ISSN 1655-3942

BARChronicle

BUREAU OF AGRICULTURAL RESEARCH

www.bar.gov.ph @DABAROfficial

Volume 19 Issue No. 12 | A monthly publication of the Bureau of Agricultural Research | December 2018

Dr. Nicomedes Eleazar (left photo, center) leads the inauguration of the Department of Agriculture - Regional Field Office CAR's R&D Multi-purpose Facility (right photo). Joining him are Dr. Cameron Odsey, regional executive director; and Dr. Magdalena Wanawan, research division chief. PHOTOS COURTESY OF DA-RFO CAR

Eleazar attends inauguration of DA-CAR's R&D multi-purpose facility

Bureau of Agricultural Research Director Nicomedes P. Eleazar graced the inauguration of the Research and Development R&D Multi-purpose Facility established at the Department of Agriculture-Regional Field Office Cordillera Autonomous Region (DA-RFO CAR) on 4 December 2018 at Baguio Animal Breeding and Research Center Compound, Dontogan in Baguio City.

The two-storey R&D multi-purpose facility houses a mini library showcasing various IEC materials on agriculture-related researches and initiatives conducted by the region including a regional R&D compendium, encyclopedia, brochures, and techno guides, among others.

The facility is in addition to the existing R&D facilities that BAR supported under its Institutional Development Grant (IDG) program either on the rehabilitation or on the establishment of new buildings including the Organic Agriculture R&D Center in the region.

The IDG program aims to strengthen the institutional capacities of RDE network members catering to the growing development needs in the agri-fishery sector through more responsive delivery of services and technological interventions.

The event kicked-off with a ceremonial tree planting and ribbon cutting ceremony led by BAR Director Eleazar and Regional Executive Director Cameron Odsey with other key officials of DA-RFO CAR. Officiating the dedication and blessing of the facility was led by Ptr. David Angiwan.

During the opening ceremony, Regional Executive Director Odsey expressed his gratitude to BAR for its support in establishing the facility and other research initiatives of the region while further encouraging researchers to conduct research with more vigor.

In his message, BAR Director Eleazar mentioned that the bureau, as the research coordinating agency of the Department, ensures that appropriate support is given to institutions that are conducting research and other research-related activities. He encouraged researchers to package and submit quality project proposals to BAR across commodities, encouraging as well, young researchers to develop more technologies and research products.

Furthermore, Dr. Eleazar underscored the importance of the Regional Research, Development

turn to page 3

IN THIS ISSUE...

NTCP projects reviewed

The Bureau of Agricultural Research (BAR), through its Technology Commercialization Division (TCD), reviewed 23 projects funded under its National Technology Commercialization Program (NTCP) on 11-14 December 2018 at Quezon City.

Out of the 23 projects reviewed, 16 are completed while seven are on-going. Most of the projects reviewed are implemented by the Department of Agriculture-Regional Field Offices. These projects cover high value crops, native animals, and livestock and poultry. One of the projects reviewed was a response to Agriculture Secretary Emmanuel Piñol's directives to utilize onion leaves as processed products.

The projects were reviewed by a panel of external evaluators from the University of the Philippines Los Baños: Dr. Cesar Quicoy, Dr. Edralina Serrano, Dr. Rodel Maghirang, and Dr. Veneranda Magpantay. They were joined by a panel of internal evaluators from BAR: Anthony Obligado, Ma. Elena Garces, Evelyn Juanillo, Jay Invisor Bermas, Ma. Eloisa Aquino and other TCD technical coordinators.

(L-R) Dr. Rodel Maghirang, Dr. Ceasar Quicoy, Dr. Veneranda Magpantay, and Dr. Edralina Serrano of the University of the Philippines Los Baños serve as the project evaluators during the review. PHOTOS: RHERMOSO

The project review served as a venue to identify and assess the projects' impacts, milestones and commercialization activities. Through this review, the sustainability of the projects and their contributions to the modernization of the agriculture and fisheries sectors were also determined and assessed.

NTCP is one of the bureau's banner programs. It aims to increase the contribution of R&D to the productivity and profitability of producers through the transformation of identified agriculture and fisheries production activities into viable technology-enhanced enterprises. ### ***(Rena S. Hermoso)***

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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, cor. 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 member-institutions under the National R&D System for Agriculture and Fisheries (NaRDSAF).

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ISSN 1655-3942

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BAR-funded project wins best livestock research award

The project, "Technology Commercialization on Slaughter Goat (Triple Cross) in Pangasinan," funded by the Bureau of Agricultural Research (BAR) and implemented by the Department of Agriculture-Regional Field Office (DA-RFO) I, won the "Best Livestock Research Award" during the "First National Livestock Program R&D Review" held on 19-21 November 2018 in Makati City.

The research team, led by Dr. Jovita Datuin, research manager of DA-RFO I, received Php 5M worth of research grant to further their studies and to upscale the project in four provinces of Region I under the auspices of the DA-National Livestock Program.

Dr. Datuin, in her presentation, mentioned that the project aimed to transform goat raising from a subsistence type of farm activity into a profitable goat livelihood employing farmer participatory approach and technology-based rural enterprises.

The research results indicated increase in growth and reproductive performance. A 10- and 20-doe level slaughter enterprise registered increases in monthly income by Php 1,825.00 and Php 4,164.16 with a return on investment of 71.57 percent and 81.65 percent, respectively.

She also reported that 211 goat raisers served as farmer-partners adopting (100%) housing, stall feeding, upgrading and strategic deworming recommendations. From the initial 52 farmer-partners, 129 additional raisers from four municipalities and 28 barangays with six organized farmer-associations were eventually encouraged to venture with goat enterprises.

Dr. Jovita Datuin (center) receives the "Best Livestock Research Award" from the DA-National Livestock Program for DA-RFO I's project that aims to develop slaughter goat to a profitable enterprise. PHOTOS: MEAQUINO

As an offshoot of the project, micronutrient supplements for goats were developed with trade name, "Jovimin". BAR provided technical and funding support for the product registration of Jovimin and was issued a Certificate of Trademark Registration on 8 September 2016.

The Jovimin balls also won a special citation under the non-food product category during BAR's 12th Agriculture and Fisheries Technology Forum and Product Exhibition.

Jovimin balls are feed supplement which contain highly digestible fermented protein, molasses, salt, mineral mixture, bran, macro and micro minerals and vitamins – all solidified by natural binder. It is recommended for all physiological ages (weanlings, growing, fattening, pregnant and lactating animals).

DA Assistant Secretary Enrico Garzon graced the review and shared his inspirational message with the participants.

Ms. Ann Martha Laspiñas of BAR-Program Development Division served as one of the members of the R&D Review Panel. She was joined by evaluators from the Philippine Carabao Center, Director Arnel del Barrio and Dr. Marlon Ocampo; Bureau of Animal Industry, Mr. Hernando F. Avilla; and Agricultural Training Institute-International Training Center on Pig Husbandry, Dr. Ruth S. Miclat-Sonaco. ### ***(Ma. Eloisa H. Aquino)***

Eleazar attends...from page 1

and Extension Network for Agriculture and Fisheries (RRDEN) in strengthening complementation of R&D programs among research institutions in the region to establish holistic and integrated partnerships, facilitate effective and efficient use of expertise and resources, and maximize dissemination, extension and utilization of research outputs for the benefit of the agriculture and fishery sector.

Also present were Regional Technical Director for Research and Regulations Dr. Anthony D. Bantog; Regional Technical Director for Operations and Extension Danilo P. Daguio; and Research Division Chief Magdalena Wanawan who also shared their messages during the event; and other researchers and staff of DA-RFO CAR. ### ***(Ma. Eloisa H. Aquino)***

Phl presents initiatives on plant health in APAARI

Mr. Anthony Obligado, head of BAR-TCD, (left) presenting the Philippine initiatives on plant health during the Asia-Pacific Association of Agricultural Research Institutions conference. PHOTOS COURTESY OF AOBLIGADO

Representing the Bureau of Agricultural Research (BAR), Mr. Anthony B. Obligado, head of Technology Commercialization Division, presented a paper, "Philippine Scenario: Regional Initiatives and Priorities on Plant Health," during the "Regional Conference on Soil and Plant Health towards Achieving Sustainable Development Goals in Asia-Pacific" on 20-24 November 2018 in Bangkok, Thailand. The conference was organized by the Asia-Pacific Association of Agricultural Research Institutions (APAARI), the Department of Agriculture (DOA) Thailand; and the Indian Phytopathological Society.

The conference provided a venue for sharing region-specific long-term experiences on the neglect of soil and plant health, soil biodiversity, emerging crop pests and diseases in the context of climate change and variability; suggest location-specific and region-specific measures and provide a platform to identify regional priorities; and also catalyze a global initiative through new collaborations, regional networks and projects.

Mr. Obligado, in his presentation, discussed the research and development initiatives coordinated by BAR that address plant health issues. To date, BAR has supported researches on abaca, rootcrops, cacao, coffee, vegetables, fruits, corn, and cassava. Studies covered the development of pest and disease control strategies particularly on integrated pest and cultural management strategies against pests and diseases such as fusarium wilt, cacao pod borer, corn borer, arthropod pest and diseases, among others.

BAR, as one of the regular members of APAARI, contributes to the discussions in determining the directions and priorities of agriculture and fisheries R&D member-institutions in the Asia-Pacific Region especially on biotechnology, information technology, and commodity value chain programs.

Established in 1990, APAARI aims to improve the agri-food systems as well as strengthen innovation systems and agri-food research that are conducted within the Asia and Pacific Region. It is a regional forum that facilitates learning, knowledge sharing, and collaboration, and is comprised by a wide network of partners, members, volunteers, and stakeholders from across the region. As part of the 21 member-countries, the Philippines has benefited from several important programs and projects implemented by APAARI in recent years.

The conference was co-hosted by the International Crops Research Institute for the Semi-Arid Tropics, Kasetsart University, International Rice Research Institute, and International Center for Agricultural Research in the Dry Areas.

Aimed at deliberating on soil and plant health issues and scenarios in the Asia Pacific Region, the regional conference was attended by experts from APAARI member-countries and international institutions including research, development, extension (RDE) practitioners; policy makers; and representatives from the private sector/industry, professional societies, civil society organizations, and donor organizations. ### ***(Ma. Eloisa H. Aquino)***

BAR seminar highlights nutritive and medicinal properties of *Trichanthera*

Several studies have been conducted on different aspects related to the soil management and crop production of Madre de Agua (*Trichanthera gigantean*) and their use in animals. However, very little is known about its nutritional value as feeds and the medicinal properties of its leaves in growing pigs.

This was the topic discussed during the BAR seminar held on 2018 December 13, the last for the year. The topic focused on using *Trichanthera* not only as alternative feed source but also as vital ingredient in native pig production.

Dr. Virgie Callo-Etis, professor and project leader of the University Rizal System served as resource speaker. Her discussion centered on the description and uses of *Trichanthera*, as well as its medicinal properties that can help in curing common diseases in animals, and its nutritive value as feed for native pigs.

According to Dr. Callo-Etis, some factors are inherent to *Trichanthera* leaves which provide efficient digestion for pigs. "To our knowledge, there are no previous reports concerning studies on digestion of *Trichanthera* leaves in monogastric animals that's why we decided to include it in our study," she explained.

"In the Philippines, *Trichanthera* tree has proved to be popular with animal growers with the leaves being fed to all classes of stock because it is proven to provide better performance in growing-fattening and breeding pigs. This high rate of farmer adoption is attributed to the relatively high content of digestive indices, especially of its nitrogenous fraction. "A certain fraction of the *Trichanthera* leaves could provide better digestion in the large intestine of pigs," she added.

In addition, Dr. Callo-Etis found out that the digestibility of organic matter and nitrogen (N) was higher for *Trichanthera* (39.2 and 50.7 percent) than for *gabi* leaves (28.8 and 30.2 percent). Thus following the same pattern of the study, *Trichanthera* contains very high water soluble N, and that the protein precipitating capacity was relatively high as compared to other tree leaves. "These could greatly contribute to the good digestibility values of *Trichanthera* leaf meal in pigs," she concluded.

Other topics discussed during the BAR seminar was the potential profitability of value-added processing technologies in organically-grown native pig by Ms. Gina Bocaya of the Department of Agriculture- Regional Field Office CALABARZON. ### ***(Leoveliza C. Fontanil)***

Participants during the December in-house seminars listening to the lectures presented by Dr. Virgie Callo-Etis of the University of Rizal System (upper right) and Ms. Gina Bocaya of DA-RFO-CALABARZON (lower right). PHOTOS: RHERMOSO

Outstanding Rural Women recognized

Chair of the DA Gender and Development (GAD) Focal Point System, DA Usec. Evelyn Laviña (right) congratulates the finalists of the 2018 Gawad Parangal sa Katangi-tanging Kababaihan sa Pagsasaka at Pangingisda sa Kanayunan, namely: (left photo, counterclockwise) Josephine Artiaga, Evelyn Grace, Evangeline Novela, Evelyn Duldulao, Francisca Rimalos, and Susana Arcenal.

It was a celebration of the power and drive of women in the agriculture and fisheries sector on 7 December 2018 at the Philippine Convention Center as the Department of Agriculture capped off its annual "Search for Outstanding Rural Women," otherwise known as the "Gawad Parangal sa Katangi-tanging Kababaihan sa Pagsasaka at Pangingisda sa Kanayunan".

Present during the activity were the six finalists who were selected from 15 regional winners; DA Undersecretary Evelyn Laviña, also the chair of the DA Gender and Development (GAD) Focal Point System; Ms. Marites Bernardo, head of the DA GAD Secretariat; and GAD focals from each DA-Regional Field Office and staff bureaus, including the Bureau of Agricultural Research.

Taking the top three spots were Josephine Artiaga, a livestock farmer from Bicol; Evangeline Novela, a cacao and dairy farmer from Davao City; and Evelyn Grace, an agro-forester and food processor from Zambales.

In her acceptance speech, grand winner Evelyn Grace encouraged her fellow finalists to continue being effective movers of change within their communities so as to further realize the DA's vision of food security. With assistance from DA, Grace is able to assist mango farmers from other regions as well as attend various trade fairs on mango production and processing.

In her keynote message, Usec. Laviña echoed Secretary Piñol's insights on gender equality: "It is man and woman, knowing and complementing each other's strengths and weaknesses, and working together towards creating something greater." Speaking on inclusivity and women empowerment, Usec. Laviña encouraged the attendees of the event to continue collaborating with the DA in coming up with initiatives geared towards increasing the involvement of women in the agriculture and fisheries sector.

As one of the staff bureaus of the DA, BAR continues to support the central office in ensuring that services are gender-responsive. It does so through its own GAD focal point system (GFPS) wherein designated staff represent every division of the bureau and is tasked to mainstream gender and development in its current operations.

On 20 December 2018, BAR's GFPS conducted the Annual Gender and Development Planning and Budget activity at BAR. GAD Focals from the various divisions of the bureau attended the activity who presented their division's accomplishments respective to the goals that were set last year. BAR also began harmonizing its current and future activities to an initial draft of a five-year plan matrix as instructed by the DA central office.

Among the GAD activities accomplished this year were the conduct of GAD trainings on Gender Sensitivity and Gender Mainstreaming, the monitoring and evaluation of BAR-funded projects identifying women beneficiaries, the publication of Information, Education, and Communication materials highlighting women-friendly technologies, the conduct of gender-responsive seminar topics, as well as BAR's month-long celebration of the National Women's Month in March 2018.

The accomplishment reports, as well as the 2019 GAD plan and budget that were presented and refined during the GAD planning and budget activity, will be consolidated and submitted to the Philippine Commission on Women for review and evaluation. ### ***(Ephraim John J. Gestupa)***

BHOOCHETANA BEYOND BORDERS

by Ephraim John J. Gestupa

Ten years ago, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) launched the *Bhoochetana* program in Karnataka, India. Heading the institute then was former Agriculture Secretary, Dr. William Dar.

ICRISAT began the project with communities in the southwestern region of India "registering zero growth in agriculture." Five years into the project, which is mainly focused on soil nutrition, the *Bhoochetana* program managed to increase small holder farm yields by 20-66 percent.

Upon returning to the Philippines, Dr. Dar together with the Bureau of Agricultural Research and the Yamang Lupa Program, initiated the adoption of *Bhoochetana* principles across farming communities in the Philippines. The initiative identified three pilot sites in Quezon, Samar, and Zamboanga. Fast forward four years later and the study proved to have yielded similar results as to ICRISAT's initiatives in India.

On 7 November 2018, the research team from DA-RFO IX (Zamboanga Peninsula) presented their paper titled, "Adoption of Bhoochetana (Yamang Lupa Program) Principles and Approaches in Boosting Agricultural Productivity in Region 9," during the 30th National Research Symposium (NRS) at the Philippine International Convention Center where they won the AFMA Best R&D Paper Gold Award. Receiving the award was Chief Science Research Specialist Engr. Roger Bagaforo.

"We have three major component of activities, first is Soil sampling analysis and mapping, wherein the collected soil samples within the pilot sites were subjected to micro and macro nutrients analysis and color coded status nutrient maps were produced. Second is productivity enahancement, in support to this component was the establishment of YLP On-Farm research and testing different major crops in the community for five cropping season and we promoted the use of good quality planting materials and other support services for production. Then third is capability building and awareness campaign," said Bagaforo during his interview with Mag-agri tayo during the NRS. The *Bhoochetana* program also established Small Farm Reservoirs (SFR) to deposit the excess water during rainy season which will eventually serve as alternative sources during the dry seasons.

According to Dr. Dar, analyzing the soil health status at a community level will serve as the guide in formulating barangay-wide specific nutrient management recommendations. These recommendations then reach small holder farmers through the use of ICT (information communication technologies) taught during capacity building activities. The ICT mainly utilized in the *Bhoochetana* project are Soil Health Cards (SHCs). SHCs serve as a farmer's long-term guide to maintaining soil health. It provides the farmer with information regarding the status of the soil in his vicinity as well as provides advice on fertilizer usage and other nutrient recommendations. By ensuring the health of the soil, stakeholders are guaranteed of robust crop productivity.

"The total impact of these activities is the increase in the yield of the farmers. As we noted in our objective, we will be having an increase of not less than 20 percent but in this [project] we were able to attain more than 60 percent increase of yield of the crops," explained Engr. Bagaforo regarding the results of the project.

With this year's NRS theme, "Generating and Integrating Best Practices in Agriculture and Fisheries through Participatory R&D," Engr. Bagaforo's project proved to be a benchmark paper for research that's geared towards empowering small scale farming

turn to last page

Farmers participate in information drive and awareness campaigns which are conducted through dialogues, trainings, field days, and FFS. (Inset) Soil samples are prepared and laid out for soil nutrient analysis. PHOTO COURTESY: DA-RFO 9

BAR celebrates

The Bureau of Agricultural Research (BAR) celebrated the holiday season with its annual Christmas party held on 18 December 2018.

The celebration started with a year-end performance assessment of all its research and development (R&D) programs. These include: 1) Community-based Participatory Action Research, 2) National Technology Commercialization Program, 3) National Organic Agriculture Program, 4) Rice, 5) Corn and Cassava, 6) Climate Change, 7) High Value Crops Development Program, 8) Institutional Development Program, and 9) Information and Knowledge Management Mentorship Program. This was followed by a thanksgiving mass to formally express the bureau's gratitude for another productive and successful year for R&D.

To give the annual song and dance competition a twist, this year's contest was inspired by the American music reality competition, Lip Sync Battle. The bureau's divisions, security and janitorial

Christmas 2018

services battled each other with lip sync performances of Christmas jingles and some of the trendiest songs of the year. Emerging as the best performer was the Program Development Division. Meanwhile, the Applied Communication Division, and the Office of the Assistant Director together with the Institutional Development Division bagged the second and third prizes, respectively.

Spearheading the conduct of this year's festivity was the Program Monitoring and Evaluation Division. ### ***(Rena S. Hermoso)***

APALI NUGGETS: A HEALTHY OPTION FOR NON-PORK EATERS

text and photos by Rita T. dela Cruz

Who would have thought that an indigenous tuber crop found in the tropical forest of the Philippines can be turned into nuggets, a healthy alternative for non-pork eaters?

The Apali nuggets have recently gained the public's attention when it won the "Best Product Award" (third place) during the "First Mindanao Technology Commercialization Forum" held in Davao City on November 24, 2018. The event showcased different innovative products generated from supported research of the Bureau of Agricultural Research (BAR) in six regions of Mindanao (9, 10, 11, 12, Caraga, and ARMM).

Apali (*Dioscorea esculenta* Lour. Burkill) or commonly known as the "lesser yam" is a tuber crop that is rich in carbohydrates and is a good addition to the usual rice and corn staples.

According to Jorgea C. Galindo of the Research Division of the Department of Agriculture-Regional Field Office (DA-RFO) 11, Apali is highly-nutritious and has medicinal properties that even the early Filipinos and their ancestors have been consuming this crop. But due to the introduction of other crops in the country, Apali has been set aside and taken for granted and, therefore, has not been cultivated as widely in many areas of the country.

Apali is mostly found in marginal, mostly secluded areas. It is a climate-resilient crop and can withstand long drought. It is also resistant to pests and diseases and is easy to manage.

With the aim of promoting and increasing the cultivation of Apali, the Research Division of DA-RFO 11 has been studying this crop, specifically on its production, so that more farmers will be encouraged to grow this indigenous crop.

"We have collected and studied different varieties of Apali. This research initiative is also in harmony with the government's effort to promote the use of underutilized crops such as the Apali and address food security," explained Galindo.

DA-RFO 11 has developed appropriate culture and management for Apali including soil and planting requirements, harvesting, and postharvest handling. In their study, it was found out that a hectare of Apali can yield from 25 to 70 tons following the production management that they have developed.

Jorgea Galindo of DA RFO 11 shows Apali tubers which was made into Apali nuggets.

"Apali can be grown even without fertilization granting that the area is already rich in organic matter. Mostly, this crop loves sandy loam and clay loam, with soil that is high in organic matter. It thrives in open or partially shaded area, being trellised. It can be intercropped with peanuts or mungbean," said Galindo.

DA-RFO 11 has also developed various products from Apali. Due to its potato-like characteristics, Apali can be processed into cue, boiled, sweetened, jams, ice cream, candies, or as vegetable mixed or stewed with meat.

"We started Apali fries and then we also tried Apali chips. When we acquired the required equipment, after peeling and slicing as chips, we dehydrated, milled and turned it into flour. The texture of Apali flour is similar to all-purpose flour. Trial studies have been done using the basic food recipes like munchkin, cookies, choco chip cookies, brownies, oatmeal cookies, pineapple carrot cake, and scotch bar, among others. Most of these products were displayed during the 2017 Agriculture and Fisheries Technology Commercialization Forum and Product Exhibition (NTF) held at BAR in Diliman, Quezon City. In fact, the "Apali flour" won the "Best Product" explained Galindo.

The latest product from Apali is the nugget. "It comes from raw tuber of Apali. We extracted the starch. The leftover, called "*sapal*" is then processed into nuggets. "*Sayang naman kase dapat makain din ito ng tao*," said Galindo.

When asked why Apali nuggets, Galindo was quick to explain that, "nuggets are among the favorite

turn to last page

DEVELOPING YEAR-ROUND QUALITY FEEDS FOR LIVESTOCK

by Patrick Raymund A. Lesaca

Dr. Nilo E. Padilla, (inset) project leader, demonstrates how green corn is to be fed to the forage chopper. which will eventually be packed into sacks. PHOTOS COURTESY OF ISU

The Philippines imports most of its milk requirements from leading dairy producing countries. Stated in the Philippine Dairy Update (Jan-Jun 2018) by the National Dairy Authority, the dairy supply situation is characterized by increasing local milk production. With the availability of huge land areas suitable for livestock raising for the first semester of 2018, milk and dairy products had increased by six percent.

The dairy cattle industry is one of the primary sources of income, especially among the farmers from the province of Isabela in Cagayan Valley, where there is a wide range of rice and corn fields, and therefore could be an abundant source of feed resources (i.e. green corn as forage/ silage, rice straw, corn stover)

However, despite the vastness of these areas, many dairy farmers are still faced with scarcity problem of quality feed resources for dairy animals especially during dry season. The supply of forage is very low during the dry spell. The wet season is the peak season wherein quality feeds are high in supply, which makes for good milk production of cows.

To address feed quality and scarcity issues, and improve the current state of the dairy sector, it is recommended that quality feed and roughages be made available all-year-round. Forages and roughages are the backbone of the industry because ruminants like cows depend on them for milk and meat production.

Farmers need to be proficient in managing the development of forages. Having an alternative supply of quality forage during lean months will help reduce the cost of feed production and increase milk production and profit. A possible approach that can be made is through forage production and its silage. Enriched with locally-available fodder, silage could provide a year-round consistent feed supply with low-cost quality nutrients for livestock.

To operationalize the supply of quality forages, the Bureau of Agricultural Research (BAR) is currently working with the Isabela State University (ISU) on a BAR-funded project, "Adoption and Commercialization of Green Corn, Green Corn-based Silage, Haylage and UMMB Production for Dairy Cattle in Cagayan Valley". Leading the projects are Dr. Nilo E. Padilla and Dr. Diosdado C. Cañete of ISU in collaboration with Department of Agriculture Region-Regional Field Office 2.

The primary objective of the project is to improve dairy production and ultimately increase the income of dairy farmers through the utilization of green corn silage, haylage and Urea Molasses Mineral Block (UMMB) supplementation using locally available resources.

According to the project proponents, green corn silage production, nutrient-enriched rice straw (as haylage) and the use of UMMB have been proven to improve nutrition among dairy animals, and thus improving milk and meat production.

Corn silage is a high energy feed resource for ruminants being part forage and part grain. In terms of nutrient content, corn silage is lower in crude protein and higher in digestible energy than other forages. Corn is relatively easy to ensile. As a minimum requirement, it is essential that cattle diet include a green fodder supplement to enhance rumen function for bovine animals and to increase milk production. Forage conserved as 'ensiled forage' or 'silage' will keep for up to three years without deteriorating. Silage is very palatable to livestock and can be fed at any time. It is also considered the most convenient way to conserve forage crops.

According to the report of ISU, the project is being piloted by the Malaya Development Cooperative (MDC) and the Quezon Dairy Farmers Cooperative. The farmers

turn to last page

Farmers grow recommended cacao varieties through CPAR

by Rita T. dela Cruz

Fermin Anog, CPAR-cooperator, harvesting mature cacao pods. PHOTOS: RDELACRUZ

Fermin Anog, 61, has been a farmer all his life. Prior to the introduction of a Community-based Participatory Action Research (CPAR) project in Calinan District, Davao, Mang Fermin was already into cacao growing but he was into native cacao.

CPAR is one of the banner programs of the Bureau of Agricultural Research (BAR) and is being implemented nationwide through the various Regional Field Offices (RFOs) of the Department of Agriculture (DA). The CPAR on Cacao Production, which started in 2016, aimed to increase the production of cacao in Calinan District, particularly in the two baranggays (Sirib and Subasta), by introducing various research interventions including the integration of cacao recommended varieties as well as capacitating the farmers on cacao production management.

"I became a CPAR farmer-cooperator with the help of Fe Oguio, the agricultural technician here to Calinan District. She invited us to a meeting wherein CPAR was introduced to us. We saw the goodness and advantage of being involved in CPAR so we decided to be involved," recalled Mang Fermin.

According to Grace Gutierrez, CPAR coordinator of DA-RFO 11, they chose cacao because it is one of the major crops being grown in the Calinan District. "One problem that we observed during the site validation was that their old cacao trees (more than 20 yrs old), have been producing less and yet the farmers wanted to sustain them as they were good varieties and high yielding too. But the problem is what technology to apply to return it to high yielding tree and to preserve it as well," she said.

She further mentioned that due to the limited knowledge in the current technology, problems such as unmanageable pest and disease occurrences, and soil exhaustion also resulted in low yield. "And this has something to do with the farmers' lack of interest in participating in seminars and trainings, inefficient information dissemination, and lack of adoption of technical recommendations," said Gutierrez.

With the introduction of CPAR in Calinan District, 30 farmers have become interested and became farmer-cooperators. One of them was Mang Fermin, who became the chair of the Sirib Active Group of Individual Growers Cooperative (SAGING Coop). He owns 0.6 hectare allotted to CPAR cacao.

Part of the interventions in CPAR is the rehabilitation of the old cacao using side grafting or/ and *chupon grafting*. *Side grafting technology* is done by inserting a pencil-size cacao budwood stick (scion) to a triangle cut in a trunk of an old cacao tree, and covering the grafted cacao with cellophane to keep out rainwater. After a few weeks, the cellophane is opened. The old cacao tree canopy is opened up when the grafted scion reaches its full-blown production. A clonal rehab of cacao is done after a year.

Meanwhile, *chupon* technology is done when a pencil-size rootstock (*chupon*) from the old cacao tree is grafted with a new variety (UF-18 or BR25). Binding it with cellophane then opening it after three weeks. The branches are then pruned so that the newly-grafted stem will have enough sunshine. When the grafted cacao scion has reached its full-blown

turn to next page

CPAR team from DA-RFO 11 and members of SAGING Cooperative during the CPAR cacao farmer's field day.

bearing time, the old tree is then cut off.

"*Ibig sabihin nito, di mawawalan ng* income *ang* farmer while waiting for the fruiting of the newly-grafted cacao in the same tree." explained Gutierrez.

"*Na-involve ako sa* CPAR *noong* July 2016. *Dito na rin ako nagsimulang magtanim ng* cacao varieties or *yung grafted* cacao *gaya ng* UF18, W10, and BR25. *Bukod doon, tinuruan din nila kami ng tamang pagtatanim, pagsugpo ng peste at sakit, pag-aani, pati na rin ng* proper pruning, soil sampling, and recommended fertilization," said Mang Fermin.

As a farmer-cooperator, Mang Fermin received technical assistance as well as initial inputs like new varieties of cacao plants (UF-18), fertilizers (organic and inorganic), farm tools, and equipment in support to their farm activities like pruning shear, bolo, water container, among others. As a counterpart, the local government unit of Calinan District provided more trainings related to cacao management which are not included in the CPAR training modules. CPAR training modules include hands-on training workshops from cultural management down to capacity building.

Mang Fermin mentioned that having been involved in CPAR brought him new learnings that he now uses to improve his cacao production. For example, he mentioned that he learned how to combine organic and inorganic (manure and urine of goats) to control pests and diseases in cacao.

"Positive *naman naging epekto sa tanim kong mga* cacao. *Yung pagdami ng peste nakontrol din. Natutunan din namin na balutin yung* cacao pod *kapag* battery size *na siya*. *Binabalot namin ng* plastic, open *naman yung* plastic *sa ilalim*. *Pagkatapos ibalot*, after three months *pwede na siyang i*-harvest," explained Mang Fermin.

During peak season, Mang Fermin harvests every other week (twice in a month) with an average of 70-80 kilos cacao from his 0.6-hectare land.

"After harvesting, we remove the beans from the pods, put them in a jar, and sell them to the Cooperative or other interested buyers," said Mang Fermin.

Mang Fermin mentioned that dry beans (underwent fermentation processing) are being sold at a higher price but due to added labor cost (drying, fermenting, processing), most of the CPAR farmers are selling wet beans only. "*Mahirap magbenta ng* dry beans *kase yung pagpapatuyo matrabaho din saka kailangan ng* facilities. *Mahirap kung wala kase di makokontrol ang panahon lalo na kung panay ang ulan, mahirap magpatuyo*. So, our coop sells wet beans only," he explained.

Although there were challenges, Mang Fermin was positive in his outlook. "*Bukod sa teknikal na aspeto, mga kagamitan,* cacao varieties, *maraming naidulot sa amin ang* CPAR. *Yung mga peste at sakit ng* cacao *na problema namin noon, ngayon nakokontrol na namin. Kaya maganda na rin yung* quality *ng* cacao pods *na napo*-produce *namin. Dahil doon, nabebenta namin siya sa mas magandang presyo*, *kaya mas* okay *din ang kita*."

"As a farmer *mas ganado akong gumawa ng gawaing pang-*farmers *kase may gamit ka, may kaagaypay ka yung mga* technician who encourages you. *Tapos may* buyer *ng* wet beans *kase noong una wala*," Mang Fermin further explained.

"*Nagpapasalamat ako sa* CPAR *kase malaking tulong ang natanggap namin kahit dalawang taon lang ang proyekto napalago naman namin ang aming* cacao. *Matiwasay namin nasunod ang mga* interventions. *Gusto ko lang i*-encourage *ang ibang* farmers *na magpatuloy sila at isapuso ang ginagawa para sa pamilya at sa ikabubuti ng ating komunidad*," he concluded.

As part of the sustainability scheme of CPAR, aside from the repayment scheme through their associations, the project has also provided the nursery inputs and seedlings from which the farmer-cooperators are now earning.

Gutierrez, during the turnover ceremony of the project, reminded everyone that although the project is now in the hands of the LGU, the CPAR Team of DA-RFO 11 will still be supporting them particularly on the technical aspect, ensuring that it will continue even though the project has been completed. ###

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CPAR brings communities to the next level

by Daryl Lou A. Battad

What does it take for farming communities to level up from a state of agricultural paralysis to a resounding case of community-driven agricultural empowerment and development?

Farmers in the province of Ilocos Norte were convinced that embracing good change brought about by an equally good government intervention was the key, especially in the case of Batac and Laoag, where the Community-based Participatory Action Research (CPAR) program was introduced. CPAR is one of the banner programs of the Bureau of Agricultural Research (BAR) that is being implemented nationwide.

CPAR on integrated rice-based farming system

Ilocos Norte is considered a prime agricultural land with 3,662 hectares of it dedicated to rice integrated with livestock farming. However, farmers continue to struggle with low yield resulting to low income, thus poor productivity.

In 2012, project leader, Ariel Agresor of the Department of Agriculture-Regional Field Office (DA-RFO) 1 implemented the project, "CPAR on Integrated Rice-Based Farming System: An Approach towards Community Driven Agricultural Development in Ilocos Norte," participated in by 38 farmer-cooperators.

The project was carried out in a 10-hectare model farm following the *rice-rice-mungbean + cattle fattening production* pattern for irrigated areas, and another ten hectares for *rice+winged bean-corn+cattle fattening production*, that featured the participatory community-based resource management system.

Technologies introduced using the CPAR approach include integrated nutrient management; integrated pest management; farm waste management for crops; housing, breeding, feeding management; health management; and waste management for cattle.

Agresor explained that the implementation of a CPAR project in the region targets the development of a modernized agriculture through efficient and effective community-based research and development (R&D) systems specifically in the municipalities of Batac and Laoag. Agresor and his team considered CPAR as a potent strategy for rural development, where appropriate and acceptable farming systems are determined by the community members themselves.

Learning and unlearning

Truth be told, the success of the CPAR project lies in the capability and willingness of the farmers to adapt to change.

With the CPAR intervention, the farmers were expected to implement various technologies based from their identified problems and needs. According to Agresor, the farmers were more than eager to learn and unlearn new and old practices, respectively.

"*Hindi naman naging mahirap para sa kanila na i-apply ang mga package of technologies as identified during the Participatory Rural Appraisal (PRA) na ginawa namin prior to CPAR implementation. Open sila sa mga bagong kaalaman, at tinanggap*

turn to next page

CPAR farmer-cooperators from Laoag, Ilocos Norte now consider themselves advocates of the CPAR program having reaped benefits that improved their lives. PHOTOS: DBATTAD

nila talaga ang CPAR dahil nakita nilang mas maganda ang magiging resulta nito sa pagsasaka nila," shared Agresor.

For instance, farmers were accustomed to unsystematic nutrient management practices, and the absence of regard for soil analysis. Through CPAR, they integrated and improved such practices, which resulted to significant increases and quality in their produce.

The farmer-cooperators also adopted technologies for cattle raising from housing, breed selection, to feeding and health management. As in any rural setting, the cattle raisers previously practiced backyard cattle production which often equates to poor quality of feed, housing, and animal health.

"Through CPAR, we taught our farmers on the selection of feeder stock, improved forages, formulated feeds, forced feeding, and complete confinement. With these production technologies, our CPAR farmers gained an average income of about Php7,000 per head, a hefty addition to the earnings acquired from other crops," Agresor said.

Palma Lorenzo, one of the farmer-cooperators enjoyed not only financial gains but more importantly, the sense of empowerment brought by his involvement in the CPAR project. "*Hindi lang nadagdagan ang kita ko, marami din akong natutunan sa pamamagitan ng mga trainings namin sa CPAR. Masaya ako na naging parte ako nitong proyekto ng gobyerno dahil kung hindi, nabalahaw na kami sa kung ano lang ang alam namin pagdating sa pagsasaka*," he narrated.

"*Sana mas marami pang proyektong gaya nito ang makaabot sa amin dito*," Lorenzo added.

Another farmer-cooperator from Batac, Rosalinda Basamot, shared how CPAR greatly improved her life. A long-time tobacco farmer, Rosalinda said that the income they got from it barely sustained them on a daily basis. "*Isang kahig, isang tuka*," as they say.

But when CPAR came, everything changed. "*Unang-una, parte na kami ng planning, ng pagdedesisyon sa proyekto. Doon pa lang naramdaman na namin na mahalaga kaming mga magsasaka. Pangalawa, naging effective talaga ang CPAR sa akin dahil kumita talaga ako, napaganda ko pa ang production ko*," Rosalinda said.

"*Nabawasan ang gastos namin sa production dahil natuto kaming mag-organic*," she added. Since the farmer-cooperators were trained on organic fertilization, they now produce vermicompost which they utilize in their farms. Rosalinda said that this significantly contributed to reduce their cost in farm production.

This is not just the case for both Palma and Rosalinda but for the rest of the CPAR farmer-cooperators as well. In fact, their records show that from 2012-2016, the average yield of crop components increased significantly, bearing a 21% increase for rice; 140% for white and yellow corn; and 348.18% for winged bean.

"*Since tumaas ang ani nila, ibig sabihin nito, tumaas din ang kita nila. In rainfed rice-based CPAR sites natin, we recorded an increase of 88%, 659%, and 191% for rice, corn, and wingedbean, respectively*," Agresor shared.

Not only that, every CPAR farmer-cooperator now produces organic fertilizer which they utilize in their own farms and, at the same time, sell to other farmers in nearby barangays. The farmer-cooperators earned P407,907.00 in total from the vermicompost alone. Value added products such as *rice crispies* and *chicharon* were also developed, giving added income to the farmers. Currently, the CPAR farmer associations were able to tie up with the Department of Labor and Employment (DOLE) and Department of Trade and Industry (DTI) for the processing of these products.

Change makers

To date, the CPAR project implemented seven years ago is still flourishing. In 2016, it was turned over to the local government unit of Ilocos Norte for sustainability.

Complementation of introduced technologies and capability buildings enhanced the knowledge skills and attitudes of many farmers, while opening opportunities and unified communities for project development. In its four years of implementation under the DA-RFO 1 in partnership with BAR, the human and social capital of farmers were increased, inspiring 625 beneficiaries into adopting the same package of technologies.

Presently, these farmer-cooperators are serving as farmer-leaders influencing other farmers to adopt the CPAR approach and, just like them, be successful,

turn to last page

Palma Lorenzo (left) and Rosalinda Basamot (right), CPAR farmer-cooperators

Apali Nuggets...from page 10

finger foods among children and adults. It can also be part of a rice meal." Feedback from those who have tasted the Apali nuggets cited that, they were delicious, "*parang ulam daw*" Galindo recalled.

Apali nuggets can be part of a vegan meal or a healthy option for those who are avoiding pork but still want to enjoy a good o'l meaty nugget. ###

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CPAR brings...from page 15

community-driven farmers who are committed to change for better lives, and better communities.

The CPAR project also won the "AFMA Best R&D Paper Development-Agriculture Research Gold Award" during the 30th National Research Symposium organized by BAR on November 8, 2018 at PICC, Pasay, Manila. ###

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Bhoochetana beyond...from page 7

communities.

"We are now looking forward to commercializing this program not only for the three [pilot] regions, but hopefully we can use this throughout the country," said Engr. Bagaforo.

Dr. Dar, in his *Manila Times* column (July 7, 2017), comprehensively wrote about how expansion is made possible in the Philippines. "*Bhoochetana* is not even rocket science; rather it is also a system of precision agriculture," he wrote. ###

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Developing year...from page 11

tapped in the piloted areas will plant corn that will be cut down at 70-85 days old. The harvested corn plants will be chopped and packed in a 30-40 kgs capacity sacks with polyethylene bag, air removed from the bags using vacuum pump, sealed, and stored in a place safe of rats. The silage is ready for feeding after 3 weeks in storage.

On-site and experiential learnings on: 1) production of silage, haylage, and UMMB, 2) showcasing or demonstration feeding of silage and haylage, use of UMMB as feed supplement, 3) cooperative/ association strengthening, among others have already been conducted.

As a result of the awareness campaign and capability building component of this BAR-funded project, the MDC has fully adopted silage as feed to their dairy animals. Milk production has gradually increased from 3 liters/ head/day to 10-11 liters/ head/ day. The cooperative is now growing their own corn for silage production, while the other coop is now ready to produce their own silage.

With the project on board, BAR and ISU project is expected to address the year-round availability of nutrient-rich feedstuff for dairy cattle/carabao; increased lactation period, milk production per head and total milk production (community, municipality, province, region); higher household income; improved nutrition of farm families, and less dependence on imported milk and milk products. ###

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Entered as second class mail at the Quezon City Central Post Office under permit no. 2C-14-01-148 NCR