ISSN 1655-3942

BARChronicle

BUREAU OF AGRICULTURAL RESEARCH

www.bar.gov.ph @DABAROfficial

Volume 20 | Issue No. 1 A monthly publication of the Bureau of Agricultural Research January 2019

PHOTOS: PRLESACA

INSET: BAR Director Nicomedes P. Eleazar delivers his opening message and marching orders, and highlights the accomplishments of the bureau in 2018.

BAR reviews

2018 accomplishments, plans for 2019

To assess its performance in 2018 and map out its plans and strategies for 2019, the Bureau of Agricultural Research (BAR) held its annual review and planning workshop on 15-16 January 2019 in Subic, Zambales.

In his opening message, BAR Director Nicomedes P. Eleazar acknowledged everyone for their contributions and support to all the programs and activities leading to the overall performance of the bureau. "The limited manpower of the bureau has never been a hindrance for us to perform better and deliver our tasks. Time and again, we have proven and we could claim that 2018 was one for the books," he said.

As a testament, Dr. Eleazar highlighted the bureau's role and coordinating function to the Department of Agriculture's (DA) Climate Change Program, and its contribution to the development of new technologies under the DA Sector outcome 2 as reported during the DA's Management Committee (ManCom) meeting held in January 2019.

Among the bureau's most significant accomplishments in 2018 were: the revitalization of the Regional Research and Development and Extension Network (RRDEN); BAR in-charge on the screening abd evaluation of DA-Agricultural Competitiveness Enhancement Fund (ACEF) research and development (R&D) proposals; receipt of 176 paper entries, the highest number of papers, during the 2018 National Research

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Usec. Serrano leads 4th PSC Meeting of FAO-DA-BAR project

INSET: DA Usec. Segfredo R. Serrano (left) delivers his welcome and opening remarks. He emphasized that the project will provide small brick by brick contribution to how the Filipinos think, and how to preserve the nation not as an individual, but as a people. BAR Dir. Nicomedes P. Eleazar (right) acknowledges the present PSC members.

Department of Agriculture (DA) Undersecretary for Policy and Planning, Dr. Segfredo R. Serrano chaired the 4th Project Steering Committee (PSC) Meeting of the project, "Dynamic conservation and sustainable use of agro-biodiversity in traditional agro-ecosystems of the Philippines." The project is funded by the Global Environment Facility (GEF) through the Food and Agriculture Organization (FAO) of the United Nations, and the Bureau of Agricultural Research (BAR) as the lead coordinating agency in the implementation of the project.

In his welcome speech, Usec. Serrano emphasized that the project will provide small brick by brick contribution as to how the Filipinos think, and how to preserve the nation not as an individual, but as a people.

The FAO-DA-BAR project aims to conserve globally-important crops like rice, mungbean, taro, yam, banana, abaca, among others, in traditional agro-ecosystems of the Philippines. Among its components include mainstreaming the agro-biodiversity conservation into policy and legal frameworks, enhancing and expanding dynamic conservation practices for agro-biodiversity in three pilot communities in Hungduan and Hingyon, Ifugao; and in Lake Sebu, South Cotabato, and disseminating the documented good practices to other areas.

Also present during the meeting was BAR Dir. Nicomedes P. Eleazar

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BAR CHRONICLE is published monthly by the Applied Communication Division of the Department of Agriculture - Bureau of Agricultural Research, RDMIC Building, Visayas Avenue corner Elliptical Road, Diliman, Quezon City 1104 Philippines.

This publication provides regular updates on DA-BAR's activities as the country's national coordinator for agriculture and fisheries R&D. It also highlights features and news articles concerning NaRDSAF-member institutions.

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ISSN 1655-3942

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ACD chief is Most Outstanding AFACI-ATIN PI

Julia A. Lapitan, head of the Applied Communication Division (ACD) of the Bureau of Agricultural Research (BAR), was announced as the "2018 Most Outstanding Principal Investigator (PI)" of the Agricultural Technology Information Network in Asia (ATIN) project in the Philippines.

The announcement was made by the Korea-based organization, the Asian Food and Agriculture Cooperation Initiative (AFACI) Secretariat, through an official letter (Ref. No. AFACI 19-3) addressed to the bureau, dated 15 January 2019 and signed by Dr. Taek-Ryoun Kwon, secretary-general of AFACI Secretariat and director of the International Technology Cooperation Center, Rural Development Administration.

In the letter, Dr. Kwon cited that the award was based "from the 2018 project evaluation results which constituted of the PI's personal assessment, computed from the weighted average of member countries (70 percent), and Korean PIs (30 percent)."

This is the second time that Lapitan was hailed of such prestigious award outscoring other 13 AFACI member-countries. She was also named by the AFACI Secretariat as the "Most Outstanding ATIN PI" in 2017 awarded in an official ceremony held in Bangkok, Thailand.

Dr. Kwon mentioned that, the Philippines' collaborative effort and commitment for AFACI projects have contributed to the development of the agriculture sector in the country as well as in other developing countries.

BAR, through its national representative, Dr. Nicomedes P. Eleazar has been a member-country of AFACI since it was established in 2009 in Suwon, South Korea. AFACI is an international cooperation body geared towards promoting sustainable agricultural growth in the Asian region and contributing to the consistent economic development of member countries through the technological cooperation in agricultural and food sectors.

ATIN, one of the projects being coordinated by AFACI, is an initiative that aims to build a standardized network and/or web-based information database system for agricultural knowledge and share information among AFACI member-countries. ### ***(Rita T. dela Cruz)***

BAR reviews...from page 1

Symposium; and facilitating the conduct of consultation meetings of visiting foreign delegations.

Dr. Eleazar also laid out some strategic plans for 2019, which were all part of his marching orders including pipeline of R&D projects, judicious fund utilization, effective implementation of projects, heightened project monitoring, being pro-active in the promotion of technologies, and some administrative concerns to champion R&D.

To keep the participants abreast on national issues pertaining DA thrusts and priorities, particularly R&D, Program Development Division (PDD) Head Joell H. Lales and PDD Assistant Head Cynthia Remedios V. de Guia presented the highlights of the DA-ManCom Meeting and Harmonized National Research and Development Agenda, respectively.

The accomplishments and the 2019 first quarter plans were also presented by the bureau's division and unit heads: Judith A. Maghanoy for the Finance Division; Lales for PDD; Anthony B. Obligado for the Technology Development Division; Salvacion M. Ritual for Program Monitoring and Evaluation Division, Marjorie M. Mosende for the Institutional Development Division; Julia A. Lapitan for the Applied Communication Division; Melissa A. Resma for the Information Management Unit, and Evelyn H. Juanillo for the Administrative Division.

BAR-OIC Assistant Director Digna L. Sandoval closed the event. She commended the efforts of everybody and reiterated the importance of cooperation among staff to deliver the expected output on time and with quality. ### ***(Patrick Raymund A. Lesaca)***

DMMSU-NARTDI awards BAR as active partner in apiculture R&D

Ma. Eloisa H. Aquino, executive assistant, Office of the Director (2nd to the left) receives the Plaque of Recognition from Dr. Joana N. Quinquito, executive director, DMMSU-NARTDI (2nd to the right). PHOTO COURTESY OF MEAQUINO

Recognizing the contribution and support of the Bureau of Agricultural Research (BAR) as one of its partners in the implementation of apiculture research and development (R&D), the National Apiculture Research Training and Development Institute (NARTDI) of the Don Mariano Marcos State University (DMMSU) presented a Plaque of Recognition to BAR Director Nicomedes P. Eleazar on 24 January 2019 in Diliman, Quezon City.

Receiving the award in behalf of Dir. Eleazar was Ma. Eloisa H. Aquino, executive assistant, Office of the Director. The plaque was presented by Dr. Joana N. Quinquito, executive director of DMSSU-NARTDI.

BAR has long recognized the vast potential of bees and its important role in increasing productivity and in sustaining biodiversity. Together with partners from the University of the Philippines Los Baños Bee Program and other R&D institutions, BAR has included apiculture as one of its R&D programs in 2010.

One agency that has continuously conducted researches and product development on apiculture is the DMMSU-NARTDI. Through various R&D initiatives funded under the BAR's National Technology Commercialization Program, it was able to develop several value-added products from bees including honey, wine, vinegar, and soap.

DMMSU-NARTDI is also working on a BAR-funded project, "Establishment, Development, and Promotion of Apiculture in the Province of Lanao del Norte" wherein apiary sites were identified and bee colonies were set-up in multiple locations in Pigcarangan, Tubod, Andil and Pindolonan.

Included in the Philippine Apiculture RD&E Agenda supported by BAR are: 1) conservation and management of indigenous bee species; 2) multi-disciplinary RDE; 3) enterprise development: bee product development, processing, and packaging; 4) beekeeping training and capacity development; 5) apiculture integration in farming systems; and 6) upgrading of service laboratories. ### ***(Ma. Eloisa Aquino)***

BAR participates in international innovation conference

Program Development Division (PDD) Assistant Head Cynthia Remedios V. de Guia, representing the Bureau of Agricultural Research (BAR) Director Nicomedes P. Eleazar, served as one of the plenary speakers during the first "International Research Conference on Innovation, Technology and, Sustainability," on 24-25 January 2019 at the Century Park Hotel, Manila.

The conference carried the theme, "Engaging People through Relevant and Socially-Responsive Research, Innovation, and Technology for Sustainability" highlighting on people's involvement and participation through breakthroughs and technologies.

The two-day event drew researchers, industry partners, and key stakeholders to discuss prevailing issues, milestones, and collaborations aimed at strengthening linkages among industries, government, private, and education sector.

De Guia presented the topic, "Traversing linkages of Agricultural Researches for Technological Innovation," highlighting the role of BAR as the lead coordinating arm of research and development of the Department of Agriculture. She

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BAR guests at DZEC 1062 Radyo Agila

In its effort to reach the greater public particularly on its programs that will benefit the farmers and fisherfolk, the Bureau of Agricultural Research (BAR) was invited as guest of the "*Usapang Pagbabago*" program simulcast over DZEC 1062 Radyo Agila on 30 January 2019.

Salvacion Ritual, head of the BAR-Program Monitoring and Evaluation Division (PMED); and Anthony Obligado, head of the BAR-Technology Commercialization Division (TCD) talked about the two banner programs of the bureau: Community-based Participatory Action Research (CPAR) and the National Technology Commercialization Program (NTCP).

Usapang Pagbabago hosts, Reg Galang and Bay Hilario asked the two guests to elaborate on the two programs including its coverage, impact, and specific projects that benefitted the farmers and fisherfolk.

On successful CPAR projects, Ritual cited Tinawon rice production using system of rice intensification in Ifugao; cacao-based production systems in Polilio, Quezon; corn-based farming systems in Bukidnon; and blue crab fishing using gill nets for marginal fisherfolk in Bataan, among others. Meanwhile, on NTCP, Obligado mentioned high-impact projects on cacao wine, chevon, goat, native swine, among others.

BAR-TCD Head Anthony Obligado and BAR-PMED Head Salvacion Ritual being interviewed by *Usapang Pagbabago* hosts, Regs Galang and Bay Hilario about BAR's banner programs—CPAR and NTCP. PHOTO: RDELACRUZ

CPAR is an extension modality and an innovative approach to research and development that focuses on the verification, demonstration, and adoption of agricultural technologies at the community level. It targets to empower farmers and fishers and their communities, resulting to an increase in productivity and an improved livelihood.

Complementing the CPAR, the NTCP highlights R&D breakthroughs and mature technologies generated and developed by research institutions. It has been instrumental in developing micro-enterprises and various agribusiness ventures through the provision of technical assistance and the much needed fund support to enhance product and process development founded on sound business model principles. ### ***(Rita T. dela Cruz)***

Usec. Serrano leads...from page 2

who serves as the national project director. He delivered a message to the farmer-beneficiaries asserting the importance of modernizing agriculture, and the greater importance of preserving traditional farmer knowledge.

Other highlights of the meeting included the approval of the project work plan and budget, and updating the members on the project's progress.

After the PSC meeting, the group went to Poblacion, Hungduan, Ifugao for the turnover of farm tools (i.e. micro-tillers and grass-cutters) to the farmer-beneficiaries in Brgys. Baang, Bokiawan, Hapao, Nungulunan, Maggok, and Poblacion. During the program, it was stressed that it is important for the farmers to benefit from these farm tools, while also conserving the traditional practices of the communities. ### ***(Ian Jomari C. Panaga)***

BAR-PDD Assistant Head Cynthia Remedios de Guia, in behalf of BAR Dir. Nicomedes Eleazar, serves as one of the plenary speakers during the Innovation Conference. PHOTO: MJTY

BAR participates in...from page 4

discussed current events in the field of agriculture both on the global and national perspectives. Further, she discussed BAR's efforts to address the current issues and emerging concerns within the agriculture sector through the six major commodity programs of the bureau namely: rice, corn and cassava, climate change, organic agriculture, high-value crops and biotechnology. ### ***(Matthew Janssen C. Ty and Nemar N. Meneses)***

Taro delicacies are now hitting Ifugao market

These taro delicacies are being sold in Banaue Hotel in Ifugao. PHOTOS: IJPANAGA

Taro (*Colocasia esculenta*) or locally referred to as "*gabi*" is rich in starch and a good source of dietary fiber. In the Northern part of the country, taro is commonly grown as source of animal feed. Now, it is being produced and packaged into local delicacies (cookies, choco chip, choco cream, and choco voron)—which are excellent pasalubong for tourists and visitors These taro delicacies are now found in the local market in Ifugao.

In 2017, the Provincial Local Government Unit of Ifugao submitted a proposal to the Bureau of Agricultural Research (BAR) to promote viable food and by-products to increase farmers income and promote livelihood opportunities of the province including taro.

Under BAR's National Technology Commercialization Program, the project titled "Product Improvement and Promotion of Coffee, Tinawon Rice, and Taro Products" was funded. The funding support covered further product development and improvement, design assistance, and promotional activities.

BAR Director Nicomedes Eleazar during an official visit in Ifugao was delighted upon seeing the Taro Cookies and Taro Choco Cream on display and are being sold at Banaue Hotel in Ifugao."This is a testament that government money has not been put to waste, after all the end goal of funding this initiative is to commercialize generated technologies and developed products and eventually bringing them into the mainstream market," Dir. Eleazar said.

The taro delicacies are being produced by Rural Improvement

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Pisay students visit BAR

Twenty-six high school students, composed of Grades 11 and 12, from the Philippine Science High School (Pisay) visited the Bureau of Agricultural Research (BAR) on 23 January 2019 as part of their Science, Technology, Engineering, and Mathematics (STEM) elective class activities. The students were accompanied by their teachers, Christian Abagat and Justin Ray Guce.

The students were welcomed by staff from the Bureau of Agricultural Research (BAR) led by the Applied Communication Division (ACD). During the short orientation, they were presented

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Dr. Primitivo Santos of UPLB shows how a SNAP Hydroponics container would look like after one month of use. PHOTO: EJGESTUPA

PHOTO COURTESY OF DA-CVRC

BAR-funded R&D facilities reach new heights in farm-tourism

by Ephraim John J. Gestupa

Agricultural practice is so evident in Filipino culture that it cuts across both urban and rural lifestyles. From our unyielding preference towards rice-based meals to our natural love for harvest festivals that are unique to every province, agriculture cannot be limited to just the mere planting of crops. Across the Philippines' 1000+ islands, agriculture and fisheries are weaved through the very fabric of culture and tradition.

During the 21st century, agriculture has grown from just being a source of sustenance and livelihood to a spectacle and celebration of history and national identity, both for locals and foreigners alike.

It is quite surprising to know that agriculture's impact on tourism is relatively new, dating back from the 1980s when the Banaue Rice Terraces was slowly attracting tourists and the strawberry farms in La Trinidad, Benguet welcomed visitors who wanted to pick their own basket of berries.

Forty years since the ascent of agriculture in the tourism sector, the government passed the Farm Tourism Development Act of 2016 (RA 10816). Section 5 of the Republic Act institutionalizes the Farm Tourism Development Board to which the Bureau of Agricultural Research (BAR) is part of. It consists of members from the Department of Tourism (DoT), the Department of Trade and Industry (DTI), and the Department of Agriculture (DA) including its staff bureaus and attached agencies such as the Agricultural Training Institute (ATI).

When asked about the role of agricultural Research and Development (R&D) in agri-tourism, DoT consultant, Cheryl Natividad-Caballero underscored the importance of improving the backdrop of agriculture and fisheries for tourism activities that are focused on recreation, entertainment, and learning. "The biggest market for farm tourism comes from domestic travelers and visitors, thus the farm must be able to feature the best technologies including food safety in agriculture and fisheries, say, production, processing and value-addition, to effectively create a touristic experience," added Caballero.

It is the DA's job to develop what used to be areas that were solely for agricultural practice, like plantations, orchards and food processing centers, into an area where people can visit to have a relaxing outdoor experience, all while discovering new R&D generated technologies such as unique food products and creative landscaping techniques.

One of the first regional research stations to have been granted eco-farm tourism accreditation is the Cagayan Valley Integrated Agricultural Research Center (CVRC) in San Felipe, Ilagan City. "Our primary mandate is to develop and promote technologies and we thought of another way of doing it that is unlike the traditional method of techno demo field days," said Regional Technical Director for Research and Regulations Rose Mary Aquino. As the DA-Regional Field Office (RFO) 2 further improved their R&D activities across its nine research satellites, it also improved on the aesthetic appeal of its infrastructure. "Because of this transformation, we were able to get the accreditation from DoT in May 2015, CVRC is the pioneer center when it comes to accreditation as agri-eco tourist destination," added

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Achieving *quality coffee* through postharvest technology system

Text and photos by Leoveliza C. Fontanil

Coffee is one important drink that Filipinos are familiar with. Studies have shown that today's demand for coffee is increasing by 2.4 percent every year. It is projected to rise in the coming years, as more and more Filipinos drink coffee every day.

From being one of the top coffee exporters in the world, the Philippines has now become an importer to other countries.

To lessen the importation of coffee and potentially reclaim its former spot in the coffee industry, the Department of Agriculture (DA) is envisioning an increase of its coffee productivity and profitability. However, due to improper postharvest handling practices, the quality of coffee being produced does not meet high quality grade. Inept and poor handling practices of our local coffee farmers in harvesting coffee berries is one of the cited problems that cause low quality grade of our coffee bean.

Dr. Helen O. Martinez, supervising science research specialist of the Philippine Center for Postharvest Development and Mechanization (PhilMech), has been looking into various technology interventions on coffee ever since the Bureau of Agricultural Research (BAR) assisted the funding of her coffee projects in 2015. The project titled, "Developed Postharvest Technologies and Business Model for Sustainable Coffee Processing Enterprise," tried to evaluate the different harvesting and postharvest handling methods of different coffee varieties achieving good quality grade.

The results of her project was presented in a free, public seminar organized by BAR on 31 January 2019.

Through the project, Dr. Martinez developed a package of Post-Harvest Technology (PH system) of quality green and roasted beans for Arabica and Robusta varieties. The PH system is a new approach on coffee crop processing (wet method –washed, dry method-natural, pulped method-semi-washed) techniques. She likewise was able to establish business models for Community-Based Coffee Processing Enterprise also known as the "CBCPE Business Model".

The CBCPE Business Model is a conducive protocol assembled by PhilMech for coffee farmers. Under the protocol, the members should sell dried coffee parchment or fresh berries to the processing center. The members and non-members patronize and avail services of the cooperative. The cooperative creates its own business management team to manage the coffee processing operation of the CBCPE. As a practical guide, the marketing of coffee beans and roasted coffee is integrated in the practice of e-marketing their coffee products which would create a competent business management team.

Dr. Martinez claimed the technical and socio-economic benefits of adopting the technology as it: 1) increases the percentage in volume of coffee processed; 2) improves quality of green coffee beans and roasted beans; 3) generates employment opportunities especially to rural women; 4) boosts confidence of farmers to expand market of their coffee products; and 5) encourages more coffee farmers to plant more coffee trees as it increases the demand.

At present, PhilMech is providing assistance to various cooperatives and associations including Talbak Coffee Growers Association in Trinidad, Bulacan, IMDALSA Agrarian Reform Cooperative in Malaybalay, Bukidnon, and Mt. Apo Coffee Association in Pasay City.

The groups of coffee growers are included in the 2017 top 10 local quality producer of Robusta and Arabica green coffee in the Philippines.

Dr. Martinez mentioned that PhilMech is in the process of transferring the technology on improved postharvest technologies system to its end-users and reaching for other possible adopters to establish more coffee enterprise in Philippines.

PhilMech has also developed information materials that they have incorporated along with the list of recommended specification of equipment for postharvest and processing of coffee per handling operation. ###

INSET: Dr. Helen O. Martinez of PhilMech presents the results of their project during the BAR in-house seminar.

Taro delicacies are...from page 6

Club (RIC) Food Processor in Baguinge, Kiangan, Ifugao which is one of the 10 existing associations and organizations and 12 individual processors of coffee, Tinawon rice, and taro products in the province assisted under the project. They received technical assistance on product packaging and labeling, developed capabilities of identified processors engaged in production of products; conduct of simple cost and return analysis, among others.

RIC Food Processors is composed of 1-6 clusters. Cluster-5 is engaged in food processing and is led by Lety Dogwe. Other members are helping in sourcing out raw materials in Barangay Haliap, Asipulo; Barangays Baguinge and Nagacadan, Kiangan.

In a week, 28 kilos of taro is being processed producing 240 boxes of Taro Cookies while 15 kilos of taro can produce 210 boxes Taro Choco Cream. Regular production could double depending on the bulk of orders.

Aside from Banaue Hotel, the taro products are also available in lodges, restaurants, souvenir shops, trade centers, public market in Lagawe, Banaue, and Kiangan. The RIC Food Processor is also distributing in Tam-an Resort in Bayombong, Nueva Vizcaya and in Baguio OTOP-DTI.

"We are thankful for the assistance provided to us to further improve the marketing appeal of our products. Also, the project provided additional income to farmers and also able to create job opportunities in food processing" Dogwe shared.

Taro products were also showcased during the 14th Agricultural Fisheries Technology Forum and Product Exhibition on 30 August-2 September 2018 at SM Megatrade Hall, Mandaluyong City. ### ***(Ma. Eloisa H. Aquino)***

BAR-funded R&D...from page 7

Aquino.

In 2018, DA-RFO 2 inaugurated its new Plant Genetic Resources Center at CVRC, its Organic Agriculture Research and Development Center at the Nueva Vizcaya Experimental Station, and its Mushroom R&D Center at the Regional Crop Protection Center in Ilagan, all of which were provided with funding support through BAR's Institutional Development Grant (IDG) Program.

In addition to these facilities, visitors can also go see camera-ready learning sites dedicated to "Edible Landscaping/Urban Gardening, Irrigation Systems, different varieties, hydroponics, integrated cropping system and developed products." CVRC's main objective for these accredited R&D facilities is to have a show window that encourages more farmers and farming communities to gradually improve their practices and farm-layouts to eventually become farm attractions and learning sites. "It is a practical way of executing technology transfer and promotion," said Aquino.

"*Dahil dito sa pagka*-accredit *ng* Cagayan Valley, *ang ibang* DA field offices *lalo na po sa* research centers *ngayon ay tinitignan na rin nila kung paano sila ma*-acredit *ng* Department of Tourism as part of their agri-tourism program," said BAR Director Nicomedes Eleazar.

BAR's partnership with regional offices have always involved the establishment of research facilities that serve as research hubs for local scientific community and as learning sites for farmers and fisherfolk to seek technical assistance in adopting agricultural technologies.

"*Kung gusto po ninyo makipag-usap sa aming mga* technical experts *sila po ay* available *araw-araw*. We always have this techno-clinic we have in all research outreach stations *na kung saan ang aming mga* staff *ay* ready to answer your queries and tour you around," added Aquino.

DA-RFO 2 continues to build-up its research satellites in terms of the technical expertise it provides to clientele. "To date, we have constructed R&D excellence landmarks for each of our research center/experiment station representing their focus commodities," said Aquino.

CVRC is the R&D center for OPV white corn and peanut, Southern Cagayan Research Center (SCRC) is for rice and mechanization; Isabela Experiment Station is for sheep-based cropping system; Quirino Experiment Station is for large ruminants-based cropping systems; Nueva Vizcaya Experiment Station is for fruit trees and dairy goat; Northern Cagayan Experiment Station is for rice-based integrated farming systems; Batanes Experiment Station is for organic farming and rootcrops; while SCRC-Cagayan Breeding Station is for climate-resilient agriculture and goat-based farming systems.

Caballero described farm-tourism site accreditation as a collaboration between the DA and DoT. "The DA adds value in the [traditional] farm by offering it as a learning site while DOT adds value in terms of its entertainment/recreation tourism opportunities." Caballero encouraged stakeholders to seize the opportunity in the increasing number of domestic tourists seeking to find available and attractive farm tourism sites. This is not only accomplished by assisting farmers to get farm-tourism accreditation but by linking them as well to a greater network of tourist destinations within the same locality.

"With proper support for farm tourism agribusiness incubation, possibly from the DA, the small farm operators can be equipped with proper business mentoring, technology orientation and linked to upscale from market opportunities and affordable credit," Caballero concluded. ###

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Developing protocol for organic okra production

by Patrick Raymund A. Lesaca

Okra, (*Hibiscus esculentus*) also known as lady's finger, is an important vegetable crop in the country. Its demand is increasing mainly due to food and medicinal uses, and non-food essentials.

Beside the local market, okra is grown as fresh and frozen export product to Japan. And for the last 20 years, the okra intended for the Japanese market, is roughly grown in a 200-hectare farm land in the province of Tarlac. The export market has significantly contributed to the economy of the province.

The production of okra must be addressed to continually meet the local and export demands.

However, one impediment that is affecting its production is leafhopper (Amarasca biguttula) and other associated pests including Spodoptera litura. The pest can cause heavy damage to the crop, and if left unattended, can reach 100 percent loss.

Counter measures against A. biguttula have been employed by the farmers. Synthetic pesticides are widely used for the control of leafhopper and other insect pests. Application of pesticides is often the most effective management against pest and diseases commonly practiced by the farmers. However, resurgence and detected resistance to leafhopper became a problem caused by chemical calendar spraying practiced by farmer-growers. Likewise, the alarming increase of toxic chemicals used to manage pest and diseases on farms, animals, and plants has endangered the environment and reduced biodiversity as well as the health of the consumers.

Threat to okra production and its remedy

To address the situation, the Bureau of Agricultural Research (BAR) funded and supported a research project, "Pest Management Strategies Development for Organic Okra Production in the Province of Tarlac for Local and Export Demand" implemented by the Tarlac Agricultural University (TAU).

The project aimed to promote pest management strategies and develop an organic protocol to produce organically-grown okra in the province.

The pesticidal properties of many plants have been known for and have been commonly used in pest control. According to Jo-Anne Lynne Joy E. Duque, project leader, an organic Integrated Pest Management (IPM) protocol should be developed for the production of organically-grown okra, or chemical-residue free, as a quality assurance for local and export demand. Dr. Manuelo Agsaoay (former project leader) advocated the bright prospect in the use of biopesticides as an important alternative to synthetic chemicals.

Based on numerous research studies, there are more than 2,000 plant species which claimed to possess pesticidal activities. Among the identified plant extracts which can be formulated as biopesticides were: *sambong* (*Blumea balsamifera*), Ageratum weed, and pummelo (citrus) leaves.

Ms. Duque said that part of the research experiment is blending and purifying the selected bioactive plant extracts. Once blended and purified, the extracts will be processed into a wettable powder (WP) formulation for the farmers' use. The formulated product will then be evaluated for field efficiency trials (on-farm) of the grower-exporters of okra in the province.

Project's significant findings

Various efficacy trials using the pummelo and sambong WP leaf

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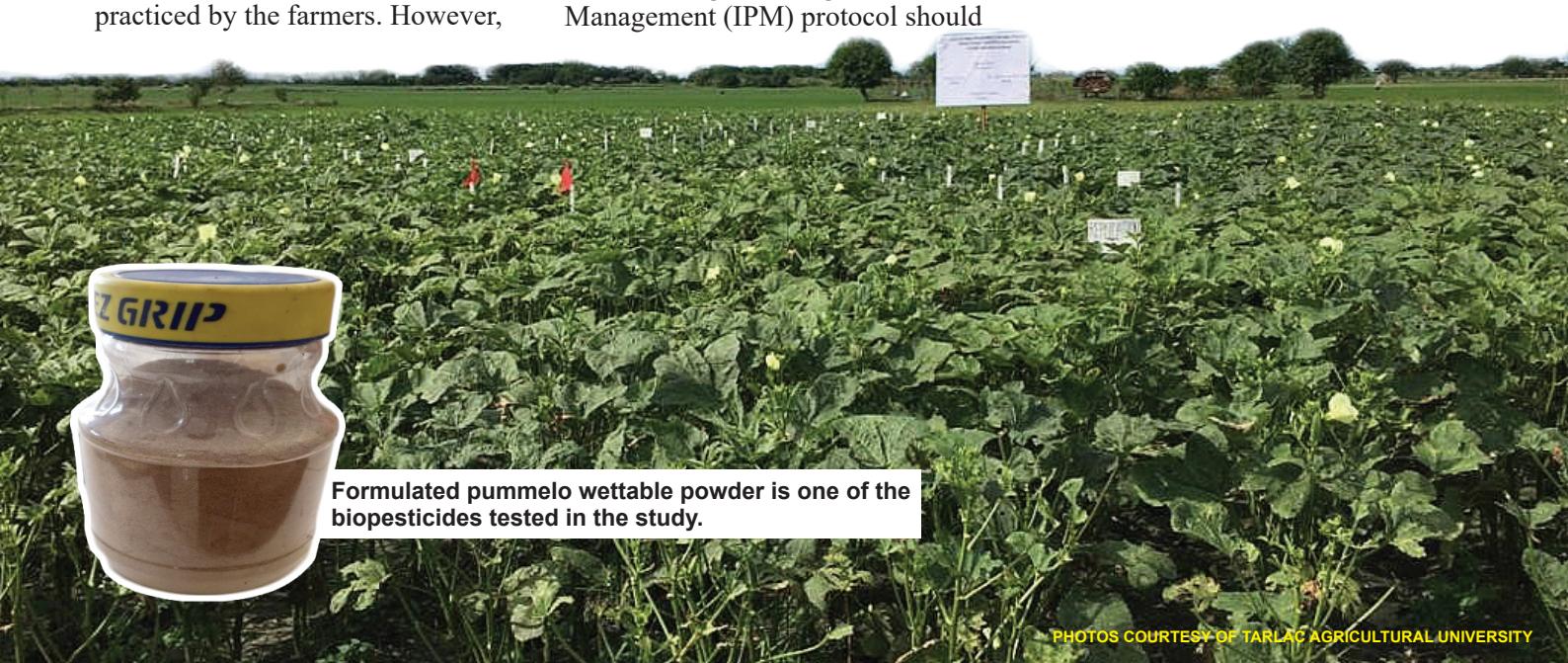

Formulated pummelo wettable powder is one of the biopesticides tested in the study.

PHOTOS COURTESY OF TARLAC AGRICULTURAL UNIVERSITY

Beefing up
Siquijor's healthy beef

by Rita T. dela Cruz

Siquijor, a tiny island province known for its mysterious and bewitching tourist attractions, is likely to be famed for yet another of its best and finest product—its beef.

This is not something to be surprised about since agriculture is a predominant sector in Siquijor and cattle raising, a significant agricultural activity.

Nestled between the Visayas and Mindano group of islands, Siquijor ranks second among the highest cattle producing provinces in the country, next to Ilocos Norte.

The native cattle strain in Siquijor is the taurine type (Bos taurus) known to have genes for marbling making it competitive with the rest of the best beef cattle in the world. Marbling is the white flecks and streaks of fat within the lean sections of meat. The degree of marbling is the primary determination of quality grade in beef. Marbling has a beneficial effect on the juiciness and flavor of beef as it keeps beef moist and succulent.

Bos taurus is a grass-fed type of cattle. Hence, the meat is lean and tender and has moderately full flavor. This native cattle strain is suitable for Siquijor's weather condition because it can tolerate the heat and it needs little water requirement. It can also easily adapt to the environment. This is also the reason why this breed is preferred by majority of the farmers in Siquijor. This native breed is also known to produce quality milk.

And because Bos taurus is a grass-fed cattle, Siquijor's locally-produced beef is considered a healthy beef. With the promising potential of the native strain, it is important to enrich the cattle production and meat processing industry to help the breeders raise their income, and provide an opportunity for Siquijor to export its quality meat globally.

R&D project on Siquijor beef production

In Siquijor, the cattle industry is hounded mainly by two aspects: production and marketing. Major constraint in production is affected by the dry season in Siquijor resulting to limited water supply, limited food supply, and excessive heat that can affect cattle raising. The natural climatic condition and sloping topography of Siquijor greatly affect the feeding practice of farmers especially during the dry season. In terms of marketing, one major challenge is the unfair pricing of traders due to lack of price standard.

Dr. Agapita Salces of the Institute of Animal Science, University of the Philippines Los Baños (UPLB), conducted a study that will not only address these challenges in production and marketing but more importantly, will commercialize the production of Siquijor beef as healthy meat.

The UPLB-led project, "Commercialization of Philippine Native Cattle for Optimum Production of Siquijor Beef" is being funded by the Bureau of Agricultural Research through its National Technology Commercialization Program. Specifically, the project will develop native beef grading standard, native beef cuts, and beef products and by-products.

In collaboration with the Department of Agriculture-Regional Field Office 7 and the Province of Siquijor-Provincial Veterinary Office, the project is employing various science-based interventions including data collection of animal performance, development of software for small hold native cattle production, planting of forage trees and legumes, and meat processing and product development.


Corned Beef


Beef Patties


Beef Tapa

PHOTOS COURTESY OF DR. AGAPITA SALCES/UPLB

Profitability of cattle raising

Results of the socio-demographic analysis conducted by the group of Dr. Salces showed that an average cattle farmer in Siquijor has three cattle per farm being raised in a land he owns through inheritance. The rate of technology adoption of cattle raisers in Siquijor is high due to the various support provided by the provincial government.

In the profitability analysis of the project, results showed that the investment cost for setting up a cattle enterprise will cost Php 22,555. 51. This comprised of cattle house, feeding, breeding stock (two young cattle one male and one female), farm tools (drum, containers, pail and scythe). However, if the cost of land will be included the total investment cost is Php 101,703.65.

The three-cattle operation in Siquijor is considered successful in increasing the income of the farmer. In terms of net income, results showed that a farmer could expect at least Php1,000 increase monthly

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Seagrass craft making flourishes in Camarines Sur

by Rena S. Hermoso and Julia A. Lapitan

From the plain-looking handwoven slippers to embroidered bags and embellished baskets, the seagrass craft making in San Fernando, Camarines Sur has upscaled into a full-blown home-based business industry enterprise providing additional income to rice farmers in the flood-prone areas.

According to the Department of Agriculture-Regional Field Office (DA-RFO) 5-Bicol Integrated Agricultural Research Center (BIARC), the majority of the flood-prone rice producing areas were left fallowed thus additional costs on herbicides and labor are needed to remove various weeds and sedges that emerge after the fallow period. "In the project site, while many people use various weed species as forage for animals, ingenious farmers surprisingly explored promising potential uses of seagrass," shared BIARC Manager Luz R. Marcelino. This shed light on the seagrass craft making, a promising income-generating opportunity for the farmers.

The project that started it all

Seagrass (*Rynchospora corymbosa*), locally-known as *ragiwdiw* and *bankuan*, is a perennial sedge that grows abundantly in flood-prone areas in Bicol. Dried stalks from seagrass are hand twined together to create the raw material for handicraft making—salapid. The salapid can be made into various products such as bags, slippers, hampers, and decorative items. According to Marcelino, the best characteristic of seagrass is its resistance to molds when stored for a longer period of time.

Thus, to further develop the seagrass enterprise, BIARC implemented the project, "Enterprise Development in Flood Prone Areas in Camarines Sur." Funded by the Philippine Rice Research Institute (PhilRice) and the Bureau of Agricultural Research (BAR), the project aimed to provide opportunities for rural employment, increase family income and empower communities through the development of agri-business enterprise. The goals of the project were to: 1) develop rice-based production systems within the framework of integrated farming systems approach; 2) identify researchable areas for optimized seagrass-based enterprise development; and, 3) develop a village-level handicraft production enterprise.

"*Ang masasabi ko lang po sa Bikolano* farmers, they are very, very resourceful. They tied up with Department of Trade and Industry (DTI) *para magkaroon ng* enhancement *doon sa* product *nila*," according to Marcelino, project proponent. In coordination with DTI-Product Development and Design Center of the Philippines, farmer cooperators' association were provided with skill and product development training and sponsored their participation in national trade fairs.

To support the associations' full operation to meet the increasing demand of seagrass in the local handicraft industry, BAR extended institutional support through the provision of common service facilities and production equipment.

Marcelino also proudly shared, "*[n]agpapasalamat din po ako sa mga* San Fernando farmers because they were really innovative. They were really bent on improving their lives in terms of the resources of what [are] the resources *na nandoon sa kanila*."

From simple products to elite fashion items

After the project has ended, BIARC continued their efforts in upscaling and expanding the seagrass craft industry in Camarines Sur. They tapped the creativity and entrepreneurial skills of Bernadette B. De Los Santos, owner of Bidibidi Enterprise, a social enterprise that combines fashion, arts and upcycling while providing livelihood to local women and out-of-school youth in Baao, Camarines Sur.

De Los Santos is part of the Gender Responsive Economic Actions for the Transformation of Women (GREAT Women) project, a Philippine-Canadian brainchild that aimed to provide support for women to start businesses and obtain a better-paying job. This project is handled by DTI together with the Department of Science and Technology, DA, Bureau of Fisheries and Aquatic Resources, Department of Labor and Employment, Philippine Commission on Women, small and medium enterprises, and private sector representatives.

She shared, "I started hand embroidery on fabrics. But they were the ones who told me, 'why don't you try seagrass as baskets and bags, and use your art sa *pag-e*-embellish?" With BIARC (as it was scouting for area for expansion) suggestion, she started making bags and baskets using seagrass as a raw material and embellished them using other natural fibers such as raffia and abaca in 2017. The following year, DTI invited her to showcase her products at the Manila FAME, a biannual lifestyle and design trade show that aims to promote the Philippines as a reliable sourcing

"[My] goal is to empower these women by teaching them the skills and bring about the best in them, while allowing them to be mothers, wives, sisters, nurturing their families, their communities." -De Los Santos


PHOTO: LAESPIRITU

destination for high-quality home, fashion, holiday, architectural and interior pieces. Then, she participated in ArteFino Fair, the biggest artisan fair in the country. She proudly shared, "*ako ang* favorite, *ang* sales *ko* is more than half a million," during the four-day event.

With the growing interest in sustainable fashion items, bags made from natural fibers such as seagrass would surely be a hit. In fact, she shared, "*patok na patok iyan ngayon kasi may* consciousness *na ang mga tao, gusto nila* good for the environment—fashionable *ka na*, good for the environment *pa ang sinusuot mo*."

After her participation at the ArteFino Fair, she has received invitations for interviews from various television networks to which she reacted, "I think it's kinda phenomenal *na* from a mere grass, now it's a high-end product; although it's not original *kasi marami namang gumawa ng* baskets."

An elite shopping center and Filipino culture shop have also shown interest in her products. She shared, "*[a]ng sabi nga nila sa akin, akmang-akma itong paggawa ko kasi pukaw na ang Pilipino ngayon.* They are starting to take pride in what they have."

Her products have also garnered attention from personalities across the globe. Fashion icons such as actress Heart Evangelista, Miss Universe 2015 Pia Wurtzbach, and international fashion designer Christian Louboutin have taken an interest with her world-class design and handicraft.

To keep up with the ever-changing landscape of the fashion industry, De Los Santos consulted BIARC on other natural fibers that can be used as raw materials for her products. She explained, "*sa aking ginagawa ang naitulong talaga [ng* research] is *iyong kapag naghahanap ako ng ibang* fiber. *Sila naman ang kinokontak ko. Kasi gusto kong mag-*infuse [*ng ibang* fiber]. We are into *saluyot para i-*incorporate *namin. Kasi sa* fashion *mabilis silang magsawa, so kailangan mayroon kang bagong* idea."

The women behind this success

Before venturing into the handicraft industry, De Los Santos was a farmer. She said, "*nagsimula ako* as a farmer *dito sa* Baao, but of course, I have always been an artist " In fact, she was awarded as the Most Outstanding Rural Woman in 2008.

"*Naisip ko lang* to go to crafts because I observed *na ang mga asawa ng* farmers from the time they plant until the time they harvest *walang ginagawa. So iyon ang naging trabaho ko rito sa amin, tinuruan ko [silang] magburda, ng kung anu-anong mga ginawa*," she shared.

She has been teaching women the necessary skills to make the bags such as basket weaving, embroidery, and crocheting. National agencies such as DA, DTI, and Department of Social Welfare and Development has tapped her to train more communities outside Baao. She explained, "*nagturo kami* via DA, *nagturo kami sa mga nasalanta ng* Mayon Volcano eruption. So *may mga* weavers *kami sa* Albay, *lahat ng kailangan kong* skill *tinuturo namin. Para* after *ng* training *sa kanila na kami kukuha, mayroon kaagad silang* income."

"[My] goal is to empower these women by teaching them the skills and bring about the best in them, while allowing them to be mothers, wives, sisters, nurturing their families, their communities," De Los Santos shared in her social media account.

At the bottom of this success, what matters most for De Los Santos is the number of lives she has touched. "This is a social enterprise. *Ang gusto ko mas maraming makakagamit; kasi pag marami, marami rin ang magagawa nila. Ang* profit margin is very minimal but it's enough to keep the business going, so that's fine," ended De Los Santos. ###

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Safeguarding traditional rice varieties in the Ilocos region

by Daryl Lou A. Battad

Rice, the Philippines' main crop and staple, has abounding varietal diversity that can be traced from the country's rich heritage. However, in a constantly changing and modernizing of agriculture, traditional varieties are often put on the sidelines, and worse, eventually forgotten.

Still, being a nation where identity and culture are kept alive, preservation efforts are being made so that traditional crop varieties can survive and may be passed on from one generation to the next. This is exactly what the Department of Agriculture-Regional Field Office (DA-RFO) 1 envisions through a project on the conservation of traditional rice varieties in the region.

Funded by the Bureau of Agricultural Research (BAR), DA-RFO 1-Ilocos Norte Research and Experiment Center (INREC) embarked on a project, "Collection, Characterization, and Seed Multiplication of Traditional Rice Varieties in Region 1."

The project aims to collect, characterize, evaluate potential varieties, and mass produce to provide available and good quality seeds to stakeholders such as rice growers and scientists for use on future researches.

Studies showed that traditional rice varieties contain less fat versus hybrid rice, making them an excellent source of minerals and vitamins such as niacin, thiamine, iron, riboflavin, vitamin D. It is also known to possess high amounts of fiber and lesser sugar. Aside from these health benefits, traditional rice varieties carry exceptional characteristics like resistance to pests and diseases, high-yielding capability, and are genetically engineered to serve as building blocks for new varieties.

Project leader and INREC Center Chief Wilma Ibea said that the conservation and profiling of these traditional varieties reinforce genetic improvement leading to the development of new and better varieties.

Collection and characterization

Seventy-one traditional rice varieties were collected from different municipalities of Ilocos Norte, Ilocos Sur, La Union, and Pangasinan. These collected varieties were then planted in the experimental farm at INREC, Batac, Ilocos Norte during wet seasons of cropping years from 2014-2017.

Growth cycle traits, vegetative properties, and reproductive traits before and after harvest were the primary data gathered during characterization following the "Descriptors for Wild and Cultivated Rice" by Bioversity International, International Rice Research

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Isik pugot is a traditional rice variety that came out to be the most promising variety. It produced the most number of productive tillers, produced the heaviest weight of 1000 seed grains at 36 grams, and highest yield of 4.30 tons per hectare.

PHOTO COURTESY OF JIBERMAS

Developing protocol...from page 10

extracts were done by determining its effects on the insect pests under laboratory and field trials.

Based on bioassay trials conducted against leafhopper, the formulated pummelo WP showed the highest mortality against leafhopper with the application of 60 grams per liter. In field conditions, the formulation was found effective, and is indeed a potential biopesticide. The results confirmed the findings that pummelo extract is toxic to leafhopper, hence causing high reduction population. The product persists at 3-6 days after application in the field, further increasing its effectivity against leafhoppers. Likewise, the sambong WP exhibited positive response in terms of mortality of S. litura (common cutworm), with mortality ranges from 40 to 60 percent. The team of Duque will still replicate the experiments to make it more conclusive.

Part of the organic protocol developed by the project proponent was the production of the Control Decision Guide Strategies, which will be demonstrated to farmer-growers and other stakeholders. The protocol will serve as guide to okra farmers, both for local and exports, not only for the province of Tarlac, but for the rest of the okra growers in the country as well. ###

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Beefing up Siquijor's...from page 11

when he choose to engage in the cow-calf operation in Siquijor.

General assessment of the results showed that good cultural management practices employed by the raisers could not be translated into profit until problems in marketing is resolved. This is attributed to the lack of price standard in Siquijor.

Product development and marketing

One of the interventions of the project was meat processing and product development through the conduct of training. One of the beneficiaries of the project was the Catulayan Community Multi-Purpose Cooperative wherein members were taught how to process and add value to their beef products. In 2017, 33 members of the Cooperative underwent the training in Siquijor. Dr. Maria Cynthia Oliveros, project study leader, demonstrated how to process beef tapa, corned beef, burger patties, and beef floss.

Meat processing was introduced to the members to increase their income and to promote the quality of native Siquijor beef. They were also taught how to look at fresh meat including the physical and chemical properties of meat to ensure its quality, tenderness of the mat during processing and storage, and even the correct meat cut. Another aspect of the training was teaching them about meat spoilage and proper handling to maintain food safety and avoid food poisoning.

Aside from meat processing, 11 members of the Cooperative also underwent slaughter and beef fabrication training. They were exposed to existing beef grading standards and beef cuts. Leading the training were Dr. Oliveros and Dr. Salces.

The various meat products were exhibited during the 14th Agriculture and Fisheries Technology Forum and Product Exhibition held on 30 August-2 September 2018 at SM Megamall, Mandaluyong. ###

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Institute; and The Africa Rice Center.

It was observed that all traditional rice varieties have the same population uniformity, life cycle, coleoptile anthocyanin coloration, lemma shape of apiculus, sterile lemma length and color, and spikelet fertility.

Traditional rice varieties were also perceived to be tall, has awn present on some varieties, and late maturing of up to 146 days.

However, out of the 71 varieties, only 53 were able to survive and categorized because some of them did not adapt locally, and some were prone to "rice blast" disease.

Isik pugot

Isik pugot is a traditional rice variety that came out to be the most promising variety. It produced the most number of productive tillers, produced the heaviest weight of 1000 seed grains at 36 grams, and highest yield of 4.30 tons per hectare. According to Ibea, this variety can be recommended for use by farmers especially in rainfed and lowland areas.

Other promising varieties include *Kamurus* rice, *Gal-ong*, *Makandaras*, and Black rice. These were drought-tolerant and need lesser amount of fertilizers, aside from their good eating qualities and nutritional content.

To date, there are nine farmers and 12 local government units (LGUs) who adopted and are continuously planting traditional rice varieties that came out of this project. Each farmer was provided with 40 kilograms of seeds while the LGUs were given 350 kilograms each. These seeds were being used as planting materials to continuously conserve these existing and promising traditional varieties that can be the region's pride and heritage. ###

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Newly-appointed/promoted staff take their oath

BAR Dir. Nicomedes Eleazar and BAR OIC-Asst. Dir. Digna Sandoval in a photo opportunity with newly-appointed/promoted staff: (L-R) Desiree Anne Macahia, Magdalena Calimutan, Juan Nikolas Paller, and Ian Jomari Panaga.

Four newly-appointed/promoted staff members of the Bureau of Agricultural Research (BAR) took their oaths on 14 January 2019 at the Office of the Director, RDMIC Building, Visayas Ave., Diliman, Quezon City. Officiating the oath-taking ceremony was BAR Director Nicomedes P. Eleazar. Also present to witness the activity were OIC-Asst. Director Digna L. Sandoval and other key officials and staff of the bureau.

Newly-appointed staff members were Ian Jomari C. Panaga, Agriculturist II; Juan Nikolas A. Paller, Administrative Officer IV; and Desiree Anne M. Macahia, Administrative Officer III. Magdalena M. Calimutan was then promoted to Administrative Officer II.

Created by virtue of Executive Order 116 signed in 1987, BAR now has 53 authorized plantilla positions of which 32 are technical while 21 for administrative positions. ### ***(Ma. Eloisa H. Aquino)***

Pisay students visit...from page 6

with AVP primers on BAR, and the two banner programs of the bureau: Community-based Participatory Action Research (CPAR), and National Technology Commercialization Program (NTCP). Also present were technical staff from the Program Monitoring and Evaluation Division (PMED) and Technology Commercialization Division (TCD) to provide answers to the students' queries.

Parts of the visit were hands-on seminar discussion on SNAP Hydroponics by Dr. Primitivo Santos of the University of the Philippines Los Baños (UPLB); and tour and briefing at the R&D Technology Commercialization Center.

According to Special Science Teacher Christian Abagat, BAR is the second stop of a series of agency visits under the student's STEM elective class on agriculture. Prior to BAR, they have visited the Agricultural Training Institute during the last quarter of 2018. Abagat emphasized the importance of these study visits as they provide a venue for the youth to see first-hand, the direct applications of what they are learning inside the classroom as well as for students to have a deeper appreciation and understanding of agriculture. ### ***(Ephraim John J. Gestupa)***

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