST and its initiatives in bringing science and technology to the people.

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# DOST provides R&D-based innovations to enhance DND's self-reliant defense posture program

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



In an informational video, the first sea trial for the BUHAWI project was held on 04 April 2022, within the vicinity of Corregidor Island that proved the project's functionality, reliability, and doability. (screenshot from the livestreaming of the Philippine Navy).

**P**reserving the country's patrimony is very important to ensuring the security of the Philippines and its people, as well as to preserve the nation's resources that will fuel economic development and inclusive growth.

To address this aspiration, Secretary Renato U. Solidum Jr. shared that the Department of Science and Technology (DOST) is fully committed to producing more relevant research and development (R&D) based outputs that would allow the country to have an enhanced and self-reliant defense posture program in the coming years.

In his message during the stakeholders' dialogue on Project BUHAWI on 04 October 2022, at the Acacia Hotel in Muntinlupa City, Sec. Solidum emphasized that DOST harnesses its R&D capabilities and resources to make



a significant impact and contributions to various sectors and institutions, including the defense department.

“The Department of National Defense (DND) is responsible for addressing the national security threats, while DOST is mandated to offer timely and appropriate solutions to the challenges of various sectors through S&T research and development “efforts,” said Sec. Solidum.

In 2019, the DOST—through its Metals Industry Research and Development Center (MIRDC)—started the development of project BUAHAWI or Building a Universal Mount for Heavy-Barrel Automated Weapon Integration. It is an automated gun mount for heavy barrel Browning 0.50 caliber machine guns that would strengthen the firepower capabilities of our navy’s small patrol craft in defending the country’s littoral water territories.

It was turned over on 20 May 2022 by the DOST-MIRDC to the Philippine Navy, an attached agency of the DND.

“As a product of science, technology, and innovation, project BUAHAWI will satisfy the country’s desire for self-reliance in defense, a goal that we share and a goal that we will make to generate a much better life for Filipinos once achieved,” said Sec. Solidum.

He assured that DOST is determined to keep engaging in R&D to create and improve the features of Project BUAHAWI so that it becomes a homegrown technology that the Philippine Navy will find useful.

“The DOST precisely has this outcome in mind with the project BUAHAWI. It is worth noting that this project is vital in strengthening the country’s naval force as the Philippines is a marine and archipelagic nation,” said Sec. Solidum.

Sec. Solidum said that the Philippine Navy and the industries concerned with our seas will find project BUAHAWI playing an important role in developing the country’s naval defense system. He

added that project BUAHAWI aims to build capabilities for manufacturing to realize the self-reliant defense posture that we must produce and use.

Meanwhile, DND Officer-in-Charge and Undersecretary Jose Faustino Jr. said that Project BUAHAWI would not only improve the firepower capability of various floating assets of the Philippine Navy but will also save the government substantial financial resources in acquiring remote weapon systems for each of the floating assets from external sources. He said that the development cost of Project BUAHAWI is only PHP 14 million, which can be reduced further to PHP 12 million if mass produced compared to imported technologies amounting to around PHP 24 million.

Usec. Faustino said that as the monitoring nears its completion, they look forward to the full implementation of Project BUAHAWI into all compatible naval assets.

“But make no mistake. This alone is not our end goal together with DOST. We called the domestic industry players to join us in this endeavor by producing more units of BUAHAWI. Join us in reviving the self-reliant defense posture

program (SRDP) by infusing capital and bringing more investment to spur the development of the domestic defense industry,” said Usec. Faustino.

Also presented at the said event was another project of DOST-MIRDC, this time with the Philippine Army, called Controller Operated Battle-Ready Armament or COBRA.

Engr. Rodnel O. Tamayo, Chief of the Prototyping Division of the DOST-MIRDC and project leader of COBRA, explained that this technology would enhance the firepower capability of armored vehicles of the Philippine Army through the design and integration of a Cal. 50 remote-controlled weapon station of RCWS.

Project COBRA has a gun mount with built-in control system and shielded housing, as well as a weapon console and power system.

The stakeholders’ dialog on Project BUAHAWI was held to determine the way forward in the technology transfer process, in consultation with and participation of top decision-makers in the DOST, DND, and industry players who can manufacture BUAHAWI units.



Secretary Renato U. Solidum Jr. (2nd from left) assures the full support of the DOST to the Self-reliant Defense Posture program of the Department of National Defense. (photo by Gerardo G. Palad, DOST-STII).

# Pinoy-made Mobile Lab to detect animal diseases to be donated to Bukidnon

Text and photo from DOST-OU/SecRD



A Pinoy-made mobile lab to detect African Swine Fever and Avian Influenza is now on its way to Bukidnon. The unit was scheduled for a grand launch event on 28 October 2022.

**A** scientific solution on wheels to detect animal diseases like the African Swine Fever (ASF) and Avian Influenza (AI) is on its way to Bukidnon.

The Department of Science and Technology (DOST) Business Innovation through S&T (BIST) Program funded the Mobile Laboratory Unit (MLU) equipped with state-of-the-art animal health diagnostic technologies. It was designed and created by a local veterinary research and diagnostics company known as BioAssets Corporation. The MLU will be donated to Central Mindanao University (CMU) in Maramag, Bukidnon on 28 October 2022 during a Grand Launching and Turnover Ceremony.

The mobile biocontainment laboratory, the first of its kind in the country, will

initially provide service for both hog and poultry breeders in Bukidnon. An estimate of 5–10 farms per day requiring diagnostic tests for livestock can be served by the MLU. The test is equivalent to having 150–250 samples pooled and tested in one site. Its establishment will support rapid response to potential outbreaks and improve capacity building and disease surveillance that would enable farmers and veterinarians to craft mitigation strategies, as well as preventive and control measures at the point of need.

The partnership between CMU and BioAssets Corporation, led by Dr. Homer Pantua—BioAssets Corporation CEO, BIST Project Leader, and *Balik Scientist*, and the creation of the MLU under the Science for Change (S4C)-BIST Program are essential pieces in the establishment of national program on disease

surveillance. Such program will help the farmers by protecting their animals, as well as the general public by establishing preventive and control measures for potential zoonotic diseases.

The province of Bukidnon was recorded to have had the highest production of 137.28 thousand metric tons liveweight in 2021. Currently there are 16,007 backyard hog raisers and 71 commercial hog raisers across 22 municipalities. In December 2021, a total of 251 poultry farms have also been recorded to be operating in the province. With the significant number of hog and poultry raisers present in Bukidnon, it is necessary that the first-ever MLU be made available in the area to support their disease diagnostics needs.

The Science for Change-BIST Program provides financial assistance to Filipino private companies for the acquisition of strategic and relevant technologies so they can undertake R&D activities. The financial assistance, which may be used to purchase high-tech equipment or to secure technology licensing and/or patent rights, will be refunded to DOST at zero-percent interest.

For companies who are also seeking to explore the benefits of the DOST S4C-BIST Program, you may contact the DOST-Science for Change Project Management Office at 2/F ADMATEL Bldg., DOST Compound, Gen. Santos Ave., Bicutan, Taguig City, with telephone numbers (02) 8837-2943/ 8837-2930. You may also send an email to [s4c.ousecrd@dost.gov.ph](mailto:s4c.ousecrd@dost.gov.ph) or visit the S4C Facebook page at [@dost.s4cp](https://www.facebook.com/dost.s4cp).





## DOST Secretary Solidum showcases DOST's green innovation efforts at the UN Commission on Science and Technology for Development in Switzerland

By Karen Lou S. Mabagos, ITCU-OASECIC

**G**eneva, Switzerland – The Philippine delegation headed by the Department of Science and Technology (DOST) Secretary Renato U. Solidum Jr. represented the country at the Commission on Science and Technology for Development (CSTD) of the United Nations (UN) in Geneva, Switzerland which was held from 25–26 October 2022.

Secretary Solidum showcased the Philippines' initiatives on green technology and innovation at the first day of the meeting. The initiatives include policies such as the Philippine Renewable Energy Act of 2008 and the Green Jobs Act of 2016.

The S&T chief also underscored the importance of research and development, upskilling the relevant actors in the society, and investment in green transformation. "It is essential to strengthen technical and innovation

capacity and build knowledge. The Philippines' Department of Science and Technology provides technological, technical, and financial support to public research and development programs in line with green technology and innovation", the Secretary said.

Aside from the deployment of solar energy systems in rural health units nationwide, the DOST Secretary mentioned that the country also conducts cleaner production assessments and clean energy audits. The Commission recognized that one of the constraints in shifting to green technology and innovation is the lack of financial resources and technical know-how of developing countries. Highlighting the DOST's investment to support micro-, small-, and medium enterprises or MSMEs, Secretary Solidum featured the Department's Small Enterprise Technology Upgrading Program or "SETUP," which provides

seed funds for technology, equipment and its upgrading, and technical training and consultancy services. He also underpinned that the DOST-National Research Council of the Philippines also implements the Alternative Energy Research Trends or "ALERT" program that aims to investigate alternative energy sources in the Philippines.

Secretary Solidum ended his statement by calling for support from international community and relevant stakeholders to continue to craft and expand national policies and institutional frameworks; to incentivize the users and producers of green technologies through financial grants, subsidies, and tax reliefs to encourage them to produce more; and implement capacity building activities to promote green transition. DOST Secretary Solidum showcases DOST's green innovation efforts at the UN Commission on Science and Technology for Development in Switzerland.



## PH science secretary highlights Philippines' water and sanitation-related initiatives at the United Nations Commission on S&T

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

**G**eneva, Switzerland – On the second day of the Commission on Science and Technology for Development (CSTD) of the United Nations in Geneva, Switzerland on 26 October 2022, the Department of Science and Technology (DOST) Secretary Renato U. Solidum Jr. bannered the Philippines' various science, technology, and innovation (STI) initiatives on ensuring safe water and sanitation.

After stating the country's situation on limited access to safe water, the

S&T chief listed the measures that the government, especially the DOST, are taking to address these challenges. Among these initiatives are the Harmonized National R&D Agenda with emphasis on the research priorities on environmental pollution control and management on water and wastewater management.

"Several programs and projects have been funded by the Department of Science and Technology that aim to provide access to potable water; develop cleaner, safer, and compact technologies

for application to industrial wastewater; develop materials that detoxify harmful substances in water; and conduct wastewater remediation. On water technologies, studies and output include the development of ceramic water filters at different scales and designs. A low-cost modular-type rainwater collection system was also invented and has been distributed to various local government units," Sec. Solidum elaborated.

The Department's STI solutions extend to the use of frontier technologies such as artificial intelligence and machine learning to help curb water shortages in the east service area of Metro Manila, software that forecasts water supply system of dams and its treatment plants, as well as remote sensing and geographic information system-plugin to train AI models to extract features from satellite imagery.

In closing, Sec. Solidum called upon CSTD members and relevant stakeholders to create enabling infrastructure, framework, tools, and environment that would help everyone to move forward in achieving Sustainable Development Goal 6.







PhilSA Spacecraft Electrical and Computing Systems Development Division Chief Science Research Specialist Dr. Julie Ann Banatao providing an overview of the MULA Satellite to participants of the MULA Mission Patch Contest Orientation held in Escolta, Manila on 22 October 2022.

## PHL's PhilSA launches MULA Satellite Mission Patch Contest

Text and photo from PhilSA

The Philippine Space Agency (PhilSA) is calling on designers, artists, and space enthusiasts to join the mission of the country's first commercial-grade satellite in development, the Multispectral Unit for Land Assessment or MULA satellite, by creating its mission patch. The contest, in partnership with the Department of Trade and Industry–Design Center of the Philippines (DTI-DCP), was launched during the Design Week Philippines celebration—the country's festival for Filipino design and creativity.

The mechanics of the contests were announced during the MULA Satellite Orientation held on 22 October 2022 in Escolta, Manila. The competition is open to all Filipinos 18 years old and above residing anywhere in the world. Employees and relatives of PhilSA and the DTI up to the second degree of consanguinity and affinity are ineligible from joining the contest.

Mission patches serve to symbolize the purpose and relevance of a specific

space mission and are meant to inspire the public to identify with and support these missions. Patches of Philippine satellites Diwata-1, Diwata-2, and the Maya CubeSats have been designed by scientists and engineers involved in their development. These micro and cube satellites were developed by Filipino engineers under a project funded by the Department of Science and Technology (DOST).

PhilSA is engaging the arts and design community through the mission patch design contest to make the development of the MULA satellite more inclusive. This is aligned with Design Week 2022 goal of celebrating “Design for All,” which underscores the role of design as a potent tool for positive impact and sustainable growth.

MULA Project Manager and PhilSA Spacecraft Mechanical and Autonomous Systems Development Division or SMASDD Chief Science Research Specialist Engr. John Leur Labrador explains how the satellite intends to

contribute socio-economic benefits for the country: “MULA, through high-resolution imaging, aims to provide usable information to improve the country's agricultural sector, national defense, disaster management, coastal monitoring, and ocean studies.”

President Ferdinand R. Marcos Jr. has expressed his support for the development of MULA, eyed for launch in 2025. MULA is the biggest Earth observation satellite being built by the Philippines to date. It weighs 130 kilograms and carries a TrueColour camera capable of capturing 5-m resolution images covering around 73 thousand square kilometers in 24 hours. Data from MULA are envisioned to contribute to the country's food security, disaster resilience, environment conservation, and national security. Its completion entails a government investment of PHP 2.578 billion from 2023-2025, with PHP 498.505 million allocated for this year.

“The total return on investment from MULA over its projected lifetime of five years from launch is more than double its investment cost. Based on the cost of medium-resolution satellite images similar to what MULA can produce, the potential gains from the satellite could reach PHP 5.78 billion,” Engr. Labrador adds.

All mission patch design entries will undergo two rounds of judging. Shortlisted entries will be notified via email. The deadline for submission will be on 20 November 2022.

For media inquiries, please contact [publicrelations@philsa.gov.ph](mailto:publicrelations@philsa.gov.ph).

# 50th Atomic Energy Week kicks off; diplomat says all Filipinos deserve cost-effective, reliable energy sources

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

The Department of Science and Technology–Philippine Nuclear Research Institute (DOST-PNRI) spearheaded the opening of the 50th Atomic Energy Week (AEW) on 05 December 2022, at their Office in Commonwealth Avenue in Quezon City.

Carrying the theme “*Agham at Teknolohiyang Pangnukleyar: Kabalikat sa Maunlad at Matatag na Kinabukasan*”, the five-day celebration aims to highlight the various research and development (R&D) efforts and initiatives of DOST-PNRI towards maximizing the beneficial use of nuclear technologies and applications, including those in the energy sector.

Serving as the keynote speaker was Franz-Michael Skjold-Mellbin, ambassador of the Kingdom of Denmark to the Philippines and Palau as he underscored immediately the valuable contributions of revolutionary nuclear technologies to various fields such as energy, health, and agriculture. He also stressed that a good mix of diversified energy sources such as nuclear, renewables, and energy storage could ensure the abundant, cheap, and reliable energy that all Filipinos deserve.

In his message, Amb. Mellbin pointed out that one of the unfortunate discussions in recent years is a dichotomy of some kind of opposition between different kinds of energy technologies, which should have not been in the first place. He added that the future will bring energy technologies in a higher integration than we have seen before and there is a space and a need for different kinds of technologies.

“Countries want reliable, flexible, secure energy systems, and energy supply

and the best way to achieve that is to have flexibility. To have options, to have several kinds of inputs into your energy system. And the future energy systems will consist not only of a variable input but also a much higher degree of system integration. So, it is not just a question of producing electricity, but it will also be a question of how do you build a system that stores electricity,” said Amb. Mellbin.

The diplomat also shared how sector coupling works in his home country, Denmark, where they can produce energy and power at the same time.

“It (sector coupling) is something my own country, Denmark, has perfected. So that when we produce electricity, we harvest the heat, put it into hot water, heating systems, and centralized cooling systems and distribute it on a massive scale. These kinds of things will be further developed over the next years. We will see many new energy solutions emerging,” shared Amb. Mellbin.

Amb. Mellbin knows that some energy technologies will be more suitable for certain situations, countries, and energy realities than others, but he believes that time will tell what is more suitable for all of us and what kind of mixes we will end up with.

“But I am sure that we will see an energy future where nuclear, renewables, sector coupling, and energy storage comes into place together. In a whole system thinking which is necessary to create optimal conditions that will allow you to enjoy abundant, cheap, and reliable energy for all Filipinos and you deserve that,” added Amb. Mellbin.

Furthermore, Amb. Mellbin pointed out that there is no doubt that nuclear

research has always gave a great future in any country. He zoned in on key reasons where doing nuclear is not only for socioeconomic benefits but also for tackling the socioeconomic challenges that come with nuclear research and energy or the use of nuclear radiation in medicine, in developing better crops, and in other solutions that nuclear science can contribute significantly.

“How do you make sure that nuclear research and science have a broad social acceptance and that the research is explained in a way that it becomes socially acceptable for communities, not only harnessing the advantages but also live in peace, so to say, with nuclear facilities?” a question posed by Amb. Mellbin.

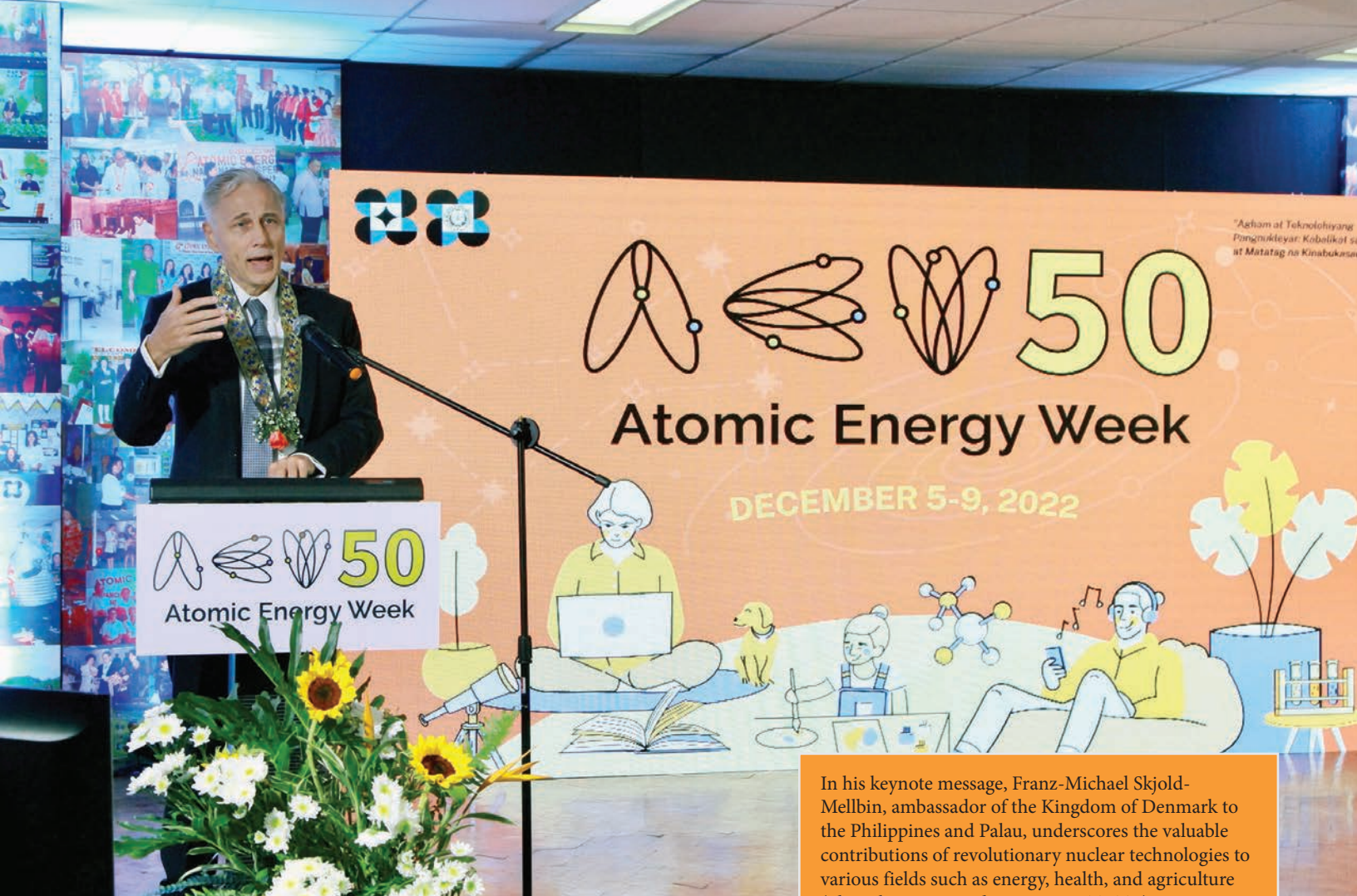
Amb. Mellbin also gave credit to the Philippines, specifically to DOST-PNRI for actively making research agreements with different countries on nuclear-related research efforts.

“It is very important to international cooperation and this Institute (DOST-PNRI) and the Philippines have been part of a wider international community working for nuclear energy, working with nuclear medicine, working with the development of radiation to create better crops and cooperation is one of the hallmarks of nuclear energy and the nuclear research community in general,” said Amb. Mellbin.

## DOST-PNRI shares initiatives and programs on nuclear S&T

As the 50th AEW kicked off on Monday, 05 December, and it will end on 09 December, key officials from DOST and DOST-PNRI shared several research and development (R&D) projects and initiatives that were done in recent years.





In his keynote message, Franz-Michael Skjold-Mellbin, ambassador of the Kingdom of Denmark to the Philippines and Palau, underscores the valuable contributions of revolutionary nuclear technologies to various fields such as energy, health, and agriculture (photo by Henri A. de Leon, DOST-STII).

DOST Undersecretary Leah J. Buendia noted some of the DOST-PNRI's ongoing initiatives in the peaceful uses of atoms in wealth creation, protection, and safety. These included setting international standards for the quarantine treatment of mango pulp weevil. She explained that it will also benefit the Philippine mango industry, especially the mango growers and exporters, and everyone else in the value chain.

Another one cited was the development of the carrageenan plant growth promoter which is already being enjoyed by farmers, vegetable growers, entrepreneurs, and others that increases production and income and the application of isotope techniques for the detection of adulteration in honey and condiments. According to Usec. Buendia, this gives big benefits to legitimate product manufacturers and consumers.

**continued on next page**



Several key DOST-PNRI officials led by Deputy Director Vallerie Ann I. Samson and former DOST Undersecretary and current National Transmission Corporation (TransCo) President Dr. Rowena Cristina L. Guevara lead the ribbon cutting ceremony for the opening of exhibits of the 50th Atomic Energy Week from 05-09 December 2022 at the DOST-PNRI office in Commonwealth Avenue, Quezon City. (photo by Henri A. de Leon, DOST-STII).



## 50TH ATOMIC (from page 28)

As for the latter, buying authentic honey gives them value for their money and ensures food safety and health concerns.

Lastly, the establishment of a nationwide radiation monitoring system is for the safety and protection of the general public.

“With these R&D projects, it just goes to show that in the field of food and agriculture, human health and medicine, environmental protection and management, industry, high technology materials, disaster mitigation, and education, DOST-PNRI has always helped and continues to address some of the Philippines’ most pressing national problems. It was never an easy feat, yet here we are celebrating a milestone,” said Usec. Buendia.

On the other hand, in his video message, Director Carlo A. Arcilla said that it will be an exciting 50 years ahead for the DOST-PNRI as well as for the Filipino people because global developments in nuclear are important ways to attain energy security, improve socioeconomic conditions, address climate change concerns, and be as competitive with other countries.

“It is worth noting that after 34 years, the Philippines has, once more, a working nuclear research reactor. Forty-four nuclear fuel rods have been loaded into the core of the newly constructed, Filipino-designed Subcritical Assembly for Training, Education, and Research or SATER. This facility is projected to open the whole scientific field of reactor physics and engineering for Filipinos; on its way for the Philippines to achieving nuclear power sustainability,” said Dir. Arcilla.

He also shared the Nuclear Medicine Research and Innovation Center, which is under construction and will help bring down the cost of cancer diagnosis and treatment, and help nuclear medicine scientists in developing techniques in nuclear medicine.



The Naturally Occurring Radioactive Materials or NORM and other several and mineral samples, as well as soil and sediment samples from all over the Philippines, are among the featured exhibits for the 50th AEW celebration at DOST-PNRI office in Commonwealth Avenue in Quezon City. (photos from DOST-PNRI’s Nuclear Materials Research section)

On the other hand, Secretary Solidum acknowledged the DOST-PNRI in earning several prestigious accolades in the local and international research scheme as well as the addition of several DOST-PNRI scientists in the scientific career system and those who have earned their advanced degrees, which is considered a huge boost to the Institute’s research capabilities.

He also recognized scientists in the Institute who have published internationally peer-reviewed journals and have recently won the DOST International Publication Award.

### More of the 50th Atomic Energy Week

After two years of virtual celebrations, the DOST-PNRI opened its doors to the public once more with the AEW 2022 that featured several technical exhibits with free guided tours.

Some of the highlights included the wreath-laying on Dr. Gen. Florencio A. Medina’s monument, the Philippine Nuclear Research and Development Conference or PNRDC, and several contests such as Mobile Photography, Poster Making, and NucleArt 4.0

The five-day celebration focused on current initiatives of DOST-PNRI and its partner institutions that will prepare the country for more relevant uses of nuclear S&T in the areas of health and medicine, food, environment, and energy security in the next 50 years.

The annual AEW celebration, as mandated under Presidential Proclamation No. 1211 in 1973, aims to generate awareness among the Filipino people on the beneficial uses of nuclear science and technology.



# PhilSA AD ASTRA scholar research recognized at international conference

Text and photo from PhilSA

The Philippine Space Agency (PhilSA) Advanced Degrees for Accelerating Space R&D and Applications Scholarships or AD ASTRA scholar Engr. Raynell A. Inojosa earned recognition for his doctoral research on antenna design for nanosatellite applications during the Institute of Electrical and Electronics Engineers (IEEE) Transdisciplinary-Oriented Workshop for Emerging Researchers (TOWERs) conference held at the Tokyo University of Agriculture and Technology in Tokyo, Japan on 26 November.

The IEEE TOWERs is an annual conference of university students and young researchers (including academic professors/scientists and working professionals) in Japan supported by the IEEE Young Professionals Affinity Group from Kansai, Sendai, and Tokyo. Inojosa's research—titled: “Electrodynamic Analysis of a Geometry-Oriented Antenna for Low-Earth Orbit CubeSat”—has been selected as one of the outstanding presentations. The award is given to emerging researchers with exceptional presentations shared at the annual conference.

As part of the scholarship grant, AD ASTRA financially supported Inojosa's short-term research engagement (sandwich program) at the Laboratory of Lean Satellite Enterprises and In-Orbit Experiment (LaSEINE) and the Center for Nanosatellite Testing (CeNT) at Kyushu Institute of Technology (KyuTech) in Japan. The testing and measurements for his research were done at these facilities under the supervision of Prof. Mengyu Cho of KyuTech.

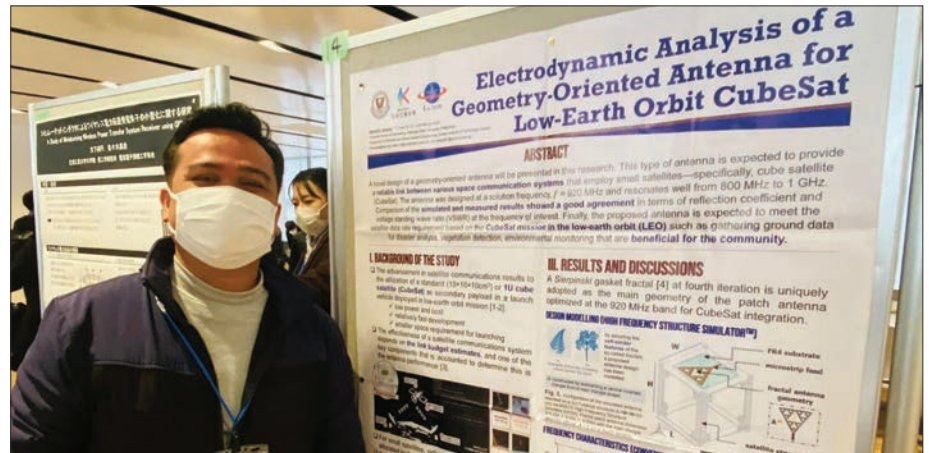
“For my research, I did a computer modeling and optimization of a 920-MHz patch antenna for low-earth orbit CubeSat integration and investigated the actual performance of a fabricated prototype

when used as a CubeSat payload,” Inojosa explained. Through his research, he hopes to come up with an innovative patch antenna design that ensures reliable, efficient, and successful communication links between a nanosatellite and a ground station terminal or GST.

Inojosa is among the first batch of PhilSA AD ASTRA Scholars. He is taking up his Ph.D. in Electronics Engineering at Batangas State University under the

supervision of Dr. Celso B. Co.

Prior to the creation of the Philippine Space Agency, the Department of Science and Technology, in collaboration with the Advanced Science and Technology Institute, has forayed in space technology with the development of the first Philippine made microsatellites, Diwata 1 on March 23, 2016 and Diwata 2 on October 29, 2018 under the STAMINA4Space program.



PhilSA AD ASTRA scholar Engr. Raynell A. Inojosa's doctorate research, “Electrodynamic Analysis of a Geometry-Oriented Antenna for Low-Earth Orbit CubeSat,” has been selected as one of the outstanding presentations during the Institute of Electrical and Electronics Engineers Transdisciplinary-Oriented Workshop for Emerging Researchers (IEEE TOWERs) conference held on 26 November in Tokyo, Japan.



Engr. Inojosa receives recognition for his exceptional research presentation. Inojosa is in Japan for a short-term research engagement as part of the PhilSA AD ASTRA scholarship grant he obtained.



# DOST co-hosts the Asia and the Pacific Regional Consultation Workshop for the Global Sustainable Development Report 2023

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







The speakers, participants, and organizers of the GSDR 2023 Regional Consultation Workshop





The high-level guests and speakers during the opening session of the Workshop (photo courtesy: GIZ) (L–R: NEDA Director Sapaen, GIZ Project Director Emmanuel, UN DESA Senior Sustainable Development Officer Bonini, UN Philippines Resident Coordinator Gonzalez, DOST Secretary Solidum, DOST Undersecretary Buendia, IGS Member Shackell and IGS Member Montoya).

**T**he Department of Science and Technology (DOST) co-hosted the United Nations Global Sustainable Development Report (GSDR) 2023 Regional Consultation Workshop for Asia and the Pacific that was co-organized by the United Nations' (UN) Department of Economic and Social Affairs (DESA) and the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) in Makati City, last 29-30 November 2022.

The Regional Consultation welcomed around a hundred participants coming from the different parts of Asia and the Pacific. The High-level Consultation session on the first day heard keynote messages from the DOST Secretary Renato U. Solidum Jr., UN Resident Coordinator in the Philippines Gustavo Gonzalez, and Dr. Verónica Tomei of the German Federal Ministry for Environment, Nature Conservation, Nuclear Safety, and Consumer Protection.

“Let us optimize science and technology as a lever for change to influence key stakeholders in governance, to stimulate economy and finance, to engage individual and collective action, and to build capacities,” DOST Secretary Solidum said. UN Resident Coordinator Gonzalez emphasized that, “achieving the Goals [Sustainable Development Goals] is more urgent now more than ever as the world faces existential challenges.” According to Gonzalez, the GSDR 2023 is very timely and critical as the world reaches the halfway point of the 2030 Agenda for Sustainable Development.





DOST Secretary Solidum delivers a keynote message at the High-Level Consultation Session of the Workshop (photo courtesy: GIZ).

the highlighted points are the options for strengthening coherence among the four levers of change introduced in 2019, which are a) governance, b) business and finance, c) individual and collective action, and d) science and technology.

To gather more detailed insights and experiences, the participants were divided into three working groups according to the priority areas of the Report. On the second day, several participants shared their reflections during the working group sessions through a fishbowl discussion and were also able to provide recommendations for call to action on the achievement of SDGs in a World Café format.

The GSDR was requested by the UN member-states to strengthen the science-policy interface and to provide evidence-based guidance on global sustainable development issues and the implementation of the 2030 Agenda and its SDGs. The report will be launched at the UN Headquarters in New York in September 2023.

The Report is tasked to be written by an Independent Group of Scientists (IGS) appointed by the UN Secretary-General, which would update the General Assembly States during SDG review deliberations or SDG Summit. Dr. Jaime C. Montoya, Executive Director of the DOST-PCHRD (Philippine Council for Health Research and Development), is one of the 15 leading experts appointed in the IGS. Dr. Montoya was joined in the Workshop by another IGS member, Dr. Nancy Shackell, Senior Research Scientist of Fisheries and Oceans Canada.

Dr. Montoya and Dr. Shackell provided, in a dialog format, an overview of the GSDR and the progress in achieving SDGs during the High-level Session. One of



IGS Members Dr. Shackell (left) and Dr. Montoya (right) giving an overview of the 2023 GSDR and the progress in achieving the SDGs during the dialog session.

## DOST, DOTr ink agreement to enhance cashless payment systems in our public transportation

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



The DOST Secretary Renato U. Solidum Jr. (2nd from left) and DOTr Secretary Jaime C. Bautista (2nd from right) lead the signing of a MoA between two national government agencies working together in raising the quality of our public transportation systems to be at par with global standards. The DOST and DOTr will establish a testing and validation facility for the Automated Fare Collection System National Standards or AFCS NS through the EPDC of DOST-ASTI. Also in photo are DOST Undersecretary for Research and Development Dr. Leah J. Buendia (left) and DOTr Assistant Secretary for Railways Jorjette B. Aquino. (photo by Henry A. de Leon, DOST-STII).

**T**he Department of Science and Technology (DOST) and the Department of Transportation (DOTr) have joined hands and signed a Memorandum of Agreement (MoA) on 22 December 2022 to work together in raising the quality of our public transportation systems to be at par with global standards.

The sealed partnership between the two government departments, held at the Electronics Product Development Center (EPDC) of the DOST in Bicutan, Taguig City, signals the beginning of

strong collaboration among government agencies to attain synergy in delivering services to the people.

Under the agreement, the DOST and DOTr will establish a testing and validation facility for the Automated Fare Collection System (AFCS) National Standards (NS) through the EPDC. This will be managed by the DOST-Advanced Science and Technology Institute (ASTI). EPDC is the country's first dedicated government electronics development and one-stop-shop facility that provides design, prototyping, and testing services for the

electronics industry.

On the other hand, DOST-ASTI—through EPDC—will administer and conduct all certification and validation (C&V) tests for Fare Media (FM) and Fare Media Validator (FMV) at the EPDC Laboratory. Also, DOST-ASTI will permit the DOTr-AFCS Program Office to use the EPDC Laboratory—including all services, and provide sufficient qualified personnel needed to conduct the testing and certification procedures as stipulated under this agreement.



For its part, the DOTr will be responsible for the administration and oversight of all services related to the C&V following DOTr’s NS and in developing the relevant operations manuals, guidelines for FM and FMV. Also, the DOTr is tasked to procure the needed equipment—including hardware, software, and accessories, as well as provide training that is necessary to operate the needed test requirements.

“The proposed collaborative efforts and the provision of support between our agencies are envisioned to be productive and supportive of the industry. With the signing of this MoA, we would like to reiterate our gratitude to DOTr for trusting the technical expertise of researchers and scientists here at DOST, especially at our EPDC,” said DOST Secretary Renato U. Solidum Jr.

Sec. Solidum assured that the establishment of this testing facility for the AFCS National Standards is just one of the many partnership efforts of the EPDC to meet its mission of providing design, manufacturing, and test expertise to research programs, small and medium-sized companies, and government agencies.

“We believe that we need to conform to global standards in terms of everything that we do. I think this is the only way for us to improve our transportation system. When President Ferdinand Marcos Jr. invited me to join the government. I told him that we will elevate the transport system to global standards,” said DOTr Secretary Jaime J. Bautista.

Sec. Bautista believes that this project will allow the riding public to use several options of payment technology when they take any mode of public transportation in the country just like those in some countries in Asia and Southeast Asia. He also assured everyone that this will not be the only time to collaborate with the DOST, especially if it is for the good of many Filipinos.

Meanwhile, DOTr Assistant Secretary for Railways Jorjette B. Aquino explained that this MoA has two essential components.

First, she shared that it seeks to establish a laboratory testing facility at DOST’s EPDC that houses state-of-the-art testing equipment for those who intend to be qualified as market players and future participants of AFCS. She considers the

EPDC facility an excellent choice as its mandate aligns with the needs of the DOTr in testing hardware and software for electronic products relevant to the AFCS ecosystem.

She also said that this partnership spells out the boundaries of mutual collaboration of the parties in the dispensation of their roles and responsibilities in connection with the C&V of FM and FMV for the AFCS sector.

“Given the paramount objective of MoA and transforming our public transport system, it can be said that this collaboration is timely in support of the aggressive plan of the government under the “Build Better More” program which seeks to improve the welfare of commuters through the provision of excellent quality public transport service delivery which will be obtained through the certification of testing and selection of qualified participants,” said Asec. Aquino.

She added that the partnership between the DOST and DOTr, “will be shown through this MoA is a pure showcase of meaningful collaboration and improving and advancing the welfare of all stakeholders for the AFCS in the country.”



Officials from the DOST and DOTr during the signing of the MoA on 22 December 2022 at the EPDC located in Bicutan, Taguig City. (photo by Henry A. de Leon, DOST-STII).

# DOST Balik Scientist discovers alternative cooking fuel to replace LPG stoves in homes

Text and photo from DOST-OUSeCRD



DOST Balik Scientist Dr. Fiorello Abenes discusses the cooking stove prototype he developed that is powered by energy innovations from nipa sap. This technology is seen as an alternative to LPG stoves.

**A** Department of Science and Technology (DOST) *Balik Scientist* hosted by the Mariano Marcos State University (MMSU) in Laoag, Ilocos Norte is set to provide clean cooking fuel alternatives to Filipino homes.

Dr. Fiorello B. Abenes, a Professor Emeritus in CalPoly Pomona University in California, USA and a *Balik Scientist* hosted by MMSU leads the technology transfer and commercialization of MMSU's Village-Scale *Nipahol* Technology (VSNT). *Nipahol* technology may also be used as cooking fuel and is seen to replace Liquefied Petroleum Gas (LPG) stoves.

"Dirty cooking is still a problem in many of the rural areas of the Philippines. The use of firewood or charcoal emit unhealthy levels of particulates and noxious gases that affect the respiratory track, mostly affecting women. Ethanol as cooking fuel is cleaner," says Dr. Abenes. "We have

developed a prototype that we hope we can scale up and make into a cooking stove suitable for indoor use and in commercial establishments."

Although the stove prototype is yet to be developed as pressurized, Dr. Abenes and his team at MMSU successfully created a *nipahol*-fueled stove with burner and functions through the pull of gravity. The successful adoption of MMSU's VSNT rests on finding more uses for the ethanol produced from *nipa*. The use of *Nipahol* as cooking fuel will accelerate the commercialization of the VSNT technology.

*Nipahol* technology is the innovation produced from extracting sap from *nipa* (*Nypa fruticans*) into "*nipahol*" at a facility housed at the National Bioenergy Research and Innovation Center or NBERIC of the MMSU. Technologies from *nipa* are seen to provide a multitude of uses, given its commercial viability in different portions of the value chain.

This innovation was made possible under the *Balik Scientist* Program that aims to promote information exchange and accelerate the flow of new technology into the country by strengthening the scientific and technological resources of the academe and public and private institutions. The program encourages Filipino scientists, technologists, and experts to return to the Philippines and share their expertise to promote scientific, agro-industrial, and economic development—including the development of the country's human capital in science, technology, and innovation.

The enactment of the *Balik Scientist* Act in June 2018 also paved the way for the DOST to grant returning Filipino scientists with competitive benefits such as daily subsistence allowance, health insurance, and roundtrip airfare. For those interested to become a *Balik Scientist*, you may contact the DOST *Balik Scientist* Program Management Office through email at [bsp@dost.gov.ph](mailto:bsp@dost.gov.ph).



# Invest in green economy to tame inflation, economist says

By Geraldine Bulaon-Ducusin, *DOST-STII*

**“W**e really need to move away from inefficient energy systems, inefficient technologies.”

This is according to Dr. Lawrence Dacuycuy, Chairperson of the National Research Council of the Philippines (NRCP), Division of Social Sciences of the Department of Science and Technology (DOST) and one of the resource speakers in the Expert Class webinar in “Gas Prices Rising amidst Ukraine-Russia Crisis,” conducted by the DOST-NRCP.

Dacuycuy explained that it will not be easy to sustain growth due to several constraints that people need to be mindful of, and one of them is the capacity of the energy sector to supply the energy that people would want so that the economy will grow.

Also, there’s a need for the government to focus its energy, in terms of transforming the economy in modernizing certain sectors that are strategic like services and manufacturing, at least to sustain industrialization at this point, and to acknowledge the presence or the importance of the fourth industrial revolution and technologies.

Dacuycuy cited the policy approaches of Germany and Portugal, wherein Germany became an export powerhouse because of Russian gas. They partnered with Russia to stabilize their energy needs, while Portugal invested in technologies that would allow them to no longer be that dependent on the Russian oil.

That is policy anticipation, when Portugal thought that it is not good as far as the national security is concerned to be solely or largely dependent on foreign supply.



If the Philippines is going to transform its economy, it is imperative for it to seriously consider to gradually shift away from fossil fuel for sustainability.

“We have to broaden the economic frontier. We have huge reserves in West Philippine Sea, but then there’s a political process that we need to observe. But that’s one way for us to push our economic frontier; otherwise, we will be dependent on foreign resources,” Dacuycuy explained.

It must be considered that inflation is contagious. It is no longer completely domestically determined, meaning, there may be shocks coming from other countries, so there may be cause-shocks introduced by their failure to adjust to certain turbulence that may interact with price shocks, especially now coming from the Ukraine-Russia crisis.

“So, if you’re the policy-maker you really have to at least acknowledge that there’s a possibility that foreign shocks get transmitted to the Philippines because the Philippines is an open economy, so we really have to be mindful of how foreign government interventions are transmitted to our economy,” Dacuycuy pointed out.

The economist added that many governments will say that they don’t intervene in the foreign exchange market, but they do, especially when they have

large reserves, they do intervene. So, the problem that is being observed now is that the federal reserve in the United States has been quite aggressive in activist’s monetary policy. This translated to the dollar’s strengthening at the expense of highly indebted countries and at the expense of developing countries that are highly dependent on imports.

“Before they’re not mindful of this, but then they were stunned by the criticism coming from India.” Dacuycuy said on the current strengthening of the dollar against the Philippine peso and other currencies.

An over-valued currency does not necessarily mean that the currency is of good standing. There is a need to analyze on a case-to-case basis. For the Philippines, there is really a need to strengthen the way it reacts to inflation because inflation has real effects.

“That’s why it’s good to observe the strengthening of the Philippine peso because it’s really bad if the peso will continue to weaken,” Dacuycuy said.

The DOST-NRCP is a collegial body of highly trained and productive scientists and researchers addressing the demand for knowledge, skills, and innovations in the sciences and humanities, a way to effectively and efficiently contribute to nation building and improvement of the quality of life of the Filipino people by 2025.





# 2022 NATIONAL SCIENCE

Agham at Teknolohiya: Kabalikat sa

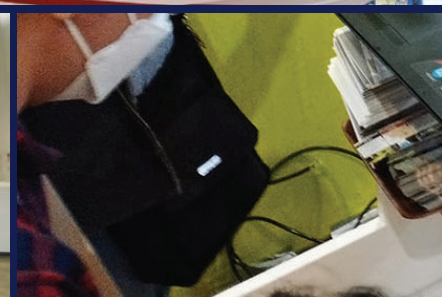






# & TECHNOLOGY WEEK

Maunlad at Matatag na Kinabukasan



DEPARTMENT OF SCIENCE & TECHNOLOGY  
2022 NATIONAL SCIENCE AND TECHNOLOGY WEEK  
**OPENING CEREMONY**  
23 NOVEMBER 2022

"I congratulate the DOST for holding once again and giving it the proper highlight and focus on this annual celebration of NSTW and organizing exhibits and activities that aim to educate, to encourage, and enhance the skills of our scientists and inventors and advocates. It creates a platform for professionals, for administrators, for policymakers, for students to converse and collaborate to harness the power of science and technology solving many of society's problems, finding opportunities for growth and for development."



PHOTO BY OFFICE OF THE PRESS SECRETARY

**HON. FERDINAND MARCOS JR.**  
President, Republic of the Philippines





# Abandoned: Mercury from Palawan mining four decades later

By Allyster A. Endozo, *DOST-STII*

“Who wants to live forever?”  
—Freddie Mercury

Agility, harmony, and vitality. These are the qualities that many of us mortals wish to possess in this fast-paced, chaos-ridden world. Such attributes, however, seem to be reserved only for the divine. The ancient Romans, in fact, worshipped a god—himself the swift messenger for a pantheon of other gods—for ends ranging from good luck to financial gain and even new life.

This god, for all his extraordinary gifts, is the eponym of the element “Hg”—“*hydrargyron*” or “liquid silver” to the ancient Greeks, and “mercury” or “quicksilver” to us modern-day dwellers. Mercury’s odd ability to stay fluid at room temperature has made it a fixture in today’s household devices such as alkaline batteries, fluorescent bulbs, light switches, and glass thermometers.

Perhaps by virtue of its rarity—accounting for only 0.08 parts per million on the Earth’s surface, mainly from the mineral cinnabar—humanity’s fascination with mercury stretches way back by at least three millennia. European alchemists believed that the right amount of this element could yield riches of gold, whereas the Chinese saw it as integral to concocting the “elixir of life” itself.

Brutally ironic as it is, mercury had already poisoned hapless multitudes throughout history: from the powerful aristocrats of imperial China as early as the 3rd century BC to humble workers of America’s fur hat industry in the 19th century, as well as innocent fisherfolks along Japan’s Minamata Bay in the late-1950s and rural residents of Iraq’s Basra City in the early-1970s.



Residents close to the artificial lake and the Honda Bay wharf at Puerto Princesa in Palawan are at high risk of poisoning from mercury and other heavy metals that emanated from the city’s abandoned mining site.

Those of us in the Philippines are no exception. Reports in 2017 revealed that 70 residents of two *barangays* in Palawan’s Puerto Princesa City tested positive for mercury poisoning. They showed symptoms ranging from numbness, gingivitis, and palpitation to thinking, sleeping, and breathing problems—prompting local authorities to evacuate 26 families from the area that year.

What could have caused such a dismal catastrophe? It turned out that the residents have been consuming contaminated fish caught in a three-hectare “lake,” which used to be an open-pit cinnabar mine. This artificial lake drains out *via* the Tagbuross River to the Honda Bay, where a wharf hosting many government facilities was built using over 2 M tons of mine waste tailings.



Palawan Quicksilver Mines Inc. (PQMI), having hauled about 2,900 tons of mercury since 1953, ultimately abandoned the mine in 1976 amid low prices in the global market and rising cost of production at the time. In retrospect, PQMI also abandoned the inhabitants near Honda Bay—an island-hopping destination that draws close to a million tourists per year—to their cruel fate.

That's not to say that Palaweños have been doing nothing to defy the dangers in which they found themselves. In 2011, the former project director of *Bantay Kalikasan* in Palawan was fatally shot by a gunman. Dr. Gerry Ortega was killed while preparing to launch the ten million signatures campaign for a mining ban in the province. Death, it seems, is faster than quicksilver.

### A toxic legacy?

From 2018–2019, a team of environmental scientists led by Dr. Jessie O. Samaniego—Senior Science Research Specialist at the Philippine Nuclear Research Institute—conducted a health risk assessment of mercury and other trace heavy metals in the vicinity of PQMI's abandoned mine. Their paper was published in the April 2022 issue of the *Philippine Journal of Science*.

• Describe the communities in which the health risk assessment was done. How have the residents fared since their evacuation back in 2017?

After the reported mercury poisoning among the residents in the community surrounding the abandoned mercury mine in 2017, the residents living on the periphery of the lake were relocated to the other *barangays* far from the former mine site. Still, many of the residents in the area remained, even in the sites near the legacy mine waste stockpiles.

• Explain how the health risk levels in those sites were established through

each of the techniques and equipment used by your research team.

Health risk levels in the area are established following the internationally accepted models for assessing health risks from heavy and trace metals in soil in mining areas. To trace the exposure pathways, we followed the four known main on-site pathways of human exposure to trace elements from contaminated soils. These are direct ingestion of soil particles, inhalation of resuspended particles through the mouth and nose, dermal absorption of trace elements in particles adhered to exposed skin, and—in the case of mercury— inhalation of vapors.

To determine the heavy metal concentration, we collected soil and sediment samples that were analyzed for total mercury using the DMA-80 evo direct Hg analyzer, following Method No. 7473 of the United States Environmental Protection Agency, and analyzed for trace metals using inductively coupled plasma–mass spectrometry.

• Among the trace metals detected, which were deemed the most significant ones in terms of concentration, hazard extent, and entry pathway?

The exposure pathway that has the highest contribution to the total risk appears to be ingestion of soil particles, followed by dermal absorption of trace metals from the soil and sediments, whereas inhalation was the least contributor to the total health risk.

The result of the health risk assessment showed that mercury was considered the main contributor to non-carcinogenic risk in the area with a hazard index of > 1 for both children and adults. Inhalation of mercury vapor from the soils and sediments is found to be a significant addition to the

health risks in the area. Other trace metals such as cobalt, iron, nickel, and thallium were calculated with a hazard index > 1, which poses health risks to children due to the ingestion pathway.

• In which international treaties on mercury mining are there pressing compliance gaps that must be addressed by Philippine authorities?

The Philippines, as a party to the Minamata Convention of Mercury, is required to comply with the provisions of the convention, including Article 12 “Contaminated Sites.” The Philippines shall undertake the identification and assessment of sites that are contaminated by mercury or mercury compounds. The country should also develop strategies and implement activities for prioritizing, managing, and remediating contaminated sites.

• What future implications could these gaps have, if left mostly unresolved, on the health and environment of the inhabitants in these areas?

If this abandoned mine remains unrehabilitated, the contamination will spread out to larger regions—including the coastal areas of Honda Bay—due to soil erosion and air dispersion. More people living and working in the area will be more vulnerable to the health risk brought about by the exposed soil and sediments in this abandoned mine site.

• Still, despite the bleak situation, are there solutions by which these communities could one day recover from the dangers of unmitigated mining?

Mining rehabilitation activities, such as revegetation, to reduce soil erosion and soil particle suspension need to be implemented so that the community can recover from the dangers of the unmitigated mining site.

# Study finds relation between COVID-19 and impaired brain function

By Geraldine Bulaon-Ducusin, *DOST-STII*

“**M**anifestation of cognitive dysfunction is present regardless of illness severity,” Dr. Antonio D. Ligsay from the College of Science of the University of Santo Tomas, a member of the researcher team who conducted the systematic review on “Clearing the Fog: a Systematic Review on Cognitive Dysfunction in COVID-19,” stated.

The review article presented evidences regarding the association between COVID-19 and cognitive dysfunction, and the most frequent cognitive impairment are attention, memory, and executive function or higher-level cognitive skills—used to control and coordinate other cognitive abilities and behaviors in COVID-19 patients.

Cognitive dysfunction, or “brain fog” as it is known, can manifest as confusion, difficulty finding the appropriate words, disorientation, memory problems, altered mental status, and trouble concentrating.

The systematic review, which was carried out in 2021, involved the identification of 289 studies through a comprehensive search in databases, of which a total of 85 full-text studies were assessed for eligibility.

After critical appraisal, 13

studies were included in the final systematic review which examined the association between COVID-19 and cognitive dysfunction, including the link between the severity of COVID-19 and the occurrence of cognitive impairment and the potential abnormal mechanisms related to brain fog among COVID-19 patients.

The participants included in the assessed studies were all greater than 16 years old, and all were diagnosed with COVID-19 infection.

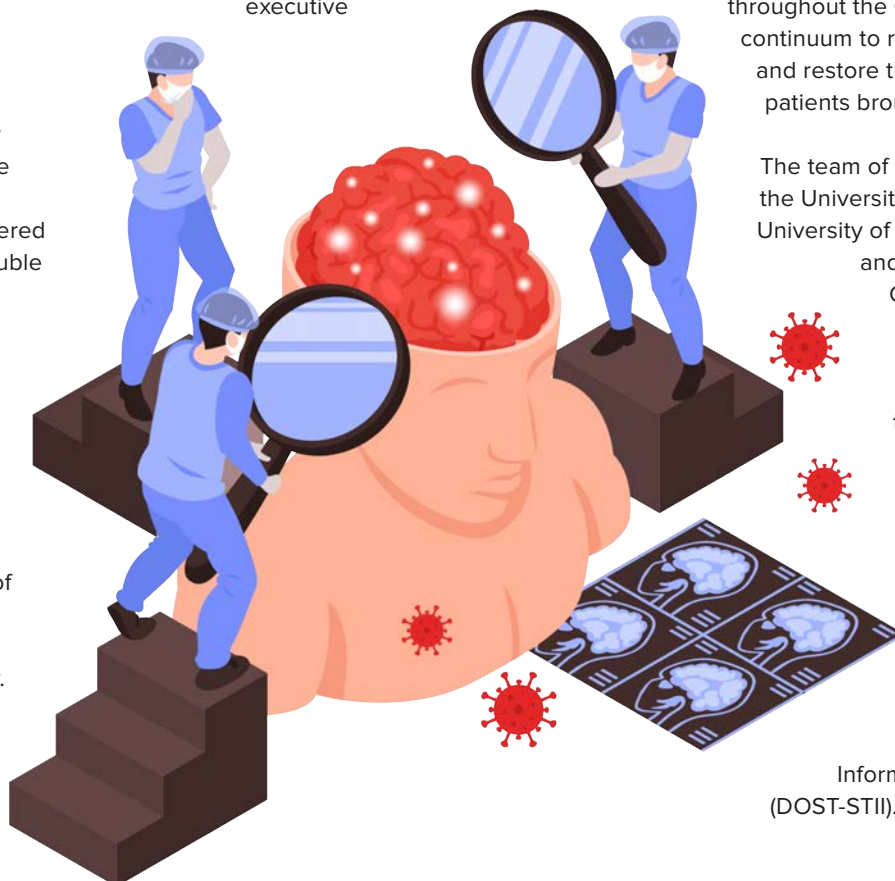
All included studies that utilized the Montreal Cognitive Assessment or MoCA test showed mild cognitive impairment following COVID-19 infection. Among the cognitive domains, attention, executive

function, and memory are most likely to be impaired. Increasing evidence also suggests that cognitive dysfunction due to COVID-19 is manifested across disease severity ranging from asymptomatic to critical illness. The interplay between physical and cognitive impairments may lead to functional problems inhibiting health-related standards of life.

Findings from this research may help re-evaluate the impact of the virus and the results may help in earlier treatment, allowing physicians and clinicians to manage the neurological manifestation effectively. The research team added that the knowledge gained from this study may be also used to improve the implementation of comprehensive treatment modalities and rehabilitation throughout the COVID-19 care continuum to remove such barriers and restore the meaningful lives of patients brought about by brain fog.

The team of researchers are from the University of Santo Tomas, the University of the Philippines Manila; and St. Luke’s Medical Center.

The full report on this research will appear in the Philippine Journal of Science (PJS), the oldest science journal in the country Part A of its December 2022 issue. PJS is published by the Department of Science and Technology–Information Institute (DOST-STII).





# PH lawmakers declare support for passing of virology institute bill

By Allyster A. Endozo, DOST-STII  
Screenshots from the virtual forum

In a virtual forum held on 10 October 2022, key officials of the Department of Science and Technology (DOST) and the Philippine Congress declared their all-out support for the immediate passing of House Bill No. 9559 or the Virology Institute of the Philippines Act.

Other than informing lawmakers on the bill's importance, the National Academy of Science and Technology (NAST) of the DOST organized the legislative forum to secure the support of non-government organizations, professional societies, and other stakeholders.

The bill, having been successfully passed on the third reading by the 18th Congress of the Philippine House of Representatives (HR) on 28 July 2021, is now awaiting the approval of a counterpart measure by the Philippine Senate.

Once established, the Philippine Virology Science and Technology Institute (PVSTI), the complete name of the facility, will spur local research on disease-causing human, animal, and plant viruses—as well as the development of affordable and home-grown diagnostics, vaccines, and therapeutics.

With global competence in mind, the PVSTI will collaborate with various international organizations, database networks, and pharmaceutical firms on technology transfer in managing a virus gene map and reference, genome, and high-containment laboratories.

In advancing the “One Health” approach of the World Health Organization, the PVSTI will seek to contain the crises brought about by habitat destruction and the wildlife trade, mainly the COVID-19 pandemic that has so far amassed over 626 M cases worldwide.

Acad. Arvin C. Diesmos of the DOST-NAST's Biological Sciences Division believes that the PVSTI is “a bold vision for the Philippines and the ASEAN Region” that will play a key role in “creating more partnerships between the government and the private sector.”

DOST Secretary Renato U. Solidum Jr. branded the PVSTI as a future “aspiration” in achieving “self-reliance” in the area of virology. “We can never predict the next viral outbreak, but we can always be ready and be prepared for the challenges head-on.”

Rep. Carlito S. Marquez, Chairperson of the HR Committee on Science and Technology, considers the establishment



Rep. Carlito S. Marquez (above) and Sen. Christopher Lawrence T. Go (below) expressing their support for the passing of House Bill No. 9559 or the Virology Institute of the Philippines Act.

of the PVSTI as “a priority in our national agenda” and “a monumental legacy” in the country’s policy on public health research.

Speaking in Filipino, Sen. Christopher Lawrence T. Go—Chairperson of the Senate Committee on Health and Demography—echoed his support and reminded the public of the need to prepare for health crises that could impact the country in the future.

On the other hand, Dr. Annabelle V. Briones, Director of the DOST’s Industrial Technology Development Institute, disclosed that the PVSTI will be built in a 5-hectare site within the New Clark Economic Zone that is administered by the Bases Conversion and Development Authority.

The PVSTI, to be headed by one director and two deputy directors, will have special divisions for virus, diagnostics and therapeutics, and vaccines research; technical services and training; policy, planning, and linkages; and finance and administration.

# Experts say tsunami should not be taken for granted; ask communities, LGUs to be prepared

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

According to the United Nations, by 2030—or eight years from now—half of the world’s population will be living in coastal communities. These are the people who will be exposed to tsunamis, storm surges, and flooding. In the case of the Philippines, 66 out of 81 provinces or 81% are exposed to tsunamis. It covers 832 coastal municipalities and 25 coastal cities, or 62% of the Philippine population are in coastal municipalities and cities.

With this available data, there is an urgent need to ensure that disaster preparedness systems are in place so that every Filipino will be safe and resilient from tsunami.

Recently, officials and experts from the Department of Science and Technology–Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS) said that despite its rare occurrence, the public, communities, and local government units should not be complacent with the possible hazards and impacts of tsunami in their areas.

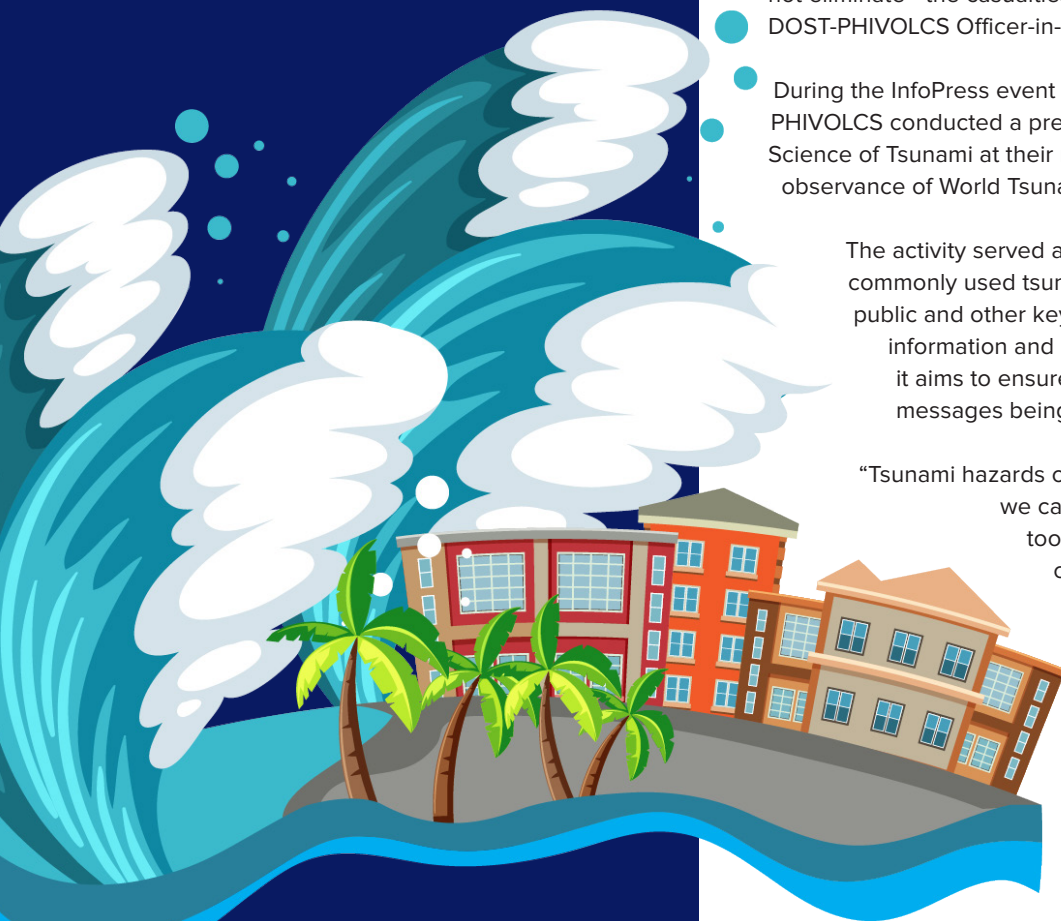
“We call for everyone’s full cooperation and commitment in participating and taking seriously all programs, initiatives, and plans of the government and agency like us (DOST-PHIVOLCS) to prepare every Filipino, especially from vulnerable communities, to minimize—if not eliminate—the casualties if a tsunami happens in our lifetime, said DOST-PHIVOLCS Officer-in-Charge Dr. Teresito C. Bacolcol

During the InfoPress event held on 04 November 2022, the DOST-PHIVOLCS conducted a press conference on Understanding the Science of Tsunami at their main office in Diliman, Quezon City in observance of World Tsunami Awareness Day.

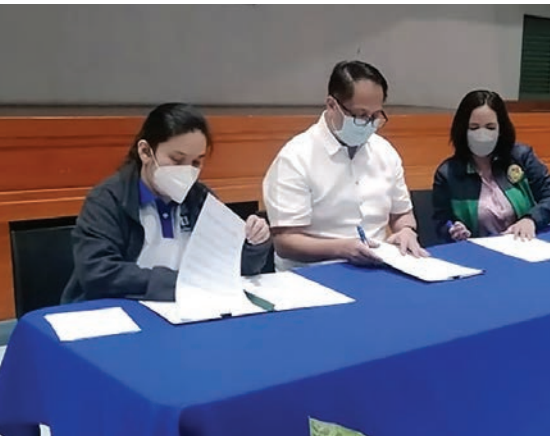
The activity served as one of the great avenues to define commonly used tsunami terms and concepts and orient the public and other key stakeholders on Tsunami Philippine information and proper response procedures. Basically, it aims to ensure the accuracy and consistency of the messages being relayed to the public.

“Tsunami hazards can result in disaster losses; however we can reduce disaster risks. Information, tools, systems, and plans are available for communities to be safer. So, let’s help us to build a Tsunami ready Philippines,” said Joan C. Salcedo, a supervising Science Research Specialist from DOST-PHIVOLCS.

Salcedo shared that DOST-PHIVOLCS has been providing services to various tsunami-prone areas. It includes monitoring and cascading relevant information and warnings down to







The DOST-PHIVOLCS signed an MoU with the local government of Parañaque City to signify the intention of both government institutions to work together to further enhance the Tsunami Awareness Campaign in the city (photo by Allan Mauro V. Marfal, DOST-STII).

the *barangays* and local communities in various platforms and possible ways, and risk assessment just to ensure that all LGUs are equipped to create an appropriate and coordinated response action plan for the residents.

Meanwhile, Ishmael Narag, another Supervising Science Research Specialist from DOST-PHIVOLCS, added that there are available technology-based and mobile applications such as Hazard Hunter, Rapid Earthquake Damage Assessment System (REDAS), and GeoRiskPH that the public and LGU officials and responders can browse and eventually help them not only on the monitoring side but also to have a better understanding of various possible tsunami risks and hazards in specific areas. He emphasized that these platforms, including the DOST-PHIVOLCS websites and social media accounts, would help every LGU to come up with better decision-making.

Narag added that the Philippines should be prepared for tsunamis, especially since the country is an archipelago and earthquakes occur often, so it is important to know the right information about tsunami.



On 04 November 2022, the DOST-Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS) conducted an InfoPress on Understanding the Science of Tsunami at Diliman, Quezon City. The activity served as one of the great avenues to define commonly used tsunami terms and concepts and orient the public and other key stakeholders on Tsunami Philippine information and proper response procedures. (Photo by Allan Mauro V. Marfal, DOST-STII).

“Nearly 80 percent of tsunami events are generated by earthquakes and other factors such as landslides, volcanic eruptions, as well as other occurrences like a meteorite impact,” said Narag.

He further shared that DOST-PHIVOLCS urges the local government units in the country to develop and further enhance their tsunami warning systems and evacuation plans to protect every Filipino, especially those residing in coastal areas.

“An effective end-to-end tsunami early warning system could save thousands of lives and it can only be successful if it spans the continuum of activities associated with an end-to-end approach,” explained Narag.

Also, during the same event, the DOST-PHIVOLCS and the local government of Parañaque City signed of Memorandum of Understanding (MoU) for both government institutions to work together to further enhance the Tsunami Awareness Campaign within the city. Some activities under this collaboration

will be a series of seminars and capacity-building initiatives as well as displaying of informational materials on tsunami produced by DOST-PHIVOLCS to be placed in different establishments in Parañaque City.

Zareena Lamberte, Chief of Research and Planning Division of the Parañaque City Disaster Risk Reduction and Management Office shared some of their initiatives and practices in preparing the residents for the threat of tsunami in their areas.

She said that aside from monitoring and awareness campaigns, DOST-PHIVOLCS is truly an able partner of the local government of Parañaque City in coming up with sound policy recommendations and response action plans, not only for tsunami but for other natural hazards like earthquake.

“It is up to us (local government) to translate and apply these plans and recommendations consistently and ensure that our community will come to prepare and resilient once these natural hazards occur in our area,” said Lamberte.

# DOST-STII, EdukSine ink agreement to promote science through film

By Dessa D. Maderal, DOST-STII



Officials from the DOST-STII and *EdukSine* sign an MoU on 12 December 2022 at the DOST-STII Office in Bicutan, Taguig City to promote S&T related content to a wider audience. DOST-STII was represented by Director Richard P. Burgos (seated, 2nd from left) and Senior Science Research Specialist and OIC of CRPD in DOST-STII, Rodolfo P. de Guzman (left). *EdukSine* was represented by Karen Salutan (seated, middle) and other officers. (photo from DOSTv).

The Department of Science and Technology–Science and Technology Information Institute (DOST-STII) and *EdukSine*, a block streaming platform, agreed to work together to promote Science and Technology (S&T) related content to a wider audience through film.

On 12 December 2022, both parties signed a Memorandum of Agreement (MoA) that aims to strengthen and promote S&T by showcasing different programs of the DOSTv in the *EdukSine* website and applications.

DOSTv is the official broadcast channel of DOST that produces various programs related to department's projects

and programs, knowledge products, services, and science luminaries in the country. On the other hand, *EdukSine* is the only block streaming platform in the Philippines, showing films, documentaries, and other socially relevant videos that appeal to various audiences.

Some of the DOSTv programs that will be shown in *EdukSine* are *SiyenSikat: Pinoy Popular Science Para Sa Lahat*, a magazine cum reality science show that highlights the fulfillment of dreams and an expression of gratitude to DOST, and *SineSiyensya*, a documentary program which features compelling true-to-life stories of people benefitting from S&T, thus can be a powerful communication

tool to inspire the audience to embrace science, technology, and innovation.

These DOSTv programs will air, initially, on *EdukSine*'s digital platforms from 19–23 December 2022. Meanwhile, other DOSTv programs like *ExperTalk* can still be seen on television every Sunday at 8 AM with replays on Saturdays at 8 AM and 4 PM on CNN Philippines and DOST Report every Friday, 4 PM at the DOSTv's official Facebook page: <https://www.facebook.com/DOSTvPH> and official YouTube channel: <https://www.youtube.com/@DOSTvPH>.

For more information on DOSTv, you may send your queries to [dostv@stii.dost.gov.ph](mailto:dostv@stii.dost.gov.ph).



# DOST-V initiates S&T program for women micro-entrepreneurs, collabs with Bicol University

Text and photo from DOST-V

Continuing its commitment for women’s economic empowerment through science, technology and innovation, the Department of Science and Technology Region V Office (DOST-V) initiated a new program to support women micro-entrepreneurs (WMEs) in the Bicol Region: the Innovations for Women Enterprises or iWOMEN Project.

Inspired by the successful run of the Gender Responsive Economic Action for the Transformation of Women or GREAT Women Project 2 or GWP2 in the region, iWOMEN is geared towards improving competitiveness, sustainability, and economic empowerment of WMEs. iWOMEN was conceptualized and developed through DOST-V’s Gender and Development or GAD implementation.

The project supports women’s economic empowerment by providing scientific, technological and innovative interventions, and technical assistance to WMEs in Bicol, covering the priority sectors of food processing; metals and engineering; furniture-making; agriculture, marine, and aquaculture; forestry/livestock; ICT/electronics; health and wellness products; gifts, decors, and handicrafts; and other regional industry priorities.

Through a Memorandum of Agreement, DOST-V forged a collaboration with Bicol University (BU) in delivering Core Business Development Sessions for iWOMEN. BU will lead the project’s capability training aspect through the university’s CTCED (Center for Technology Commercialization and Enterprise Development) and SILI DELI (Start-up Incubation and Limitless Integration of Dynamic Entrepreneurial Leaders of Innovation) technology business incubator.

DOST’s Innovations for Filipinos Working Distantly from the Philippines (iFWD PH) program will also play a key part in the project, as its core business modules will be used for the initial iWOMEN trainings. While iWOMEN focuses on WMEs, iFWD PH is a program of the department that aims to help Overseas Filipino Workers or OFW (OFWs) establish their own

iWOMEN is implemented in four stages. Levels 1 (pre-implementation) and 2 (technology and capacity-building trainings) are implemented this 2022; for 2023, Level 3 will involve the conduct of technology needs assessment, technology pitching/matching, and techno-based enterprise startup assistance.



DOST-V Regional Director Rommel R. Serrano (center) leads the MOA signing with Bicol University to support women micro-entrepreneurs in the Bicol Region.

technology-based businesses in the country.

Twenty-four (24) iWOMEN applicants are slated to take part in the trainings in partnership with BU. With 85 maximum allotted slots, the remainder will be given to new iFWD PH regional applicants, regardless of gender.

Two successful iWOMEN who complete the training from each of the six provinces of Bicol will be chosen for the assistance, which includes capability building training, technical consultancy, and financial grant worth PHP 100,000 for the acquisition of equipment, supplies, raw materials, and packaging and labeling expenses.

Ultimately, the goal of iWOMEN is to prepare WMEs become eligible to avail of the Small Enterprise Technology Upgrading Program (SETUP), DOST’s banner program that aims to assist micro, small, and medium enterprises or MSMEs in adopting technological interventions to improve their products and operations.

For 2024 and beyond, Level 4 implementation will consist of iWOMEN Connect (market expansion through adoption of digital marketing technologies), Advanced iWOMEN (sustainability program through SETUP), and iWOMEN Share (advocacy for women economic empowerment through the project).



“  
**... Ang galing talaga ng Pinoy. Basta maganda ang suporta sa ating mga scientists, researchers, world-class talaga ang Pilipino.**  
”

President Ferdinand R. Marcos Jr. said that to come up with solutions to the problems arising in this time of the pandemic, innovation, and agility are needed to be able to adjust properly with new ideas and systems. (photo by Henri A. de Leon, DOST-STII).

## **PBBM assures full support to all DOST programs, services, and efforts**

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

**P**resident Ferdinand R. Marcos Jr. shared on Wednesday the full commitment of his administration to all the research and development (R&D) programs and services of the Department of Science and Technology (DOST) during the opening of the 2022 National Science and Technology Week (NSTW) celebration held on 23 November 2022, at the World Trade Center in Pasay City.

In his keynote message, President

Marcos Jr. underscored the importance of harnessing our existing resources and capabilities through various science-based and related efforts and initiatives to provide inclusive development in the countryside, as well as career and livelihood opportunities for every Filipino.

“I assure you the full support of my administration to research institutions and emphasized the need for the government to provide direction in determining the necessary R&D needed for the country’s economic transformation, especially

acknowledging collaboration between DOST and DTI to help startups and MSMEs,” said President Marcos Jr.

He also stressed that the government has the responsibility to give direction so that the output of our R&D is immediately used by our farmers, entrepreneurs, and the citizens.

Meanwhile, he also said that there is a need to improve science, technology, engineering, and mathematics or STEM subjects in the country. The President



added that the material is available, it is just a matter of incorporating it into our curricula.

“We should give it (STEM) an emphasis because every aspect, STEM subjects have become important,” President Marcos Jr. said.

The President believes that hard sciences will play a large part when it comes to the new solutions that we are looking for in this new world that we are going to have to live in. He said that innovation and agility in being able to adjust properly to new ideas, systems, and science are going to be the lifeblood

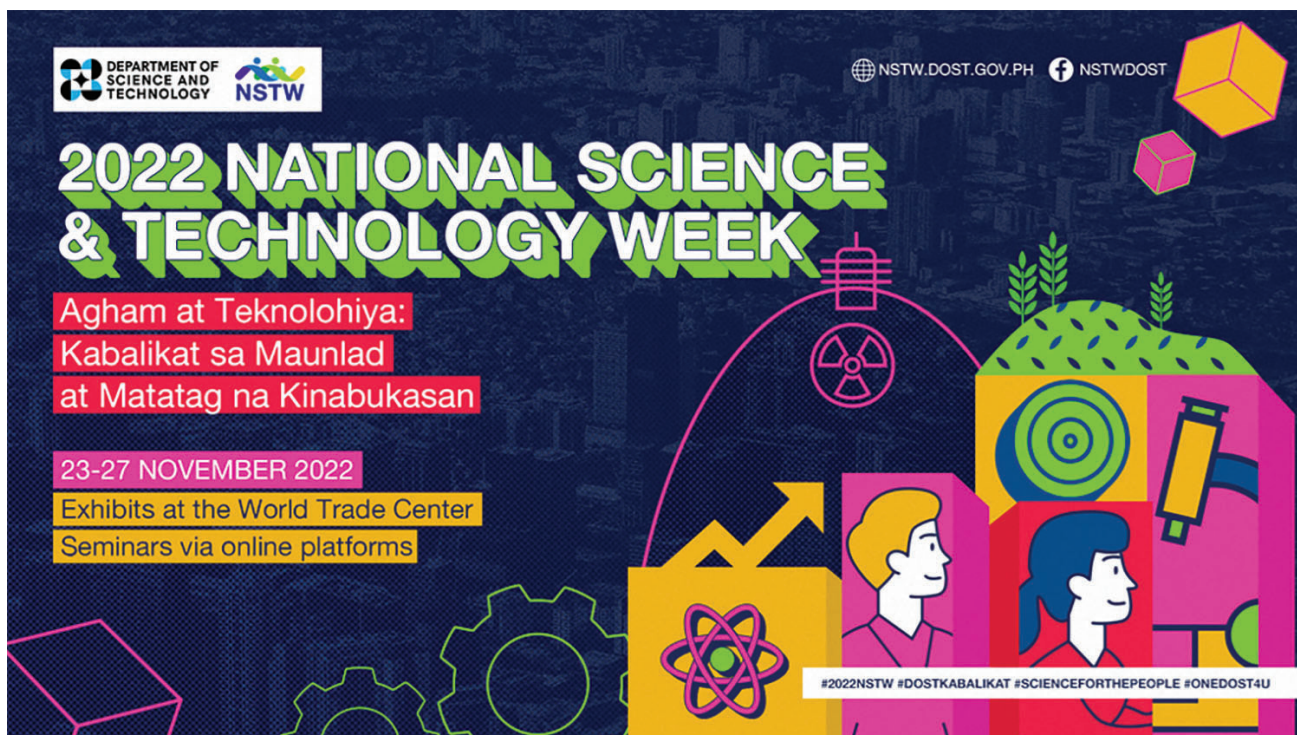
create solutions to address the country’s problems in food security and climate change adaptation, among others.

The 2022 NSTW celebration returned at the World Trade Center this year to showcase the latest innovative R&D products and services developed by DOST and its partners from the academe and non-government and private organizations.

Carrying the theme “*Agham at Teknolohiya: Kabalik at Maunlad at Matatag na Kinabukasan*,” this year’s S&T festivity showcases all the research and development (R&D) outputs, as well

there will be technologies to be bannered that will help the people and the country bounce back better from the pandemic.

In addition, there will be techno-products and activities that will provide a better angle on DOST innovations that respond to the pressing needs of various sectors and stakeholders towards the goal of attaining inclusive growth in the various areas: agriculture and food security, health, job creation, education, energy, transportation, blue and green economy, and environmental protection. Incidentally, these programs are aligned with the current priorities of President Ferdinand R. Marcos Jr.’s administration.



of our survival in the coming years.

“Going through all these exhibits, they are very, very interesting. *Ang galing talaga ng Pinoy. Basta maganda ang suporta sa ating mga scientists, researchers, world-class talaga ang Pilipino,*” the President reiterated.

Lastly, he acknowledged the efforts and commitment of DOST and its attached agencies for implementing programs that

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.

Exhibits of the latest technological innovations can be viewed on-site, while forums, webinars, and virtual talks are broadcast online so that more people can attend and participate. Furthermore,

The 2022 NSTW exhibits, and other related activities opens until Sunday, 27 November 2022.

For more information and updates regarding the 2022 NSTW hybrid celebration, please visit [www.nstw.dost.gov.ph](http://www.nstw.dost.gov.ph) and its official Facebook page or send your inquiries to the 2021 NSTW Secretariat at [nstw.secretariat@gmail.com](mailto:nstw.secretariat@gmail.com) and [nstwpromotions@gmail.com](mailto:nstwpromotions@gmail.com).

# “National science fair in Region I” goes to Pangasinan: S&T at the forefront of enriching lives in the region

By Rosemarie C. Señora, DOST-STII

**A** total of 1,635 visitors flocked this year’s celebration of the Regional Science and Technology Week (RSTW) by the Department of Science and Technology (DOST) Region I, held from 09-11 November 2022 at the Pangasinan Training and Development Center in Lingayen, Pangasinan.

Anchored on the theme, ‘*Agham at Teknolohiya: Kabalik at Maunlad at Matatag na Kinabukasan*’, the celebration featured science and technology exhibits and bazaar where micro, small, and medium enterprises assisted by the DOST Region I displayed their unique products and services.

In his video message, DOST Secretary Renato U. Solidum Jr. highlighted the role of science and technology in people’s everyday lives, especially when the COVID-19 pandemic hit, not only the Philippines but all the countries around the world that disrupted the way people live.

“The COVID-19 undeniably changed the lives of mankind. It was a crisis that tested not only our healthcare system, but all aspects of our modern lives such as transportation, food security, economy, and even politics, among others,” he said adding that the importance of science and technology cannot be understated.

“That’s why the Department of Science and Technology was at the forefront of the country’s battle against the pandemic since it began,” he said.

## S&T spur regional development

The Secretary also said that the Department’s focus is to support the socioeconomic agenda of the current administration and align its resources toward more equitable operations in the national, regional, and provincial levels.

“We align to the socioeconomic agenda through the use of S&T innovations for wealth creation and generation, promotion of well-being, wealth protection through disaster and climate resilience, and sustainability,” he said.

He also acknowledged the partnerships of DOST with other national government agencies, private organizations, and the academe, which help the DOST bring science closer to the people and to continue creating “solutions that are relevant, innovative, and will fill the gaps in various sectors and communities to achieve inclusive development.”

The science chief also highlighted the role of science and technology in generating jobs and strengthening economic development in the regions through its banner programs such as the Small Enterprise Technology Upgrading Program (SETUP) and Community Empowerment through Science and Technology.

In addition to this, he also said that the Department is prioritizing and strengthening the implementation of its programs and projects to “ensure security in food, water, and energy, become resilient in times of climate and natural hazards, increase investment in science and technology human resources development, upgrade

science, technology, and innovation facilities, adopt digital transformation, and change the landscape toward smart and sustainable development.”

“True to our mantra, we assure you there will be a one DOST for you, to deliver a shared goal of creating an ecosystem that will nurture economic and social growth through science, technology, and innovation,” he said.

For his part, Dr. Armando Q. Ganal, Regional Director of DOST-I thanked everyone who attended the first grand face-to-face activity since the start of the pandemic, especially the science, technology, and innovation exhibitors assisted by DOST.

Ganal highlighted some of the programs the regional office has been conducting in the province of Pangasinan such as its partnership with the Pangasinan State University for the development of an application system that will monitor tourists in the Hundred Islands area.

“I hope the system will be up and running so that our tourism industry in Alaminos will be improved,” he said.

He also shared initiatives in the region with DOST’s flagship programs such as the SETUP, where micro, small, and medium enterprises were given assistance to increase their productivity and improve product quality through various modes of assistance like provision of financial assistance to acquire technologies to improve their products’ packaging and label, consultancy with industry experts, and technology trainings.





**Dr. Armando Q. Ganal,**  
**DOST-I Regional Director**  
 (photo from DOST-I)

“Hand in hand with the SETUP program is the community-based program that provides assistance to community-based organizations that are trying to improve their productivity in sectors such as furniture, food processing, handicrafts, aquatic and natural resources, agriculture, and information technology through the CEST program,” Dir. Ganal said.

Another program that Dir. Ganal has shared is the Innovation, Science, and Technology for Accelerating Regional Technology-based or iSTART development program where they are now “in the process of providing some assistance to the first six pilot municipalities in the province of Pangasinan.”

Last is the CEST program through which they provided community assistance in areas of livelihood, basic education, water sanitation, health, and disaster risk reduction and management.

Further, Romeo M. Javate of the Investment and Operations Division of the DOST–Technology Application and Promotion Institute provided the context about the celebration of the National Science and Technology Week in the regions.

He said that the event is observed yearly to highlight significant achievements in science and technology and celebrate the ingenuity of our Filipino inventors and scientists.



**Romeo M. Javate of DOST-TAPI**  
 (photo from DOST-I)

“The science of today is the technology of tomorrow,” he said.

### Messages of support

Pangasinan Governor Ramon Guico III, represented by former board member Von Mark Mendoza, thanked the DOST and DOST-I for holding its 2022 RSTW



**Special Assistant to the Governor of Pangasinan, Mr. Von Mark Mendoza**  
 (photo from DOST-I)

in the biggest province in the Ilocos Region.

In his speech, Mendoza said that although there are already attempts, the province is yet to harness science and technology.

With this, he renewed the call to position Pangasinan as an educational center with a dream of having a Philippine Science High School Campus right in the middle of the Pangasinan Training and Development Center. He also assured that the provincial government will continue to support DOST in its future endeavors.



**Lingayen Mayor Leopoldo N. Bataoil**  
 (photo from DOST-I)

Lingayen, Pangasinan Mayor Leopoldo N. Bataoil also thanked the DOST for the assistance it has extended to the town, especially in the upgrading of the Lingayen Slaughter House. He boasted that the said slaughter house is now a model slaughter house after receiving assistance from an expert recommended by the DOST.

**(photo highlights continued on next page)**



**Highlights:** (photos courtesy of DOST-I and DOST-STII)





## Problem on plastic wastes: Do Filipinos care and what can we do about it?

By Geraldine Bulaon-Ducusin, *DOST-STII*

“For many Filipinos, microplastics, plastics, when you go to the communities, the problem is very abstract to them. Sasabihin lang nila ‘ano ba sila?’ *Pero ‘pag hindi natin kasi nakikita ang koneksyon sa atin, we also don’t care. And when we don’t care, we do nothing.’*”

This is according to Dr. Deo Florence L. Onda, *Balik Scientist*, during a forum on Plastics and Microplastics in Marine Environment, wherein he explained the importance of people’s participation in gathering local data, and the importance of telling the people stories about those data.

The microplastics researchers are determined for their research to not end up rotting in the shelves. They espoused that research should serve the people and the only way that researchers could connect to the people is for the public to also know their stories.

Onda believes that one of the great obligations of scientists is not just to do research but to actually tell stories that would relate to people. Researchers should extract information, translate them into data, but at the end of the day, make a story out of them and tell them to the people who will benefit from them.

Through the stories derived from the data gathered, the Filipinos would know how plastics are affecting them in terms of their health, food security, environment, and general welfare.

One of the outcomes from this microplastic research project is a facility, the MicroQUIB – Microplastics Quantification Identification and Biodegradation Facility—which was built for microplastics researchers who collect samples but do not have this type of facility in their own university. MicroQUIB is an all-complete facility dedicated to

research and training housed at the Marine Laboratory of the University of the Philippines–Marine Science Institute located in Bolinao, Pangasinan.

Since there is a need for more people to do the work on the ground, the other component of the project is the development of training programs targeting the academics and those who are working in the universities, and also those from the national government agencies such as the national coastguard, as well as plastic research enthusiasts.

One of the beneficiaries of the training program is from a university in Davao City who is now capable of teaching others.

“Training programs like these are very important *kasi hindi mo lang nilalagyan*

*ng band-aid solution yung problema, nag-iinvest ka actually sa isang tao na who can pass it on to other people and to the next generation, and it’s paying it forward,”* the teacher–beneficiary said.

These training programs also allow them to do surveys and contribute to data generation. So far, over 50 people were trained who can now do plastics, microplastics, and macroplastics in their locality.

“We always believe there’s not, there’s no monopoly of science. We need to decentralize experts, and as more people do their work on the ground, we understand the issue better, so we can actually come up with solutions that are more long lasting, more appropriate, and actually sustainable,” Onda pointed out.



(Photo screen-grabbed from the National Science and Technology Week’s webinar on Plastics and Microplastics in Marine Environment) Dr. Deo Florence L. Onda, *Balik Scientist* said, “Sa Pilipinas kasi mahilig tayo mag copy-paste. Kung ano yung nag work sa isa, kokopyahin natin. Without understanding why it actually worked in another area and might not work in one locality.”

# DOST showcases fishery, agro-forestry, ecotourism technologies during Caraga science fair

By Allan Mauro V. Marfal, DOST-STII

Officials from the Department of Science and Technology (DOST) led by Secretary Renato U. Solidum Jr. (Front row 3rd from left), Undersecretary for Regional Operations Engr. Sancho A. Maborrang (front row, 2nd from right), DOST Caraga Regional Director Engr. Noel M. Ajoc (front row, right), DOST–Technology Application and Promotion Institute Atty. Marion Ivy Decena (front row, 2nd from left), DOST–Science Education Institute Deputy Director Engr. Albert G. Marino (Back row, 2nd from left), and Butuan City Councilor Cherry May G. Busa (front row, left) graced the opening of techno-exhibits and other scientific events for the 2022 Regional Science and Technology Week (RSTW) celebration in Caraga at the Robinson’s Butuan City. (photo from DOST–Caraga)



The Caraga region is being eyed to become the Fishery, Agro-Forestry, Mineral, and Ecotourism or FAME Center of the country. In a report shared by the National Economic Development Authority, all provinces in the region will focus their efforts on developing and utilizing its abundant natural endowments such as agriculture, fishery and aquaculture, forestry, mineral, and ecotourism.

Because of this, the Department of Science and Technology (DOST), has remained proactive in delivering its services, initiatives, and research and development (R&D) projects in the region that will play a crucial and significant role in translating development goals into reality—this according to a city official as the Regional Science and Technology Week (RSTW) celebration in Caraga opened on 19 October 2022 at Robinson’s Place in Butuan City.

In a message from Butuan City Vice

Mayor Lawrence Lemuel H. Fortun, which was delivered by City Councilor Cherry May G. Busa, the local official acknowledged the efforts of DOST-Caraga in the areas of R&D, as well as various scientific and technical services and in helping the region increase the productivity of its fishery and agro-forestry sectors. Likewise, the local official lauded the department for spearheading value-adding activities that harness the vast potentials of its eco-tourism industry.

He also added that DOST–Caraga nurtures an enabling environment for the university researchers, local scientists, and engineers to innovate and find solutions to various concerns that are unique in their local areas.

“I see that the conduct of this year’s Regional S&T Fair in Butuan City will be a perfect opportunity to explore ways through which S&T help us achieve our region’s goal, of becoming the fishery, agroforestry, mineral, and eco-tourism center in the Philippines. With the

active engagement of the academe and research institutions in various areas in the region, I am positive that this will be realized,” said Vice-Mayor Fortun in a statement.

Meanwhile, DOST–Caraga Regional Director Engr. Noel M. Ajoc acknowledged the efforts of the city government, as they were able to craft important ordinances in Butuan to support the Startup and innovation ecosystem in Butuan by providing them with attractive incentives.

The RSTW in Caraga was held face-to-face setup after two years of conducting it virtually. It featured techno-exhibits and activities with the attendance of experts, researchers, engineers, scientists, and S&T champions from DOST agencies and its partner institutions from academe and local government.

Some of the featured activities were the Stakeholders’ Forum with the local government units in the region that was



followed by the Stakeholders' Night, during which DOST-Caraga showcased the success stories of its technology adaptors. Meanwhile, researchers, entrepreneurs, and industry players who searched for R&D outputs to adopt got to see research opportunities brought by the Science for Change Program Forum, Innoveats Caraga, and presentation of different R&D outputs.

During the science week celebration, DOST-Caraga also recognized the exemplary performance of DOST scholars in the region through the In Touch with Excellence Night. Other activities included MSMEs and farmer producers of coffee and cacao, DOST Caraga Sci-Talk Series with the topics on Science behind Coffee, Trace, and Tag: a Presentation of Authenticity and Traceability for Coffee and Cacao, and the Science Behind Chocolate.

“Through partnerships with other government agencies, private organizations, and the academe, the DOST will continue to create solutions that are relevant and innovative and will fill the gaps of all sectors and communities to achieve inclusive development,” said DOST Secretary Renato U. Solidum Jr.

He added that the Science Department will continue to prioritize and strengthen the implementation of programs and projects to generate jobs and strengthen regional development through STI; ensure security in food, health, water, and energy; become resilient in times of disasters brought by climate change; increase investment in S&T human resources development; upgrade STI facilities; adopt digital transformation; and change the landscape of cities and communities towards sustainable development.

“We are in the process of refocusing the Department’s major programs to support the socioeconomic agenda of

the President and align the grants-in-aid financing towards a more equitable operation in the national, regional, and provincial levels,” added Sec. Solidum.

On the other hand, DOST Undersecretary for Regional Operations Sancho A. Maborrang shared that programs and services provided by DOST have significantly aided in the development of Caraga for the past years.

“Over 500 micro to medium-sized businesses all over the region benefited from our Small Enterprise Technology Upgrading Program (SETUP) and consulting services. Through SETUP, 1,378 jobs were generated with over 459 million pesos SETUP gross sales recorded between the years of 2019 to 2022,” said Usec. Maborrang.

Usec. Maborrang added that the creation of R&D facilities and innovation hubs along with upskilling of the Caraganons through the DOST Coursera scholarship grants further strengthen the region’s capacity for innovation.

All the techno-exhibits for the RSTW

celebration in the Caraga region will run up to 23 October 2022 at Robinson’s Place Butuan City. For more information and to watch all the fora, you may visit the official Facebook Page of DOST Caraga <https://www.facebook.com/DOST.Caraga>.

Lastly, the science week celebration continues on the national level with the 2022 National Science and Technology Week to be held in a hybrid set-up from 23-27 November 2022 with on-site exhibits at the World Trade Center, Pasay City. This year’s theme is “*Agham at Teknolohiya: Kabalik at Maunlad at Matatag na Kinabukasan*”. The on-site S&T exhibits and virtual forums and webinars will showcase various clusters in the areas of agriculture and aquaculture, health and food and nutrition, livelihood and enterprise development, blue and green economy, nuclear science, additive manufacturing, robotics and industrial automation, disaster resiliency and climate change, scholarships, and community empowerment. For more information, please visit the website at <http://nstw.dost.gov.ph> and its Facebook page at [facebook.com/nstwdost](https://www.facebook.com/nstwdost).



Secretary Renato U. Solidum Jr shared during the opening of the 2022 RSTW on 19 October 2022, in Butuan City that they are in the process of refocusing the DOST’s major programs to support the socioeconomic agenda of the President and align the grants-in-aid financing towards a more equitable operation in the national, regional, and provincial levels. (photo from DOST-Caraga)



Leading the MoA signing for Project COBRA are (L-R): DOST-MIRDC Executive Director Engr. Robert O. Dizon, PH Army Vice Commander Maj. Gen. Adonis R. Bajao, and Engr. Maricel M. Teogangco of MRSP. Also present are DOST Officials Secretary Renato U. Solidum Jr. (standing, 2nd from left) and Undersecretary for Research and Development Dr. Leah J. Buendia (standing, 2nd from right).

## DOST, PH Army, MRSP sign agreement for Project COBRA towards a self-reliant PH defense

By Rosemarie C. Señora, DOST-STII





**T**o improve the firepower capability of armored vehicles of the Philippine Army, the Department of Science and Technology (DOST) signed on 23 November 2022 a Memorandum of Agreement (MoA) with the Philippine Army (PH Army) and the Mechatronics and Robotics Society of the Philippines (MRSP) in a ceremony held at the World Trade Center, Pasay City.

This is for the Project COBRA, which stands for Controller Operated Battle Ready Armament, that aims to design and integrate a caliber 0.50 remote-controlled weapon station to help address the pressing problems of the Philippine Army such as high dependency on acquisition of imported military equipment and armaments, slow and delayed delivery of technology and support, gun operator of armored personnel carriers or APCs being at the direct line of fire, and long-overdue modernization of military assets to adapt to changes to national security and sovereignty needs.

Compared to Project BUHAWI or Building a Universal Mount for Heavy Barrel Automated Weapon Integration,

which is also developed by the scientists and researchers from the DOST–Metals Industry Research and Development Center (DOST-MIRDC) for the use of the Philippine Navy, the two projects are almost the same in terms of weaponry, on-mount EO system, and on-mount ammunition but differs in motion with the COBRA having a 360-degree turn as compared to BUHAWI, which only has 270-degree turn. The COBRA has also more features such as interchangeable gun mount, compact design lightweightness, and has integrated power supply.

The DOST will fund it for two years, from 2023–2024, for a total of PHP 24,286,705.60, while the PH Army will share PHP 5,000,000 in year 2024, for a grand total of PHP 29,286,705.60.

Among the expected advantages of the DOST-developed defense technologies projects BUHAWI and COBRA are creation of local defense industry, job generation, locally-sourced parts, availability of local experts, cost effective, foreign exchange savings, and potential export product.

In his speech, DOST-MIRDC Executive Director Robert O. Dizon said that as the signing coincides with the opening of the 2022 National Science and Technology Week, they are optimistic that the partnership will be instrumental in making Filipinos know the value and

significance of science, technology, and innovation in addressing concerns in the economy, in society, and the overall improvement of lives, including the area of human defense.

“We are looking forward to the success of this project as it will be another contribution of the DOST and the DOST-MIRDC in achieving the DND’s goal of a self-reliant defense posture, as well as DOST’s mission to provide innovative solutions to the needs of its partners,” said Dizon, adding that they are thankful for the partnership with PH Army and MRSP.

Representing the Commanding General of PH Army LTGEN. Romeo S. Brawner, Jr., Vice Commander Maj. Gen. Adonis R. Bajao said that with the new design and integration of Project COBRA, the PH Army will acquire added strength in its firepower capability, particularly in its armored assets. The partnership, he said, also supports the local defense industry through the Self-Reliant Defense Posture Program (SRDP).

“Your invaluable support enables the Philippine Army to deliver our main thrust of capacitating our forces, intensifying stakeholder engagement, and in promoting capacity and capability building,” he said adding the cooperation will benefit the protection of the Filipino people and the security of the land.

For his part, DOST Secretary Renato U. Solidum, Jr. extended his appreciation for the partnership of mentioned offices, as it underscored the importance of collaboration among various agencies of government.

“Thank you for this collaboration and we will make sure to actually continue what we have started—first with the PH Navy, then to the PH Army, and hopefully with the PH Air Force,” he said.



Ms. Marites Saldo accepts the award on behalf of ACT Machineries and Metal Craft Corporation, this year's National winner for the ICON Awards during the 2022 National Science and Technology Week. With her are (L-R): DOST-VIII Regional Director Ernesto Granada, DOST-VI Regional Director Rowen Gelonga, UPISSI Director and Board of Judges Chair Prof. Melanie Moraga-Leaño, and DOST Undersecretary for Regional Operations Sancho A. Maborang, DOST-II Regional Director Virginia Bilgera, and Provincial S&T Director Lucio Calimag (photo by Gerardo Palad, DOST-STII).

## DOST honors MSME “Industry 4.0” frontrunners from the regions

By Joy M. Lazcano, DOST-STII



**R**ecognizing the efforts of the micro, small and medium enterprises (MSMEs) in upgrading to modern manufacturing technologies and capabilities to meet the next wave of global industrialization, the Department of Science and Technology (DOST) awards the top MSMEs that adopted frontier technologies to fortify their market standing.

This year's SETUP Forum and Awards recognizes the top MSMEs that have exhibited the will and the capacity to adapt to the changing industry landscape despite the pressing challenges brought about by the global economic slowdown due to COVID-19.

As the industry shifts to Industry 4.0 (I 4.0), the MSMEs are slowly pivoting to more sophisticated technologies—which include cloud computing, data science, additive manufacturing, robotics, artificial intelligence, and automation, among others.

The adoption of these technologies set the companies for more globally accepted products and operation amid the rapidly changing, product-centric economy.

Further, the SETUP Awards is divided into three categories, the 2022 ICON Awards or the Industry 4.0 Champion of Innovation Award; the I-Ready Award or Industry 4.0 Ready Award to give recognition to companies that have started their journey toward the use of technology as their potent ally to equip them towards the advent of I 4.0; and finally, the SETUP PRAISE Awards.

For this year, the finalists in the I-Ready Awards category include the I-Provide Health Food Company and Ideatechs Packaging Corporation that offer customized paper packaging products

including cups, bowls, and meal boxes, among others. Other finalists were Tonio's Sisig from Region IV-A, Filbake Food Corp., a food manufacturing company that specializes in bread manufacturing in Region VI, and Herbanext, a trailblazer in herbal food supplement manufacturing.

On the other hand, the Balubal Sash and Furniture Shop from the Cordillera Administrative Region; ACT Machineries and Metal Craft Corporation, which specializes in the manufacturing of agriculture equipment in Region 2; Northwind Fine Herd Int'l Inc.; Nisco Phils. Enterprise, a Filipino based company that fabricates food manufacturing equipment, cosmetics, and pharmaceutical packaging applications; and GICA Engineering Technology, a company engaged in engineering services that produces customized products that are needed by the clients' production lines top the line-up of finalists for the ICON Award.

Moreover, it was Filbake Food Corp. owned by John Guidon Macciri I. de la Cruz that topped the national award for I-Ready, while the ACT Machineries and Metals Craft Corporation owned by Samuel Paul I. Babas went home as the ICON national winner.

Meanwhile, JLM Farms—a vegetable farm in the Cordillera region owned and operated by Johnny L. Marcos—bagged the SETUP PRAISE Award for this year. JLM Farms was also recognized as the Most Sustainable MSME by the Board of Judges from the University of the Philippines Institute for Small Scale Industry (UPISSI) led by its director Prof. Melanie Moraga-Leaño.

Other MSMEs that were recognized were the Manila HealthTek, Inc. as the Most Innovative MSME; Ginga Agrifood Manufacturing Enterprises,

Inc. as the Most Agile MSME; Negros Prawn Producers Cooperative as the Most Resilient MSME; while the Most Productive MSME went to Provider Enterprises.

The regional winners received a trophy and a cash prize of PHP 20,000, while the finalists got a trophy and PHP 50,000, while the national awardees got a trophy and a cash prize of PHP 100,000 each.

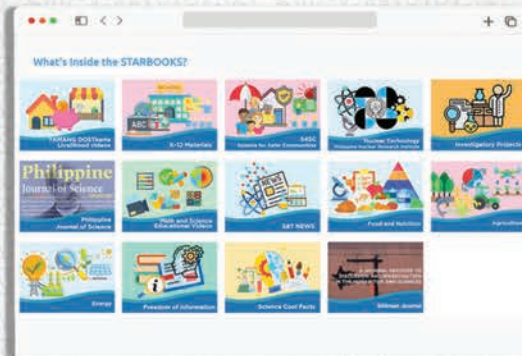
In his message, DOST Secretary Renato U. Solidum Jr. said that the Department has put in place a variety of program offerings for MSMEs to grow their business through various technological interventions for product improvement and funding for business development services.

“Our micro and small enterprises, as compared to large firms, often lag behind in capital, managerial and workforce skills, inability to exploit scale economies in production, and the lack of awareness on market opportunities and new technologies. And with the emergence of new industries, it is important that no one gets left behind, and everyone should be equipped with the right tools and knowledge to go with the flow, adaptable, and be flexible enough to the changes brought by innovation,” explained Solidum.

The SETUP Forum and Awards is a special event conducted during the 2022 National Science and Technology Week celebration held at Hall A of the World Trade Center, Pasay City. The celebration—which carried the theme “*Agham at Teknolohiya: Kabalik at sa Maunlad at Matatag na Kinabukasan*”—was held from 23–27 November at 9AM-6PM. To know more about the various activities, log on to <http://nstw.dost.gov.ph/> or at the NSTW Facebook page / [nstwdost](https://www.facebook.com/nstwdost).

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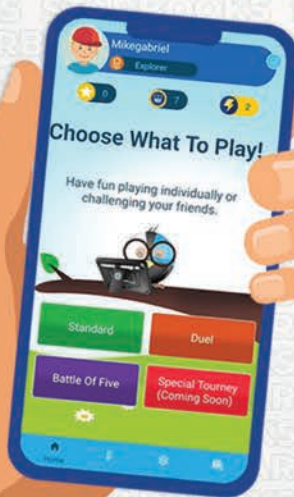
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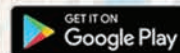
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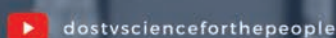


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