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BAR graduating scholars with BAR Director Nicomedes P. Eleazar (back row, center), BAR OIC-Asst. Director Digna L. Sandoval (back row, 3rd from left), and UPLBFI Exec. Director Casiano S. Abrigo (back row, 2nd from left) during the recognition ceremony at UPLB.

BAR undergrad scholars recognized

Sixteen scholars of the Bureau of Agricultural Research (BAR), of which five earned highest distinctions (one *Magna Cum Laude* and four *Cum Laude*), graduated during the 47th Commencement Exercises of the University of the Philippines Los Baños (UPLB) held on 22 June 2019.

The five scholars who graduated with the highest distinctions were: 1) Samantha Johanna T. Timbreza (BS Development Communication, *Magna Cum Laude*); 2) Stephanie Edora P. Manrilla (BS Development Communication, *Cum Laude*); 3) Marleth B. Temporal (BS Agriculture, *Cum Laude*); 4) Vanessa Kate I. Alvarez (BS Agricultural Biotechnology, *Cum Laude*); and 5) Lermarie S. Bautista (BS Agricultural Biotechnology, *Cum Laude*).

Prior to the graduation ceremony, the BAR scholars were recognized on 13 June 2019 during the “*Isang Parangal... Isang Pasasalamat... Ika-5 taon,*” spearheaded by the UPLB Office of the Student Affairs. Present

during the event were BAR Director Nicomedes P. Eleazar and BAR OIC-Assistant Director Digna L. Sandoval who awarded the certificates of recognition to the scholars.

During the event, one of five scholars, Timbreza, delivered a message to her fellow scholars and partner donors.

“Let me declare a new dream: that one day, I will be the one sitting in the seat of our sponsors, finally learning how it feels to be an instrument of grace in a UP student’s life. My fellow scholars, I urge you to not only believe in the grace that’s transpiring in our lives today but also to believe that we, someday, can be the channel of grace itself,” Timbreza said.

In another activity, prior to the graduation, the five scholars who graduated with Latin honors were recognized by BAR on 20-21 June 2019 at College of Development Communication and College of Agriculture and Food Sciences, respectively. BAR OIC-Asst. Dir. Sandoval, who was present during the event, took pride of the

achievements of the scholars for their hard work and dedication to their chosen fields. She personally congratulated and awarded each of the scholars with a BAR Academic Excellence Medal and Php 10,000 cash.

Launched in 2012, the BAR Undergraduate Scholarship Program is funded by the bureau through Institutional Development Division, and is being implemented in partnership with UPLB-Vice Chancellor for Academic Affairs and

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Eleazar urges ISU graduates to pursue excellence amidst the challenge



BAR Director Nicomedes P. Eleazar serves as the keynote speaker during the commencement exercise of the Isabela State University-San Mateo on 4 June 2019.

PHOTOS: AOBLIGADO

“The road to excellence is never going to be easy, but the reward is unimaginable. We are what we repeatedly do. Excellence is not an act but a habit,” stressed Dr. Nicomedes P. Eleazar, director of the Bureau of Agricultural Research (BAR), as he served as the keynote speaker of the Isabela State University (ISU)-San Mateo Commencement Exercises on 4 June 2019.

In his address, BAR Dir. Eleazar mentioned that striving for excellence should not be confused with striving for perfection. Excellence, according to him, leads to improvement, while perfection

paves way for idleness; perfection is difficult to attain, while excellence is possible.

He added that, “there is a need to develop a mindset that achieving excellence is a process and it often starts having set of goals and passion to reach it. The pursuit of excellence keeps you focused on what matters the most, filling your self-esteem to do better each time you feel inadequate. Productivity is built into the pursuit of excellence.”

Dir. Eleazar commended ISU-San Mateo campus, now on its 34 years of existence, for going the mile in nurturing a culture of excellence among its students as manifested in

its effort to provide quality education despite the challenges. He also mentioned BAR’s partnership with ISU as it assumed leadership roles in research not only in Region 2, but in the country and in Asia as well.

There were 180 students who graduated from ISU-San Mateo campus, of which, 57 received their degree in Bachelor of Agricultural Technology while 23 in Diploma in Agricultural Technology.

ISU-San Mateo is one of the eight campuses of ISU, which has been one of the long time partner-state universities of BAR in the Cagayan region. ### (Rita T. dela Cruz)



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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BAR refines its performance assessment mechanism

To promote awareness in the system and generate employees' appreciation for the Department of Agriculture-Strategic Performance Management System (DA-SPMS) as a management tool for performance planning, control, and improvement, the Bureau of Agricultural Research (BAR) conducted an orientation seminar for its staff on 17-18 June 2019.

Serving as the resource person for the two-day seminar was Civil Service Commission (CSC) Field Director (DA-DENR cluster) Fe P. Lacaba.

Through the activity, BAR staff members were guided in internalizing their roles as partners in meeting the organizational performance goals. With BAR gearing up for ISO certification, the SPMS orientation serves as a streamlined, scientific, and verifiable basis in assessing and improving the agency's performance from individual to office level.

Prior to the adoption of the

SPMS, the DA system had been using the National Performance Appraisal System (NPAS) and the Performance Evaluation System (PES) administered in accordance with the rules, regulations, and standards promulgated by the CSC. The NPAS and PES focus on individual appraisals based on targeted output and accomplishments. While these systems were primarily used as prerequisites for promotion and other personnel actions, including separation and performance-based incentives, these were not linked with the attainment of organizational vision, mission, goals.

To address the gaps and weaknesses found in previous performance evaluation systems, the DA has transitioned into using the SPMS which provides a more holistic and encompassing assessment of the agency's programs and projects. Through the SPMS, BAR hopes to

develop a culture of performance and accountability.

The two-day orientation covered the role of SPMS in relation to BAR's mission and vision and its relevance to the employee's individual work performance, focusing on the four stages of SPMS, namely: 1) performance planning and commitment, 2) performance monitoring and coaching, 3) performance review and evaluation, and 4) performance rewarding and development planning.

BAR division and unit heads presented their respective Performance Commitment and Review Forms (PCR). PCR is a key tool in measuring office and employee performances that are specific to each division. With the PCR, performance assessment is classified under the agency's core functions, strategic priorities, and support functions. ### (Ephraim John J. Gestupa)



PHOTOS: EJGESTUPA

INSET: CSC Field Dir. Fe Lacaba (top), serving as the resource person for the activity, discusses the difference of SPMS over the assessment mechanism used before by DA. While, BAR Dir. Nicomedes Eleazar (bottom) expresses the timeliness of the activity as the bureau continues to update its strategic priorities and is also gearing up for ISO 9001:2015 certification.

PhilRice to launch book on climate change-adaptive school

The Philippine Rice Research Institute (PhilRice) is set to launch a book titled, “What is a climate change-adaptive school?,” by the second semester of 2019.

The book conceptualizes how a school can be climate change (CC)-adaptive. It documents the experiences of its participating high schools strategically located nationwide. At the heart of this book are the central roles that schools can play in CC adaptation in rice-farming communities.

A good portion of the book provides description on how the participating schools implemented the project. Each section provides information on the development context, technology highlights, ways in which the participating school engaged their surrounding communities, and the immediate outcomes of the project. The minimum requirements, as well as key lessons in implementing a CC-

adaptive school initiative, are also outlined in the book.

This book is produced under the Bureau of Agricultural Research (BAR)-funded project, “Development of Agriculture [Technical Vocational] (TecVoc) High Schools Offering Crops Production as Key Information Hubs on Climate Change-Ready Rice Production Technologies for Improved Agricultural Productivity.” The project develops means of integrating learning modules on CC and its effect on rice production as well as identifying CC-adaptive technologies. Participating teachers, school principals underwent a training program on CC and rice production at PhilRice Central Experiment Station in Nueva Ecija during the start of the project.

According to Jaime A. Manalo IV, project leader and primary author of the book, “it is hoped that we are able to set the minimum standards on how schools in rice-farming

communities can play pivotal roles in climate change adaptation.” He added that the book aimed to advance the discourse on CC adaptation in rice-farming communities with the end in view that it can result in concerted action to help rice farmers cushion the impact of climate change.

In 2017, the book “Communicating climate change in the rice sector” was also published under the auspices of this BAR-funded project. The book aimed to provide some tips on how people, who are oftentimes not ready to talk about climate change but are obliged to because of their jobs, may communicate about this important phenomenon. The e-version of the book is available for free download at the PhilRice website.

The publication of both books was funded through BAR’s Scientific Publication Grant. ### (Rena S. Hermoso)



Students harvesting vegetables from capillarigation setup in Luna, La Union.

PHOTO: JAYSON C. BERTO/PHILRICE

Korea RDA's agri exhibit showcases Phl AFACI projects



AFACI Deputy Secretary General Kim Minkyong (left) and Communications Specialist Ma. Eloisa Aquino (right) give brief overview of the Philippines activities in the AFACI Program to DA Undersecretary for Operations Ariel Cayanan (2nd from right) and Agricultural Attaché to Korea Maria Alilia Maghirang (2nd from left).

PHOTO COURTESY OF AFACI

Philippine projects, funded under Korea's Asian Food and Agriculture Cooperation Initiative (AFACI), along with other member-countries, were exhibited at the "2019 Agricultural Technology Exhibition" on 19-22 June 2019 in Seoul, South Korea. The event was organized by the Rural Development Administration (RDA).

Gracing the event was Department of Agriculture (DA) Undersecretary for Operations Ariel Cayanan who was also in Seoul, Korea to attend the 10th Anniversary of RDA. Cayanan visited the AFACI booth showcasing various information materials produced as outputs of the projects being implemented in the Philippines.

Meeting Cayanan were AFACI Deputy Secretary General Kim Minkyong and Philippines' Communications Specialist Ma. Eloisa Aquino of BAR. Dr. Kim gave a brief overview of

Philippines' activities and initiatives under the AFACI program. Joining Usec. Cayanan in the exhibit was Maria Alilia Maghirang, agricultural attaché to Korea.

Since 2010, DA through BAR, has been coordinating 14 projects under AFACI. BAR Director Nicomedes Eleazar serves as the AFACI national representative while Julia Lapitan, head of the BAR-Applied Communication Division serves both as the national contact person and the principal investigator of the AFACI-ATIN project.

AFACI is an inter-governmental and multi-lateral cooperation body aimed to improve food production, realize sustainable agriculture and enhance extension service of Asian countries by sharing knowledge and information on agricultural technology. It is based in its headquarter at the International Technology Cooperation Center, RDA in Jeonju, South Korea. ###
(Ma. Eloisa H. Aquino)

BAR undergrad...from page 1

UPLB Foundation, Inc.

BAR has supported 87 undergraduate scholars composing of students taking BS Agriculture, BS Agricultural Biotechnology, and BS Food Technology, and BS Development Communication. In 2015, the scholarship program was extended to agriculture-related degree programs including BS Agricultural Engineering, BS Agricultural Economics, and BS Agribusiness Management.

To further contribute and enhance the workforce of the agri-fishery research and development and related fields, the scholarship program will soon be made available to other state universities that are Centers of Excellence in agriculture, fisheries, and related fields. ###
(Clarisse Mae N. Abao)



Vichel Rse Juguilon-Pangan, GAD specialist and consultant, and Rita dela Cruz, ACD asst. head, serve as the resource persons for GSL and IEC workshop, respectively, held on 18-21 June 2019.

PHOTOS: EJGESTUPA

2nd batch of GSL-IEC workshop held

The Bureau of Agricultural Research (BAR), through its Gender and Development (GAD) Focal Point System, spearheaded the second run of the “Workshop on Gender Sensitive Language (GSL) and BAR Information, Education, and Communication (IEC) Development and Production” on 18-21 June 2019 in Lubao, Pampanga.

The second batch (Visayas and Mindanao clusters) was composed of participants from the Department of Agriculture-Regional Field Offices, Bureau of Fisheries and Aquatic Resources-Regional Offices, and BAR. The activity was held to capacitate the participants with the skills needed in producing gender-responsive outputs, including project proposals and IEC from funded projects.

Vichel Rse Juguilon-Pangan, GAD specialist and consultant, served as the resource person for the GSL workshop wherein she first reviewed basic GAD concepts. She mentioned that for language to be fair, a person must first adopt a gender-perspective that is critical and careful with ideas and thoughts that propagate gender-bias. Juguilon-

Pangan then proceeded to discuss the importance of gender-fair language in the agricultural sector. According to her, language must not treat farmers and fisherfolk as homogenous, given that male and female stakeholders have different gender roles that need to be equally considered and highlighted both during project formulation, monitoring, and evaluation.

For the participants to further apply their learnings during the activity, workshops were conducted wherein they evaluated BAR-produced IEC materials and project proposals based on the GAD tools and techniques discussed.

After talking about gender-fair language, Juguilon-Pangan then discussed the Harmonized Gender and Development Guidelines (HGDG) for Project Development, Implementation, Monitoring, and Evaluation. The HGDG is a tool used to ensure that research projects are gender-responsive across its various stages. HGDG makes use of checklists as a measuring tool for gender-responsiveness, each varying depending on the sector to which a project is implemented.

The participants were tasked

to measure the level of gender-responsiveness of BAR-funded project proposals using the checklist while also providing feedback as to how GAD can be mainstreamed in the research initiatives assessed.

Meanwhile, Rita dela Cruz, assistant head of BAR’s Applied Communication Division (ACD), presented the Knowledge Management Program including its framework, strategies, and various modalities and platforms used by the bureau. She also discussed the various types of IEC and how to develop and produce them according to the need of the intended audience. She also encouraged the participants to submit contributions to BAR’s regular publications, given the specifications and style guide discussed during her presentation.

ACD Chief Julia Lapitan officially closed the activity acknowledging the cooperation of everyone in going through all the workshops. She hoped that with the two batches of GSL trainings conducted, the participants will be able to apply what they have learned and to make the outputs of research gender-sensitive. ### (Ephraim John J. Gestupa)

BAR, SEARCA conduct financial viability and profitability training



The participants of the Financial Viability Training from DA regional offices and research stations and LGUs with BAR Director Nicomedes P. Eleazar (seated, center) and SEARCA Director Glenn B. Gregorio (seated, 4th from right).

PHOTO: RHERMOSO

Bureau of Agricultural Research (BAR), in partnership with the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), conducted another batch of the “Financial Viability and Profitability Analysis of Agricultural Technologies

and Emerging Enterprises” Training-Workshop on 3-8 June 2019 in Los Baños, Laguna.

Representatives from the regional offices and research stations of the Department of Agriculture (DA) and local government units (LGUs) across the country participated in

the training. Dr. Corazon T. Aragon (project leader), Dr. Cesar B. Quicoy (financial viability expert), and Prof. Bates M. Bathan (training facilitator) served as trainers and lecturers.

Dr. Aragon gave a lecture on cost and return analysis, financial cash

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18 NTCP projects reviewed

To further refine the accomplishments of the projects prior to the final submission of reports, the Bureau of Agricultural Research spearheaded the evaluation and review of 18 completed projects on 25-27 June 2019.

These projects were funded under the bureau’s banner program, the National Technology Commercialization Program (NTCP). Of the 18 projects reviewed, three were on livestock,

while 15 were categorized under fruits and vegetables.

The submitted consolidated reports serve as bases for a much wider dissemination of relevant information and technologies to the public, particularly its impact. The consolidated reports will also serve as reference for the production of information materials including research projects.

One of the main objectives of the review was to assess the viability and “commercial-ability” of a

particular technology and products generated under these NTCP projects.

The members of the reviewing panel were Dr. Edralina Serrano, Dr. Elda Esguerra, Dr. Cynthia Oliveros, and Dr. Cesar Quicoy, who are all from the University of the Philippines Los Baños. Also present during the review were TCD Head Anthony Obligado and Asst. Head Ma. Elena Garces; and TCD technical staff and focals.

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Cacao-generated technologies, a livelihood option for farmers

Text and photo
by Leoveliza C. Fontanil



Cagayan Valley-local cacao brands such as tablea tops and kisses, 80% dark chocolate, yema-filled dark chocolate, choco-nut crispy cookies, and tablea-soybean chips.

PHOTO: LFONTANIL

The Department of Agriculture reported that the global demand for cocoa is estimated to reach from 4.7 to 5 million metric tons (MT) by 2020, but a cocoa global shortage is also predicted to reach one million MT in the same year.

In the Philippines, the local consumption of cocoa reaches 50,000 MT every year but the local supply is only around 10,000 MT.

To avoid further impending deficit, the Philippines has committed to produce 100,000 MT of fermented processed beans for the export and domestic markets through 40 percent annual increase in the production by 2020 according to the Department of Trade Industry in 2016.

DA is targeting to optimize opportunities and strengths in pursuing the inclusive development of the cacao industry in the country. With that, DA supports the need for intensification and promotion of technologies on cacao production and processing to improve the livelihoods and profit of small cacao farmers and growers.

In support to this advocacy, the

Bureau of Agricultural Research (BAR) featured in its seminar series, relevant topics on cacao-generated technologies particularly the development of new products for improved livelihood and enterprise. The seminar, spearheaded by BAR-Applied Communication Division, was held on 28 June 2019 in Quezon City.

Dr. Perlita P. Raymundo, project leader and director of the Cagayan Valley Cacao Development Center of Isabela State University (ISU), served as the resource speaker on the topic, "Research and Development Extension for Cacao Production, Processing and Utilization." The project aimed to generate appropriate production and processing technologies addressing the concerns of the cacao farmers.

During the seminar Dr. Raymundo shared various ISU-developed technologies on cacao that farmers' will find easy to adopt, such as the scientific way of growing cacao, its benefits to health, and its contribution to economic and social development. She also discussed the

importance of using suitable planting and grafting material for cacao farm establishment and rehabilitation. She explained how the use of Good Agricultural Practices can help farmers in improving production and providing equitable economic returns; and how the production of consistent quality cacao can lead to a cost efficient farming practices.

Dr. Raymundo also showcased some of the local cacao products that they have developed which are now dubbed as the "new pride of Cagayan Valley." Among these include: tablea tops and kisses, 80 percent dark chocolate, yema-filled dark chocolate, choco-nut crispy cookies, and tablea-soybean chips. The development of these cacao product lines was part of a BAR-funded project specifically for the local entrepreneurs.

ISU's initiatives on cacao started in 2011. It aimed to generate cacao production and post production technologies on processing and value adding for cacao. The projects were supported by BAR through its banner program, the National Technology Commercialization Program. ###

AMIA village in Banate adopts climate-resilient technologies

Text and photo by Daryl Lou A. Battad

“*Babuyang Walang Amoy*” or odor-free swine raising and native pig production technologies were among the interventions determined based from the climate risk assessment that was carried out in the municipality of Banate, Iloilo.

The farmers were highly receptive of the technologies especially odor-free swine raising because it is environment- and farmer-friendly, making use of available and indigenous materials particularly for housing and feeds. Farmers also noted that native pigs are less prone to diseases, making it a viable agriculture enterprise despite Banate’s high climate risk vulnerability.

Implemented under the project, “Community-based Action Research

for Climate-Resilient Agriculture (CRA) in Region 6,” it targets to assess climate risks and prioritize CRA agricultural landscapes and value chains. The project also sought to organize and facilitate community-level action learning through testing and sharing of CRA technologies, practices, and other innovations; enable agri-fisheries communities in mainstreaming CRA; enhance and sustain agri-fisheries communities’ access to integrated CRA services for finance, climate information, and institutional support services; and monitor and evaluate CRA outcomes on overall livelihood resilience of agri-fisheries communities.

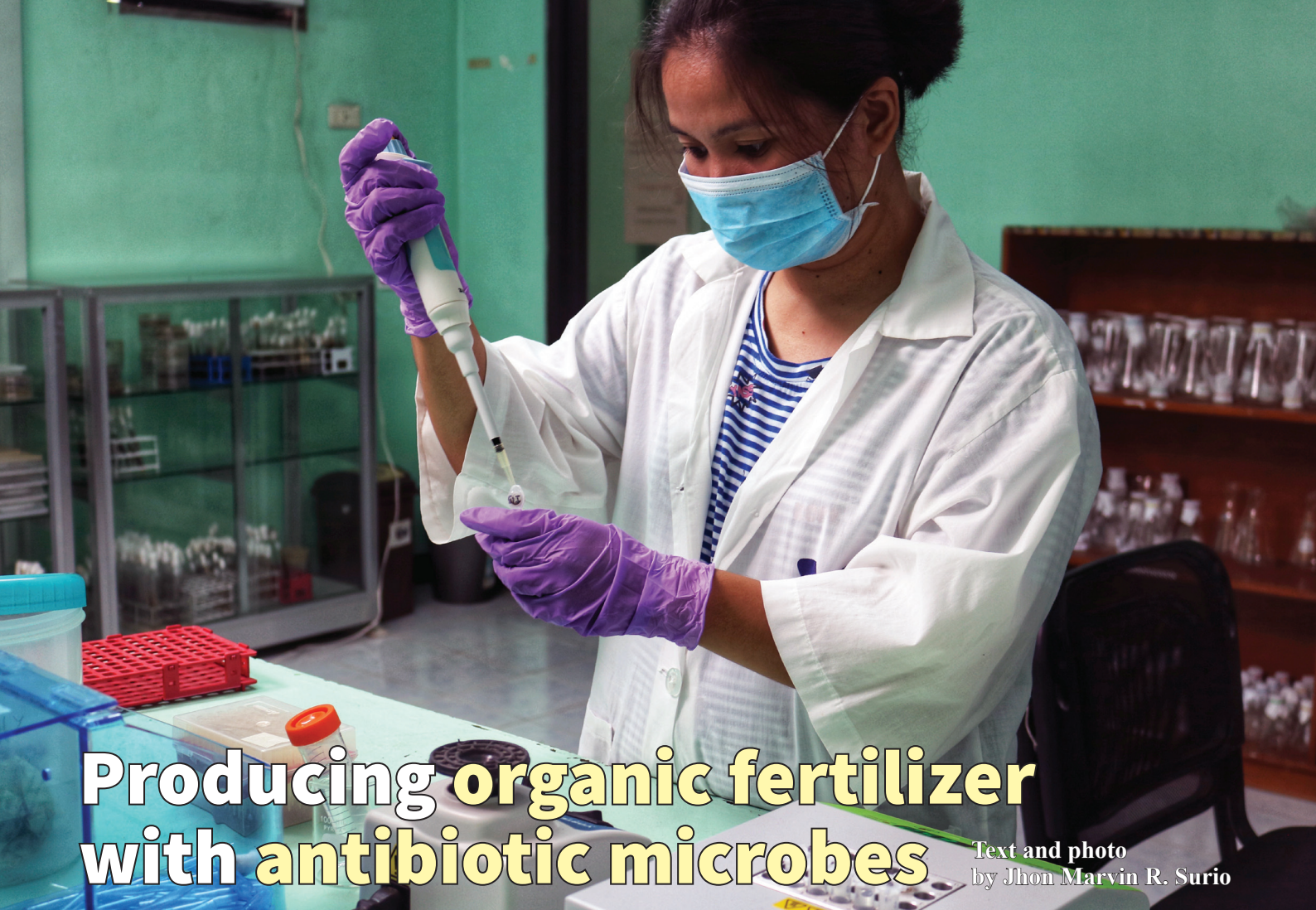
As per visit of the monitoring and evaluation team from the Bureau of Agricultural Research (BAR),

through its Program Monitoring and Evaluation Division, farmer-cooperators have fully adopted the CRA interventions and are presently economically benefiting from them. In fact, the technologies are being expanded within and neighboring communities, allowing more farmers to adopt such practices.

The BAR-funded project is being implemented by the Department of Agriculture-Regional Field Office 6 under the Department of Agriculture’s Adaptation and Mitigation Initiative in Agriculture (AMIA) program. AMIA enables local communities to manage climate risks while pursuing sustainable livelihoods through the promotion of CRA technologies and practices. ###



Native pigs are fed with available indigenous resources in the field such as indian mangoes and water spinach (*kangkong*).



Producing organic fertilizer with antibiotic microbes

Text and photo
by Jhon Marvin R. Surio

The antibiotic resistance of pathogenic microorganisms poses a threat to public health and agricultural productivity and sustainability.

The extensive use of antibiotics in curing diseases and both in boosting and speeding up the growth especially of poultry animals has made it an emerging contaminant and pollutant because of the great risks it poses to the environment, food sources, and ultimately, to humans.

To address this, the Ramon Magsaysay Center for Agricultural Research and Environment Studies of the Central Luzon State University implemented a study titled “Isolation and Utilization of Antibiotic Degrading Microorganism (ADM) in the Production of Organic Fertilizer.”

The study utilizes microorganisms from composting to remove antibiotic contents to produce organic fertilizer. It underscores the importance of the composting process, which serves as initial step in the treatment of organic solid wastes.

Funded by the Bureau of Agricultural Research, the first part of the study was the identification of microorganisms that possess properties that can remove traces of antibiotics through the process of composting.

Microorganisms, specifically bacteria and fungi, were used because they can be easily isolated, given that specific substrates were identified to culture them.

Series of tests were conducted in the selection of microorganisms, including DNA analysis, morphological and biochemical tests, determination of minimum inhibitory concentration, molecular identification and characterization, and substrate formulation.

Out of the 14 microorganisms, two fungal species (ADM3 and ADM7) surfaced as ideal for the purpose of the study. The two fungal species were then cultured for mass production.

ADM3 and ADM7 were mixed in compost consisting of hay, dried leaves and trimmings, untreated chicken manure, carbonized rice hull, and antibiotic. The compost

requires to be left for 60 days to breakdown the materials used. Once ready, it is air-dried overnight and processed using a multi-purpose shredder to grind the vermicast into finer bits. The end product has fine, sand-like texture that can be mixed into the soil as fertilizer.

Results of the sample analyses showed that the two fungal species, ADM3 and ADM7, yielded 50-60 percent and 80-90 percent efficacy for the two antibiotics used in the study, namely tylosin tartrate and oxytetracycline, respectively.

“*Matagal nang may available technology sa pagtanggap ng antibiotic residue pero sa chicken manure, wala pang gumagawa at nag-a-apply,*” said Roy Searca Jose dela Cruz, project leader, on how the research was pioneered.

Not known to many, most medicines used to cure animals of certain diseases as well as commercial feeds that are being used to feed poultry animals use high amounts of antibiotics.

Unfortunately, these antibiotics are not fully utilized by animals

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Exploring the potential of breadfruit through R&D

by Patrick Raymund A. Lesaca

Breadfruit (*Artocarpus altilis*) is a versatile food crop that is believed to have originated in the South Pacific. It can be cooked and eaten in all stages of maturity. The seeds are also edible. It has the potential to become a rich source of nutrients for many Filipinos especially in poverty-stricken regions. Breadfruit is currently being cultivated in some part of the country, particularly in Mindanao.

There is a need to characterize the crop to know the diversity and to select good cuttings that can mitigate the problem on virus disease and other pests. More efforts have to be done to exploit the crop for there is high supply during certain periods of the year in some parts of the country. Results of the study will serve as baseline data for researchers to further pursue studies on breadfruit.

Exploring further the versatility of this crop, a study that focused

on the survey, characterization, evaluation and maintenance, and production of breadfruit from nursery to bearing stages was conducted by the Department of Agriculture-Regional Field Office (DA-RFO) 11 and was funded by the Bureau of Agricultural Research (BAR).

The study aimed to evaluate the performance of breadfruit root cuttings, jackfruit, *marang*, and breadnut seeds as ideal sources of rootstocks for breadfruit; evaluate the response of breadfruit root cuttings applied with growth hormones; and evaluate the field performance of breadfruit from transplanting to bearing stage.

According to Merly S. Salaver, project leader from DA-RFO 11, breadfruit is only planted in the backyard. Thus, data collection on area distribution, which requires survey of existing tree, has not been given importance. Similarly, the

characterization of trees and other related information on the different management practices from nursery to bearing stage have not been fully documented. The study, according to her, will provide the needed information about the potential of the crop as food substitute.

The survey, identification, and characterization of plant source and fruits were done in Davao Region. Age of trees ranges from 5 to 50 years old and were mostly found in Davao Occidental and Davao Oriental.

Results and Recommendations

Based on the survey conducted, Davao Occidental has the greatest number of breadfruit trees followed by Davao Oriental. In terms of fruit weight, Davao City recorded the heaviest at 1.9 kg, followed by Compostela Valley at 1.5 kg.

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PHOTO: ACBRION

BAR, SEARCA...from page 7

flow analysis, discounted measures of project worth (net present value, benefit-cost ratio, and internal rate of return), and sensitivity analysis. Dr. Quicoy discussed the partial budget analysis and break-even analysis while Prof. Bathan facilitated the hands-on sessions on cost and return analysis, partial budget, and break-even analysis.

The training-workshop aimed to equip the participants with knowledge and skills in conducting financial viability and profitability analysis of new technologies and enterprises thru lecture sessions and laboratory exercises. BAR and SEARCA have

already capacitated more than 150 participants since the training begun in 2017.

Dr. Nicomedes P. Eleazar, BAR director; and Dr. Glenn B. Gregorio, SEARCA director graced the training-workshop. In his message, Dr. Eleazar underscored the importance of incorporating financial viability analysis in the technology commercialization research proposals submitted to BAR. This is to ensure that technologies produced from research initiatives will be profitable and sustainable enough to become an agribusiness venture or enterprise. On the other hand, Dr. Gregorio shared that research initiatives must be industry-driven, thus, the importance

of conducting financial viability and profitability training to capacitate researchers and project implementers with the necessary skills. He also said that it is high time that researchers look at the commercial side of their projects; otherwise developed technologies would only remain in papers.

During the closing program, representatives from Luzon, Visayas, and Mindanao shared their experiences during the training and how the things they have learned will be useful for their on-going and future research projects. They also expressed their gratefulness to BAR and SEARCA for conducting such training. ### (Rena S. Hermoso)

Exploring the...from page 11

Davao City fruit samples were judged as very acceptable in terms of flesh color, aroma, flavor, and texture, compared to those fruits in Compostela Valley, Davao del Norte, and Davao del Sur in which they were judged as acceptable.

In terms of establishment, evaluation, and maintenance from nursery to bearing stage, results showed that breadnut seeds performed best in terms of percent germination at 94 percent with 86 percent survival rate during pricking stage compared to jackfruit and *marang* seeds with 84-82 percent germination and 77-85 percent survival rate, respectively.

Marang as rootstock germinated the earliest at seven days after sowing. However, the breadnut rootstock has the highest germination and survival rate, graft success, and graft survival. Roots applied with Atonik (a plant stimulant) as growth hormone were taller and with the highest survival rate.

After extensive R&D, the project proponents recommend the following: 1) use breadnut seeds as best source of rootstock for breadfruit; 2) use growth hormones to breadfruit root cuttings for faster multiplication of seedlings; 3) conduct sensory evaluation of breadfruit fruits with *marang*, breadnut, and jackfruit as rootstocks;



L-R: Project Leader Merly Salaver, BAR OIC-Assistant Director Digna Sandoval, Science Research Specialist (SRS) Anecita Telabangco, and Supervising SRS Nida Gigayon monitor the breadfruit project. PHOTO COURTESY OF DA-RFO 11

4) continue gathering of data on the number of fruits relative to the different rootstocks; and 5) conduct research on postharvest and product development on breadfruit and formulate operation manual for breadfruit.

R&D initiatives

As an alternative food crop to rice and corn, breadfruit can be multiplied faster through the technology on right selection of rootstock and the application of growth hormone to root cuttings. A widespread cultivation can be done since breadfruit grows in any type of land conditions. The variety of breadfruit grown in Davao City is commendable since result

during sensory evaluation was very acceptable among all samples taken from other provinces of Davao Region.

With the technology being developed on breadfruit, information given will bring impact to the researchers, government organizations, and private sector in addressing the food security issues by making widespread cultivation and use of breadfruit for food.

This initiative can address food security and enhance the livelihood of farmers through value-adding. To promote the cultivation of breadfruit, DA-RFO 11 is planning to conduct mass propagation of planting materials using breadnut rootstock. ###



High-earning profit from off-season mangosteen

Text and photos by Rita T. dela Cruz

Mangosteen (*Garcinia mangostana* L.) is a high-value tropical fruit that is widely-grown in the Philippines due to its well-regarded, unique taste and reputed health benefits. The fruit is covered in a perfectly round and dark purple rind that peels away and stains the fingers when opened, revealing a segment of soft, milky white flesh that practically dissolves in the mouth.

Mangosteen is mostly produced in Mindanao particularly in the Sulu archipelago, Zamboanga del Norte, Davao del Norte, Misamis Occidental, Davao City, and Agusan Del Sur.

Unlike other tropical fruits that can be enjoyed all throughout the year, mangosteen is abundant from August to September only, just as the rainy season begins. During regular season, where there is an abundance supply of mangosteen, a kilo costs Php 25-35. During off-season, the price skyrockets to as much as Php 250-300 for a kilo of mangosteen.

Looking at this great

opportunity to boost the earnings of farmers, Agapito Regulacion, researcher and chief of the Davao Agricultural Research Central Experiment Station (DARCES) of the Department of Agriculture-Regional Field Office (DA-RFO) 11, developed a technology that will enable farmers to produce off-season mangosteen and earned as much as ten times its in-season price.

Initiated in 2015, the research project titled, “Development of Package of Technologies for Off-Season Production Mangosteen” was funded by the Bureau of Agricultural Research.

“Developing an off-season technology for mangosteen has the potential of bringing high profit to the farmers. With this technology, farmers can schedule the off-peak months wherein they can harvest mangosteen,” said Regulacion.

Off-season mangosteen technology

“The seed of mangosteen is apomictic, a form of asexual reproduction involving the development of an embryo without

the occurrence of fertilization. It may be grown from seeds or asexually through grafting,” explained Regulacion.

In mangosteen, the flowering process is crucial in its fruit production. Attempts to induce its flowering process showed significant results in regulating the off-season production of mangosteen.

In the study, Regulacion used several research interventions to determine their efficacy in inducing fruit flowering in mangosteen. These included: pruning, plastic mulching, bark ringing, application of a chemical flower inducer (Paclobutrazol), and installing rain shelter.

Pruning involves cutting off one foot from the top of every lateral branch of the mangosteen tree while the plastic mulching involves installing 3.5 meters of UV plastic mulch at the base of the mangosteen trees.

According to Regulacion, bark ringing is an established technology, which he learned from Thailand.

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It is used for off-season *rambutan* but he tried it in this study to test if it will work with mangosteen. It involves scraping the bark, two feet from the base at one inch wide and on cambium layer deep. The scraped part is covered with transparent plastic to avoid fungal contamination.

The application of a chemical flower inducer (Paclobutrazol) was also tried in the study. It was applied at a rate 500 ppm to five-week old leaves (from flushing) and to fully mature leaves.

Another intervention was the use of rain shelter (200 microns UV protected plastic sheet) as roofing material installed in a bamboo frame. Result of the study showed that this particular research intervention proved effective in inducing fruit flowering in mangosteen.

“It was observed that among the treatments tested, only the trees with rain shelter have induced flowering two months (60 days) after establishment. The other treatments have initiated leaf flushing,” explained Regulacion.

He added that, the high temperature and water stress cause the mangosteen trees to induce flowers. The microclimate inside the

rain shelter was controlled resulting in a drought and higher temperature condition that triggered the trees to induce flowers after 60 days of stress period. During this period, carbohydrates begin to accumulate at the apical part of the leaves forcing the bud to break which then initiates the flowering process.

“Another important aspect of this technology is the establishment of a trench canal lined with plastic to enhance drainage of rain water and to avoid seepage,” he added.

“If farmers are able to adopt and use this technology effectively, they can predict the schedule of their production and identify easily when to produce them the best, which is during off-season where the price of mangosteen is high. If they can program their production and harvest them from December to February wherein mangosteen is not available, then it will be very profitable for them. The price is 10 times more during the off-season,” explained Regulacion.

Off-season versus in-season mangosteen

“As per data gathered, we found no difference on the fruit size and taste quality between off season and on season fruits. Although, season-produced mangosteen had more

fruits with a yield of 58 kilos per tree while the off-season mangosteen had lesser yield of about 28 kilos per tree,” reported Regulacion.

Mangosteen has a distinct taste and a wide appeal. Regulacion mentioned that, generally, the white fluffy fruit has the right mix of sweetness and sourness into it, enough to crave one more after the next.

“The size of fruit is affected by the fertilization, climate, and the availability of water system in the growing area. These are essential elements to ensure that the mangosteen trees will grow to its full potential,” Regulacion stressed.

He added that, as observed, mangosteen that are grown in higher elevation bear more fruit because of the colder climate, hence the harvest time is relatively prolonged. The maturity of the mangosteen fruit is affected by cold environment, the higher the elevation, the lower is the temperature. “Here in Manambulan, the harvest season is until September only, but those mangosteen that are planted in higher elevation, they can still harvest fruits until October,” he claimed.

Investing in off-season mangosteen

Initial investment of Php 1M for off-season mangosteen technology



Farmers establish a trench canal lined with plastic to enhance drainage of rain water and to avoid seepage.



DARCES Chief Regulacion shows how the rain shelter is installed over the mangosteen trees.

will be costly but the returns are high as the year progresses. This is in addition to the income that a farmer gets from in-season mangosteen.

Adopting the planting distance of 5x10 square meters, a hectare can be planted with 200 trees. With an average of 25 kilos harvested per tree, a hectare of farm can produce around 5,000 kilos or five metric tons of mangosteen.

At an off-season price of Php 250 per kilo, a farmer can have a gross sale of Php 1.25 million. Minus the Php 1M initial investment, this gives the farmer an initial net income of Php 250,000.

During the first two years, a farmer can earn Php 1.5M but in the succeeding year, he will just invest Php 100,000 for the replacement of the bamboo frame, since the it has to be replaced every two years. The rain shelter can be used up to 15 years.

Farmer adopting the technology
Alfredo Mier manages a farm in

Toril, Davao City was one of the first adoptors of the off-season mangosteen technology that was developed by DARCES.

“The technology was introduced to us by Dr. Regulacion when we were at DARCES. He taught us how to do, including when to install the rain shelter, so I got interested. I told the technology to the owner of the farm and asked if we can try it with our mangosteen trees and he gladly agreed,” recalled Mier.

“Our attempt in adopting the technology was a success. We tried it in our eight-year old mangosteen

trees last August 2018. After two months, the trees produced flowers so by December they bore fruits already,” he happily reported.

“We wanted to harvest from December to March where there is no mangosteen in the market so that we can take advantage of the high price. Also, we don’t need to compete with big farms during in-season where us an oversupply of mangosteen,” he added.

He mentioned that the harvest during off-season is not as much as during in-season but with 10 times the price a kilo, the effort was worth it. “*Kahit na mas kaunti ‘yong bunga ng off-season mas bawi naman kami sa presyo nga off-season mangosteen,*” he concluded. ###

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unless they are struck by a disease. As a result, unused antibiotics along with hormones are concentrated into the animal’s manure.

Chicken manure then becomes hazardous if left untreated and used. Since organic agriculture is characterized by the heavy use of organic fertilizer, if utilized, there is a great chance that the vegetables will absorb the antibiotics from it.

Some of the adverse effects of antibiotic absorption among vegetables include stunted growth, slow spreading of roots, inhibiting growth, and eventually producing unsatisfying crops.

Vegetables become carriers of potentially harmful antibiotics, which lead to unintentional use among humans once eaten. Coupled to the dilemma of developing new antibiotics, this leads to higher antibiotic resistance among humans, possibly making it harder for scientists to cure human diseases in the long run. This can endanger both the public health and agricultural productivity.

Furthermore, the antibiotics from chicken manure can also potentially cause environmental pollution, in the form of soil and/or water contamination, adding to the long list of hazards that the use of untreated chicken manure can bring.

The ultimate goal of the study is to produce organic fertilizer for farmers. However, the microorganisms identified can also be used for other functions such as biofiltering antibiotic residues found in waste water according to dela Cruz.

“*Nasa unang hakbang pa lamang ang study na ito. Marami pa itong kasunod kasi pwedeng ibang antibiotics naman ang gamitin or traces ng hormones naman ng chicken ang i-target nating tanggalin,*” dela Cruz concluded. ###

BAR conducts internal audit for ISO 9001:2015 certification

As a pivotal requirement of ISO 9001:2015 certification process, the Bureau of Agricultural Research (BAR) conducted its on-site internal audit on 4-6 June 2019.

Leading the audit were the BAR Core ISO Team members, namely: Alexander Arizabal, Jr. (Quality Management Representative), Juan Nikolas Paller (Document Control Officer), Desiree Anne Macahia (Risk and Opportunities Assessment Team Leader), and Jennifer Alianza (Internal Auditor).

The auditees consisted of BAR's top management and all technical and administrative divisions, including sections and units.

Internal audit functions primarily as a self-check mechanism to ensure that the Quality



PHOTO: DLBATTAD

Top management audit is composed of division and unit heads of the bureau.

Management System adheres to the standards set by the ISO 9001:2015. It prepares an organization for ISO certification through process conformity assessment, performance and effectiveness

evaluation, and identification of opportunities for improvement.

The audit team is composed of BAR staff who have been appointed and trained as ISO 9001 auditors. ### (Daryl Lou A. Battad)

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Some highlights of the review included the commercialization of mutton (meat from sheep) as alternative for red meat; sustainable use and commercialization of underutilized Philippine fruits, including guayabano, sapinit, and kamias in

Quezon province; and production, promotion, and commercialization of coconut sap sugar and nipa palm sugar. Product samples were also presented to the members of the panel during the review.

The lead project proponents and presenters were from Department of Agriculture-Regional Field Offices (2, 4A, Quezon Agricultural

Research and Experiment Station, 9, and 10); state universities and colleges; local government unit of Quezon; and members of a non-government organization, the Foundation for Rural Enterprise and Ecology Development of Mindanao, Inc. ### (Patrick Raymund A. Lesaca)



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