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S&T POST

APR-JUN 2017

SCIENCE AND SUSTAINABLE TOURISM

Strange bed fellows?

Awkward may be an understatement if we put together science and technology with tourism in one basket. The conservatives may even describe the combination as “strange bed fellows”. Or is it, really?

Traditionally, tourism is associated with the arts, say, humanities. In a more critical scrutiny, however, advancements in tourism have been largely dependent on the twin wonder called science and technology such as, but not limited to, energy, transportation, communication, health, among others.

It has, thus, become fascinating to witness that great changes have started to be seen and felt as these supposed strange bed fellows meet in a common ground.

As we celebrate and ride along the tides of change, 2017 has been declared the International Year of Sustainable Tourism for Development by the United Nations General Assembly. The resolution, adopted on 4 December, recognizes “the importance of international tourism, and particularly of the designation of an international year of sustainable tourism for development, in fostering better understanding among peoples everywhere, in leading to a greater awareness of the rich heritage of various civilizations and in bringing about a better appreciation of the inherent values of different cultures, thereby contributing to the strengthening of peace in the world.”

The statement said, “The decision to adopt 2017 as the International Year of Sustainable Tourism for Development comes at a particularly important moment as the international community embraces the new Agenda 2030 and the Sustainable Development Goals (SDGs), approved by the UN General Assembly in September 2017. Tourism is included as targets under three of the SDGs - SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; SDG 12: Sustainable Consumption and Production and SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.”

For this, the S&T Post editorial team decided to highlight stories relevant to this international observance. A photo essay on the wonderful Tawi-Tawi is featured in this issue since a full story was featured in the 4th quarter issue of S&T Post in 2016. Other contributions are also featured such as the Bohol Bee Farm in Region 7, the Coral reef reforestation by PCAARRD, and restoration of old churches by the DOST-FPRDI.

True, the decision of the UN “… follows the recognition by global leaders at the UN Conference on Sustainable Development (Rio+20) that “well-designed and well-managed tourism” can contribute to the three dimensions of sustainable development, to job creation and to trade.”

Noticeably, demarcation lines are slowly being erased and walls are torn down as everyone moves towards harmony where science is fused with the arts and other fields become inter-and multi-disciplinary. And as fusion starts, let us just hope that everything is for the betterment of everyone.

Aristotle P. Carandang, LPT, MPS, Ph.D

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DOST STARBOOKS

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science for the people 2017

Department of Science and Technology

in celebration of the

National Science and Technology Week

World Trade Center, Pasay City 11-15 July 2017

WHAT IS NSTW?

An annual project of DOST, NSTW is a show window for Filipino ingenuity, innovation and S&T developments as well as a platform for promoting S&T as a key driver of economic development. Admission is free.

President Rodrigo R. Duterte

This occasion is proof of our strong resolve to attain scientific progress that will uplift the lives of our people.

DOST Secretary Fortunato T. de la Peña

The DOST will be in the forefront again in showcasing the latest and most innovative products, know-how, and services, developed and funded by Filipinos in service to Filipino society.

Why you should be at the NSTW

- Fairs and Exhibits
- S&T Forums
- Launches
- Film Showing
- Technology Exhibit
- SETUP Forums
- Awarding Ceremony
- Scientific Career Talks
- Science Journalism Writeshop
- Tec Talk
- BioCamp
- Trainings
- Info Seminars
- Disaster Summit









Started in **1950** as Philippine National Science Week celebrated 3rd week of November

Institutionalized in **1982** (Proclamation No. 2214)

1990 S&T Fair was established. It became the banner activity throughout the 1990.

1993 NSTW celebration was moved to the third week of July through Proclamation No.169.

For more information:

nstw.dost.gov.ph

2017NSTW

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DOST 2017 NSTW

S&T POST

DEPARTMENT OF SCIENCE AND TECHNOLOGY
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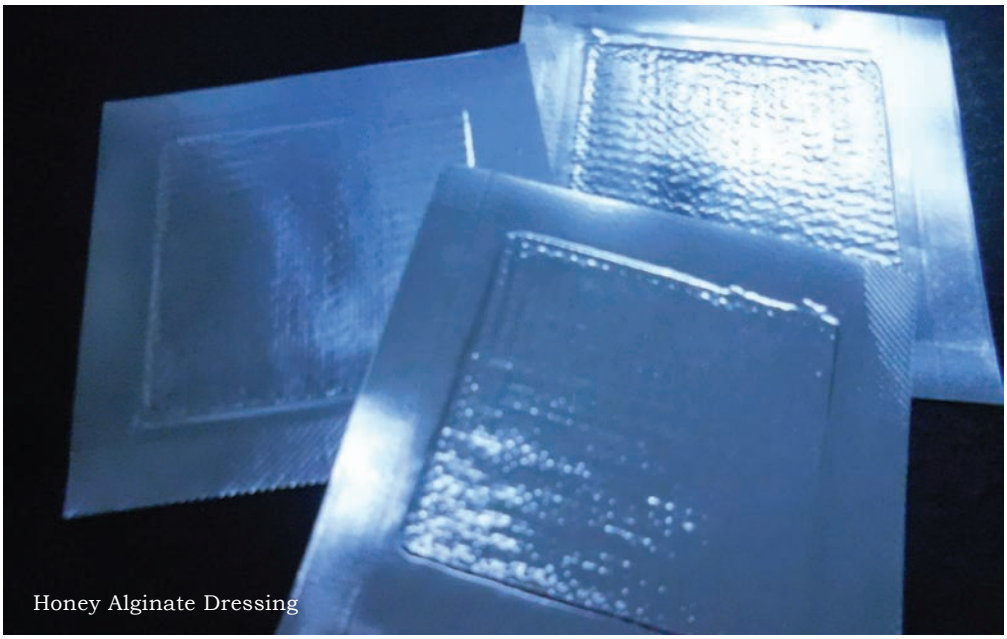
ON THE COVER

Science cuts across all sectors, including tourism. One of the country's natural beauties that attract tourists are our beautiful corals which are restored and reproduced using science and technology.

PNRI introduces Nutribar, wound dressing

THE DOST-PHILIPPINE Nuclear Research Institute introduced these two novel products during the celebration of the Atomic Energy Week last December. The PNRI Nutri Bars are nutritious and tasty survival food that can provide energy to people in calamity areas and during emergency situations. The bars are a blend of locally available natural ingredients such as *pinipig* (pounded glutinous rice), banana chips, and sugar. Containing no preservatives, the bars are vacuum-packed in laminated aluminum foil pouches and irradiated to preserve the product for a longer period. Meanwhile, the Honey Alginate Dressing for wounds is made from local honey sources for treating exudating wounds and burns. Honey and sodium alginate are the main components of the dressing superimposed in surgical gauze. The dressing is highly absorbent and does not stick on wounds. It also has a low pH content and promotes healing of wounds such as pressure sores, burns, skin lesions, and leg ulcers. It is sterilized through gamma irradiation.



Honey Alginate Dressing

Nutribar

DOST to stage "Science for the People" on S&T Week

By S&T MEDIA SERVICE

GET READY for an amazing science and technology (S&T) experience as the Department of Science and Technology (DOST) showcases the country's best in S&T research and services, interactive exhibits, and technology-aided entrepreneurship this coming National Science and Technology Week (NSTW). To be held July on 11 to 15 at World Trade Center in Pasay City, the NSTW aims to give the public a unique experience on how S&T work for a better life.

"We celebrate the National Science and Technology Week annually to showcase the services and products of our scientists, engineers, researchers, inventors, and innovators," said Sec. Fortunato T. de la Peña.

"This year's theme is 'Science for the People,' and we will highlight the practical use of various technological products and research outputs," he added.

The NSTW is celebrated every month of July through Proclamation No. 169 of 1993. It aims to recognize the contribution of science and technology in the development of the country and garner support from the public and private institutions for its sustainable development.

The activities lined up for this year's NSTW are science and technology forums on agriculture, health, nutrition, disaster preparedness management, and manufacturing. Technology exhibits and launches, film showing, scientific career talks, science journalism writeshop, SETUP forums, and awarding ceremony are also included.

All forums will be held at the Philippine Trade Training Center while the exhibit areas will be located at the World Trade Center.

DOST-PCHRD to lead health cluster

With the subtheme "Conquering Diseases, Promoting Health," the Philippine Council for Health Research and Development (PCHRD) will lead the health cluster, together with the Food and Nutrition Research Institute and the Philippine Nuclear Research Institute.

"For this year's celebration, we want to show that our supported technologies are being used from womb to tomb. NSTW will serve as a good venue for other government agencies and private sectors to support and create similar initiatives improving the lives of the citizens through S&T," Dr. Jaime C. Montoya, executive director of DOST-PCHRD, said.

Expected activities in the health group include fora, games, raffle, massage, nutrition counseling, cooking demonstration, and weeklong interactive exhibit.

Among the programs and technologies to be featured include Drug Discovery and Development Program, Rxbox, OL Trap, Genomics, Pinggang Pinoy, Polyvinyl Pyrrolidone Carrageenan Hydrogel Dressing, Reliefvent, eHATID, and Axis Knee System.

Latest innovations for textile industry

During the five-day NSTW, DOST-Philippine Textile Research Institute (DOST-PTRI) will show to the public the latest innovations, including technologies and products, that would help boost the country's growing local textile industry.

Anchored by their Lab to FAB (Fabric and Beyond) concept, DOST-PTRI will showcase locally-developed products and services including the Portable Therapeutic Handloom, Modified Handloom Weaving Machine, indigenous resources and natural fabrics, and other products from DOST-PTRI's Innovation Center for Yarns and Textiles (ICYT) and Regional Yarn Production and Innovation Centers (YPICs).

DOST-PTRI is poised to highlight its indigenous inputs, innovative technologies, and high-value outputs to give the public the chance to see and appreciate some of DOST-PTRI's work throughout the years. These products were borne out of PTRI's unyielding commitment to continue its mission of rejuvenating and revitalizing the country's textile industry.

The Portable Therapeutic Handloom is a PTRI-designed technology specialized for differently-abled persons, especially for paraplegics. Its distinctive feature is a hand-held lever that takes the place of pedals, to facilitate the interchange of harnesses during weaving of yarns. With this strategic mechanism, the handloom will now only require eye-hand coordination, streamlining the hand weaving process.

Meanwhile, the Modified Handloom Weaving Machine is attached with an alternative foot switch that allows direct winding

of fabric onto the cloth beam, without requiring the weaver to stand. This increases the weaver's productivity. With the help of four harnesses and four pedals, the range of designs that can be produced using this model is also expanded. Its metal parts ensure durability and smooth operation; while its ancillaries - such as the bobbin winder, ratchet and pawl, and tension control - aid in overall efficiency.

The ICYT is a premier facility for innovating indigenous fibers and fiber blends for high-value yarns, fabrics, and related textile outputs. Fiber carding, blending, yarn spinning, handloom weaving, power loom weaving, and knitting are a few of the ICYT's specialized services. The Regional Yarn Production and Innovation Centers are facilities that address the gap between agricultural inputs and end-users of textile products throughout the country. The project is seen to generate hundreds of jobs and encourage appreciation of local textiles, helping spur the revitalization of the textile industry.

Further, Indigenous resources and natural fabrics are the core ingredients of the DOST-PTRI projects to optimize the researches on Philippine tropical fabrics and natural dyes which are at par with the global market in the burgeoning Slow Fashion Movement and Cradle-to-Cradle Fashion concepts. DOST-PTRI has conducted more than 100 natural dye extractions and applications, with eight natural dyes developed for silkscreen printing; 30 for powder production; and 10 for upscale natural dyeing.

Regional science and technology week celebrations

After the event, a series of regional science and technology fairs will also be held in every region in the country until December.

DOST-Davao Region

The Department of Science and Technology – Region XI has lined up all its pre-event activities as a prelude to the regional celebration of the NSTW on July 3-5, 2017 at the NCCC Mall of Davao.

From June 26 to July 1, DOST-Region XI will hold a Techno-Agri-Industrial Trade Fair to be hosted by the provincial local government unit and Department of Trade and Industry (DTI) – Davao del Sur. Participants will be various national government agencies including the Provincial Science and Technology Center-Davao del Sur, local government units, non-government organizations, private companies, and enterprises .

Said activity will be held at the Coliseum Grounds in Capitol Compound, Brgy. Matti, Digos City, Davao del Sur concurrent to the 50th Celebration of Araw ng Davao del Sur. It aims to showcase and promote the best products and services in Davao del Sur; strengthen relationship between the provincial Government of Davao del Sur, LGUs, NGAs, NGOs, and MSMEs, among others; and introduce the province as a techno-agri-industrial hub and tourist destination for prospective investors and tourists.

Aside from the PSTC's active participation in this activity, PSTC Davao del Sur will also take part in awarding the outstanding constituents with notable contributions to Davao del Sur for the "Business Innovation of the Year" award on June 27, 2017.

Further, PSTC Davao del Sur will also conduct DavSur Science and Technology Day consisting of a science and technology (S&T) exhibit and plenary on June 27 at Tablizo Gym, Capitol Compound, Brgy. Matti, Digos City, Davao del Sur.

Through the S&T exhibit, the latest trends and advancements in modern and smarter agriculture will be presented alongside the developed technologies of various higher education institutes in Davao del Sur.

Moreover, three major topics will be presented in the plenary – "Technology for Real-Time Crop Monitoring & Forecasting System", "Climate Change Impact to Agriculture" and "Permaculture Promoting Farmers' Resilience to Climate Change."

Participants will include 250 farmers and municipal agriculturists/extension workers in Davao del Sur while speakers will be coming from UPLB-Project Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines and Bureau of Plant Industry XI.

The 2017 NSTW is open to the public. For more information, please check the website *http://nstw.dost.gov.ph/* or like us on Facebook at *https://www.facebook.com/2017nstw/*. Please send your inquiries through 2017nstw@gmail.com.

Some scenes in previous NSTWs:

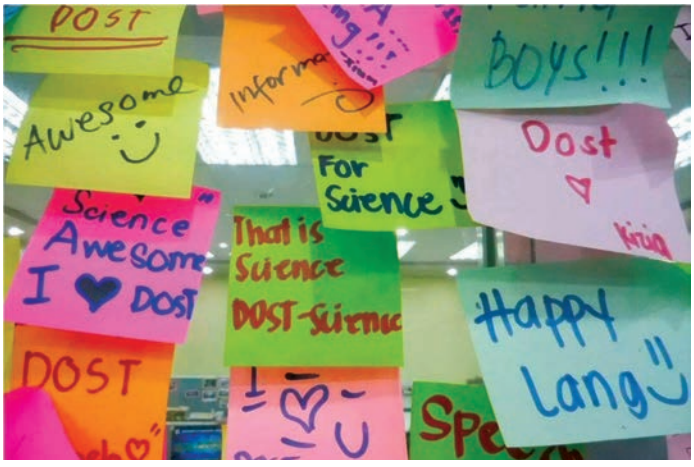
Earthquake simulator

The RxBox can send vital signs to specialists anywhere in the world through the Internet for accurate diagnosis of patients in marginalized areas.

Students learn how an active volcano behaves

Students enjoy reading amazing S&T facts in DOST's library-in-a-box called STARBOOKS.

Students actually peep into the telescope to see objects in space.



Participants leave notes on their NSTW experience.

NSTW Facts

- The NSTW highlights the significant contributions of science and technology to national development and has become a platform for heralding S&T advocacy in the country.
- In the 1950s, the National Science Development Board (forerunner of DOST) spearheaded the Philippine National Science Week celebration on the third week of November. It became a backdrop for conferring recognition and appreciation to outstanding scientists, researchers, inventors, and institutions.
- The NSTW was institutionalized in 1982 through Proclamation No. 2214 signed by Pres. Ferdinand Marcos, which designated the second week of July each year for its observance.
- The Science and Technology Master Plan was launched by the Aquino administration during the 32nd NSTW celebration in 1990 to establish the desired direction of S&T development in the country. The S&T Fair was included in the line-up of important activities of the NSTW during the same year. It became the banner activity throughout the 1990s.
- In 1993, the NSTW celebration was moved to the third week of July through Proclamation No. 169 under the Ramos administration.
- Other important activities of the NSTW include the various awards for basic and applied research, technology transfer, technology commercialization and S&T promotion, technology demonstration, and technical tours.

SCIENCE NEWS

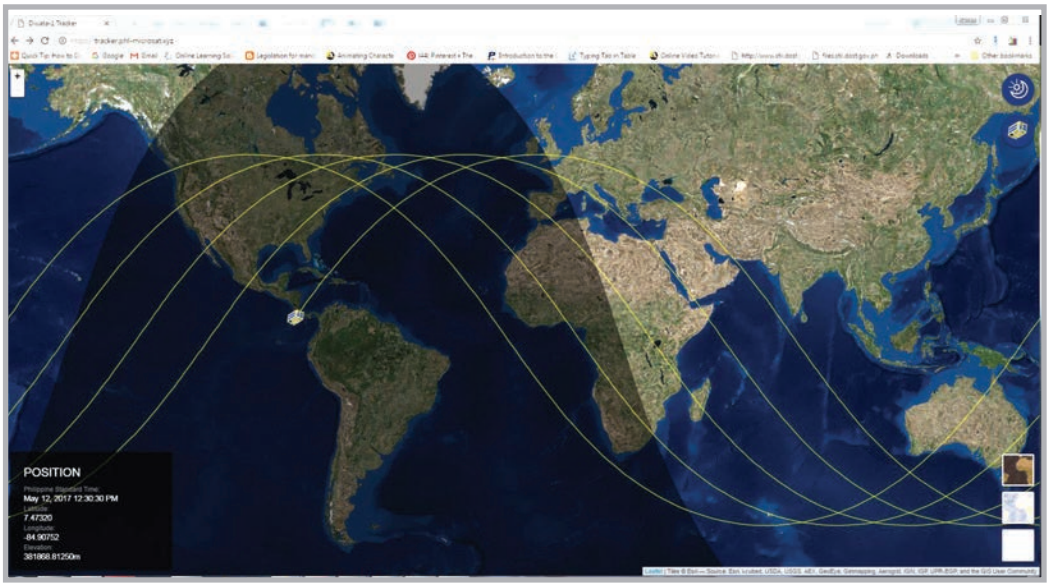
Diwata-1's greatest achievements

By ALLAN MAURO V. MARFAL, *DOST-STII*

A MAJOR breakthrough in Philippine space technology happened a year ago when we sent Diwata-1, the country's first microsatellite, into space.

Now, it has travelled around the world some 5,000 times since it was sent into orbit on April 27, 2016. Since its journey, it has captured high resolution images of different areas in the country and these images can be used in strategic planning to strengthen agriculture, conserve the environment, and prepare for disasters.

Yet, more than anything else, the knowledge and experience that we gained from building this microsatellite are the greatest achievements we had in this program.



This was shared by Dr. Joseph Joel R. Marciano, acting director of Department of Science and Technology-Advanced Science and Technology Institute (DOST-ASTI) and project leader of Philippine Microsatellite Program, during the Pinoy Showcase of Space Technologies which featured the unveiling of the Philippine Earth Data Resource Observation (PEDRO) facility on April 27, 2017 at ASTI in Diliman, Quezon City.

Diwata-1, a part of the PHL-Microsatellite Program, is a collaborative effort between the Department of Science and Technology (DOST), University of the Philippines, and Hokaido and Tohoku Universities in Japan.

"The space program really takes a whole barangay. This has been a roller coaster ride for everybody, indeed for everybody, and not just the scientific community. We are learning new things and we are really seeing things hands-on," says Dr. Marciano.

He adds, "It proves that it is really a worthy investment for our country. It is beyond building and sending a microsatellite in space. It also helps our young Filipino scientists to have significant exposure and work on developing this (Diwata-1). With the guidance of some of our partners in Hokaido and Tohoku Universities in Japan, our country has the opportunity to learn the best practices, in terms of conducting space technology programs."

Dr. Marciano said that the accomplishment of Diwata-1 could also pave way for more support for the PHL-Microsatellite Program as it provided clear explanation our policymakers on how various applications in space technology could empower different industries in the country.

"At the back of our minds, part of the achievement is the inspiration that we can bring to every Filipino especially in the field of science and technology and how can we make leaps and bounds in terms of improving our nation, our society through this kind of endeavour," says Engr. Ariston Gonzales of the Uiversity of the Philippines-Electrical and Electronics Engineering Institute (UP-EEEI).

Meanwhile, Dr. Marc Talampas, project 1 leader, also shares that through the efforts of the program, UP-EEEI is now offering an elective course, Satellite Technology and Planning, to make these programs interdisciplinary.

Free public access of Diwata-1 images

Meanwhile, all photos captured by Diwata-1 and sent to PEDRO could be accessed by anyone through www.phl-microsat.upd.edu.ph after finishing registration procedures.

PHL-Microsat Project 3 leader Engr. Mark Edwin Tupas explains that by allowing the public to have free access to the photo captured by Diwata, it could stimulate research and exchange of knowledge among researchers and different educational institutions.

Tupas added that in order to maximize the usage of Diwata, they will allow the public to have access to the photos, as there are also other people, aside from those working for Diwata, who know how to use satellite images.

Dr. Marciano said that these images will remain free under certain conditions, and he reminded the public that DIWATA images cannot be used for commercial purposes.

As Diwata-1 has only a life span of two years, it will disintegrate in space as soon as it reaches this period.

With that, we are expecting Diwata-2 to take over and this is still under the PHL-Microsatellite.

According to Dr. Gay Perez, project 5 leader of PHL-Microsatellite Program, Diwata-2 will focus more on assessment and will have more periodic passes in a day.

"So if we have an area that is experiencing drought, we can monitor the development of the drought in this specific area plus of course the additional payloads and amateur radio unit which can be used for emergency communication," Dr. Perez explains.

A coffee table book containing the project's growth and achievements from conception to its first year in space was also launched in the event.

Bulacan farmers now closer towards rice self-sufficiency

By LEIDI MEL B. SICAT, *DOST-III*

THE DUTERTE administration's goal of hitting 100 percent rice self-sufficiency level in two years, to push the Philippines to reclaim its status as rice exporter, is now a step closer to attainment.

A recent partnership among the Department of Science and Technology Regional III (DOST III), the Philippine Sino Center for Agricultural Technologies (PhilSCAT), the Local Government of Pulilan (Pulilan LGU), and the Department of Agriculture Regional Field Office III (DA-RF III), just might have proven that such a target can be realized.

The team believes that achieving higher rice yields is possible given the correct seed variety and quality, proper plant spacing, correct fertilizer timing and rates, and appropriate irrigation application. That is the reason why the farmers who participated in a recent project were convinced to migrate from direct/broadcast seeding to mechanized transplanting; from using the usual inbred seeds to hybrid rice seeds; from their old practice of applying 4-6 bags of fertilizer to the more intensive 8-10 bags of fertilizer per hectare.

Under the umbrella of the DOST-Community Empowerment through Science and Technology project, "Effective Translation of Science and Technology Intervention for Agricultural Productivity: The Case of Rice and Mango in Pulilan, Bulacan", PhilSCAT Director Dr. Emmanuel V. Sicat who provided technical services, requested for hybrid rice seeds from DA-RFO III Dir. Andrew Villacorta last year. PhilSCAT immediately deployed its technical team led by Dr. Carlos Abon and conducted trainings on seedbed preparation using double mulching technique in December last year, and use of mechanized transplanter in January this year.

The carrageenan plant growth promoter developed by Philippine Nuclear Research Institute (PNRI) and funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD), both of the DOST, was likewise sprayed at 14, 28 and 42 days after transplanting.

The 25 Pulilan farmer-participants in this endeavor were closely guided and monitored by the joint DOST-PhilSCAT team. On April 18, 2017, the farmers witnessed the combined harvester churn out 177 cavans of Mestiso 78 palay (also known as Long Ping 937) at 70 kg per cavan from the 1.25-hectare farm of Lito Calderon. The harvest totalled 12.39 tons or 9.9 tons per hectare. This year's harvest is almost double compared with last year's harvest of 6.597 tons of PSB Rc 218.

Meanwhile, Ponciano Mendoza harvested 140 cavans of SL8-H at 55 kg per cavan from his 7,500 square meter farm. This is equivalent to 10.27 tons (or 205 cavans) per hectare which, according to him, is almost double compared with his harvest last year of 80 cavans.

Awed by the result, he exclaimed, "Sa kaunaunahang pagkakataon ay umani ako ng ganito kaganda! Lubos po akong natutuwa na ang ating mahal na Mayora Maritz Ochoa-Montejo, ang PhilSCAT at ang DOST ay nagtutulong-tulong para sa ikabubuti naming mga magsasaka." (For the first time, I had a productive harvest! I am so happy that our mayor Maritz Ochoa-Montejo, the PhilSCAT, and the DOST worked together to benefit us farmers.

Rosalina de Guzman, also a farmer-participant, was quick to add, "Dahil din sa carrageenan plant growth promoter, talagang umani ako ng mataas, nakatipid din at nakabawas sa pataba. Kaya naman pala ang 200 kaban sa isang ektarya!" (Because of the carageenan plant growth promoter, I actually had a very abundant harvest and I was able to save from fertilizer costs. Producing 200 cavans per hectare is very possible!)

The initiative was spurred by the personal experience of Dir. Sicat, himself an agricultural engineer and a weekend rice farmer, who was inspired by his harvest of at least 200 cavans per hectare in his rice fields at the Science City of Munoz, Nueva Ecija in the 2015 and 2016 dry seasons. After his abundant harvest, he was challenged by Mayor Montejo to help the Pulilan rice farmers achieve the same successful harvest.

DOSTv now on free TV

By ROMELIE JANELLE MARANAN
DOST-STII

DOSTV, THE official science channel of the Department of Science and Technology (DOST), aired on free TV last week of May. The shift from online to regular channel gives more people easier access to the latest weather and science updates.

DOSTv airs Monday to Friday via PTV4 from 9:00 to 9:30 in the morning. The transition of the program from the online platform to free TV marked DOSTv's first anniversary last May 30, 2017. To date, DOSTv has aired 251 episodes online.

For its pilot episode on PTV4, DOSTv featured the coral reef reforestation project of the DOST-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development on the majestic waters of Tawi-Tawi on its SineSiyensya segment.

Programming contents will still include weather reports from DOST-PAGASA; interview with S&T experts and officials; SineSiyensya (documentaries); Balitang RapiDOST (S&T local news); Global Science (S&T worldwide news); Sci-Facts (S&T trivia); Sustansyarap (DOST-Food and Nutriton Research Institute's healthy recipes); DOST-PHIVOLCS update; and a lot more.

Aside from its 9am airing on PTV4, DOSTv will continue its daily online streaming at 11:00 am via www.dostv.ph, www.dostv.ph/youtube, and facebook.com/DOSTvPH. DOSTv also streams weather updates from DOST-PAGASA every 5:00 am and 5:00 pm on its online platforms.

The science program also airs on Global News Network at 11:00 am and 4:00 pm, and on some local cable channels.

Produced by DOST-Science and Technology Information Institute, DOSTv is DOST's initative in communicating science for the people, promoting a culture of science and technology, and raising the aspirations of the youth to pursue careers in science, technology, engineering, and mathematics.

PH biodiversity paves way for revitalized drug development in the country

By GERALDINE BULAON-DUCUSIN, *DOST-STII*

PHILIPPINE BIODIVERSITY offers potential leads for the development of pharmaceutical medicines, according to an outstanding researcher recently awarded by the Department of Science and Technology - National Research Council of the Philippines (DOST-NRCP).

"There are endemic plants, insects, marine organisms, minerals (in the country) that could be a source of pharmacologic interventions in diseases," said Dr. Joven Apostol, a 2017 Outstanding Filipino Researcher. Apostol, a pharmacy professor at the University of Sto. Tomas, admitted that while the presence of foreign pharmaceutical manufacturers has dipped over the years as most have shifted operations to other countries, such drawback was in a way a blessing.

"It has awakened the Filipino spirit to become more entrepreneurial and there has been a growth spurt in local drug manufacturing," he said.

Apostol likewise pointed out that basic research is crucial in drug development. "A pharmaceutical product is only good as it is safe and effective," he said. "A drug molecule will not advance to formulation and manufacturing without the preliminary data on its safety, effect, mechanism of action, toxicity and others – basic information on drug source, synthesis, kinetics, and interactions, which can only be provided by basic research," Apotol explained

Research in basic pharmacology includes screening of these biomaterials for their effects on the physical and chemical processes of the living organism and on the nature and courses of diseases. Various methods of testing are employed, such as in vitro, in vivo and in silico. The results of these basic researches serve as the basis to support further studies leading to formulation and clinical use of the drug product.

Gains in the growth of the pharmaceutical sector can be sustained by continuous support to both basic and applied research. This way we can reduce our reliance to foreign manufactured drugs.

Dr. Apostol is optimistic that given the right support, structure, formation of scientists, industry, and government, it is possible that in five to ten years, the country is halfway in terms of drug discovery. In such time, the drug being developed should be in the clinical trial phase and the company doing the development should have spent half a billion dollars, he said.

DOST-NRCP is the country's lead agency in basic research, and is mandated to promote and support basic and problem-oriented researches, particularly those which are multidisciplinary, in the sciences as well as in the humanities. NRCP supports researches that identify and provide solutions to national issues and problems, and generate new knowledge in preparation for the future.

In June 2017, NRCP hosted the 17th Science Council of Asia Conference participated in by researchers and scientists from 31 academic institutions and organizations of the 18 member countries across Asia.

STARBOOKS lands on flying school

By KARL RAVEN A. RAMON, *DOST-STII*

PASAY CITY –The Philippine State College of Aeronautics (PHILSCA) recently installed STARBOOKS or Science and Technology Academic and Research-Based Openly-Operated Kiosks in its library to upgrade its services to students. STARBOOKS, developed by the Department of Science and Technology - Science and Technology Information Institute (DOST-STII), is a library-in-a-box that provides reliable and free science and technology (S&T) information to the public in an offline mode.

PHILSCA President Dr. Bernard R. Ramirez remarked that STARBOOKS "will enhance the data gathering of students taking up research subjects, and it will also enhance the research capability of faculty members."

He likewise underscores the importance of having this kind of resource which they can use while their request for budget for research is pending.

He also committed that PHILSCA will contribute to STARBOOKS its own researches in the field of aviation.

To formalize the turnover of STARBOOKS, a memorandum of understanding (MOU) was signed on May 4, 2017 at the PHILSCA Villamor campus by Arlene E. Centeno, DOST- STII's Finance and Administrative chief representing Director Richard P. Burgos; Dr. Ramirez; and Engr. Arman P. Bionat, assistant regional director for technical operation division of DOST-NCR. The MOU signing was witnessed by PHILSCA College Librarian Dr. Estrella E. Yago.

Dr. Yago, when asked about the status of their library, admitted, "We have 10 computer units with very poor internet connection. Last semester we didn't have internet connection yet."

She also said that although their library contains almost 10, 000 books, some students still struggle to gather information in the library. Paula Manzano, a third year aeronautics engineering student, said that three sections are sharing two books, and this give them very limited time to review.

Now that they have STARBOOKS in their school, Dr. Yago is enthusiastic that it will strengthen their library collection especially on e-resources. She is also positive that STARBOOKS will give impact on the library accreditation in 2018.

Hands-on training was conducted by STII IT unit

DOST STARBOOKS TURNOVER. (R-L) STII FAD Chief Arlene E. Centeno, representing Director Richard P. Burgos, together with Assistant Regional Director for Technical Operation Division for DOST-NCR Engr. Arman P. Bionat and PHILSCA President Dr. Bernard R. Ramirez sign the memorandum of understanding of the turnover of STARBOOKS.

Meanwhile, Manzano is excited to experience STARBOOKS, expecting a hassle-free data gathering compared with the current inconvenient online data gathering. Thankful for the printability feature of the data, "I can review more," she excitedly exclaimed.

To give initial experience on the capability of STARBOOKS, STII staff conducted training on how to use it. Representatives from various PHILSCA campuses animatedly took turns to explore STARBOOKS' collection of thousands of S&T information materials which include books, journals, researches, and others, including livelihood videos.

DOST chief urges for more research on fishery resources, Philippine Rise

By RODOLFO P. DE GUZMAN, *DOST-STII*

DEPARTMENT OF Science and Technology (DOST) Secretary Fortunato T. de la Peña asked researchers to do more scientific studies on high potential fishery resources like seaweeds and on Philippine Rise formerly known as Benham Rise.

Speaking before 300 delegates composed of scientists, academicians, researchers and various industry stakeholders, Sec. de la Peña said, "The Department of Science and Technology is focusing on strengthening research and development initiatives in various fields including the fisheries sector because this will provide more opportunities for our marginalized fishermen in the regions and will help them uplift their economic condition."

The Secretary emphasized, in particular, the importance of Philippine Rise in the present administration's thrust of reducing economic inequality through creation of more income opportunities coming from marine resources. In fact, according to the Food and Agriculture Organization, the country ranked eighth among the top fish producers in the world in 2016, with Central Visayas at the forefront.

Philippine Rise is a seismically active undersea region estimated to cover an area of about 13 million hectares located east of Luzon and is 35 meters underwater with the shallowest point located off the provinces of Aurora and Isabela.

In April 2012, the United Nations Convention of the Law of the Sea already recognized and officially approved the Philippines' claim on Benham Rise as part of its continental shelf and territory.

Based on initial studies Philippine Rise is rich in mineral, oil and gas deposits like solidified methane that could help the country achieve self sufficiency in energy.

Sharing DOST's thrust on R&D is Bohol 2nd District Representative Erico Aristotle C. Aumentado, chair of the Science and Technology Committee in the Lower House.

"I fully recognize the importance of science and technology in developing our economy and I am supporting R&D activities particularly of the DOST in the fisheries sector as these will open doors to more opportunities without compromising the future," said Rep. Aumentado.

The congressman also called for stronger cooperation of different sectors of society government, the private sector, and the academe.

Sec. de la Peña and Rep. Aumentado were speakers at the Visayas Regional Scientific Meeting (RSM) held in April in Cebu City.

Rep. Aumentado expressed his support for the regional scientific meetings as a means to share ideas in creating income opportunities in the provinces. Said meetings also address R&D initiatives in protecting the environment through science and technology, he said.

"We can only do this with the free exchange of ideas and to follow one path for sustainable development," he added.

DOST Sec. Fortunato T. de la Peña (top) and Bohol 2nd District Representative Erico Aristotle C. Aumentado, chair of the Science and Technology Committee in the Lower House (right).

Building back better libraries in Bohol

By **FRAMELIA V. ANONAS and RODOLFO P. DE GUZMAN**, *DOST-STII*

The earthquake in 2013 may have destroyed edifices, but the hope to rebuild schools and libraries in Bohol will never be shattered.

The dirt road to Mantasida Elementary School is bumpy and muddy but now the pupil's path to knowledge has just been made easier through STARBOOKS.

HEAVY RAIN just drenched everything in Brgy. Mantacida. Twelve-year-old Ray-Ann Delgado Panotsol had to be careful where to step on the sticky dirt road else she might slip and soil her yellow shirt paired with her navy blue school skirt. She had to look her best today—she will be delivering her 'thank you' speech for the STARBOOKS units installed in her school's library.

The library of Mantasida Elementary School is as large as the classrooms in Ray-Ann's school but it looks roomier. In the middle of the room is a three-level shelf brimming with books. The shelf has a label that says "mini library", correctly describing what it actually is.

On the other end were computer units from the Department of Education's Computerization Project in 2015 which are being used for instruction and administrative purposes only.

Having the fully-packed STARBOOKS in their library, what Ray-Ann feels is like having a movie star as a classmate. She looks forward to browsing it during library time.

Remote barangay

Ray-Ann lives in Mantasida, a barangay of Catigbian town. It is 35 kilometers away from Tagbilaran City, Bohol's lone city and provincial capital. It is a 50-minute ride from Tagbilaran, passing by the towns of Cortes, Antequera and Balilihan.

The way to Mantasida is quite difficult, especially after a heavy rain. The barangay's dirt road has animals sleeping on it, oblivious to the rain and not used to the flurry of vehicles. The carabaos did not even move a bit when the vehicles of visitors passed on the road. The visitors have a special mission: they are coming today to hand over the STARBOOKS units to the school.

A fourth-class municipality, Catigbian (population: 23,333) has a literacy rate of 87.9%, according to the town profile. School Principal Artemia Lamoste said that her hopes to contribute to increasing the literacy rate crumbled when the 2013 5.6-magnitude earthquake flattened Bohol, including their library.

Helping build back better library

Children's Hour, a non-profit organization that supports projects on education, among others helped rebuild their school building. Today, it is coming back with more friends to help. These are Sun Life, which helped buy computer units, and the Department of Science and Technology-Science and Technology Information Institute (DOST-STII), which installed STARBOOKS for free in said computer units.

STARBOOKS means Science and Technology Academic and Research Based Openly Operated Kiosks, a library-in-a-box with thousands of S&T materials, plus livelihood videos.

Ray-Ann felt butterflies in her stomach as her name was called to deliver her thank you speech. She felt her knees giving way but she reminded herself that she should not let

Ray-Ann and her schoolmates finally get to use STARBOOKS.

her teacher and her principal down. They all worked together to compose the speech. They even rehearsed a few times. She stood with courage and started her spiel.

In the middle of her short speech, she acknowledged their benefactors. "Thank you, DOST, Children's Hour, and Sun Life," she said.

Finally, on behalf of all students in her school, she promised to use STARBOOKS in their studies and use these with care so that more students will benefit from STARBOOKS.

After the formal turnover of the STARBOOKS units, Ray-Ann and her schoolmates crowded around the kiosks, wondering how to use these gizmos that look like automated teller machines. When her turn finally came, a DOST-STII staff went by her side and taught her how to register. It was quite easy. Soon Ray-Ann and her classmates were transported to another world which can only be reached by reading books.

Principal Lamoste smiled as she saw how eager the pupils were to use STARBOOKS. "Now our students will be more inspired to study," she thought, and imagined Catigbian's literacy rate going up in a few years.

Bohol again

A couple of months later in May, DOST-STII came back to Bohol. This time, it was the Secretary of DOST himself who came, along with congressmen led by Bohol 2nd District Representative Erico Aristotle C. Aumentado, chair of the House Committee on Science and Technology.

Secretary Fortunato T. de la Peña led local officials and school principals in Ubay, Bohol in the unveiling and demonstration of STARBOOKS at the Ubay National Science High School on May 5, 2017.

"STARBOOKS was developed by STII to bring free library services primarily to public schools in the provinces without internet access to help students in their research works," says Sec. de la Peña. "It has become a platform for DOST-Science Education Institute to share developed learning modules to Ubay National Science High School and other high schools here in Bohol."

Ubay Mayor Constantino H. Reyes expressed his gratitude to DOST for bringing STARBOOKS to eight schools in his municipality because it "will greatly help students in their school work particularly in science and technology."

"We are very fortunate and we cannot deny our excitement for STARBOOKS that we know will be a big help to our students and we, Boholanos, will respond to this and harness its full potential. My administration will continue to adapt to technology, extending learning opportunities," said Mayor Reyes.

Meanwhile, Rep. Aumentado who made it all possible for schools in his district to avail of STARBOOKS, says, "We start by providing our students with technology, with STARBOOKS, of providing the modern approach to make available information to improve stock knowledge of our youth."

Present during the memorandum of agreement signing for the turnover of STARBOOKS were school principals and officials from Tapal Integrated School represented by Benigno Tubo; Tubog Integrated School represented by Evelyn Golosino; Camambugan National High School represented by Joselito Cantoria; Cagting High School represented by Melecio Bucio; Union National High School represented by Elsa Boyles; Hambabauran National High School represented by Marnelie Golosino; Sierra Bullones National High School represented by Junvic Andaya; and Ubay National Science High School represented by Chona Ricacho.

Ray-Ann says thank you to DOST-STII, Children's Hour and Sun Life for giving her school STARBOOKS units that would help much in their studies.

DOST, House committee push bill to upgrade S&T provincial officers to director level

By RODOLFO P. DE GUZMAN, *DOST-STII*

PROVINCIAL SCIENCE and Technology Center (PSTC) directors of the Department of Science and Technology (DOST) have their hands quite full every working day. Their offices are mini-DOSTs, implementing various programs that address their area's needs in health and nutrition, livelihood generation, education, disaster preparedness, and others.

Thus House Bill No. 1205 filed by Zamboanga del Sur 1st District Representative Divina Grace C. Yu is a welcome development to recognize the huge inputs of DOST provincial directors to the whole science community.

The bill titled "An Act Upgrading the Position of the Provincial Science and Technology Officer into the Provincial Science and Technology Director in the Department of Science and Technology and Amending Republic Act No. 6959", is also known as Provincial Science and Technology Directors Act of 2016. It aims to upgrade the status and rank of S&T center provincial officers with commensurate increase in remuneration and benefits.

House Bill No. 1205, once enacted into law, upgrades the PSTC director to Salary Grade 27 and shall be entitled to reimbursable representation and transportation allowance and other benefits prescribed by law. Currently, most PSTC directors are within Salary Grades 19-22.

Likewise, the PST office shall be provided with a minimum of six technical staff and one non-technical officer, thereby further strengthening the PSTC. PSTCs currently have only one to two permanent staff, plus a few project staff.

Also, the PSTC shall be appropriated with separate funding by the Department of Budget and Management allowing it to better extend service to the people in the provinces.

PSTC directors currently have the following functions: formulate the provincial S&T plan, programs and projects; implement and monitor technology promotion and commercialization of projects under the Small Enterprise Technology Upgrading Program (SETUP); disseminate S&T related information of R&D results; coordinate with LGUs, the academe and other public and private institutions to push S&T education, research, and human resources training; among others.

On this development, DOST Secretary Fortunato T. de la Peña is quite grateful. "We thank the House of Representatives Committee on Science and Technology headed by Rep. Aumentado for supporting this bill to upgrade the position of our PSTC officers," says de la Peña.

"They are the ones directly implementing the DOST programs like SETUP for livelihood, the RxBox for healthcare service, our scholarship programs and many more," he adds.

To push the enactment of the bill into law, the Committee on Science and Technology at the House of Representatives held a public hearing at the Bohol Bee Farm in Dauis, Bohol last May.

Committee chair Rep. Erico Aristotle C. Aumentado of the 2nd District of Bohol and host of the event said that the committee fully recognizes the many projects of the DOST in the province, as well as in the regions, that greatly help people improve their lives.

The public hearing served as a venue for the participants to submit their comments, suggestions, and recommendations before the final draft is made for endorsement to the committee-at-large.

"We also are thankful for the DOST and the PSTC in Bohol for providing our people the needed assistance using science and technology like the STARBOOKS that were given to our public high schools, therefore, providing them with information they can use for school work," says Rep. Aumentado.

The public hearing was also attended by other House Committee on S&T members namely, Rep. Francis Gerald A. Abaya of the 1st District of Cavite, Rep. Allen Jesse C. Mangaoang of the Lone District of Kalinga, and Rep. Mark Aeron H. Sambar of the PBA Party List.

S&T Committee Chair Aumentado (middle) joins Academician Fabian M. Dayrit (left), Vice President, NAST Philippines) and DOST Secretary Fortunato T. de la Peña, for a small talk in NAST's Regional Scientific Meeting. *(Photo by Gerardo G. Palad, DOST-STII)*

DOST Secretary Fortunato T. de la Pena (middle) thanks the members of the House of Representatives Committee on Science and Technology for supporting two proposed bills, one to upgrade the Provincial Science and Technology Center officer to director level and the other to amend the National Metrology Law. Members of the House S&T Committee headed by Representative Erico Aristotle C. Aumentado (2nd from left) of the 2nd District of Bohol expressed their full support for the two proposed legislations to be endorsed to the mother committee for enactment. Others in photo are (L-R) Representative Francis Gerald A. Abaya of the 1st District of Cavite, Representative Allen Jesse C. Mangaoang of the lone District of Kalinga, and Representative Mark Aeron H. Sambar of the PBA Party List. *(Photo by Henry de Leon, DOST-STII)*

DOST backs metrology law amendment

By RODOLFO P. DE GUZMAN, *DOST-STII*

TAGBILARAN, BOHOL – The Department of Science and Technology (DOST), under the leadership of Secretary Fortunato T. de la Peña, showed its full support for the amendment of the National Metrology Act of 2003 or R.A. 9236. In said law, the DOST plays a vital role as an implementor of programs involving competency training to strengthen local metrology authorities at the local level.

The proposed bill, to be known as the National Measurement Infrastructure System (NMIS) or House Bill no. 3578, will include in its objectives the following: establishing the National Metrology Institute (NMI) under the DOST and providing capacity building programs through competency training in metrology at the local level. This initiative aims to attain harmonization of metrology standards consistent with ASEAN and other recognized international standards. The NMI shall be headed by an executive director who will be under the policy, technical and administrative supervisions and control of the DOST.

"This bill on measurements is really important because it affects our daily lives. Just for example when I buy t-shirts I cannot find a standard size of large or extra large because it differs from one brand to the other and what is more critical is the standard measurement for other products like food, fuel and drugs," states Sec. de la Peña.

Aside from the creation of the NMI, the bill also incorporated the strengthening of the National Metrology Board whose membership includes the secretary or chair of the departments of energy, public works and highways, and national defense, and committees on science and technology in both the Senate and House of Representatives.

Likewise, the proposed bill involves the strengthening of the trade department's role in consumer protection through the designation of local government units as Local Metrology Authority (LMA).The LMA shall function as a regulatory body that will implement national metrology policies at the local level, enforce legal metrology regulations, set up the Weights and Measurements Office, conduct registration of measuring instruments for commercial application, conduct surveillance function, and issue certification for measuring instruments.

Further, the bill paves the way for creating set standards and promoting the following: labeling, verification of quantity in pre-package products, market surveillance and use of measuring instruments, laboratories and procedures, Mutual Recognition Agreements (MRA) among countries, public information and education/advocacy, and inclusion of the DPWH in the accrediting body.

Dev't council pushes study on running AGT in the Cordilleras

By **SHAI SINGA-CLAVER**, *DOST-CAR*

THE REGIONAL Development Council of the Cordillera Administrative Region (RDC-CAR) is encouraging the conduct of a feasibility study that would look into the possibility of deploying the Automated Guide-way Transit (AGT) System in the region's BLISTT (Baguio City, La Trinidad, Itogon, Sablan, Tuba, and Tublay) area.

AGT System, the mass transport technology locally developed by the Department of Science and Technology (DOST) through Metals Industry Research and Development Center, is the department's answer to address the need for environmentally sustainable transport technologies that could ease air pollution and traffic congestion.

RDC-CAR has already spearheaded various initiatives to ensure the realization of the undertaking, including the creation of an Ad Hoc Committee for the AGT System Project. The committee will spearhead the terms of reference for the conduct of the full blown study and look into possible funding sources for the conduct of the study.

In a meeting held March 20, 2017, the Ad Hoc committee concluded that the AGT could be an alternative transport system to significantly enhance current public transportation and help boost tourism.

To show its approval for the project, the provincial local government unit of Benguet submitted a resolution to strongly support the proposed development of the AGT in La Trinidad, Benguet and Baguio City and the conduct of a full-blown study. For its part, the BLISTT governing council likewise filed a resolution for the endorsement of the recommendation for funding of the AGT study under the 2018 DOST budget.

The clamor for the conduct of a full blown feasibility study came at the heels of the outcome of a pre-feasibility study that looked into the viability of deploying the AGT system in Baguio City and La Trinidad as an alternative solution to solve traffic congestion, transportation woes, and worsening air pollution. DOST-CAR commissioned Transport and Traffic Planners, Inc. to do the pre-feasibility study which was completed in 2015.

Results of the pre-feasibility study showed that the proposed AGT system will benefit majority of the commuters along the proposed lines, namely the Baguio Central Business District line with a total length of 2.1kms; the Baguio-La Trinidad line with a total length of 5.4kms; and both lines combined. However, the same document recommends that alternative sources of employment and business opportunities for affected sectors must be addressed by appropriate agencies.

While the study was limited to Baguio City and La Trinidad, expansion is recommended to include Itogon, Sablan, Tuba, and Tublay, covering the whole BLISTT area.

The draft terms of reference for the feasibility study includes, among others, a commitment to fully study the feasibility of deploying and operating the AGT system in BLISTT to include value engineering/ value analysis to identify the best possible implementation options or configurations for the project.

The draft terms specifies that the study shall include field surveys including traffic volume and occupancy counts, travel time studies, public transit surveys, and interviews; detailed assessment of passenger demand; environmental benefits; structural and geotechnical assessment for AGT track and station design; identification of stakeholder groups and potential impacts of the AGT system; institutional analysis to identify possible interfaces; and assessment of potential financial and economic benefits and costs of the AGT system.

Funding for the conduct of the study on AGT is estimated at PhP10M. Possible funding sources being looked into by the Ad Hoc Committee include the Japan International Cooperation Agency and a private-public partnership center. Currently, DOST-CAR has included this particular budget in its 2018 budget proposal which was duly endorsed by RDC-CAR.

'Inventrepreneurs' tie up with DOST-NCR

By EDGILYN R. ALCASID, *DOST-NCR*

DOST-NCR Regional Director, Jose B. Patalinjug III and FISPC Chair, Michael Hortaleza, seal their respective organizations' partnership with a handshake as they launch the new OneSTore Hub.

IN RECOGNITION and support of the ingenuity and innovativeness of Filipino inventors, the Department of Science and Technology-National Capital Region (DOST-NCR) and the Filipino Inventors Society Producer Cooperative (FISPC) forged an agreement to make inventions and innovative products made by local inventors more accessible to the public. Representing the two institutions were DOST-NCR Regional Director, Jose B. Patalinjug III and FISPC Chair, Michael Hortaleza who signed a memorandum of agreement (MOA) on May 14, 2017 to formalize their partnership.

The MOA signing coincided with the launching of the DOST-FISPC OneSTore Hub at the Delta Building in Quezon City. Through the tie-up, clients nationwide and even overseas can easily shop for products made by Filipino inventor-entrepreneurs or "inventrepreneurs" at the physical hub or through onestore.ph.

Present in the MOA signing were DOST Secretary, Prof. Fortunato T. de la Peña; DOST-NCR Regional Director, Jose B. Patalinjug III; DOST-II Regional Director, Engr. Sancho Mabborang; FISPC President, Francisco Pagayon; FISPC Chairman, Mike Hortaleza; and other DOST and FISPC officials.

Sec. de la Peña, a strong believer in the innovative spirit of Filipinos, said that the initiative is part of DOST's continuing quest to provide support to more innovators and inventors nationwide. He also personally tried the OneSTore kiosk and selected items to his liking.

For his part, Patalinjug emphasized DOST-NCR's pleasure in partnering with FISPC as the agency upholds its own support to inventor-entrepreneurs dubbed as "inventrepreneurs". He likewise expressed his admiration for Filipino inventors and assured FISPC that DOST-NCR will continue to work with them as they bring the inventrepreneurs' products to greater heights through OneSTore.

"We will also be providing FISPC with a package of assistance through DOST-NCR's programs and services," Patalinjug added.

On behalf of FISPC, Pagayon expressed his gratitude to DOST and said that he is looking forward to a fruitful and long-term partnership between the two organizations. He added that FISPC is also eager to avail of the additional support offered by DOST-NCR as this can greatly benefit inventrepreneurs in improving their products and expanding their markets.

DOST recognizes that one of the biggest problems among micro, small and medium enterprises or MSMEs and local inventors is access to commercial market. The department thus extended its marketing assistance for its Small Enterprise Technology Upgrading Program beneficiaries and other stakeholders through e-commerce. This gave birth to OneSTore as DOST's response to provide further assistance to MSMEs in terms of using online platforms to reach more markets.

In Metro Manila, DOST-NCR is the lead agency that manages the implementation of the OneSTore project. To date, there are now two OneSTore hubs that DOST-NCR oversees—the OneSTore hub-Lyf Wellness Center in Quezon City owned by Dr. Carl Balita and the newly opened hub in Delta Building operated by FISPC.

Sec. de la Peña trying the OneSTore kiosk

Regional Director Patalinjug affirming DOST-NCR's support to FISPC

DOST gives therapeutic handlooms to special education students

By EDGILYN R. ALCASID, *DOST-NCR*

IN AN effort to provide more opportunities and empower persons with disabilities, the Department of Science and Technology-National Capital Region (DOST-NCR) and DOST-Philippine Textile Research Institute (DOST-PTRI) partnered to empower differently abled pupils in a school for children with special needs. The partnership provides opportunities for students to earn income through handloom weaving.

In early May, DOST-NCR brought to St. Francis School-VSA Arts of the Philippines, Inc. (SFS-VSAP) the PTRI-developed portable therapeutic handlooms designed to provide a weaving technology for those with special needs.

"Our differently abled children and fellowmen are capable of producing outputs that can be beneficial to our country's economic development. With adequate technology, training, and opportunities, we can further empower them so they can do bigger things," said DOST-NCR's Regional Director Jose B. Patalinjug III.

He added that seeing the students weaving and using the portable handlooms firsthand further affirmed his conviction that children who have special needs are capable of thriving.

"These children are truly inspiring. We from the DOST-NCR want to assure SFS-VSAP and other similar institutions that we will continue to provide assistance to capacitate more Filipinos with special needs. In fact, we are looking at the provision of additional technology needed by SFS-VSAP to assist more children and adults who are differently abled," Patalinjug said.

The partnership was borne out of the DOST-NCR funded project titled "Improving the Capacity and Productivity of Urban Weaving of St. Francis School-VSA Arts of the Philippines, Inc. thru the Fabrication of PTRI Developed Portable Therapeutic Handlooms." Under the said project, DOST-NCR will provide 10 units of the PTRI developed therapeutic handlooms to SFS-VSAP and provide trainings on the features, operations, and maintenance of the technology.

The therapeutic handlooms were specifically designed to engage differently abled persons in handloom weaving as a therapeutic rehabilitation for their physical, mental, social, and vocational ability. What makes the handlooms special is that these are strategically designed for the use of paraplegic persons or those with total non-coordination of their lower extremities.

DOST-NCR Regional Director Jose B. Patalinjug III observes how differently abled students of St. Francis School-VSA Arts of the Philippines, Inc. use the therapeutic handlooms that the agency provided in support of the school's objectives to provide more opportunities for children and adults with special needs.

It features a hand held lever which eliminates the use of treadle in interchanging heddles to lock wefts. The therapeutic handlooms also promote easy weaving comprehension as it only needs eye-hand coordination for its users.

The project's beneficiary, SFS-VSAP, was established in collaboration with the National Council on Disability Affairs to strengthen the artistic potentials and enhance the skills of Filipino children and adults with special needs.

SFS-VSAP aims to empower differently abled persons by giving them learning opportunities, trainings, and jobs through skills acquisition. Included in the programs they offer are weaving trainings and tutorials for differently abled students so they can unleash their creativity and self expression.

Prior to the DOST-NCR support, SFS-VSAP only had four handlooms which were imported from Japan and Thailand and were interchangeably used by 20 student-weavers during their classes. The school currently has 47 students and among these are those with Down syndrome, global development delay, autism, and hearing impairment.

According to Rebecca Santos, VSA Executive Director, the imported handlooms are very expensive and costs roughly P60,000.00 each. Hence, it is not easy for them to buy additional pieces that can assist more students.

"If you look closely at our students, you can see how skilled and determined they are, especially in weaving. We are indeed very thankful to the assistance given by DOST-NCR as we can now support more students with special needs through the additional handlooms," Santos said.

She added that they are also looking forward to showcase the products made by the students at DOST's upcoming National Science and Technology Week exhibit in July.

Climate science camp ignited NegOr youth's interest in S&T, environmental issues

By SEAN ADRIAN T. GUARDIANO, *DOST-Negros Oriental*

AROUND 250 high school students and teachers from four selected public schools participated in a week-long climate science boot camp held April 17-20, 2017 in Dauin, Negros Oriental. The science camp was organized by the Department of Science and Technology-Science Education Institute (DOST-SEI), in cooperation with DOST-Negros Oriental Provincial S&T Center (NegOr PSTC).

Anchored on the theme "Oceans and Climate Towards a Resilient Planet", the camp sought to encourage students to pursue S&T careers and instill deep appreciation for S&T as a way to address environmental and societal issues. It featured lectures, hands-on activities about the atmosphere, weather, ocean, and marine biodiversity.

Resource persons for the science camp include scientists, instructors and researchers from the University of the Philippines-Marine Science Institute (UP-MSI) led by Dr. Aletta Yñiguez, DOST-SEI headed by Mrs. Ruby R. Cristobal, and meteorologists from the Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA).

The lectures centered on the following subject about the earth's atmosphere: temperature, pressure, rainfall, greenhouse gases, weather, hazards, and extreme weather conditions. Speakers also discussed oceanic temperature, circulation, chemistry, marine biology and focused on issues such as ocean warming, rise of sea levels, ocean acidification, and the impacts of coral bleaching.

Participants came from the following schools in Negros Oriental: Dauin National High School, RTPM-Dumaguete Science High School, Dumaguete City High School, and Zamboanguita Science High School. A similar activity was simultaneously conducted in the nearby province of Siquijor.

www.sei.dost.gov.ph

Improved FPRDI kiln yields better quality bamboo charcoal

By APPLE JEAN MARTIN-DE LEON, *DOST-FPRDI*

DEPARTMENT OF Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI) has redesigned its bamboo charcoaling kiln to make high quality charcoal at a higher yield.

According to Engr. Belen B. Bisana, chief of the institute's Bio-Energy and Equipment Development Section, the improved kiln is intended to produce high quality charcoal for industrial uses such as removing odor, purifying water, and maintaining soil alkalinity. The new kiln can be loaded with at most 500 kilos of bamboo slats, thereby yielding 35-40 percent more charcoal compared to the conventional drum kiln that only makes 25-31 percent.

"Bamboo is a good raw material for charcoal since it is a fast-growing plant and can be re-harvested without any harmful impact on the environment," explained Bisana. "The part of the bamboo used for charcoal is the stem base, which is typically discarded or left behind after harvesting," she added.

Aside from bamboo charcoal, the new kiln also yields more pyroligneous liquor or industrial vinegar from collected and condensed smoke. "The industrial vinegar is a high-end product that can be used as a good disinfectant, bathroom deodorizer, and organic pesticide, among other uses. It is in demand in other countries especially in Japan," noted Bisana.

Funded by the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development, the technology was developed under the project "High Quality Charcoal from Bamboo for Industrial Uses" that began in 2014. It is now on its last phase with pilot testing being done at the CS First Green Agri-Industrial Development Inc. in Pangasinan.

DOST-FPRDI offers other technologies for charcoal production such as the charcoal briquettors (manual and mechanized) and carbonizer that turn agro-forest wastes such as coconut shells, coffee bean hull, and sawdust into densified charcoal. Briquettes are easier to ignite, burn slower, and emit more intense heat per unit volume than ordinary charcoal.

"Through these technologies, the institute hopes to provide livelihood options particularly in rural communities where charcoaling is a common practice," said DOST-FPRDI Director Romulo T. Aggangan.

Interested parties may contact (049) 536-2586 or 536-236 for inquiries on technology demonstration and installation.

The improved bamboo charcoaling kiln can produce more bamboo charcoal and pyroligneous liquor than the old model.

Caraga researchers gear up on documentation of indigenous medical practices

By GABRIELLE ESPINOSA, *DOST-CARAGA*

Dr. Isidro Sia explains the importance of research on indigenous people in the Philippines.

Researchers discuss possible research topics on the subject of traditional knowledge on health of IPs.

TO IMPROVE the health of Indigenous people, we need to focus more on creating solutions, so said Dr. Isidro Sia, pharmacology professor of the University of the Philippines – Manila.

"There is little research on the medical practices of indigenous people. We need to strengthen this, especially that we have lots of IP tribes in the country, particularly in the Caraga Region," Dr. Sia said.

Dr. Sia posed his challenge to researchers from state universities and higher education institutions in Caraga who converged on April 6, at the Father Saturnino Urios University audio-visual room to plan on documenting traditional knowledge on health of the indigenous people in the region.

According to Dr. Sia, researchers need not limit their documentation on the traditional knowledge on health of indigenous people. Upon discussion, it was found that there are about six major indigenous communities in Caraga, namely the Higaonon, Mamanwa, Agusan Manobo, Manobo, Higaonon and the Banwaon.

Dr. Sia said that researchers may also document traditional knowledge on the health of ethnolinguistic groups in the region such as the Butuanons and Higaonons of Agusan, the Surigaonons of Surigao del Norte, the Cantilanons, Tampaganon and Kamayo of Surigao del Sur.

Spearheaded by Caraga Health Research Development Consortium (CHRDC) of the Department of Science and Technology, the activity aimed to come up with researches which focus on the documentation of traditional knowledge in the aspect of health of the indigenous people in Caraga.

Among the researchers who participated came from Agusan Sur State College of Agricultural Technology, Butuan Doctors' College, Caraga State University, Father Saturnino Urios University, Philippine Normal University, Saint Paul University, Surigao State College of Technology, Surigao del Sur State University, Saint Joseph Institute of Technology, and the Butuan City Library.

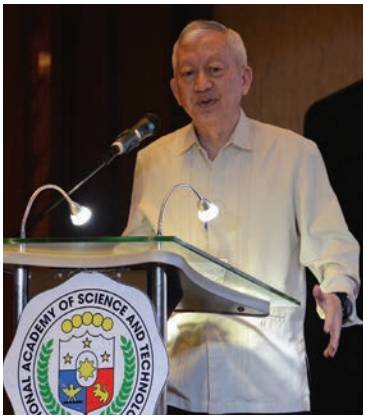
The Philippine Council for Health Research and Development also invited the researchers to submit more proposals under their Traditional Knowledge on Health (TKH) Program. TKH advocates for the preservation of traditional knowledge on health since previous documentations are not yet enough to cover the depth and breadth of Philippine traditional knowledge and health practices. It also capacitates researchers in the documentation, dissemination and utilization of traditional knowledge in health, and encourages indigenous people to be a part of the health research process.

TKH is a research program of DOST, in partnership with the Department of Health, National Commission on Indigenous Peoples, Intellectual Property Rights Office, National Museum, Department of Agriculture, and Department of Environment and Natural Resources. The program also includes a digital library on Philippine traditional knowledge on health which is considered to be the knowledge bank for traditional health practices of indigenous and cultural communities in the Philippines. The digital library can be accessed through the website: *http://www.tkdlph.com*

Experts seek mutual approach towards 'blue economy'

By RODOLFO P. DE GUZMAN & KARL RAVEN A. RAMON, *DOST-STII*

At the Luzon Regional Scientific Meeting on May 15, 2017 at the CAP John Hay Convention Center in Baguio City, Academician Rafael D. Guerrero III once again stressed the need to create policies that will support sustainable development initiatives for the benefit of marginal fisherfolks, fishing companies and consumers. Guerrero also expressed his support for the creation of a separate Department of Fisheries and Aquatic Resources independent of the Department of Agriculture. (Photo by Henry A. de Leon/S&T Media Service)



Academician Rafael D. Guerrero III explains the opportunities that can arise from the country's marine and aquatic resources. (Photo by Gerardo G. Palad, S&T Media Service, DOST-STII)

Dr. Ronald U Mendoza of Ateneo de Manila University, Dean-School of Government (Photo by Gerardo G. Palad, S&T Media Service, DOST-STII)

THE DEPARTMENT of Science and Technology-National Academy of Science and Technology (DOST-NAST) expressed support to the so-called "blue economy" by focusing on more research and development activities geared at harnessing the vast resources offered by the seas and oceans from fisheries to mineral deposits.

In a forum organized by DOST-NAST, dubbed as "Legislative Forum Towards Blue Economy", held on April 18, 2017 in Cebu City, experts from two different specialties called for a mutual approach towards a sustainably managed blue economy. The said forum was part of NAST's Regional Scientific Meeting with the theme, "Attaining Sustainable Development Goals: Philippine Fisheries and Other Aquatic Resources 20/20".

Academician Rafael D. Guerrero III, member of NAST-Agricultural Sciences Division, presented the vast opportunities that the country can harbor from the Blue Economy, stressing the need to "prioritize the use of the seas for the benefit of the people." Guerrero emphasized further that blue economy can bring not just fishes but also oil, gas, minerals, and even pharmaceuticals.

In the same forum, economist Dr. Ronald U. Mendoza, Dean of Ateneo de Manila University's School of Government, posed a challenge to science experts and the government to invest enough in the marine sector, and to use "not only science but also economics." Mendoza is positive that once investments in the country's marine sector set sail, the road towards the sustainable management of the country's blue economy will not be far behind.

Guerrero also emphasized the need to institutionalize a designated department that will handle the country's blue economy to be called the Department of Fisheries and Aquatic Resources, while Mendoza stressed the need to translate data from blue economy into plans and policies to introduce possible total economic valuation.

The Philippines as an archipelagic country boasts of a coastline that measures up to 36, 289 km longer than China and the United States. The country's waters also hold 70 percent of the Coral Triangle or the Global Center of Marine Diversity where 76 percent of coral species live and is home to at least 2, 228 species of reef fish. And with Philippine Rise (formerly Benham Rise) harboring 13M hectares of oceanic plateau, both Guerrero and Mendoza agree that it is a challenge on how to sustainably manage the country's marine and aquatic resources.

NAST scientific meeting in Cebu

Here are some scenes during the Visayas Regional Scientific Meeting held April 18, 2017 at the Marco Polo Plaza Hotel in Cebu City. The event was organized by the National Academy of Science and Technology (NAST), an attached institution of the Department of Science and Technology (DOST). (Photos by Gerardo Palad, DOST-STII)

Secretary Fortunato T. de la Peña says in this DOSTv interview that DOST is focusing more on the development of R&D projects in line with its thrust to use science and technology to achieve inclusive growth, particularly in the regions, in partnership with state universities and colleges (SUCs). He mentioned the different initiatives of the DOST in various areas like the creation of Food Innovation Centers in Regions 6, 7, and 8, producing high value food products like the Fried Mayahini or *barinday (Venus clam)* by Eastern Visayas State University, the ready-to-cook complementary food blend branded as Morise (mongo-rice-sesame) by the University of Antique and DOST's Food and Nutrition Research Institute, and the P4.2 million funding for the Western Visayas Health Research and Development Consortium.

A certified *"Fault Finder"*, DOST Undersecretary for Disaster Risk Reduction and Climate Change Adaptation, Dr. Renato U. Solidum Jr. (right) was interviewed by Ms. Gel Miranda, lead anchor of the DOSTv, during the Visayas Regional Scientific Meeting held on April 18-19, 2017 at the Marco Polo Plaza Hotel in Cebu City. Usec. Solidum, also OIC of PHIVOLCS, explained the importance of "disaster imagination" in preparing for earthquakes. He underscored that science, technology, and disaster imagination are key elements in identifying, assessing, and mitigating risks brought about by geological hazards like earthquake, tsunami, etc. Usec. Solidum also talks about the need to create a business continuity plan to hasten the restoration of basic services after a calamity strikes and ensure that normal life resumes immediately. The event was organized by the National Academy of Science and Technology (NAST), an attached institution of the DOST.

The Ritazo Tingub Women's Worker Association has sewn a better life for its members with the Trash to Crafts Project supported by the DOST, the Healing the Hurting World Foundation Inc., and Justice Peace and Integrity of Creation. The group that started in 2004 availed of assistance in the form of training and donation of sewing machines. These industrious women of Barangay Tingub, Mandaue City manufacture bags and coin purses made from waste rags and textile. The women workers come from poor, homeless families who were relocated in the city. Secretary Fortunato T. de la Peña, (sitting) viewed the different products like hand bags that are now found in malls in Cebu City and nearby provinces. The bags are made of discarded textile (ritazo).

DOST Secretary Fortunato T. dela Peña, with Victoria Sandidge, owner of the Bohol Bee Farm, during his visit to the resort.

The Bohol Bee Farm Story

By LICINIO F. GINGOYON, *DOST-VII*

"It started with a dream."

A dream it all was 15 years ago. Victoria Sandidge vividly recalls how her now thriving entrepreneurial venture all began.

Sandidge is the owner and manager of the Bohol Bee Farm Resort, a booming eco-tourist destination ensconced in a wooded coastal enclave. The resort does not only offer an idyllic look and feel of tropical countryside living, it also provides a kind of service that is identified with organic and sustainable lifestyle and work environment.

Bohol Bee Farm Resort is located in Panglao Island, Bohol, on a six-hectare nature-inspired hideaway that takes pride in its rural charm accented by tree-covered landscape, nipa-roofed wood-and-concrete-walled chalets, and a majestic seaside cliff along the south periphery of the resort premises.

Down the rugged perch of the cliff, a rustic restaurant sits, beckoning visitors and guests to indulge in the unique taste of its healthy green cuisine against the backdrop of breathtaking vista of Panglao's pristine waters.

Bohol Bee Farm: The beginning

Sandidge was a nurse who made good money in the United States. But long before the lure of American dream came about, she also once was a little girl who found happiness in living a bucolic life in her sleepy village in Panglao. As such, it was a

"I came back because I believed that in our own country, we can still do something. We have to start believing. This is the way to go."

Sandidge showing DOST officials around the Bohol Bee Farm Resort.

dream for her to come back to Panglao, a dream she nurtured 40 years ago, which became half-buried in oblivion as she would later immerse herself in what she thought were grander pursuits in life.

Realizing, however, that material fortune was not all there was to life, she decided to return to the Philippines. She left the U.S. against all odds, against the "better" judgment of her parents who seemed to have lost faith in their own country, perhaps for good reason.

"I came back because I believed that, in our own country, we can still do something. We have to start believing. This is the way to go," says Sandidge who took her two kids, then 12 and 10 years old, with her when she flew back to the country.

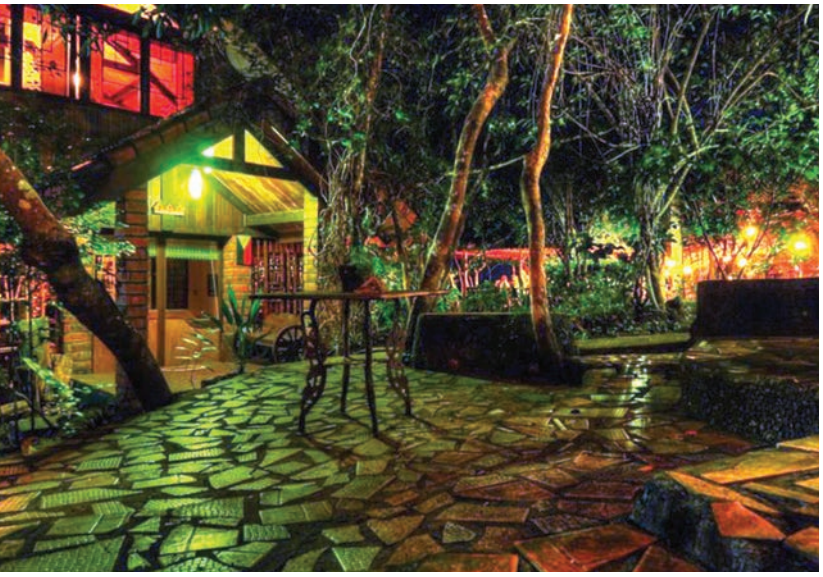
She started small at the farm in 2002 with a restaurant in a canopied cottage and a modest two-room vacation inn manned by only four workers. An organic gardening hobbyist, she used the resaurant to showcase the recipes for food items she made from the produce of her organic garden.

Buzz around the bee

As the business grew through the years, many new organic food along with other home-made commodities were produced to give customers a wider array of products to choose from. The growing consumer demand made her see the need to increase the production volume of goods to ensure proper preservation and packaging of food products to extend their shelf life.

The growing consumer demand made her see the need to increase the production volume of goods to ensure proper preservation and packaging of food products to extend their shelf life.

Boosted by DOST's invaluable support, the Bee Farm improved its business in terms of production efficiency and product quality.



One of these products was the manually-produced organic ice cream with natural ingredients extracted from fruits, vegetables, and herbs produced in the farm. Using manual juice squeezing method, Sandidge's factory barely managed to produce a maximum of 40 gallons of ice cream in a day of 14-hour, two-shift work.

The frozen product gained a steadily expanding market and Sandidge saw the dire need to boost production in order to meet the demand. An Italian guy offered to sell a second-hand ice cream machine which was marked down at a temptingly low price.

Then she learned about the Department of Science and Technology (DOST) and its support to entrepreneurs like her. Seeing the huge potential of the Bee Farm business, the Bohol Provincial Science and Technology Center (PSTC) extended its helping hand to Sandidge. The center provided her the much-needed funding and technical assistance in a partnership deal under the Small Entrepreneurs Upgrading Program (SETUP).

Boosted by DOST's invaluable support, the Bee Farm improved its business in terms of production efficiency and product quality. DOST provided Bee Farm with training on basic food sanitation, hygiene, and current good operation and manufacturing practices, as well as consultancy on food safety and manufacturing productivity.

The agency likewise provided technical assistance in product packaging and labeling, food safety and good manufacturing practices (GMP)-compliant plant layout, and product development to improve the shelf-life of the goods. Moreover, DOST helped the factory in acquiring a brand new modern ice cream machine and a blast freezer.

The results were simply great, says Sandidge who was happy with the improvement in production technology and the technical skills of the Bee Farm workers. Their ice cream production rate increased by 70 percent, as well.

"Previously we could only produce about 40 gallons a day. Now we can produce 200 to 250 gallons a day, and we have seven branches now," Sandidge proudly proclaims. The factory was able to develop new product lines and penetrated new markets in Bohol province and Cebu City.

Booming bee

The Bee Farm Resort has since enormously grown to become one of the most popular ecotourism businesses in Bohol today, offering quality services and more diverse products made from organic materials sourced from its own farm. Highlighting the resort's attraction are the delectable organic ice cream, spread, and other interesting products with qualities raised to excellent standards with DOST's help.

But what makes the eco-resort cum factory stands above the rest is the nobility of Sandige's intentions — that rare sense of humanity that seems lost on many. To her, it is about the primacy of value the Bee Farm places on social responsibility and ecological sustainability over and above profit.

A case in point is organic food production. It not only promotes nutritious diets and healthy ecosystem but also gave jobs to village folks as farm workers, production crew, and service staff at the village resort. Even if the factory uses high-powered machinery, Sandidge

sees to it that she employs more villagers and their dependents as her way of giving back her blessings to the community.

"With just four workers before, we have 423 people now working with us," she says.

"It's not all about money. You realize you are not here just for yourself. You are here to serve. Success is not all about material things you have. Success is deeper than that. Success is about helping others," she says.

Because of its success, the Bee Farm received a host of prestigious awards that recognized its commitment in giving value to the environment and humanity more than profitability in its business.

Witnessing the remarkable growth of her once fledgling enterprise, Sandidge recalls that poignant moment when she decided to come back to her old hometown – for good – to live her dream. She cherishes the wonderful journey and partnership she has with her staff and the DOST that believed in her and walked with her through challenging times.

"What you see here (in the Bee Farm) is the dream I had when I was small. When my teacher asked me to draw something, I drew a small nipa house in a farm, with the river, with the tree," she recalls. "And 40 years later, God gave more than what I expected. And I couldn't have done this alone. I have my people. And an agency (DOST) that really believes in me."

Sandidge has kept faith in herself and in her country, even during crucial times when her parents, for lack of faith, tried to dissuade her from going home. "Even my own parents did not believe in my own country," she reveals. "But as long as you believe, that thing you believe in can grow."

A dream does not turn into reality through magic. But a dream could stir things that will turn it into reality, such as determination and hard work borne out of faith and courage. Eleanor Roosevelt once said, "The future belongs to those who believe in the beauty of their dreams."

The woman behind the Bee Farm continues to believe. She believes in our country. She believes in DOST. And DOST believes in her — and stands by her through thick and thin.

They both believe in the beauty of her dreams. And they are making history.

More corals, more tourists

By RICARDO R. ARGANA, *DOST-PCAARRD*

Technology to restore corals helps in increasing tourism opportunities in Cabuan, Guinsiliban in the province of Camiguin.

While Camiguin island is essentially known for its sweet lanzones, this province has something more to boast about. The island is blessed with natural attractions such as cool refreshing waters and waterfalls, panoramic view of the ocean, and potential dive sites. One of such dive sites is in barangay Cabuan, Guinsiliban in Camiguin.

Aware of such potential, the Cabuan Community Village Coastal Tour Association (CCVCTA) worked together with the Department of Science and Technology and the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD), Sangkalikasan Producers Cooperative (SPC), and the provincial government of Camiguin to roll out the Coral Reef Restoration (asexual) Program.

The program addresses coral degradation in the island to improve the view of dive sites and boost tourism potential.

The 61-member tour association which is registered with the Department of Labor and Employment aims to monitor and strengthen the protection and conservation of coastal and marine resources in the barangay. The association embodies the people of Cabuan's strong connection with the sea, spirit of volunteerism, desire to adopt progress that is environmentally sound, and reclaim their identity as a people of the sea. Thus, the association readily adopted the program.

Having started in 2014, the Coral Reef Restoration Program rolled out coral transplantation technology using asexually reproduced corals to improve productivity of coral resources for sustainable fisheries. Chosen sites for restoration were Camiguin, Bohol, Pangasinan, Sarangani, Bataan, Zambales, Palawan, Zamboanga del Norte, and Ilocos Norte. The sites were selected based on their suitability for restoration, availability of sufficient amount of coral fragments for transplanting, and their location within the marine protected area.

Dislodged live coral fragments or the so-called "corals of opportunity" (COPs) are gathered and attached to

coral nursery units so that they can quickly recover and regenerate. Each nursery unit can hold 500 COPs per batch and can be used several times a year. Ingenious as it is, the technology uses marine epoxy clay, nails, and cable ties.

Louisa Smith La o', member of the SPC, presented the organization's accomplishment as a program collaborator during the Sixth General Assembly and Convention of the Philippine-Korea Rural Development Administration Alumni Association on September 29-30 at the DOST-PCAARRD Innovation and Technology Center in Los Baños, Laguna.

Adopting the theme, Technology Transmission to Community Transformation, the event highlighted the outcomes or impacts of technology transfer initiatives in transforming communities.

La o' shared that with the DOST-PCAARRD program on coral restoration, 10 CNUs were designed through the DOST-funded Filipinnovation program and two SPC-designed CNUs have been deployed underwater with 5,000 and 3,000 COPs, respectively. This has helped in improving not only the coral reefs but also the marine ecosystem as evidenced by the increase in fish density and marine biodiversity.

Aside from what have been restored, the program has also institutionalized certain mechanism towards a sustainable underwater tourism. For one, it initiated the Eco Dive Tourism Education and Briefing, DOST-PCAARRD's coral propagation main tool. It has also provided divers with the opportunity to experience coral restoration as an added feature of the dive.

With the success of the technology in Cabuan, Louisa said, "Today, we are no longer just divers. We have the power to bring back life to the sea."

"Today, we are no longer just divers. We have the power to bring back life to the sea."

Other initiatives under the program

The Coral Reef Restoration program also initiated efforts in Bakud Reef located in the town of Kiamba, Sarangani. The Provincial Government of Sarangani collaborated with the Mindanao State University-General Santos City, which was the project implementer.

The project is also part of the Filipinnovation program.

The restoration effort became necessary when MV Double Prosperity, a Panamanian-registered vessel, ran aground Bakud Reef destroying massively some 2,844 square meters of precious coral reefs, among other major damages.

Tuka Marine Parks 1 and 2 were identified as the donor/collection sites; Tuka Marine Park 3 for the Coral Nursery Units (CNUs), and Bakud reef as transplantation site. The sites were chosen because of their suitability for restoration; availability of sufficient amount of coral fragments or COPs; and their being within the sphere of a Marine Protected Area.

The project is expected to transplant 30,000 coral fragments to restore damage reef area; set-up and deploy 10 CNUs; identify, document and establish a stream of dive sites; and develop a pool of human resources for coral restoration and eco-tourism.

Meanwhile, Hundred Islands in Alaminos, Pangasinan, also a tourist destination, was also identified as one of the beneficiaries of the program. The initiative was supported by the Pangasinan State University, LGU of Alaminos, Pangasinan, the Citizens' Armed Force Geographical Units of the Philippine Army Auxillary Force, and the RVS 4 Star Mariculture Coral Farm.

Quezon island was identified as the donor/collection site, Clave Island for setting up of the CNUs, and Romulo Island as the transplantation site.

Members of the Cabuan Community Village Coastal Tour Association worked together with the DOST, PCAARRD, SPC and the provincial government of Camiguin in rolling out the Coral Reef Restoration Program

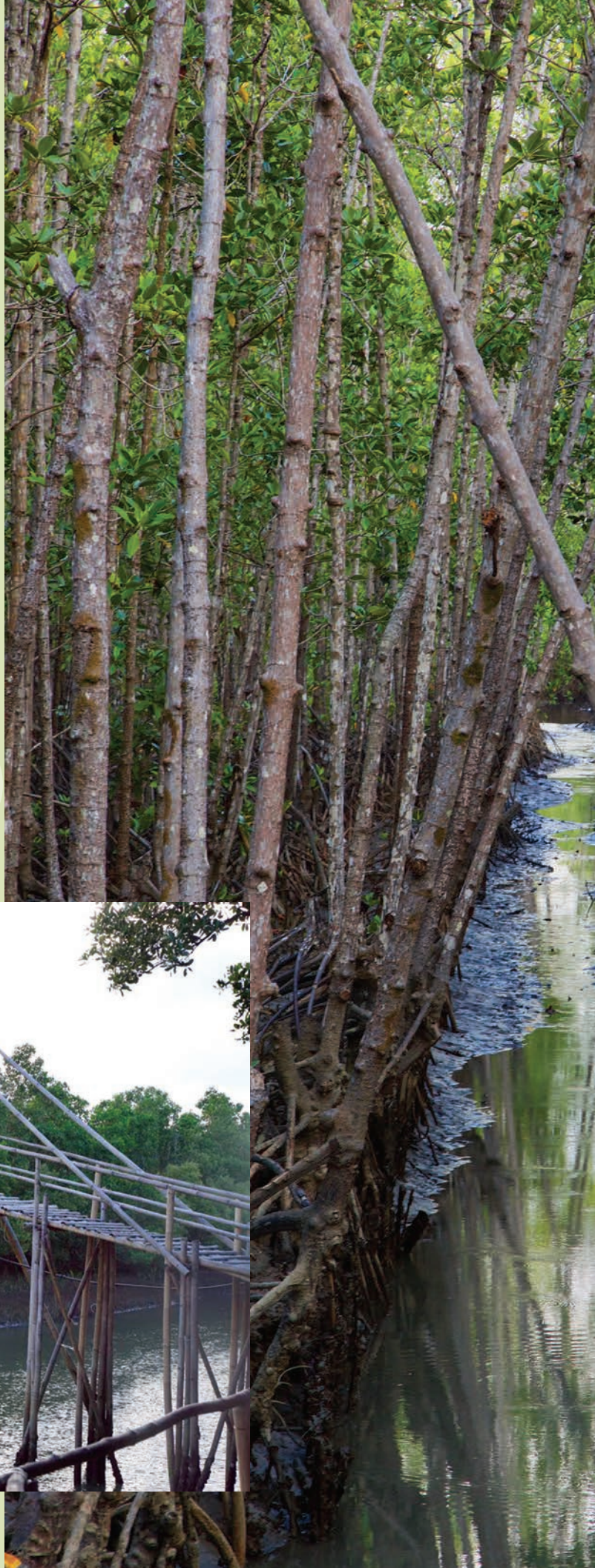
Mangrove Haven

By FRAMELIA V. ANONAS, *DOST-STII*
Photos by HENRY A. DE LEON

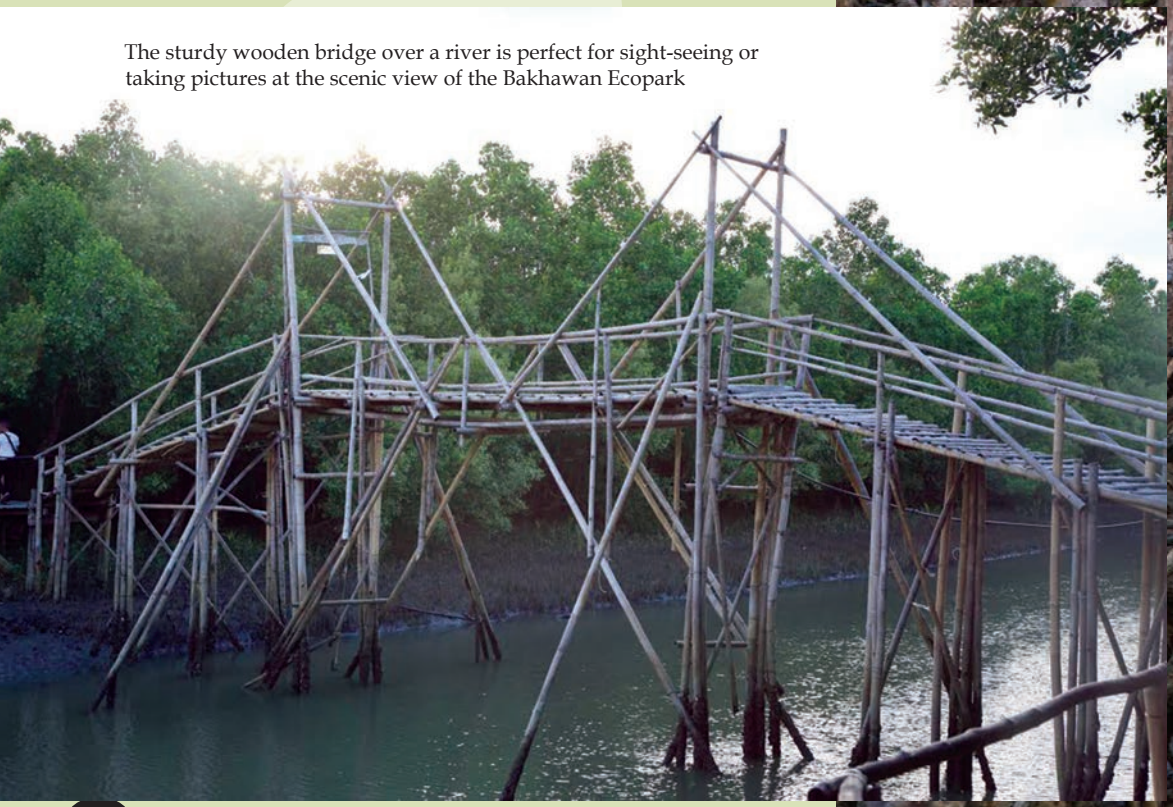
"It was science that was behind the establishment of our mangroves here," said Madelyn Cuadra of the Provincial Environment and Natural Resources Office, when she spoke in the Science Communication Training for the Media in Aklan last June. "Scientists recommended that the idle mudflat area in Kalibo be built with mangrove to serve as shield for the community during calamities."

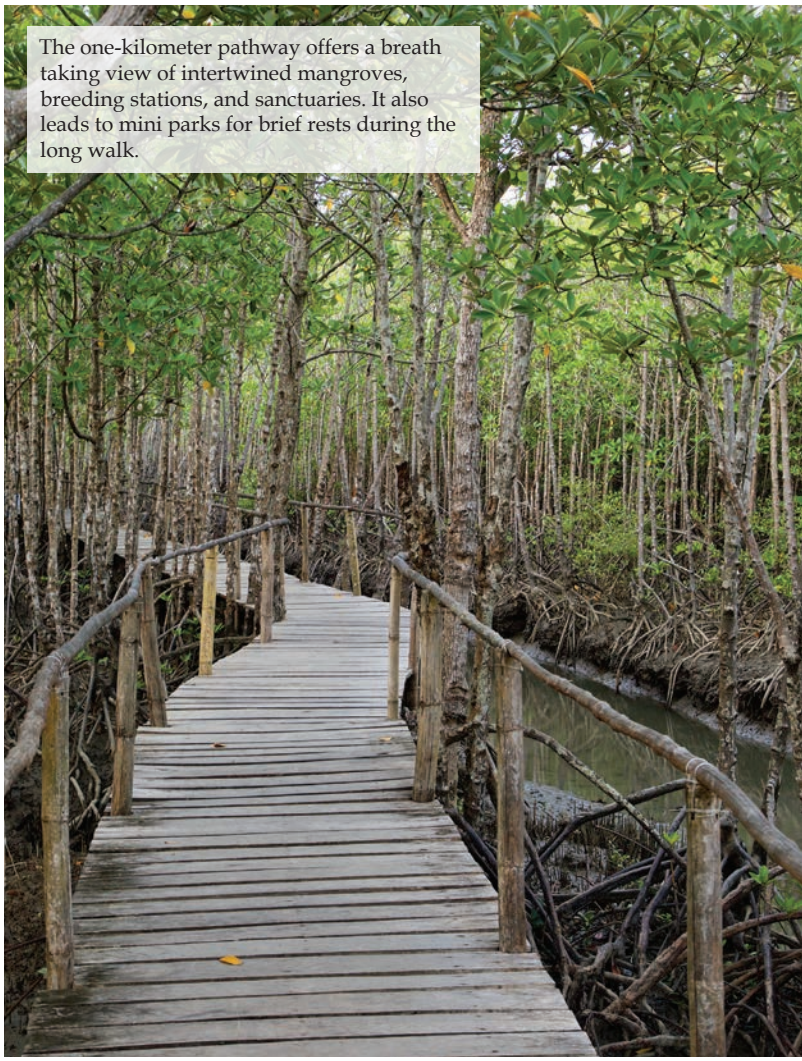
The training was organized by the DOST-Science and Technology Information Institute and the Philippine Science Journalists Association, Inc., in coordination with the Kalibo provincial government.

Cuadra was talking about the Bakhawan Ecopark, a 220-hectare mangrove forest, and now Kalibo's top attraction next to its Ati-Atihan Festival. "Bakhawan" means mangrove in the local language.



The sturdy wooden bridge over a river is perfect for sight-seeing or taking pictures at the scenic view of the Bakhawan Ecopark



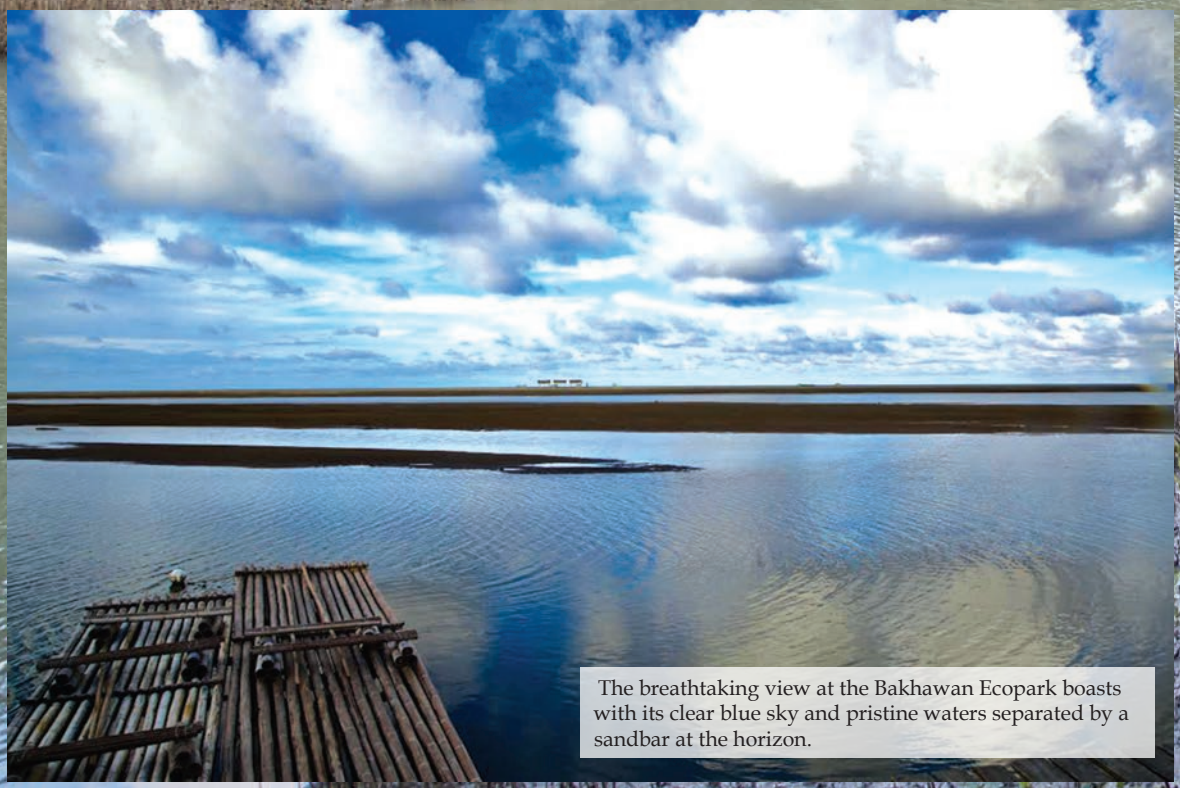


The one-kilometer pathway offers a breath taking view of intertwined mangroves, breeding stations, and sanctuaries. It also leads to mini parks for brief rests during the long walk.

The Eco-park is operated by a non-government organization called KASAMA or the Kalibo Save the Mangroves Association.

Visiting this park means walking on a 1.3-kilometer wooden trail that leads to a rustic viewplace that offers a scenic view of the beach. Along the trail and amidst the mangroves are breeding stations of bangus (milkfish) and plapla (tilapia), and sanctuaries of various birds and other marine creatures. Midway is a frail-looking but actually sturdy wooden bridge that crosses a river— perfect for selfies and groupies. Other features of the ecoparkare a souvenir shop, watchtower, canteen, massage area, charcoal briquetting, picnic huts, and a Center for International Mangrove Studies. It even offers free water on its entrance area.

The ecopark was established in an area called Brgy New Buswang which was prone to floods and storm surges during weather disturbances. Upon recommendation of experts, a group of Kalibonhons in KASAMA worked with the local government of Kalibo, Aklan and the Department of Environment and Natural



The breathtaking view at the Bakhawan Ecopark boasts with its clear blue sky and pristine waters separated by a sandbar at the horizon.

Resources to convert a mudflat into a mangrove forest which was envisioned as the community's first line of defense against floods and storm surges.

The project started in 1990 with 50 hectares. Now it has grown more than four times its original size.

Originally conceived to serve as defense against natural calamities, Bakhawan Ecopark has now become a tourist attraction, giving the locals a source of livelihood. Members of KASAMA are assigned in respective areas of the park for maintenance and management, and they receive salaries for it.

The ecopark is said to be the country's most successful mangrove reforestation project, setting a benchmark for other green projects in the country. It has been awarded by the United Nations- Food and Agriculture Organization as one of the exemplary forests managed in the Asia-Pacific region. Further it received the Golden Eagle Award in the Asia Pacific for excellence in environmental preservation.

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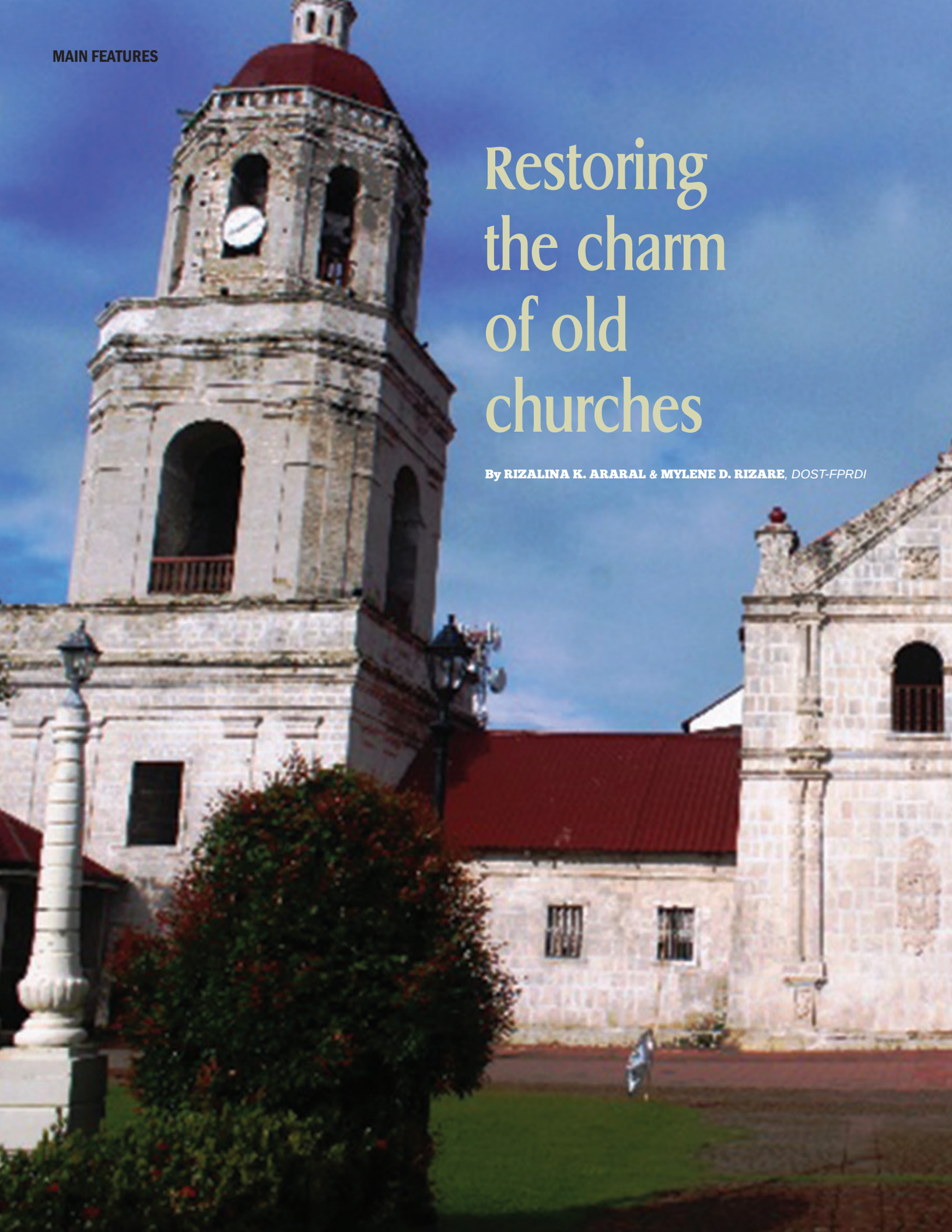
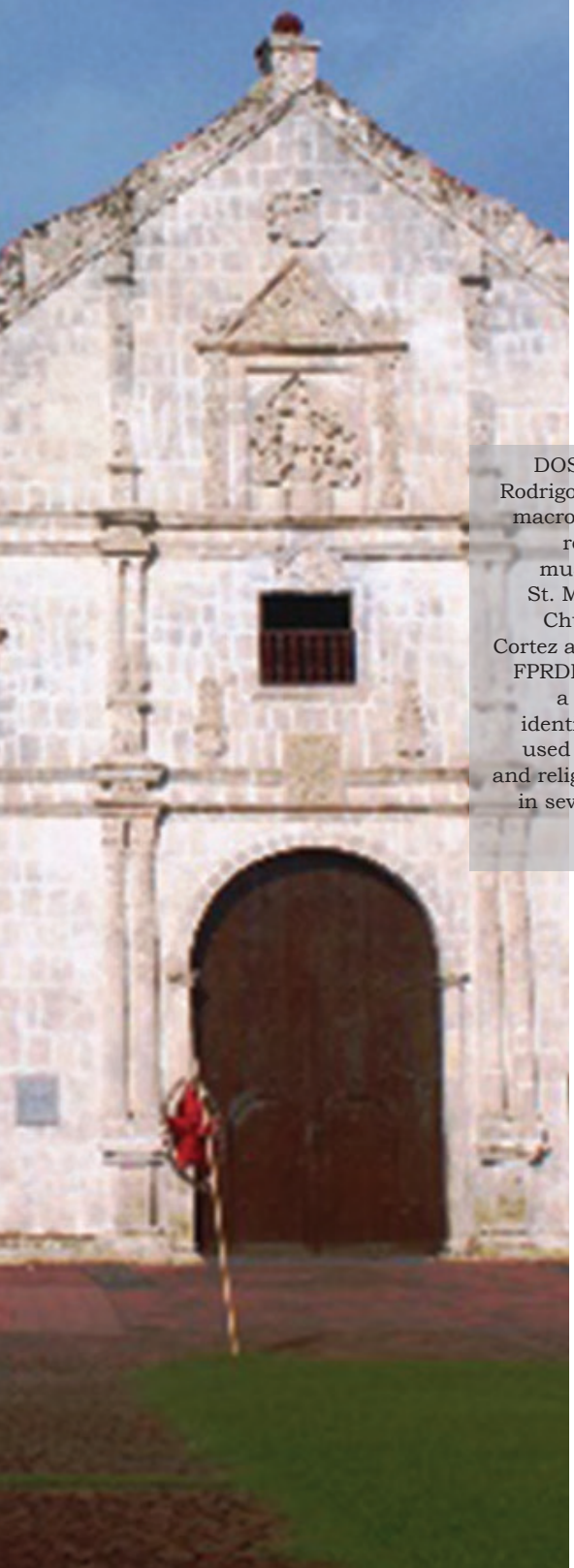
Home to a 220-hectare mangrove forest, the Bakhawan Ecopark serves not just a defense against natural calamities, but is also one of the main attractions in the area.



Restoring the charm of old churches

By **RIZALINA K. ARARAL** & **MYLENE D. RIZARE**, *DOST-FPRDI*

DOST-FPRDI's wood identification technology helps old churches have feasible restoration plans.



In partnership with the Department of Science and Technology-Forest Products Research and Development Institute (DOST- FPRDI), the National Historical Commission of the Philippines (NHCP) embarked on a project to restore 15 Bohol and Cebu heritage churches damaged by the 7.2 magnitude earthquake on 15 October 2013.

According to NHCP Director Ludovico Badoy, "Following international conservation and restoration standards, the Commission gathers information on the type of materials that make up these wooden structures, and uses such to come up with feasible restoration plans."

Dr. Ramiro P. Escobin reports, "Almost 1,500 pieces of wooden structures and museum pieces found in the old churches were identified by the DOST-FPRDI team with relatively high accuracy using the traditional, practical and standard methods in wood structure identification."

DOST-FPRDI researcher Rodrigo E. Cortez, Jr. takes macro-photos of a wooden religious image and a museum piece from the St. Michael de Archangel Church in Argao, Cebu. Cortez and four other DOST-FPRDI researchers formed a team which recently identified the tree species used in wooden furniture and religious artifacts found in several old churches in the Visayas.

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Tawi-Tawi: An Island Gem of the South

Home to a rich biodiversity with its vibrant waters and clear blue skies, Tawi-Tawi will surely captivate anyone with its beauty. Aside from picturesque sceneries and abundance of marine resources, its heartwarming people adds more to what a gem this island province truly is.

But underneath all this beauty in Tawi-Tawi lies a bigger problem causing its natural resources, specifically its coral reefs and marine species, to slowly deteriorate and be gone for good. Destructive fishing practices, including the infamous dynamite/cyanide fishing, are the main culprit for such damage. As an island province, its people are greatly dependent to fishing as their primary source of living. It is without a doubt that this gradual destruction of their corals and other marine resources will take a huge toll not only to the marine species, but most importantly to the residents of Tawi-Tawi.

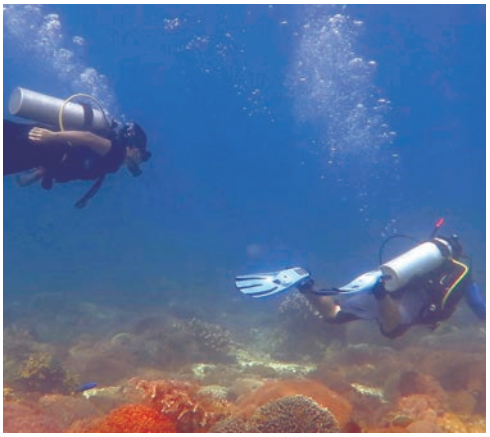
Fortunately, with the efforts of Department of Science and Technology (DOST) through the Philippine Council for Agriculture, Aquatic, and Natural Resources and Development (PCAARD), and in partnership with Mindanao State University – Tawi-Tawi College of Technology and Oceanography, a rehabilitation program for coral reefs has helped improve the current conditions of the corals covering Tawi-Tawi.

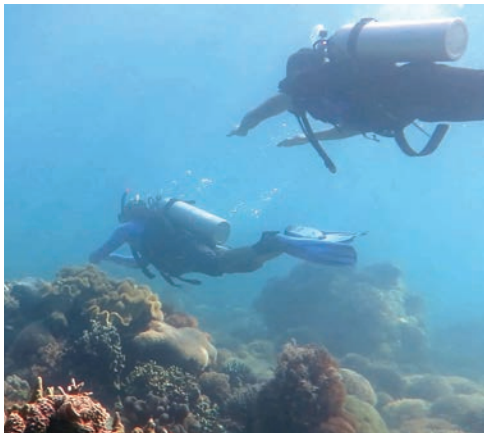
The said program has made some positive impact and behavioral change among its local fishermen. Rani Timpah, a Tausug fisherman, is actively participating in the coral reef rehabilitation. As a former user of dynamite in fishing, he has seen the grave effects of this destructive fishing practice. But now, Rani and the other Tausug fishermen claims how life-changing the rehabilitation project has been, even more so that the fish and marine species are now starting to flourish in their corals once again.

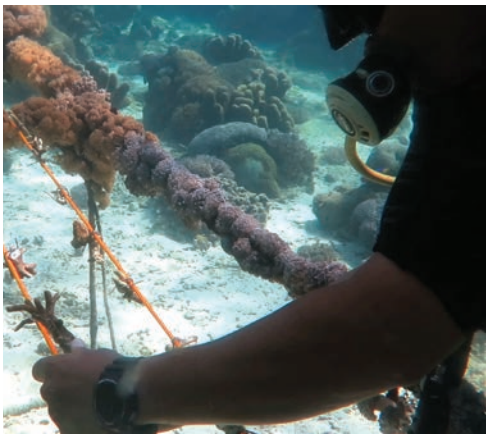
Tausug fishermen harvest marine products from their sea and (inset) a lone local house is situated amidst the crystal clear waters of the Tawi-Tawi islands. *(Photo by Aristotle P. Carandang)*

A majestic view of the Tawi-Tawi islands showcasing its pristine waters. *(Photo by Aristotle P. Carandang)*

A former dynamite fisherman, now an advocate for coral reef rehabilitation, Rani Timpah shares his story on how he helps in protecting the corals. *(Photo by Aristotle P. Carandang)*







DOST-PCAARD Coral Reef S&T program researchers demonstrate the process of restoring and propagating corals. *(Photo by Emir Khan Bautista)*

A picture of health
How S&T made this organic farm productive

By **KARL RAVEN A. RAMON,** *DOST-STII*

Under the SETUP, Kerobee Farm's greenhouse facility received an upgrade, consultancy on Nutritional Content Analysis of his four herbal products, and training in Good Manufacturing Practices, Packaging, and HACCP/ISO.

The Cordillera is known for its rich land that nurtures pretty flowers, fruit-bearing plants, vegetables, and herbs. As such, Engr. Romeo Kimbungan of Kerobee Farm, honey producer since 1992, made this as an advantage to his business.

Greenhouse facility gets even greener

In 2008, Engr. Kimbungan established his own organic herbal production facility, adding organic vegetables and herbal plants in his product line.

However, his greenhouse facility was not able to protect its plants from certain conditions like weather, plant diseases, and pests. But this was only until Engr. Kimbungan availed himself of the Department of Science and Technology's flagship program in aiding MSMEs (micro, small, and medium enterprises) called SETUP or Small Enterprise Technology Upgrading Program in 2010.

Under the program, Kerobee Farm's greenhouse facility received an upgrade, consultancy on Nutritional Content Analysis of his four herbal products, and training in Good Manufacturing Practices, Packaging, and HACCP/ISO.

At present, his farm has improved its production efficiency-- crops are grown year-round and protected from airborne/soilborne diseases and even pests. With the facility upgrade, his workers are able to work efficiently and conveniently even during rainy seasons.

Upgrading tea facility

Engr. Kimbungan saw the promising career of his farm and availed again another SETUP assistance in 2014, this time to augment his tea production.

Now his farm is equipped with appropriate technology like automatic tea bag machine and improved its label design and packaging material. He also availed of product laboratory analysis, MPEX consultancy, trainings on lip balm and cream processing. Kerobee Farm has now expanded to include a tea and herbal processing facility.

PROJECT VISIT IN THE HIGHLANDS. Academician Rafael D. Guerrero III (R) together with the media and personnel from the DOST-National Academy of Science and Technology, Philippines visited Engr. Romeo Kimbungan's Kerobee Farm, a DOST-assisted enterprise, after attending the Luzon Regional Scientific Meeting organized by NAST, held on May 15-16, 2017 in Baguio City.

Photos by Gerardo G. Palad, DOST-STII

S&T intervention enabled the company to eliminate frequent human handling that can cause contamination and it also reduced atmosphere pressure which helps preserve the aroma of the teas.

(Right photo) Kimbungan shows to the media the "assisted by DOST" mark on the packaging of his products. *(Photos by Gerardo G. Palad, DOST-STII)*

Aside from improved tea quality, S&T intervention enabled the company to eliminate frequent human handling that can cause contamination and it also reduced atmosphere pressure which helps preserve the aroma of the teas.

In addition, the automatic tea bag machine lessened production time: from 11 tea bags/minute, Kerobee Farm now produces 35 tea bags/minute.

Everybody's cup of tea

From a wide range of products, it is impossible not to touch your inner taste for healthy products.

From initial product lines of (1) herbs and process teasan (basil, mint, dandelion, lemon grass, yacon, gotu kola, strawberry, kale, wheatgrasss, and chia); (2) fresh vegetables (lettuce, tomato, spinach, buckwheat); (3) fruit (strawberry); (4) processed Teasan (banaba, spinach, gipah, guyabano, ginger, and turmeric), Kerobee Farm is now also offering additional farm products like (1) herbs (ashitaba, rosemary, milk thistle, and stevia); (2) vegetables (cucumber, french beans, alfalfa sprouts, beans, eggplant, hot pepper, pechay, polonsai, and chives); (3) and other additional product lines (honey vinaigrette with herbs-salsa dressing, honey calamansi concentrate, herbal wine, honey turmeric drinks with lemon, organic lip balm, ashitaba tea, arabica coffee, 9-in-1 herbal tea, and turmeric and malunggay powder in sachet).

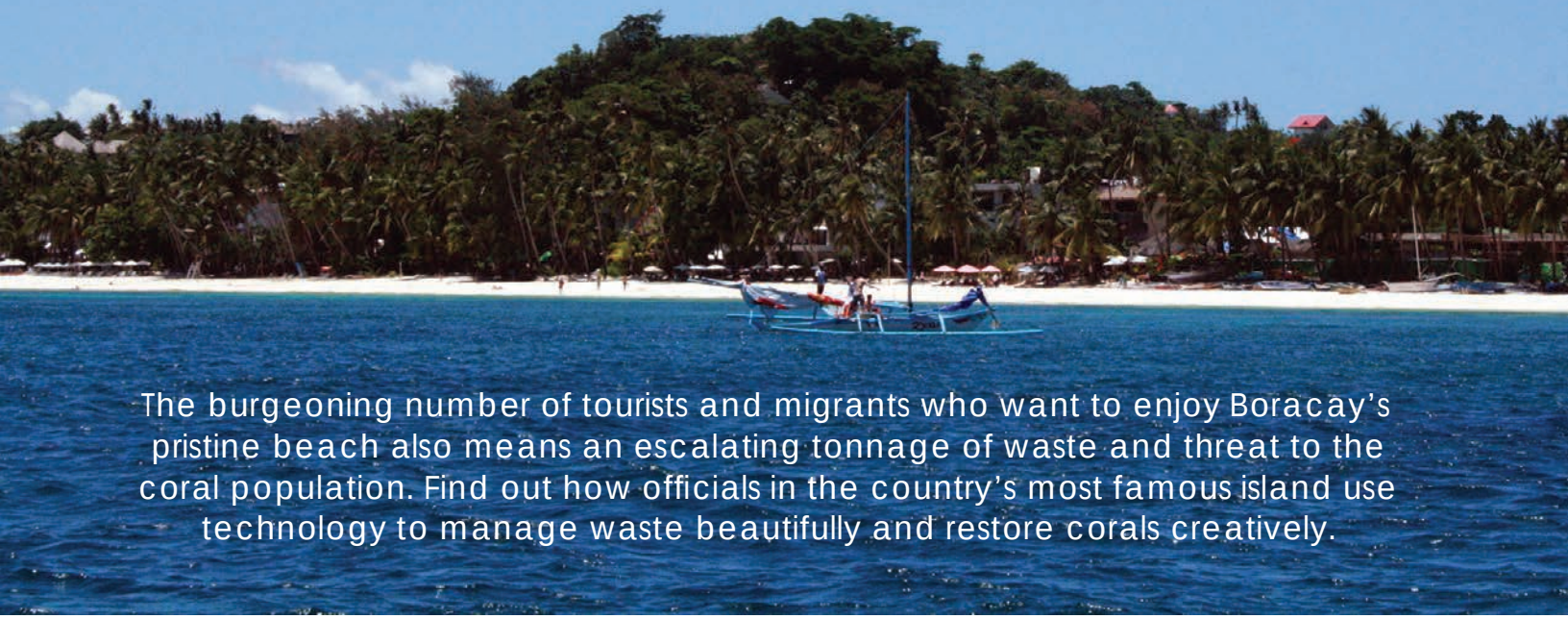
With DOST assistance costing no more than P2 million, S&T intervention made his enterprise healthier. In 2015, Engr Kimbungan's enterprise was awarded as Best Regional SETUP Adoptor. Kerobee Farm in its brightest stage is now planning to have a branch in Metro Manila to reach potential market. Kerobee Farm at present only offers its products in the local market and upon orders only.

The tea-bagging machine makes production time in Kerobee Farm quicker and more efficient.

Kimbungan of Kerobee Farm is interviewed by the media

Boracay beauties
From waste to wealth, from fragments to reefs

By KARL RAVEN A. RAMON, *DOST-STII*
Photos by **LGU-MALAY AND HENRY A. DE LEON**, *DOST-STII*



The burgeoning number of tourists and migrants who want to enjoy Boracay's pristine beach also means an escalating tonnage of waste and threat to the coral population. Find out how officials in the country's most famous island use technology to manage waste beautifully and restore corals creatively.

Considered by many as the face of Philippine tourism, Boracay Island has been featured in various travel magazines and sites as a top destination not only in South East Asia but also in the world.

A must-see destination, Boracay has seen an increasing number of tourists, establishments, and residents. Consequently, there was also a rise in waste as well as damaged corals thus diminishing Boracay's opportunities in tourism, environment, and fishery.

In a field report from Coastal Development and Education Foundation, Inc., irresponsible engagement in water sports activities such as jetskiing, diving, banana boat riding, and boat anchoring might impact the status of the marine ecosystem leading to soil erosion, a phenomenon that usually occurs if there are storm surges and tidal waves.

MRF in Brgy. Manocmanoc *(Photo from LGU-Malay)*

Managing waste

The town of Malay in the province of Aklan where Boracay Isaland is located extended its efforts to rehabilitate, nourish, and protect the premier tourist destination of the Philippines. It made use of technologies from the Department of Science and Technology (DOST) and funding from the Department of Tourism (DOT) and other government offices with some private sectors. Malay began its efforts in waste management by establishing three materials recovery facilities (MRF) in compliance to R.A. 9003 or the "Ecological Waste Management Act of 2000." The MRFs were established in barangays Yapak, Manocmanoc, and Balabag.

MRF aims to mimimize waste generated in the island. Garbage was sorted into recyclable and non-recyclable then turned into to displays and tiles, as well as compost used in their bio-intensive garden powered by vermiculture.

Garbage in, compost out

Malay acquired the Accelerated Biodegradation of Municipal Solid Waste developed by DOST- Industry Technology Development Institute (ITDI) through funding from DOT.

Organic Fertilizer from Bioreactor

MRF's Comfort rooms with bottles reused as walls and CDs as ornaments

MRF staff shows that the ground bottles are safe even when stepped on by bare feet.

MRF staff shows the African night crawlers in their Vermiculture Building (Photo by Karl Raven A. Ramon, DOST-STII)

Garbage bins and pots made from crushed bottles and plastics *(Photos from LGU-Malay)*

DOST-ITDI's composting technology popularly known as the bioreactor involves a five-day continuous process time exposing mixed waste (50 percent wet waste composed of food waste, market waste etc. and 50 percent dry waste composed of yard waste, sawdust, rice hulls etc.) to temperature as high as 50-60°C which kills pathogens, disease vectors, and other undesirable organisms. The bioreactor can process 500kg of waste per day with at least one person to operate. The bioreactor is energy-friendly, it uses very low power supply. It has a fast process rate and has no seepage and no significant odor emission. Thus, with the bioreactor, there is no proliferation of flies, rats, and other pests.

Also, organisms that thrive in high temperature were added to the mixture to further accelerate the composing process.

Where do broken bottles go?

Broken hearts go somewhere, and, in Boracay, broken and unreusable bottles stay in the MRF. The materials are grounded so finely such that it can be used as alternative sand and floor ornaments. Through the facility, the bottles go full circle as these were originally made from sand. The glass/ bottles crusher machine was donated by DOT.

Styropportunities

No more worries with the styropor and plastic as this technology developed by DOST-ITDI in cooperation with Packaging Council of the Philippines can turn these environmental nuisance into tiles and bricks.

Styro and plastic are shred and mixed with used vegetable oil. The gooey mixture are then molded into flower pots and even tables and chairs. In Boracay, they chose to turn plastic and bottles into bricks for pathways or sidewalks. Malay officials consider this as an opportunity to give livelihood to the locals.

Moreover, waste like coconut shell and husk, coffee bean hull, and other non-wood biomass materials are turned to charcoal, an innovation from DOST-Forest Products Research and Development Institute (FPRDI). This alternative charcoal has low smoke emission but easy to

Tiles made from melted styropor (Photos from LGU-Malay)

Charcoal Molding Machine *(Photos from LGU-Malay)*

Coral transplantation *(Photo from LGU-Malay)*

ignite and gives off more heat than the usual charcoal.

As another way to protect the environment, the local government also established a Vermiculture Building in the MRF and implemented vermiculture technology from DOST.

Only residual wastes from Boracay are left to be transported to mainland Malay where a sanitary landfill is situated. Reassuring that there will be no garbage scattered in the water during transport, residual wastes are re-sacked, pressed, and tied.

As of press time, the LGU-Malay announced the soft launch of its new measure—the banning of plastics in Boracay starting July 15, 2017. This initiative is part of Municipal Ordinance No. 320 of 2012 or the "Ordinance Prohibiting the Use of Plastic Bags on Dry Goods, Regulating its Utilization on Wet Goods and Prohibiting the Styropor in the Municipality of Malay and Prescribing Penalties Thereof."

Coral reforestation resumes

In 2012, DOST's Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) funded the Filipinnovation on Coral Reef Restoration Program. The program deployed live Coral Nursery Units in different areas in the Philippines.

In 2015, as part of the Asia-Pacific Economic Cooperation Policy partnership on Science, Technology and Innovation, a new method was tried in order to save the corals. This method involved tying coral fragments.

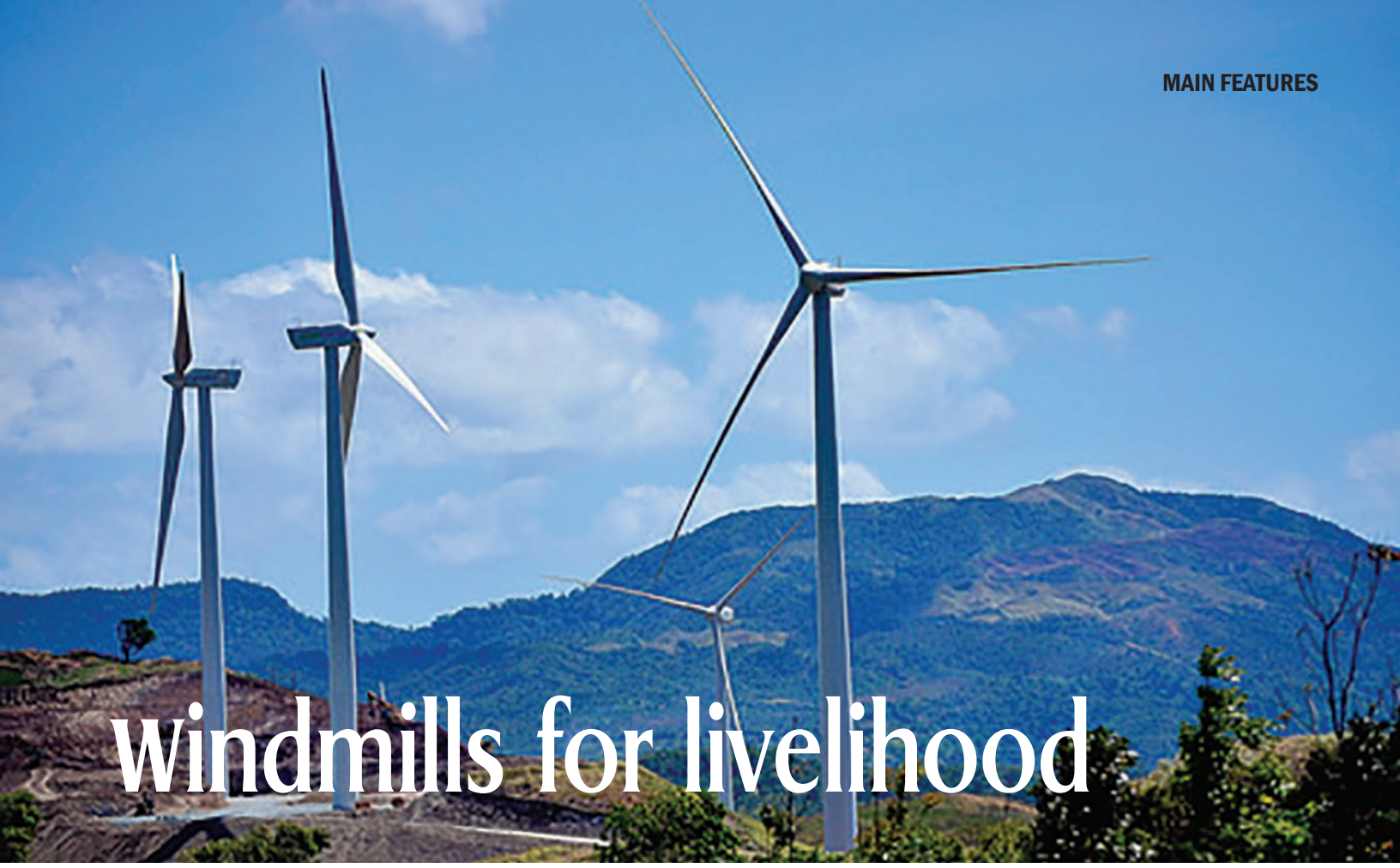
A report from PCAARRD detailed the method which involves dislodging the healthy corals or "Corals of Opportunity" (COPs) and attaching them to coral nursery units (CNU). CNU designs and techniques were also provided by PCAARRD. The method increased the recovery, regeneration, and the survival rate when deployed in degraded coral reef sites.

A Pilot Technology Demonstration on Coral Reef Restoration in Boracay conducted by University of San Carlos and PCAARRD from May 2012 to April 2013 targeted four strategic sites in Boracay: Angol Point; Lobster Rock; Coral Garden; and Friday's Rock.

A total of 36 CNUs were installed in the island containing 14, 500 coral fragments with 94.90 percent survival rate.

This year, the town of Malay will resume its coral restoration efforts using the same practices and techniques.

Malay in cooperation with other institutions/organizations continues to push for sustainable tourism in its Beach Protection Program such as the bimonthly beach cleanup (every 2nd Saturday of the month). Other environmental activities include underwater cleanup, planting of palm trees, collection of Crown of Thorns that prey on hard corals leading to coral bleaching, and mangrove and seagrass rehabilitation that helps the sands intact, preventing beach erosion.



Windmills for livelihood

www.pusangkalye.net

By RIZALINA K. ARARAL, *DOST-FPRDI*
Photos by DOST-FPRDI

Some 30,000 tourists visit Brgy. Halayhayin, Pililla, Rizal on weekends just to view the windmills. Seeing this opportunity, Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI) offered training courses that opened more livelihood options for communities living within the area.

Rizal's abundant bamboo resources served as raw materials for 28 barangay residents from Sitios Mahabang Sapa, Kawayan and Bugarin who were trained on bamboo treatment and preservation by Sheryl Micosa, DOST-FPRDI expert.

The training was sponsored by the Alternergy Wind One Corporation, builder of the Rizal Wind Farm, as part of its social responsibility to its host communities. Located on top of a hill, the farm is made up of 27 giant windmills that generate a total of 150 gigawatt hours of energy.

Earlier, the same group of participants attended the course on the basics of bamboo handicraft production, also conducted by the institute. Most of the attendees were either pineapple farmers or handicraft-makers.

And while up there too

While airborne from a training with project visit in Aklan, as our plane could not yet land for some reasons, the pilot took us to a wonderful ride around Laguna, Cavite, and Bulacan. Amid the greenery of the farmlands and mountains, what we saw from our windows was indeed spectacular: the seven lakes of San Pablo, Laguna, as captured here by Henry A. de Leon.

1 - Sampaloc; 2 - Bunot; 3 - Palakpakin; 4 - Muhikap; 5 - Kalibato; 6 - Pandin; 7 - Yambo

Tourism on the Job

Photos and text by FRAMELIA V. ANONAS, *DOST-STII*

DOST's information team usually goes around to document activities, write stories, organize events, conduct trainings, and even film science stories. Some of the built-in perks are meeting people, building friendships, and seeing sights. Here we share some of the memorable places we saw and people we met while doing our jobs as information staff.

1) Igorot brothers from Bauko, Mt. Province perform the rain dance to ask for rain in the scorching heat.

2) They also pray to their ancestors to help bring in rain, and they took us to the Layaan Burian Cave, a 45-minute hike from the Abatan-Bagnen road. According to legends, the first known descendant in Bauko named Opeg, a warrior and defender of the people, was the first to be entombed in the cave.

3) It looks like snow under the burning heat of the sun, but this is Pacific Farms, a 500-hectare salt farm in Bolinao, Pangasinan which is now becoming a popular site for eco-tours. It has a salt mountain and offers a unique train ride that gives a wonderful view of the salt bed harvesting area. Pacific Farms is a SETUP adoptor and uses DOST technologies to further improve its production and farm conditions.

4) Looking for blue mussels in a river in Carael, Dagupan City.

5) We even saw the end of the rainbow while documenting the Green Salad Farm in Bauko, Mt. Province, another SETUP adoptor.

Dir. Edgardo M. Esperancilla of DOST VIII gives inspirational message to the participants from the two barangays of Higatangan Island, Biliran, a CEST community of Naval town.

Residents of this island, known for its shifting sandbar, which attracts a large number of tourists, learned how to have a common dream for Higatangan and how to pursue it through the help of science and technology.

Chasing the dream
Prepping up Higatangan Island

By ROMEO L. DIGNOS, *DMT, PSTC-Biliran Provincial Director*
and **Engr. RAMIL T. UY**, *DOST-VIII*
Photos **by ENGR. RAMIL T. UY**,

"What is your dream for Higatangan Island?" This was the powerful question asked to the 55 workshop participants to the Training Workshop on Community Life Competence Process (CLCP) organized by the Department of Science and Technology Regional Office No. VIII on June 14-15, 2017 at Emponet Resort in Brgy. Libertad in Naval, the capital town of Biliran Province.

The participants, coming from the two barangays of this tourist spot known for its shifting sand bar, were composed of representatives from various sectors such as barangay officials, farmers, fisher folks, women, youth, senior citizens, housewives, and micro entrepreneurs (mat weavers).

They have identified what they want for Higatangan for the next 10 years, and these are: 1) access to safe and potable water; 2) clearing of unwanted structures in the beach and sand bar area; 3) easy access to health services and medicine, 4) putting up of police sub-station, 5) construction of covered court both for sports and evacuation purposes, and 6) dumping site for solid waste management.

DOST-VIII's answer to the participants' dream for the beautiful island of Higatangan is DOST's Community Empowerment through Science and Technology (CEST) program.

Engr. Ramil T. Uy speaks in front of 55 participants at the training workshop on Community Life Competence Process (CLCP).

Dir. Esperancilla gives drinking water to a child of the island. The water comes from the distributed water filter developed by ITDI.

Tourist destination

Higatangan Island, with two component barangays (Mabini and Libertad) and home to a total population of 1,970 (PSA,

A youth representative from the island illustrates his dream for their island on the prepared map of Higatangan island by the facilitators.

2015), is one of the picturesque tourist destinations in Biliran. Its most famous site is its marvelous shifting sand bar that stretches to about 200 meters from the shoreline of Brgy. Mabini to the open and relaxing sea.

The island is surrounded by crystal clear waters that entice snorkelers and divers. White beaches are found on the west side and rock formation carved by nature on the north.

Like many rural barangays throughout the country, Higatangan is not immune to common social and developmental problems. Simple community problems are compounded by the fact that the influx of local and foreign tourists is expected due to increased promotional activities spearheaded by the young and active Naval Mayor Gerard Roger M. Espina.

S&T interventions

DOST VIII Regional Director Edgardo M. Esperancilla who heads the CEST Team himself inspired the participants of the training workshop by reminding them how fortunate they are for being residents in a potential world class tourist spot. It is even better than other popular places abroad, he said.

He also stressed the need for better management of their resources to maximize their potential especially for tourism purposes. He expressed appreciation on the enthusiastic response and cooperation of the representatives from various sectors coming from the two barangays. Director Esperancilla further stated that results of the CLCP will be a good entry point for identification of priority projects for implementation by concerned line agencies.

The CLCP involves the crafting of common dream or vision for Higatangan in the next 10 years and identifying the key issues and activities that participants deem important in achieving their dream. The final output of the activities is an action plan for one year in relation to their priority activities.

The activity culminated with the distribution of ceramic water filter to 10 randomly selected participants. The ceramic water filter is a plastic pitcher with built-in filter made from ceramic materials. It uses nanotechnology in removing solids and micro-organisms from water to make it potable. This is useful in places with compromised sources of water. The product is developed by DOST-Industrial Technology Development Institute especially for disaster stricken areas. The distribution is somewhat coincidental since the topmost problem identified was access to potable water.

Evelyn Tablante of DOST-VIII served as resource person and lead facilitator of the workshop. Support facilitators for the two-day training workshop were DOST-Biliran staff Ma. Catherine Maniba-SRS II, Juliet M. Aguirre-AA III, and Gracevillalyn Saldo-PA II with DOST-8 support staff Teresa Yepes and Ma. Arian Jane Q. Gad.

Engr Ramil Uy, Sr. SRS of DOST-VIII, presented the programs of DOST-VIII to the participants to give them a birds' eye view of relevant services DOST-8 is providing to the community under the CEST program. Dr. Romeo Dignos, Provincial S & T Director for DOST-Biliran also presented the Small Enterprise Technology Upgrading Program to encourage the micro-entrepreneurs in the island to adopt technology innovation for better product quality to catch the tourist taste and needs.

The Naval State University, headed by OIC-President Dr. Victor Cañezo ably represented by NSU's Director for Extension Services Office (ESO) Dr. Christopher Vicera, served as the organizing institution for the CLCP activity. Jeremy Balondo and Engr. Bryan Bernil, both personnel and instructors of NSU served as facilitators of the training-workshop.

The NSU ESO is expected to undertake follow-up activities to link the community with concerned line agencies and other development stakeholders to address their problems. Meanwhile, DOST-VIII encouraged barangay officials to coordinate with DOST Provincial Office for further partnership and in preparing proposals for possible project cooperation in relation to areas where science and technology can be used to address the major issues identified by Higatangan Island constituents.

Recipients of 10 water filters distributed to the lucky participants of the Community Life Competency Process of Higatangan Island. In photo are DOST-VIII personnel (in orange, L-R) Engr. Ramil T. Uy, CEST coordinator; Evelyn Tablante, CLCP resource person and CEST staff; Ma. Arian Jane Gad; and Dr.Romeo L. Dignos, PSTD of Biliran Province.

Turning struggles into blessings

The success story of La Union's AVP Dressing Plant

By FLORDE LIZA L. ALIDA, *DOST-I*

Dressing chickens is a tedious task, and not for the faint of heart. Yet after the dressing process, another crucial step has to be completed: selling it to consumers. But will the chickens sell or be rejected by meticulous consumers?

Such was the daily grind of Myrna Padua with her dressed chickens back in the early 1990s. Myrna was one of the suppliers of live chicken in the town of Bauang in La Union. In 1998, she decided to sell dressed chickens for additional income. Realizing good business in the venture, Myrna and her husband, Anthony, who was then working as a security guard, decided to put up their own dressing operation and company which they called AVP Dressing Plant in 2009.

From dawn to dusk, Myrna would be counting around 60 heads of chicken butchered and dressed manually. The dressed chickens, however, had poor meat quality due to internal bleeding as shown by blood spots in the breast, and broken bones. Blood also dripped in the slitting area causing a high biochemical oxygen demand (BOD) of the wastewater. These glitches resulted in low competitiveness of her dressed chicken in the marketplace.

Myrna Padua (first from left, first photo) and Anthony Padua (first from right, second photo) welcomed DOST Secretary Fortunato T. de la Peña (first from right, first photo) and other DOST officials during their visit at the AVP Dressing Plant, a quality chicken meat supplier in La Union.

Upgrading the dressing plant through SETUP

To increase productivity and enhance the quality of their meat products, the couple sought the assistance of the Department of Science and Technology (DOST) through the Small Enterprise Technology Upgrading Program (SETUP). They were granted the needed set of equipment for a semi-automated chicken dressing operation in 2013.

The equipment is composed of the machine control panel, overhead conveyor (where the birds are hanged while moving slowly to the next operation), electric stunner machine (a bin filled with water where electric current passes to paralyze the birds), blood trough to collect the blood, scalding bin to soften the skin and facilitate removal of the skin during defeathering, and kerosene burner.

Aside from acquiring the needed machinery, Anthony and Myrna were also trained on current good manufacturing practices and financial management through the DOST Provincial Science and Technology Center in La Union. They were likewise provided with technical assistance and consultancy services, specifically the Cleaner Production Assessment and Energy Audit, which provided recommendations for efficient waste reduction and energy management practices, respectively.

Rewards of technology interventions

With technology input, semi-automation enabled the firm to dress 700 chickens in just three hours a day. It also saved on electricity at an average of PhP5,000.00 per month. The average operation production time shortened from eight hours to three hours, while the gross sales went up by 30 percent.

Due to DOST interventions, the BOD of the wastewater generated during processing has considerably dropped because of a three-

chamber water treatment facility where the wastewater is disposed to prevent pollution of nearby waterways. Wastewater was also monitored regularly to sustain environment friendly production. The firm gained accreditation by the National Meat Inspection Services, and received technical assistance and monitoring from DOST to sustain safe production.

Currently, AVP Dressing Plant earns thousands from sale of the internal organs and other body parts of the chickens. Gizzard, liver, feet, intestines, head, and hardened blood are becoming popular in the markets of neighboring towns and food firms in La Union. The firm also entered into a marketing agreement with Max's Restaurant in San Fernando City and Magnolia Chicken of San Miguel Corporation.

The technology interventions assured the consuming public that AVP Dressing Plant is producing safe and quality dressed chickens. This motivated the couple to put up another business venture, AN2N'S Lechon Manok, a favorite lechonan in Bauang, and a favorite stopover of travelers.

At present, the company employs 19 workers in the processing and marketing of its products, and more than 45 individuals in the dressing plant.

The technology interventions assured the consuming public that AVP Dressing Plant is producing safe and quality dressed chickens.

The AVP Dressing Plant was also visited by DOST Secretary Fortunato T. de la Peña during his tour around the region, together with other heads of DOST-attached agencies. According to Secretary de la Peña, the dressing plant is among the firms that are ready to compete in the ASEAN market. It was recognized as the Best Regional SETUP Adoptor for Region I and it represented the region in the nationwide search for the 2016 Best SETUP Adoptor Award of DOST.

The struggles of the chickens in their old dressing plant mirrors the struggles experienced by Anthony and Myrna in the beginning of their business. They put in so much in their operations yet they struggled in product marketability because of bigger competitors with better quality end products. But with technology intervention, Anthony and Myrna proved that struggles can be turned to profits for the benefit not only of business owners like them but also for the good of the community that they belong.

Caging the chickens

By **LIEZ'L MARIE LAMASAN**, *DOST VI*

The chicken and egg story has been enhanced by technology. With stronger wire mesh, there are more chickens that lay more eggs.

Tocilog. Konsilog. Tapsilog. Ever wonder why these breakfast treats are oh-so-yummy? The secret is in the magic ingredient locally known as "itlog". The itlog or egg belongs to the "go" food group, the one that gives bursting energy to keep you alive and kicking all day long. So whether you are up for a hard-boiled egg, sunny-side up dish, or omelette, it's still the egg that matters.

The eggs often served on our dining tables come from chicken, mostly grown in large-scale poultry farms. These farms make sure that they give continuous supply to clients.

Strategically located in San Miguel, Iloilo, the Egger Farm is one poultry farm that stood firm against all odds. It has overcome time, financial resources, management, and even technical difficulties. The success of the firm has been attributed much to the Lagman household whose dedication and passion for agribusiness continue to linger.

Chicken and egg story

The once simple chicken and egg story came into being when Mr. Alfonso Lagman Sr. made the smart move of investing his initial Php 4 million to produce eggs and poultry meat products. As an agriculturist, he certainly knew that time is of great essence considering the span of months before chickens hatch eggs that will eventually be sold in the market.

Others would not venture their assets in this kind of business as the rising expenditures and the fear of losing would pose as hindrances.

When Lagman hired 14 employees, he laid out plans and actions that showed his persistence to succeed. Thus, the farm's

The S&T-based initiative also proved to be a support facility in addressing the lack of a locally-based producer of wire mesh poultry cages.

operation has expanded and currently has 47 employees. From his Php4 million investment, he now enjoys his assets which have risen to more than Php6 million.

Egger Farm, a major poultry operator in Iloilo, boasts of its chicken population of 80,000 layers and still counting. The farm contributes about a third of the supply of eggs in the entire Panay Island.

Its chickens are housed in grey-hued poultry cages which used to be easily corroded. To replace the rusty materials, Lagman used wire mesh in the cages. Because the wire mesh was manually fabricated, it was difficult to meet the farm's standard repair requirement. This technical constraint hampered the poultry farm's expansion program and likewise entailed additional cost for buying commercial cages.

Such was the situation when the Department of Science of Technology's Small Enterprise Technology Upgrading Program came in and helped establish a wire-mesh manufacturing and electro-galvanizing plant. The said plant introduced the use of technology on multi-spot resistance welding in producing a wire mesh, and electro-galvanizing in enhancing the anti-corrosion property of the poultry cages. Moreover, the innovative machinery paved way to Egger Farm's cost efficiency program that saved a minimum of 30 percent in its cage expense requirement.

Flying high

With the aggressive project implementation, the farm currently adopts a low-carbon steel wire poultry layer cages which improve the economic life of poultry cages by 300 percent.

Galvanized welded wire mesh are stronger structures and have exceptional corrosion resistance. Just imagine the huge savings generated in maximizing the use of the equipment. Moreover, Egger Farm's current egg production volume has increased by 20 percent compared with its previous volume.

Considering the demand for chickens and eggs, the S&T-based initiative also proved to be a support facility in addressing the lack of a locally-based producer of wire mesh poultry cages. Technology transfer and skills training among technicians improved the farm's production system and made it more efficient.

Lagman discovered the real plum and he believes in the power of technology: innovative, brilliant, practical.

So there goes the chicken and egg story with smarter innovations.

Grey-hued poultry cages used to accumulate rust easily. Replacing them with wire mesh has helped but it incurred more cost for the cages. The photo on the middle right shows the wire-mesh manufacturing and electro-galvanizing plant which helped Egger Farm to produce a higher yield and minimize their cost on cage expense.

DOSTv one year on air

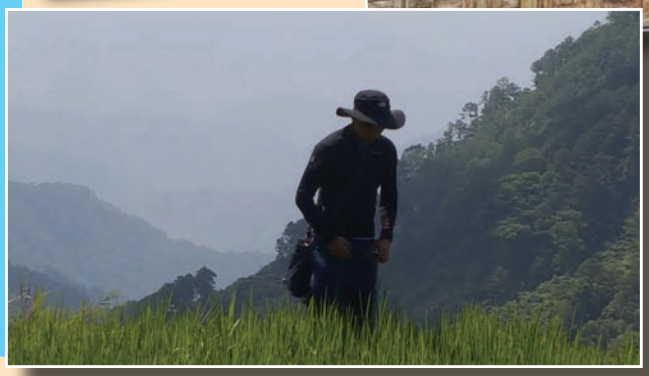
"Now that you are on board, make DOSTv run. And do it in July." This was the marching order of then Secretary Mario Montejo when he administered my oath of office as DOST STII director on March 7, 2016. "Okey, sir," was all I could say. A few days later he changed the game plan. "Do it end of May. There will be a new administration in June." That was when near panic set in: less than 3 months to DDay and a ragtag support team with zero competency in commercial broadcasting. Can we really deliver? To test the waters, I made a few frantic calls to friends in the broadcast and communications industry. They assured me it could be done. I talked to team members. They committed to make things happen. We reviewed and improved our technical set up. We outsourced content production. But what made it all so feasible was the eagerness and engagement of the youthful team. They were willing to work long hours, suggested and used social media platforms for group communications, volunteered to take on other tasks, and finally delivered and made it possible for us to livestream our first episode on May 30, 2016.

DOSTv is a digital native. It was born online and is fuelled by the creativity and collaboration of millennials. A year later, it now broadcasts on PTV4 and GNN to reach a potential audience of 14 million. I am so proud that with the support of friends and the dedication of our staff we could go from zero to hero in a year's time to better communicate Science For The People.

Richard P. Burgos
STII Director

When Dir. Richard Burgos approached me to take part in the rebirth of DOSTv, I didn't hesitate because I know Richard is one person who is driven to make things happen. I was also confident that the directions set by the core group was workable and everything within the creative and technical capabilities of the team. It was no easy endeavor for all of us because aside from the very hectic lead time to the launch date, we had to struggle with casting to procuring temporary equipment if only to make sure we would be right on schedule. I personally congratulate the men and women of DOSTv for the job well done and for taking steps to bring the program to where it is now.

Fr. Reynaldo E. Jaranilla, OAR
President, Recoletos Communications, Inc.



Producing documentaries for DOSTv is actually a full narrative cycle for me. Being a Development Communication graduate, we are molded to communicate with a purpose. Needless to say, each journey to film scientific documentary is definitely memorable. The tales of coral restoration in Tawi-Tawi (dynamite fishermenn turned environment advocates), stories of environment concerns in the Mountain province, and empowerment journeys thru STARBOOKs are just some of the subjects which make me grounded and optimistic about our struggle as a nation towards development. Way back in college, these stories of human empowerment appear to be too abstract. But now that I am in the field, each reality presents different challenges that is beyond memorable. In my own little way, I contribute something for a better narrative for the people making everything totally rewarding as well, a transformative experience.

Henry C. Burgos, director

When I auditioned as anchor, I had no idea what I was going into. I was already then a talent in one network and a freelancer. I auditioned at the last call in May, thinking the post would just entail reading the weather news. When I arrived at the studio during the audition, all other applicants were so much younger and were from top universities. I looked like their teacher! Some were so pretty and looked like models. I wanted to back out. I felt I might not be the right person for the job. I was very nervous, it was my first time to undergo audition. So when I was taken in, it was really unexpected.

It was hard at the start because the topics were technical. The segments I handle in my current stint were on business and entertainment, and these were all completely different fields. Handling science was a challenge but I could relate on topics like SETUP. During interviews, some of the guests were also not at ease, so I had to warm them up and tell them we will just be like having a chat.

My most memorable experiences at DOSTv are doing interviews with DOST Secretaries, National Scientists, and experts; and doing field interviews.

Gel Miranda, program anchor

Lunduyan: the mussel documentary. The STII staff composed of Rodolfo P. de Guzman and Arjay C. Escondo ride motorized boats to shoot the Pinoy Long Line technology of DOST-PCAARRD and the UP Visayas, used for mussel farming in Guimaras, Iloilo. Dr. Carlos Baylon of UP Visayas (standing in blue/black shirt) and project leader of the mussel technology explains to the DOSTv production team the use of ordinary plastic containers and nets to raise mussels in a more effective and economical way.

Behind the scenes

Experiences of DOST segment producers

Text & Photos **By RODOLFO P. DE GUZMAN,** *DOST-STII*

Lights.
Camera.
Action.

These three powerful words kept me awake and on my toes for several weeks. Insomnia?

Truth be told, I got some sleepless nights when I started working on the documentaries for the DOSTv, the newest communication platform of the Science and Technology Information Institute (STII) of the Department of Science and Technology (DOST).

Admittedly, I was no broadcast journalist nor was I a mass communication graduate. To say the least, I am just an avid moviegoer and a sucker for espionage films of the Jason Bourne genre.

So when I, together with the rest of my fellow Information Officers at the Communication Resources and Production Division of STII and other staff, was asked to wear the hat of a Segment Producer (SP) for documentaries to be aired on DOSTv, my surprised reaction was, *"Huwwwhhhhaaaaattttttt?"*

Absurd? Maybe not, because management was dead serious to produce these 30-minute documentaries highlighting the many S&T technologies

and innovations of the different DOST agencies and institutes.

For reel or for real

The preliminary meetings with the production house, Keep Me Posted Inc., started sometime in April 2016 to discuss programming and how the documentaries will be done. We were told that we will work as SPs for reel or real.

Over brewed coffee and some pastries, the STII team talked about the documentaries and we were asked to choose what topic we want to handle. Simply put, we as SPs will be the persons-in-charge of the pre-production arrangements and planning, initial research, coordination, scheduling of the shoot and getting the nod of the resource persons to be interviewed and videotaped.

After that meeting, the picture became clearer to all of us, but the task seemed to be daunting. Truthfully, we were apprehensive, excited perhaps, but more so, I myself was quite scared because this was uncharted waters and I did not want to drown in the middle of the ocean in making this 30-minute documentary!

Pressure was mounting. The moment of truth was near. DOSTv, the first Filipino weather channel produced by DOST-STII, would air on YouTube on May 30, 2016.

As the saying goes, we must get our feet wet to achieve the task at hand. So, all SPs suited up and prepared physically, mentally, and emotionally for the yet undetermined adventure, disguised as work?

Blood, sweat, tears and more

All the SPs, armed with the list of the documentaries they chose, started preparing their project briefs, rustling through the DOST directory to find the contact numbers of the resource persons for possible interviews.

One lesson I learned was it is important to anticipate changes and to be flexible in scheduling the shoots because it is quite hard to find the time and date common to all resource persons to be interviewed as what happened to me when I asked Dr. CP David of PCIEERRD for the Diwata-1 shoot. I scheduled and cancelled his interview twice or thrice, and I got a word or two from him telling me straight to make up my mind first.

It was an embarrassing moment but I had to admit my fault. I learned my lesson and it made me more careful the next time around.

My succeeding documentaries proved to be more fun than I expected. That was maybe because I already had "experience" my baptism of fire during the Diwata-1 episode.

My second shoot was about *'tahong'* or mussel. We did it on land and water. We flew in to Iloilo to meet our resource person, Dr. Carlos Baylon from the University of the Philippines Visayas. Good for me I was joined by my colleague, Arjay Escondo, who made our lives much easier.

The fun part was when we got to ride the ferry to Guimaras, an island paradise between Iloilo and Negros Occidental. On the island, together with our crew,

Colors of T'boli: The Dreamweavers documentary. The vivid colors of the indigenous fabrics woven into the T'boli culture are captured on film by the DOSTv production team during the shooting of the Dreamweavers documentary in Lake Sebu, South Cotabato. The T'boli's use modern technology of the handloom and natural dyes developed by DOST-PTRI to create works of art reflecting old traditions of their ancestors with unique designs that come from their dreams. Tenorium director Michael Cardoz (left) supervises the shoot and conducts the interview. To reach the other T'boli communities in the mountains, the team had no choice but to ride the habal-habal for almost an hour through rough roads and streams. The segment producers of the Dreamweavers documentary were Rodolfo de Guzman and Arjay Escondo of DOST-STII.

we shot footages of the mussel farm on motorized boats as we documented the so-called **Pinoy Long Line**, an innovative way of growing mussels. And the bonus, of course, was the succulent seafood of oysters, shrimps and grilled fish that we partook during lunch in a beachfront restaurant after the shoot.

But the more challenging docu we had, again with Arjay, was that for the **TelaNation Part 2** where we went to the majestic Lake Cebu in South Cotabato. We were so lucky to have very accommodating hosts led by Ms. Nida Bacaling, a T'boli, who heads the Kenhulung Wowen Weavers Association. These women, garbed in their traditional T'boli garments, showed us their rich culture and tradition in dance and sacred rituals as part of the art of weaving that has, for years, been a part of their lives.

Arjay and I will always savor the experience of riding the *'habal-habal'* (motorcycle) to reach the T'boli community of weavers up in the mountains. But there was a tense moment during our shoot when a T'boli man, who seemed to have too much to drink, surprisingly came strutting around near us in the plaza wielding his bolo and shouting some unrecognizable words. At that instance we thought we could be in danger. Good for us, as we sighed relief, an elder T'boli man came and reprimanded and pacified the man with the bolo.

This experience indeed made me think twice if the blood, sweat and tears we poured into this venture were all worth it. Honestly, I had no regret.

Shared pain and glory

My fellow SPs had their own experiences to share while doing their documentaries. Some found it hard at the start but later on got the hang of it and produced nice documentaries. Others had the same experiences of the pain and glory that went into producing the documentaries.

However, all agreed that it was challenging and a great learning experience. We learned time management by juggling the schedules of interviewees and the production crew. We also learned to multi-task by factoring in the many steps involved in the actual shooting: travel time from one location to another, time for setting up, catching daylight, having several takes and retakes of one scene, carrying our *merienda* on location shoot while squeezing in meal times and catching enough sleep.

Here are some of the things my fellow segment producers had to say:

"Travelling with the docu crew is a worthwhile experience. You get to experience behind-the scene moments and have a first-hand feel of what the people really thinks of the DOST projects. *Tapos akala mo alam mo na yung magiging final video. May surprise pa palang kakaiba pag labas nung docu. Kaya nga lang, ang pinaka masakit na part ay preparing the material, from topic, the storyline and the interviewees, tapos biglang change topic. Back to square one. Sakit bes! Haha*," said **Arjay C. Escondo**.

"Despite of all the stress during preparation for every shoot, it is still worth it because of the opportunities to learn new things, particularly in the field of filmmaking and TV Production," said **Allan Mauro Marfal**, SP for ***Unos***, the first documentary aired on DOSTv's pilot run.

One SP even had to literally sit out a super typhoon and brave the strong winds as their team, led by Dr. Aristotle P. Carandang as head SP, was caught at the height of *Lawin* last year in Tuguegarao, Cagayan.

"The most memorable part is when we were in Tuguegarao City with Dr. Aristotle P. Carandang, CRPD Chief, for the shoot of OneSTore.ph. We still came despite of the upcoming typhoon which later turned out to be the Super Typhoon *Lawin* which devasted the Northern Region of the Philippines with its wind capacity up to signal number 5. We indeed survived Signal Number 5, we even ca me up with a new docu, the wrath of the ***"Bagyong Lawin"*** #WeSurvivedSignalNoFive," said **Karl Raven Ramon**.

For **Ma. Lotuslei P. Dimagiba**, being a segment producer gave her a great sense of fulfillment and she was very thankful that she was given that rare opportunity to be of service to the people. This was what she had to say.

"I am a writer but I have little to no experience in being a segment producer. What is a segment producer? Well google said that the segment producer's job is to develop the various "entries" in a segmented TV program; truly that was one of my tasks for DOSTv: Science For The People, a TV program of DOST, to handle the documentary segment entitled *"SineSiyensya."*

I was the segment producer for **"Stormchaser"** and I'm proud that I was a part of it primarily because I was able to meet people who risk their lives to deliver public service by providing essential information during typhoons. Who does that? People evacuate or flee to safety during typhoons and disasters but these people chase it to gather relevant information to relay disaster preparedness, which is why it is important to relay to the public what these people are capable of doing even betting their lives on the line *"para sa bayan."*

Being a segment producer is a great experience, it's not easy but it is satisfying when the documentary is ready for showing. Truly, I'm happy that I was part of something that can make a difference, a difference to show that despite the dishonesty that some public servants do in the government, there are still good people who dedicate their lives in serving the Filipino people," narrated Lotuslei.

Becoming a Segment Producer was not a walk in the park, but true enough we all took pride of what we did because it was really hard work. At the end of the day, what mattered most was the accomplishment and the feeling that we were able to do something worth sharing to all Filipinos; that the DOST has a lot of technologies, inventions, innovations to share so that they can improve their lives.

Finally, the klieg lights are off, the chattering silenced and the proverbial bow off stage is greeted with applause(?). Indeed, the life behind the camera is equally exciting as the one on cam!

P500 to success

How four sisters grew their house of goodies from scratch

By MARITES C. BATAC, *DOST-III*

BEAKRIS House of Goodies

Company logo of BEAKRIS House of Goodies

GREAT THINGS can start from humble beginnings, they say. In the case of four sisters from Brgy. Parang-Parang, Orani, Bataan, it all started with polvoron.

With just P500 as initial capital, sisters Pamela, Claire, Charina, and Sonia Santos couldn't have imagined that the company they built from scratch – the BEAKRIS House of Goodies — would grow big. BEAKRIS is now in fact one of the most in demand producers of homemade sweets and has become a banner product of the Galing! Bataan Brand Development Program.

It wasn't always smooth sailing for the sisters. Their business was actually borne out of necessity. Pamela was a graduating BS Architecture student when their parents' livelihood, which was fishing, failed. With two other sisters also in school, she had to drop out of school and find a way to help the family.

First foray

She first tried peanut flavored-polvoron in 1996 from a recipe developed by Claire. It was Charina, the youngest, who sold it to local schools. Eventually, they developed another product- the creamy yema. Surprisingly, market pick up for these products was good. Encouraged by this positive development, Pamela decided to stick with the venture.

Perhaps it was her training as an architecture student that never made Pamela too shy to try out new ideas and apply it to her business. Aside from developing other variants for their polvoron, she also wanted to develop a packaging and label design that would distinctly make their products stand out in the market.

Lucky for her as a Galing! Bataan product brand, she was able to get assistance from the Department of Science and Technology - Industrial Technology Development Institute (DOST- ITDI) which developed the packaging and label design for their polvoron and sweet tamarind candy products.

Still wanting to stay ahead of their competitors, Pamela pursued DOST's Small Enterprise Technology Upgrading Program or SETUP upon learning about it and how it helped entrepreneurs like them to be successful in their ventures. She availed herself of the program's financial assistance worth Php 300,000.00 to acquire a double-jacketed cooking mixer and refractometer.

A testimony

Pamela candidly narrated how BEAKRIS was able to come up with enhanced and faster procedures, and better quality products.

"We manually prepared the tamarind ball candies, cooking the sweets with low fire," she shared.

That time, they used carajay (an open pan) and a ladle to mix the ingredients and cooked the tamarind candy for two hours. Because of the length of time and difficulty of the task, they were only able to produce one batch in a day.

Similarly, toasting of flour in producing polvoron was done manually. Continuous toasting over low fire took 45 minutes to one hour. This practice sometimes produced uneven toasting which resulted in poor appearance and taste of polvoron.

> SETUP offers a lot of help to small entrepreneurs like us. It is not easy for us to acquire equipment, especially if it costs a hundred thousand pesos. Borrowing money from other facilities means interest. SETUP does not charge us any interest."

But these practices were junked as soon as BEAKRIS received support from SETUP. They were able to acquire a double jacketed kettle which made the preparation of polvoron and tamarind candies much quicker and easier.

The automated mixer, meanwhile, managed everything from cooking, heating, mixing, tilting, and lifting. They can now produce four batches or more per day with assured quality of finished products.

The refractometer helped them a lot in measuring the concentration of sugar of tamarind mixture, thus standardizing the taste, particularly the sweetness, of their products.


Top photos show how the polvoron products of BEAKRIS House of Goodies were packaged before DOST intervention. Bottom photos show the improved packaging and label design for tamarind candy (left) and polvoron (right) developed by the Packaging Technology Division of the DOST-Industrial Technology Development Institute.

"Malaki ang naitulong ng SETUP sa tulad naming maliliit na negosyante. Hindi madali sa amin ang makapag-acquire ng equipment, lalo na kung hundred thousand (pesos) ang halaga. Pag nangutang kami sa iba may interest pa. Dito [SETUP], walang interest," the 46-year-old Pamela narrated. "SETUP offers a lot of help to small entrepreneurs like us. It is not easy for us to acquire equipment, especially if it costs a hundred thousand pesos. Borrowing money from other facilities means interest. SETUP does not charge us any interest."

"Bukod sa naka-acquire na kami ng equipment [through] DOST-Bataan, naituro din sa amin kung ano ang naaangkop na equipment or technology." (Aside from having acquired equipment through DOST-Bataan, we also learned which technology is appropriate [for our business]).

Pamela is managing the day-to-day operations of the firm whose name was derived from their eldest sister Sonia's two daughters, Beatrice and Kristine.

Always in quest for improvement, BEAKRIS realized later that it needs to improve on texture as the sugar granules give the polvoron a gritty feeling in the mouth.

After the initial SETUP support, BEAKRIS was still using its old La Germania oven bought in 1997. There was already an increasing demand for its cakes and the old oven was no longer apt for commercial production. Also, because it is small, the oven yielded unevenly baked cakes and pastries, and it over roasted peanuts.

Thus, Pamela again applied for SETUP support through DOST-Bataan and got a Php 205,000.00 funding in 2012. BEAKRIS used the amount to acquire industrial oven, sugar pulverizer, and food processor. The industrial oven baked cakes and roasted peanuts on a higher scale, the sugar pulverizer ground sugar into perfect powder, and the food processor cut and ground spices uniformly.

In its roasted peanuts alone, BEAKRIS increased production volume by about 150 percent. With all the improvements that happened in their business, Pamela adamantly voices her gratefulness to DOST for all the assistance extended to her company.

"Very thankful ako sa DOST. Kung wala ang SETUP, siguro hanggang ngayon manu-mano pa rin kaming nagluluto ng tamarind [candies]. May [malalaking] orders kami dati na hindi naming maserve kasi limited lang ang capacity namin noon," she shared. (I am quite thankful to DOST. Without SETUP, we might still be preparing tamarind candies manually. We had big orders before but we were not able to serve because of our limited capacity).

"May impact magmula sa production hanggang sa sales. Kung hindi kami nabigyan ng intervention [ng DOST-SETUP], hindi rin namin maiimprove ang quality [ng products]." (It made an impact from production to sales. If there was no DOST-SETUP intervention we will not be able to improve the quality of our products.)

Indeed, BEAKRIS has gone far. From a backyard enterprise selling polvoron, it has grown into a House of Goodies that offers delicious Pinoy delicacies. This is one proof that, with a lot of perseverance, P500 can go a long, long way.



Clockwise: Top-left photo shows Corazon, the mother of Pamela G. Santos, manually cooking the tamarind candies under low fire using carajay and ladle. Top right photo shows the double jacketed kettle that BEAKRIS House of Goodies acquired through DOST's Small Enterprise Technology Upgrading Program which helped the firm to increase plant capacity and productivity, and improve the product quality. Right photo shows Pamela using the refractometer to measure the concentration of sugar, thus standardizing the sweetness of their products.

Dinagat MSMEs armed with the science of food tasting

By JUN IAN Y. FACUNDO, *DOST-Caraga*

THE MARKET potential of the food industry in Dinagat Islands is high, but understanding the importance of food innovation and development is quite low, especially among the micro, small and medium enterprises (MSMEs).

To address this, the Department of Science and Technology (DOST) Caraga thru the Provincial Science and Technology Center (PSCTC), introduced a training on food innovation, development and sensory evaluation to 25 MSMEs from the different municipalities in the province. The four-day extensive training equipped the participants with the knowledge and skills on the scientific discipline of evaluating food through natural sensory skills. The training also discussed the need to innovate products according to trends to meet present customer demands.

The training centered in coming up with a standard of food processing anchored on the quality and safety of the products delivered and served to the consumers worldwide. "In today's trend, products which have maintained their quality and modified their products according to the consumers' preferences will continue to dominate the market," explained Professor Sylvia Aguhob of Xavier University and training facilitator.

Professor Aguhob also emphasized the necessity of food processors to be creative and be open in the innovation of their products. MSMEs have to keep the quality at its finest even when it requires price increase or replacement of material's brand.

Dr. Sylvia Aguhob, food technologist from Xavier University, shares her knowledge on sensory evaluation methods.

Science of sensory evaluation

Sensory evaluation in food industries began in the 1940s when the expert tasters of tea, coffee, and cheese industries started conducting quality assessment of their products. Since then it was integrated in the entire product life cycle with the application in product development.

The product development includes tests on determining preferences, identifying sensory drivers of liking, targeting sensory-based consumer segments, competitor analysis, new concept development, product design and optimization, scale-up and cost reduction.

Sensory tests

Prof. Aguhob introduced the types of test used in determining the quality and superiority of the products which were provided by the participants during the second day of the technology training.

The first test, Triangle testing, includes the Difference Test designed to compare two treatments; the Attribute Test compares two or more treatments to determine difference in the intensity of a specific attribute; Descriptive Test is designed to describe the attributes of importance of a product and its intensity; while the Consumer Test determines the preference or acceptance of the consumers to a product.

In the context of quality control and marketing, Professor Aguhob explained the sensory specifications which ensures acceptability and delivery of emotional benefits in the innovation of food product processing.

Results of the Training

The training provided an opportunity for the food processors to be pioneers in the promotion of the delicacies in the province. It was considered to be the first training on sensory evaluation and food innovation conducted for the MSMEs in the island.

Through the technology training, the PSTC-PDI also tagged two more potential packaging and labeling adaptors for this year.

SUCCESS GEARERS. (L-R) Marichu Dayondon Baclay of PSTC Bohol and PSTC Cebu Provincial Director Engr. Samuel Parcon toured Sec. Fortunato T. de la Peña at the FAG Engineering Group represented by Engr. Rosario Lagunay, management consultant; Delfin Cuevas II, sales manager; and Cary Cuevas, production supervisor of Canduman Branch. *(Photo by Gerardo G. Palad, S&T Media Service, DOST-STII)*

A visit to promising Cebu-based entreps

By KARL RAVEN A. RAMON, *DOST-STII*

MORE EQUIPMENTS HIGHER YIELD. With the assistance of DOST-SETUP, the FAG Engineering Group now has additional and upgraded equipment that led to more improved products and additional market.

SECRETARY FORTUNATO T. de la Peña, on April 18, 2017, visited select Cebu-based micro, small, and medium enterprises (MSMEs) supported by the Department of Science and Technology (DOST).

Gearing up for success

A two-time DOST-assisted enterprise called FAG Engineering Group first availed of assistance under DOST-Small Enterprise Technology Upgrading Program (SETUP) in 2003 to upgrade equipment. Under the program, the group was able to acquire bench lathe and copy lathe machines, and this boosted the group's production capacities. The quality of FAG's product improved and this helped the group capture additional market.

The assistance helped the group upgrade its facility from low precision to intermediate precision.

In just four years, the company's gross income rose from Php1.4 million in 2002 to about Php 6.6 million in 2006. With an

FAG Engineering Group bagged the 2012 Best Regional Adoptor Award for DOST-SETUP.

increased income, the group was able to acquire three more equipment vital to the operations such as milling machine, profile grinder, and surface grinder.

The FAG Engineering Group has opened its second branch in Western Cebu. It sought a second round of assistance from DOST through the Technology Application and Promotion Institute's (TAPI) Venture Financing project in 2009.

Through DOST-TAPI's assistance, the group's acquisition of computer numerically controlled (CNC) vertical machine center was made possible. The CNC is a machine that enabled the group to produce high precision metal parts and components while increasing the cycle time up to 50 percent for the machining requirements.

With almost Php 4 million worth DOST assistance (TAPI Venture Financing, SETUP, Manufacturing Productivity Extension, and Energy Audit) and the tough grind of the group, FAG Engineering was able to thread its success on a big scale. FAG Engineering was the 2012 Best SETUP Adoptor in Region 6. Eventually the group's gross sales went high, up to 100 percent in 2016 compared with 2007 figures.

FAG now not only provides products and services for the general manufacturing industry. It has also ventured on plastic, furniture, and ship building industries.

From trash to cash

No dirty cash but just clean, crisp money from trash. That's how Ritazo Tingub Women Workers Association (RTWWA) converted waste materials or "retaso" from Dedon International to something pricey.

Ritazo produces assorted bags and wallets made out of scrap cloth which are very durable, of very high quality, and of good and affordable price.

The association gets its scrp materials from Dedon International, a furniture manufacturing company and a client of another DOST-assisted enterprise, the FAG Engineering Group whose high precision machines provide components for the furniture industry.

RTWWA and other community-based enterprises, namely the Tingub Creekside Urban Poor and Housing Association Inc. and Kasambagan Subdivision Panagdait Chapter Inc. received assistance from DOST under DOST 7's Community Empowerment thru Science and Technology Project as requested by the IPI Foundations, Inc.

In 2011, the association received Php 614, 840 worth of high-speed sewing and waste recycling technologies inclusive of support on product development and design. They also received trainings. This collaboration helped increase production capacity and assured product quality, widened the association's market and income opportunities. It also

WOMEN POWER. Sec. Fortunato de la Peña is surrounded by all-women employees of RTWWA. The association hired only one male employee as technician.

PLATES OF FORTUNE. Vicente N. Ebarita Jr, general manager of Ceramikhaus presents some of the company's products to DOST Sec. Fortunato T. de la Peña. *(Photo by Gerardo G. Palad, S&T Media Service, DOST-STII)*

strengthened the organization's management capability.

At present, the association's line of products such as bags and wallets is now available in SM Cebu.

Efforts of the community and the DOST sewed together livelihood opportunities and income for urban poor communities.

Molding Ceramikhaus' fortune

Ceramikhaus was an exporter of wooden handicrafts and furniture until Chinese competitors copied its products and invaded the international market in 1998. The owner changed its course and balanced the scale to compete with the Chinese through ceramics-based products. Thus, Ceramikhaus was molded on May 20, 1998.

Now 15 years in the ceramic industry, this venture used to lack technology to cope with competitors. But not anymore starting 2013 when it sought DOST's assistance under SETUP.

Before the DOST assistance, Ceramikhaus took long hours for CMYK color separation and primarily used silk screen in designing its products. This limited its capacity to accept bulk demands, and so it lost opportunities.

DOST helped address this situation by providing ceramic printing technology, MPEX Productivity Consultancy, Cleaner Production Consultancy, and Energy Audit Consultancy with total worth of Php 400, 000.

Photo by Gerardo G. Palad, DOST-STII

DOST-FNRI's Pinggang Pinoy

Now, Ceramikhaus boosted its production volume and gross income up to 30 percent in just one year. In 2016, 5 percent of the usual printing downtime was saved.

Ceramikhaus now offers personalized mugs, wedding souvenirs, personalized plates, porcelain plaques, personalized glass, customized items, wood items, and wood-acrylic plaques. Its clients are still growing, including Shangrila Cebu and Balesin Island. DOST-Food and Nutrition Research Institute's Pinggang Pinoy model was also made by Ceramikhaus.

Life lessons molded DOST scholars in Caraga to graduate with high honors

By GABRIELLE ESPINOSA, *DOST- Caraga*

HONOR, HUMILITY and confidence— these are the three words that mark the seven magna cum laude and 10 cum laude scholars of the Department of Science and Technology (DOST) as they proudly marched on stage to receive their diplomas, awards, and medals in separate commencement exercises at the Philippine Normal University (PNU) Mindanao, Surigao State College of Technology (SSCT), and Agusan del Sur State College of Agriculture and Technology (ASSCAT) in the Caraga region.

In Caraga, a total of 42 undergraduate DOST scholars from PNU Mindanano, ASSCAT, SSCT, Caraga State University, Father Saturnino Urios University, and Surigao del Sur State University graduated as class 2017.

More than just financial assistance

The scholars from PNU Mindanao shared their experiences on how the DOST scholarship helped them achieve success amidst their individual stories of struggle and survival as they juggled academic life, family, and even jobs.

Marinelle Ramos, magna cum laude, revealed unassumingly that the DOST scholarship gave her a sense of fulfillment and purpose. "Being a DOST scholar is a great privilege since it did not only help us financially but also personally," said Marinelle.

Marinelle admits that the financial assistance of the DOST scholarship also helped her to become thrifty and develop a sense of humility.

"That time (when I was a scholar), my family could not afford to pay the tuition of my sister who was studying in medical school. Having that amount of money (from the DOST scholarship) helped my family to get through. I was not forced by my parents but it (the scholarship) taught me to prioritize my needs and use my money responsibly instead of spending it on leisure activities," she shared.

This was also true for Kimberly Besas and Fevwileane Padalapat, both graduated cum laude, who served as bread winners of their family all throughout their college life.

"I am so thankful that I became a scholar. The DOST scholarship not only changed me but it also moved my parents to change their habits on arguing over money when they saw

Kimberly Besas, cum laude, from PNU Mindanao, recalls her experience as a working student and breadwinner of the family.

me taking over the family's finances. They saw me writing a long list of expenses and felt how I managed our situation. They witnessed how I was able to balance my academic and financial responsibilities. Over time, I became the family's inspiration," Fevwileane explained.

"My mom and dad are separated. My mom migrated to Manila and my dad has another family to feed," disclosed Kimberly. "Being the eldest, I have been through many jobs just to provide the basic needs of my six younger siblings. The DOST scholarship eased the burden, it was not just for me but for my whole family," Kimberly added.

DOST scholarship empowers

The scholars also shared stories of personal transformation, of how being a scholar changed their mindset in life. For example, Arnold Abadiano, magna cum laude, developed his interest in research through the DOST scholarship.

"I'm glad that as a DOST scholar, I was able to help and serve not just the university but also (in promoting research) by being a contributor in developing research in our institution. An educator's role does not end in passing knowledge to students. He/She has to expand the knowledge through research to improve curricular programs in universities in the countryside," Arnold explains.

Similarly, like how Arnold developed his passion for research, Chris John Cagas, another DOST scholar, also developed passion in his course after passing the DOST scholarship.

"It is unusual how an easy-go-lucky person like me, who is not an academic achiever, received one of the most prestigious scholarships nationwide. At first, it felt like I didn't belong in this circle of excellent students. But after I became scholar, I become conscious of my demeanor. Every time I hang out with my friends, I remind myself that I am not just an ordinary scholar but a DOST scholar, and it's something worth holding up," he said.

"Through the scholarship, I am reminded of how education can transform someone like me," Chris John explained.

This was also the case of Marion Jane Montilla, a scholar who is a teenage mother. She dropped out of school after discovering her pregnancy. However, she was able to gather up the courage to reenroll and apply for the scholarship.

"My life as a student is full of regrets. I went through so many courses in different universities and finally settled at PNU. But I became pregnant right after getting admitted. Depression hit me for a year but I didn't give up, I still sought the positive side of my situation and enrolled again after giving birth. I did not even expect to become a DOST scholar. The idea of being a scholar pushed me to do more in my life, to not settle for less. Now, I can see myself as an inspiration to other students to work hard and not settle with mediocrity," said Marion.

Molding science and technology leaders

Since its implementation in 1994, the DOST scholarship program has benefited talented and deserving students whose families cannot afford college education. The program has produced thousands of undergraduates who excelled in the fields of science and technology in the country.

Can an apple a day keep the doctor away?

By IMELDA ANGELES-AGDEPPA, *PhD, Assistant Scientist, DOST-FNRI*

IS THERE truth in the saying that "an apple a day keeps the doctor away?" What makes an apple good for our health?

Apple, scientific name *Pyrus malus*, provides a lot of health and nutritional benefits for our body. A medium sized apple, weighing 138 grams, contains about 81 calories, zero fat and cholesterol, 10 percent carbohydrate, and more than 80 percent of water.

According to a research from Cornell University, a combination of the plant chemicals flavonoids and polyphenols, collectively known as phytochemicals, provide the fruit's antioxidant and anticancer benefits. In addition, the skin of an apple contains a small amount of beta-carotene and 4 milligrams of quercetin, an antioxidant compound that prevents oxygen molecules from damaging an individual's cells that can lead to cancer and other diseases.

The apple's skin has insoluble fiber, which is a great help for constipation. It also helps prevent diverticulosis, a condition where small pouches form on the colon and become inflamed or infected. It also has a soluble fiber, which is the pectin that can help lower cholesterol as well as the risk of heart diseases. This soluble fiber can also slow the digestion and the rise of blood sugar, making it good for patients with diabetes.

About 4 percent of an apple is made up of vitamins and minerals. The flesh provides some iron and potassium. Like other fruits, apple contains vitamin C (8 milligrams/ medium size).

Though apples give a lot of benefits, can these be reasons to say bye-bye to a doctor and just rely on apples for good health? Definitely, not!

According to the 2012 Nutritional Guidelines for Filipinos developed by the Technical Working Group headed by the Department of Science and Technology's Food and Nutrition Research Institute, one should eat more vegetables and fruits. Consume two to three servings of vegetables each day, of which a serving is equivalent to ½ cup or 40 grams for non-leafy and 1cup or 25 grams for leafy vegetables.

The same guidelines recommend taking two servings of fruit daily, of which serving ranges from 45 to 300 grams depending on the size and variety of fruit. The consumption of these foods everyday is encouraged to get the essential vitamins, minerals and fiber for regulation of body processes.

How to get the best from fresh fruits

By MA. SUSANA O. ENCARNACION, *DOST-FNRI*

Fruits are best enjoyed when they are eaten at their freshest. But do you know how to choose the best one among some of our favorite fruits? Here are some tips when choosing fruits:

Apples: Look for firm and well colored fruit. Avoid bruised fruit or one that yields to slight pressure on the skin. Apples are said to soften ten times faster at room temperature, refrigerate them to prolong freshness.

Bananas: Look for bananas that are firm, bright and free of bruises or other injuries. Avoid those that are bruised and with discolored skin. They are best stored at room temperature.

Grapes: It is best to look for well colored and plump grapes firmly attached to the stem. Avoid soft, moldy or wrinkled grapes and those with bleached areas around the stem ends. Don't let grapes get wet. Wash them just before eating.

Guavas: It is best to look for soft green fruit with a fragrant aroma. Avoid hard fruit. Guavas are best ripened at room temperature. Ripe guavas will keep only for a day or two but the pulp can be frozen.

Oranges: Look for firm, heavy fruits with fresh, bright looking skin that is smooth. Lightweight oranges are likely to lack flesh and juice. Very rough skin texture means thick skin and less flesh. Oranges keep fresh for only one week or two if refrigerated. They yield the most juice if kept at room temperature.

Papaya: Look for those with firm and unblemished fruit, with the green color turning yellow. Avoid those that are solid green or mushy or with bruises. Papayas are best ripened in paper bag at room temperature until softened and golden yellow.

Use the above tips as guide when choosing fruits to get the best out of them. Some fruits like mango, papaya, guava and citrus fruits are rich sources of vitamin C, and help prevent scurvy. They are also very important in increasing resistance to infection and facilitating the absorption of non-heme iron.

Yellow fruits, on the other hand, are beta-carotene rich and common fruits like bananas, melon and pineapple contribute additional vitamins and minerals that are good for the body.

Fruits, like vegetables, provide dietary fiber that aids in regular bowel movement. Eating fruits alone however, will not provide all the nutrients our bodies need. The human body needs more than 40 different nutrients for good health.

As suggested in the 2012 Nutritional Guidelines for Filipinos developed by the Technical Working Group, headed by the Department of Science and Technology's Food and Nutrition Research Institute, no single food can provide all the nutrients in the amounts needed. Remember that "eating a balanced diet for good health and nutrition" is still best. Happy fruit munching!

Science For The People

Photos by Henry A. de Leon, *DOST-STII*

1 Secretary Fortunato T. de la Peña led the launching of the Continuous-Type Superheated Steam Treatment System (SSTS) for Stabilized Brown Rice last April 2017. Designed and developed by the Metals Industry Research and Development Center (DOST-MIRDC), the SSTS aims to prolong the shelf life of brown rice up to nine months instead of just two to five months. The launching event serves as DOST's way of promoting and entrusting the responsible use of continuous-type SSTS to the agriculture community of Pulilan, Bulacan, especially to the Pulilan Rice and Vegetables Production Cooperative (PRVPC).

2 In line with its thrust to strengthen skills competency of human capital and entrepreneurs in the metals industry in the regions, Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña (2nd from left) recently inaugurated the Metals and Engineering Innovation Center at the Don Mariano Marcos Memorial State University (DMMMSU) Mid-La Union Campus in San Fernando, La Union. The center is poised to provide technical training to engineering students and entrepreneurs in the field of metal works and fabrication with trainers from the DOST-Metals Industry Research and Development Center (DOST-MIRDC). With Secretary de la Peña (L-R) are Dr. Paulito C. Nisperos, Chancellor DMMMSU Mid La Union Campus; Atty. Benjamin P. Sapitula, President DMMMSU; Dr. Victorio C. Palabay, Dean College of College of Technology; and Dr. Jaime T. Manuel, Chancellor DMMMSU North La Union Campus.

3 Secretary Fortunato T. de la Peña (center) visits Pauline's Bakers Percent commissary in Laoag City, Ilocos Norte, which was given P1.8 million in financial and technical assistance through DOST Region I. The visit coincided with the DOST Region I S&T Caravan, where the department brings down science knowledge products, technologies, and innovations to entrepreneurs in the provinces to enable them to improve productivity and provide employment in local communities. With Sec. de la Peña in photo are (L-R) DOST-Philippine Textile Research Institute Director Celia B. Elumba, Daniel Borja, Pauline's Bakers Percent General Manager, and DOST Region I Director Armando Q. Ganal.

4 Provision for clean, potable drinking water is one of the primary foci of technology development initiatives by the Department of Science and Technology (DOST) t hrough the Industrial Technology Development Institute (ITDI). DOST-ITDI uses nanotechnology to produce ceramic water filters made from red clay with anti-microbial agent colloidal silver at the Ceramics Research and Training Center housed at the University of Northern Philippines campus in Vigan City, Ilocos Sur. DOST Secretary Fortunato T. de la Peña (right, in barong) observes keenly how the water filters are produced using molds and locally fabricated spinning equipment. As of February 2017, the center has already produced 3,063 units where 2,665 have been sold.

5 Secretary Fortunato T. de la Peña (5th from right) cuts the ribbon signaling the opening of the S&T Caravan in the Ilocos Region on March 27-29, 2017, spearheaded by DOST Region I under the leadership of Director Armando Q. Ganal (4th from left). The caravan with an exhibit carries the theme "Science for the People", the battle cry of the current administration's program to bring down DOST knowledge, products, technologies, and innovations to the provinces as a way to alleviate poverty. Other DOST officials present were (right to left) Dr. Romulo T. Aggangan of the DOST-Forest Products Research and Development Institute, Paulina Nebrida of DOST Region I, Director Patricia Azanza of DOST-Industrial Technology Development Institute, DOST Undersecretary for Regional Operations Brenda Nazareth-Manzano, Director Edgar I. Garcia of DOST-Technology Application and Promotion Institute, and Dr. Aristotle P. Carandang (in checkered polo), Chief of the CRPD-Science and Technology Information Institute, representing Director Richard P. Burgos.

6 Modern food technology from DOST allows small entrepreneurs like MGN Frozen Foods in Gabor Norte, Sta. Cruz, Ilocos Sur to improve the quality of their sausages and other meat products by introducing good manufacturing practices (GMP) in its operation. DOST Secretary Fortunato T. de la Peña (3rd from left) asks Nerio F. Gacutan (2nd from right), owner of MGN Frozen Foods, the process in making high-quality sausages. The company availed of a P2.0 million financial assistance to acquire, among other equipment, a 6-ton walk-in freezer to store their products and this enabled them to increase productivity by 16% with a 266% increase in gross income.

7 DOST, through the Industrial Technology Development Institute (ITDI), develops ceramic pot/candle-type water filter ideal for household use. This technology can also be used in communities with no access to clean water, especially during disasters, as it generates safe and potable drinking water using red clay with anti-microbial colloidal silver. DOST Secretary Fortunato T. de la Peña (middle), shows the water filter in plastic pitcher that is commercially marketed in a special packaging by the University of Northern Philippines' Ceramics Research and Training Center in Vigan City, Ilocos Sur. Looking on are (L-R) DOST Region I Director Armando Q. Ganal, DOST Undersecretary Brenda Nazareth-Manzano (partly hidden), DOST-FPRDI Director Romulo T. Aggangan, and Ilocos Sur Governor Ryan Singson.

Department of Science and Technology

in celebration of the

2017 National Science and Technology Week

science for the people

GENERAL PROGRAM OF ACTIVITIES

Time	Event/Activity	Venue	Lead Agency
	July 11 (Tuesday)		
8:00 am - 12:00 nn	Opening Ceremonies *(by Invitation Only)*	World Trade Center, Pasay City	DOST-PCHRD
1:00 pm - 5:00 pm	Viewing of Exhibits	World Trade Center, Pasay City	
1:00 pm - 5:00 pm	PBDIC Forum	Rooms A&B, PTTC, Pasay City	DOST-PCHRD
1:00 pm - 3:00 pm	Itik Pinas	Room G, PTTC, Pasay City	DOST-PCAARRD
1:00 pm - 8:00 pm	PSTC Congess	Hotel Jen, Pasay City	Regional Offices
3:00 pm - 5:00 pm	NRCP Policy Forum	Room G, PTTC, Pasay City	
	July 12 (Wednesday)		
8:00 am - 10:00 am	Tec Talk: Back Home	Rooms A&B, PTTC, Pasay City	DOST-SEI
8:00 am - 5:00 pm	Viewing of Exhibits	World Trade Center, Pasay City	
8:00 am - 3:50 pm	39th Annual Scientific Meeting	The Manila Hotel, Manila	DOST-NAST
8:00 am - 5:00 pm	JAAP Meeting and Symposium	Room G, PTTC, Pasay City	DOST-ITCU
10:00 am - 12:00 nn	• Coral Research Towards Conservation (Sexual Production of Corals) • Assessment of Coral • Philippine Rise (Benham Rise)	Rooms A&B, PTTC, Pasay City	DOST-PCAARRD
12:00 nn - 5:00 pm	Science Journalism Writeshop	Rooms A&B, PTTC, Pasay City	DOST-STII
	July 13 (Thursday)		
8:00 am - 3:50 pm	39th Annual Scientific Meeting	The Manila Hotel, Manila	DOST-NAST
8:00 am - 5:00 pm	Viewing of Exhibits	World Trade Center, Pasay City	
8:00 am - 10:00 am	• Increasing Brown Rice Quality Through Superheated Steam • GIS-Based Geo-Tagging Existing and Identification of Suitable sites for Cacao and Rubber Plantations	Rooms A&B, PTTC, Pasay City	DOST-PCAARRD
8:00 am - 12:00 nn	NOVARTIS Biocamp	Room G, PTTC, Pasay City	DOST-PCHRD
10:00 am - 12:00 nn	12-Horsepower Single Cylinder Diesel Engine	Rooms A&B, PTTC, Pasay City	DOST-MIRDC
12:00 nn - 3:00 pm	#EMERGENT: Artificial Intelligence Forum	Room G, PTTC, Pasay City	DOST-PCIEERD
1:00 pm - 3:00 pm	Auto-Parts Facility in support of the Components and Parts Manufacturing Sector	Rooms A&B, PTTC, Pasay City	DOST-MIRDC
3:00 pm - 5:00 pm	Coconut Somatic Embryogenesis	Rooms A&B, PTTC, Pasay City	DOST-PCAARRD
3:00 pm - 5:00 pm	Empowering Research and Industry Innovations thru World Class Testing Facility	Room G, PTTC, Pasay City	DOST-ITDI
	July 14 (Friday)		
8:00 am - 5:00 pm	Viewing of Exhibits	World Trade Center, Pasay City	
	July 15 (Saturday)		
8:00 am - 5:00 pm	Viewing of Exhibits	World Trade Center, Pasay City	

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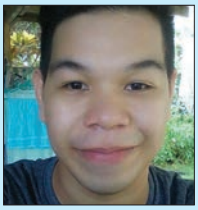
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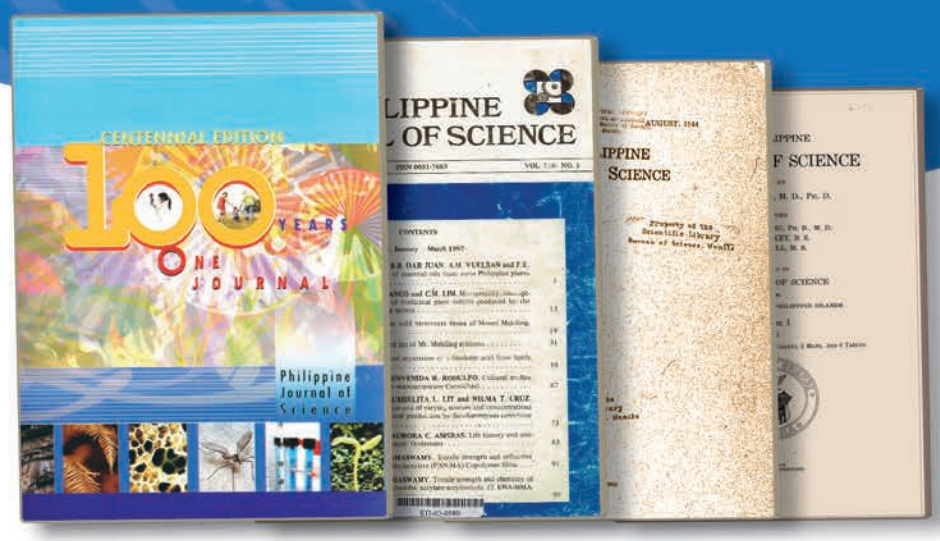

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