

# RESEARCH FOR DEVELOPMENT BARDIGEST

*The official magazine of the Department of Agriculture-Bureau of Agricultural Research*

**Integrated agri lab drives  
Cagayan Valley towards  
growth and recovery**

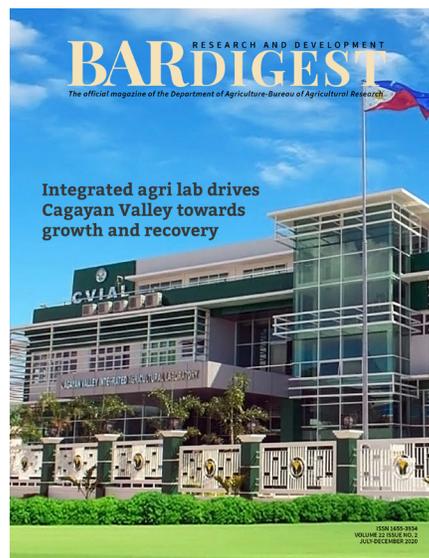


ISSN 1655-3934  
VOLUME 22 ISSUE NO. 2  
JULY-DECEMBER 2020

# ABOUT THE COVER

Located in Tuguegarao City, the Cagayan Valley Integrated Agricultural Laboratory is the Philippine's first world-class research for development diagnostics facility. The one-stop agriculture laboratory was funded by the Department of Agriculture-Bureau of Agricultural Research through its Research Facilities and Development Grant in 2012.

PHOTO COURTESY OF CVIAL/DA-CAGAYAN VALLEY



**BAR R4D Digest** is the biannual publication of the Department of Agriculture-Bureau of Agricultural Research (DA-BAR).

This magazine contains feature stories on the latest technologies and breakthroughs in agriculture and fishery research for development (R4D) based on the studies and researches conducted by the member-institutions of the National Research & Development System for Agriculture and Fisheries (NaRDSAF).

DA-BAR was established to lead and coordinate the agriculture and fishery R4D in the country.

The editorial board welcomes comments and suggestions from readers. Reach us via our email [kmisd@bar.gov.ph](mailto:kmisd@bar.gov.ph) and our social media accounts [f](#) [@](#) [v](#) /DABAROfficial.

## EDITORIAL BOARD

**EDITOR** Rena S. Hermoso  
**WRITERS** Clarisse Mae N. Abao  
Ma. Eloisa H. Aquino  
Chantale T. Francisco  
Rena S. Hermoso  
Jireh Alodia R. Laxamana  
Jhon Marvin R. Surio

**CONTRIBUTORS** Jacob Anderson C. Sanchez (PSAU)  
Ericson M. Guiao (PSAU)  
Mae Odimyrl A. Morales  
(DA-Northern Mindanao)

**DESIGN/LAYOUT** Rena S. Hermoso  
**CIRCULATION** Ricardo G. Bernardo  
Lyn D. Pardilla

**CONSULTING EDITORS** Salvacion M. Ritual  
Julia A. Lapitan

**ADVISER** Dr. Vivencio R. Mamaril



Agricultural Magazine of the Year  
2007 Binhi Awards

Best News Magazine  
2003 Gawad Oscar Florendo

© Department of Agriculture-Bureau of Agricultural Research 2020

This magazine is copyrighted by the Department of Agriculture-Bureau of Agricultural Research. No parts of this publication may be reproduced and distributed without the permission from the management and proper attributions from its original source.

# CONTENTS

## R4D NOTES

From blueprints to pouring concrete, with research as pillars	<b>4</b>
Integrated agri lab drives Cagayan Valley towards growth and recovery	<b>6</b>
A known ALIAS in agriculture	<b>8</b>
Cultivating cacao in Cagayan Valley	<b>10</b>
PH 1 <sup>st</sup> nutraceutical R4D facility stands in Pampanga	<b>13</b>
Attracting foot traffic	<b>16</b>
It's not 'OA' to go OA	<b>18</b>

## INFOGRAPHICS

Organic Agriculture R4D Centers in the Regions	<b>20</b>
OARDC complements NMACLRC's organic agriculture, agri-tourism hub in Northern Mindanao	<b>22</b>
Strengthening R4D amid the pandemic	<b>24</b>
Postharvest R4D strengthened through appropriate infrastructures	<b>27</b>
Powering CALABARZON agriculture R4D through a technology commercialization center	<b>30</b>
Showcasing new industry-driven food products and technologies	<b>32</b>
Raising climate change awareness at CLSU through a dedicated center	<b>34</b>
Boosting climate change R4D in Isabela	<b>36</b>
More than just a pile of bricks	<b>38</b>



# From blueprints to pouring concrete

**W**ith the world acting as a canvas to our progressive ideas and creative thoughts, we must be architects with a sample blueprint. How every building is borne out of different purposes and nature, every pile of brick it took to construct a facility has a story and goal.

However, more than the beauty and functionality of these facilities, it is the construction of the foundation, by which research is at the core, that will surely stand the test of time. Motivational speaker Jim Rohn stated it best when he said, “Whatever good things we build end up building us.”

With research for development (R4D) serving as its pillars, every established infrastructure contributes to shaping the agriculture and fishery sector as it did and always does. Building these research facilities is synonymous to building a better society for stakeholders and the public, especially for farmers and fishers.

Cognizant to this and in support to the paradigms of Agriculture Secretary William D. Dar, the

Department of Agriculture-Bureau of Agricultural Research (DA-BAR) through its Research Facility Development Grant program funds the establishment and upgrading of research facilities, as well as procurement of scientific equipment among the National Research and Development System in Agriculture and Fisheries research partners.

This second semester issue of the BAR R4D Digest highlights some of the facilities that were funded and supported by the bureau. From Luzon to Mindanao, these facilities continue to stand with pride, not only because of its achievements over the past years, but also because of how adaptive and resilient they perch on every region despite the recent ravages of typhoons and pandemic in the country.

With statures that never waver, featured research facilities include postharvest horticulture training and research center, organic agriculture R4D center, mushroom technology and development center, Cagayan Valley integrated agricultural laboratory and cacao development center,



PHOTO COURTESY OF CVIAL/DA-CAGAYAN VALLEY

## e, with research as pillars

Dr. Vivencio R. Mamaril

nutraceutical R4D laboratory, R4D multi-purpose facility, alternative low input agricultural system research, development, and extension center, R4D technology commercialization centers, and climate change centers.

From display centers that boost market sales of agricultural products to facilities that focus on organic agriculture or naturally-grown plant-based herbal products for veterinary purposes, among others, the agricultural R4D in the country continuously grows through the efforts and initiatives of concerned agricultural offices and state universities and colleges (SUCs)—inspiring others to further invest in R4D.

Going above and beyond their service, these research facilities have also adapted with the changing times. When the pandemic crisis hit the Philippines, many had extended their support to the DA's Ahon Lahat Pagkaing Sapat Kontra COVID-19 program, which aims to increase food security in the country, by launching various initiatives on urban gardening projects and disseminating agricultural technologies.

To this end, the bureau, together with concerned SUCs and agricultural regional offices, has been busy in its efforts in further improving the efficiency of these research facilities to develop and process more sustainable technologies vis-à-vis the DA's battlecry, *Masaganang Ani at Mataas na Kita*. Attention was also given in empowering the stakeholders towards greater food security and sustainability through these facilities.

In retrospect, no two research facilities are completely alike; however, all are still interconnected and tied to a common goal, that is, being of service to the agri-fishery sector. After all, we are not just building a future for a few years, we are continually looking for sustainable solutions.

Although the path towards development is constantly under construction, there is always magic in the attempt; in always carrying a blueprint and executing these design plans, not for ourselves, but more importantly for our stakeholders, the researchers, farmers, and fishers.

Hence, this issue of the BAR R4D Digest. ###

**P**eople love convenience, which caused the rise of numerous malls in the city and the hype on one-stop-shops like supermarkets and department stores.

If this can be done to cater to basic needs and social services, this can also be used as an opportunity to mobilize various agricultural diagnostic services.

Hence, the Cagayan Valley Integrated Agricultural Laboratory (CVIAL) was upgraded to a world-class research for development (R4D) diagnostics facility housing various agricultural laboratories in an all-in-one facility.

### **PH's first world class one-stop agri lab**

The nation's first state-of-the-art Philippine integrated agricultural laboratory upgraded in 2012, CVIAL aimed to provide various diagnostic services not only in Cagayan Valley, but also to other provinces nationwide. It was operationalized through the efforts of the Department of Agriculture (DA)-Cagayan Valley region.

Funded by DA-Bureau of Agricultural Research (BAR) through its Research Facilities Development Grant, CVIAL was equipped with modernized equipment and housed four major laboratories: 1) Regional Soils Laboratory (RSL), 2) Regional Crop Protection Center-Plant Health Clinic (RCPC-PHC), 3) Regional Animal Disease Diagnostic Laboratory (RADDL), and 4) Regional Feed Chemical Analysis Laboratory (RFCAL).

First, RSL provides technical information on plant nutritional disorders, analyses (soil, fertilizer, plant tissue, and water), and fertilizer recommendations relative to soil condition and plant nutrient requirements. The analyses aid farmers to attain optimal benefits of the soil and plants while considering environmental protection and soil care.

Second, the RCPC-PHC provides early detection, adequate information, and immediate solutions to pests and plant diseases, nutritional disorders, and pesticide injury due to its improper use.

The laboratory also utilizes a gas chromatograph/mass spectrometer (GC/MS) machine, funded by DA-BAR, to analyze and detect unknown compounds through data matching with the National Institute of Standards and Technology library. It provides quantitative and qualitative analysis of pesticide residue levels (PPM/PPB) that adheres to Food Safety concerns, Public Awareness and Monitoring of Compliance on pre-harvest interval, dosage, and Good Agricultural Practices (GAP).

Third, RADDL provides immediate and efficient diagnostic services to reduce and control disease outbreaks of livestock and poultry. Not only to prevent further damage and risk to farmers, the results can also ensure product safety and consumer welfare.

Lastly, RFCAL enforces product standards to ensure

quality, consumer safety, and acceptability of feeds compliant with local and global standards.

Aside from the laboratories, the Regional Food Technology Development Center and Incubation Center serves as a research and training facility for value adding and food processing, was also housed in CVIAL compound.

**A decade-long service for PH agri** CVIAL offers numerous services for scientists, researchers, farmer communities, as well as students and other stakeholders. Some of which were strengthened through five DA-BAR funded-projects implemented through the facility.

International and local partners were also engaged through CVIAL such as the US Defense Threat Reduction Agency Anthrax Project team, National Dairy Authority, small ruminant raiser associations, rice and corn clusters, research stations, state universities and colleges, and local government units nationwide.

A pride of the DA-Cagayan Valley, RFCAL was awarded in the Annual National Quality Corn Achievers Award by testing the corn's aflatoxin content in the region's different municipalities.

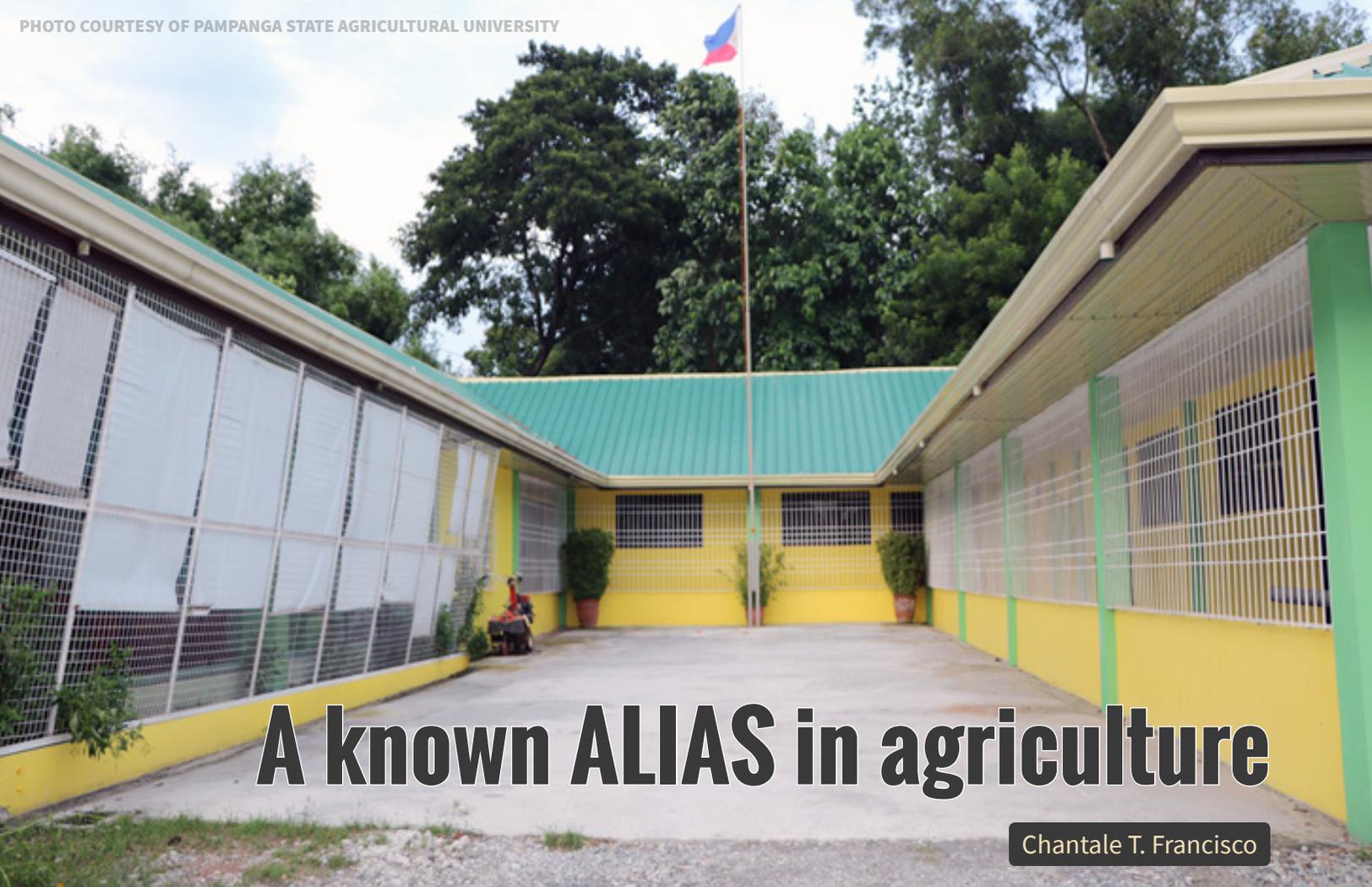
Meanwhile, RSL also developed soil fertility maps of rice, corn, and high value crops for local government units. Further, the results of fertilizer analyses conducted at RSL were used to monitor compliance of inorganic fertilizers distributed by dealers.

*turn to page 15*

# Integrated agri lab drives Cagayan Valley towards growth and recovery

Clarisse Mae N. Abao





# A known ALIAS in agriculture

Chantale T. Francisco

According to studies, the physical environment directly affects one's productivity. It affects the quality of the output and service one can deliver. Needless to say, how buildings are structured is crucial to the development of an efficient work system.

With that in mind, the Pampanga State Agricultural University (PSAU) established the Alternative Low Input Agricultural System Research, Development, and Extension (ALIAS RDE) center. According to Dr. Norman De Jesus, center director, it serves as a demonstration site where farmers can learn how to grow, process, and sell their crops.

The center is also an avenue where farmers can appreciate and embrace no-chemical farming and realize that organic farming is as efficient and effective as conventional farming. Apart from growing healthier vegetables and fruits, organic farming also ensures public health safety.

To further encourage farmers to adopt organic farming, PSAU conducted a study that delves on proving the benefits of going natural in farming.

For example, inducing microbial inoculants and plant-based pesticides are effective in controlling plant diseases and pests.

Introducing honey bees as natural pollinators can also enhance the fruit-setting by 42-68 percent and making adlay an intercrop is effective for organic vegetable and fruit crops.

Due to these findings, the university wanted to influence more farmers and expand. To put their plans into actions, PSAU tapped the Department of Agriculture-Bureau of Agricultural Research as their partner.

In 2016, the once small ALIAS RDE center was developed into a much bigger complex ready to be filled with agricultural interventions and ideas.

From a small building, it was expanded to a 450-square meter complex and was incorporated with three hectares of farm. With that, the facility became more capable and efficient as a place for learning. The ALIAS RDE center became a venue for technology innovation and diffusion and housed more additional income-generating projects to support more research for development projects for the farmers.

### Through the years

Through time, various food and non-food products were developed within its premises. These products were commercialized and the center played a critical role in speeding the process.

Among its stakeholders are women, out-of-school youth, and other public organizations in the region who would like to venture into the micro- or cottage industry of ALIAS.

They received a series of training and seminars for capacity-building in the facility. Moreover, agripreneurs and farmers were also honed by the seminars conducted in the center.

From its expansion, hands-on training with an average of 450 individuals per year were launched and various products were developed. These include training and improvement of adlay-based products like honey soap, *tinapay*, *palitaw*, *pan de coco*, *pandesal*, tea, and pudding.

Beeswax and honey products like lotion, germicidal soap, foot scrub, and hair remover were also developed along with rare finds like tamarind aromatic oil and tomato jam. All of these products were made possible by the collective efforts of the researchers and farmers.

All these efforts did not go unrecognized. On 2017, ALIAS was conferred the Pagasa Award of the Civil Service Commission, one of the highest and most coveted recognition that an individual or group can receive because of their exemplary work and commitment in government service.

### In times of crisis

During the pandemic, a lot of efforts were made to ease the burden on the agricultural sector. Aside from food packs and kits distributed, it is equally essential to encourage everyone to also grow their own food. Thus, the ALIAS RDE center initiated a project on the enhancement of food production systems for COVID-19 health frontliners and vulnerable communities in Pampanga.

This included fresh production of assorted vegetables; seeds and seedling production and distribution; and product processing.

The ALIAS RDE center along with the university's laboratories were utilized for the production of the vegetables. The list of vegetables includes solanaceous crops (tomato, eggplant, *sili panigang*); *okra*; vine crops (pole sitao, *ampalaya*, squash), and;

legumes (mungbean). These crops identified were grown organically.

PSAU distributed manuals of different backyard vegetable production systems to assist the beneficiaries in growing the seedlings.

Processed food kits were also distributed to the frontliners. For instance, fresh vegetable bundles were prepared with seasonings so recipients can easily cook them. Tomato jam, tomato in brine, sprouted mungbeans, mulberry tea, sampaguita tea, *malunggay* tea, among other products, were processed for distribution.

As of writing, about 37,500 assorted vegetable seedlings were given to beneficiaries. Moreover, a webinar was launched on backyard gardening which was supplemented by brochures on the same topic.

One thousand two hundred eighty individuals across five municipalities in Pampanga benefitted from the project. And to continue this initiative's success, PSAU and Brgy. San Agustin in Magalang, Pampanga signed a memorandum of agreement to ensure the sustainability of the project even after its duration. ###

For more information:  
**Dr. Norman De Jesus**  
Director, ALIAS RDE Center  
Pampanga State  
Agricultural University  
Magalang, Pampanga  
(0928) 550 2561  
normandejesus2005@yahoo.com.ph

# Cultivating cacao in C



PHOTOS COURTESY OF CVCDC/DA-CAGAYAN VALLEY

Agriculture Secretary William Dar and ISU President Ricmar Aquino leads the inauguration of the Cacao R4D Processing Center on 18 December 2019 at ISU-Echague Campus, Isabela.

CVCDC-led on-site trainings on cacao production and processing



CVCDC's cacao processed products

# Cagayan Valley

Clarisse Mae N. Abao

**C**hocolates, through cakes, drinks, or just plain bars and candies, are loved by Filipinos of all ages as a constant must-have item during Christmas, Valentines' Day, and birthday celebrations.

Cacao, where chocolates are made of, is a high value crop as identified by the High Value Crops Development Act of 1995. For the last quarter of 2020, 2.54 thousand metric tons of cacao were produced, with Davao region as the leading producer followed by Batangas, Cebu, Bohol, and South Cotabato.

By 2022, the Philippines target to produce 100,000 metric tons of cacao to stabilize its position as one of cacao major exporters in the world. With cacao's great demand worldwide, it is a continuous challenge for the country to produce enough volume for both local consumption and global exports.

## **Humble beginnings in the north**

Due to Cagayan Valley's vast area, climatic conditions, and soil characteristics suitable for growing cacao, the region presents a great potential for growing cacao.

Recognizing the crop's promising opportunities, the Isabela State University (ISU) embarked on improving cacao in the Cagayan Valley region with research for development (R4D) initiatives supported by the Department

of Agriculture-Bureau of Agricultural Research (DA-BAR).

To ensure proper and sustainable cultivation of cacao, ISU implemented a DA-BAR funded project in 2011 that generated production and post-production technologies and promoted good agricultural and manufacturing practices adopted by farmers.

Capacity building activities were also conducted to identify farmers' knowledge, skills, and aptitude gaps. This project laid good foundation for the cacao farmers to produce quality cacao seedlings and to properly nurture, harvest, ferment, dry, roast, and process cacao.

## **"From Bean to Chocolate"**

As the demand for cacao increases, the region claimed it is time to elevate to commercialize cacao products and technologies.

Another project funded by DA-BAR in 2016 paved the way for ISU to further promote generated cacao technologies and value-added products through R4D.

Aimed to improve the livelihood of smallholder cacao farmers in the region, the project also introduced in the local market the processed cacao products developed through the Cagayan Valley Cacao Development Center (CVCDC), ISU-Echague.

Some of the newly packaged products developed were 100-percent dark chocolate (tablea tops), 90 percent and 80 percent dark chocolate bars, choco-nut crispy cookies, pastillas de cacao, polvoron de cacao, tablea kisses, and caramelized cacao nibs.

CVCDC also tried unique recipes using cacao: suman-filled chocolate, yema-filled dark chocolate, and tablea soybean chips, among others. Nutrition facts of the said products were analyzed by the Department of Science and Technology (DOST)-Cagayan Valley and DOST-Food and Nutrition Research Institute.

Through DA-BAR, ISU's cacao products were secured with intellectual property rights: utility models for cocoa liquor (tablea), dark chocolate, polvoron from tablea, polvoron from legume and tablea, and the "Sikulati" as trademark of all cacao products. Product bar coding and labelling were also obtained from the Cocoa Foundation of the Philippines.

## **Expanding reach, building partnerships**

Four years later, ISU had once again sealed a project with DA-BAR to improve the cacao industry in the region but this time through an R4D processing facility.

Funded under the bureau's Research Facilities Development

## The processing center is a “one-stop shop” which serves as a venue for trainings and workshops and as a technology display for organically grown cacao processed technologies and products.

Grant, the Cacao Processing Center was opened on 18 December 2019 for cacao stakeholders.

The two-storey facility houses various processing equipment such as pod breaker machine, roasted bean cracker and winnower, chocolate tempering machine, chocolate maker machine, cocoa butter extractor, among others, as well as a spacious training area that can cater to a larger group of cacao farmers.

Further, the processing center is a “one-stop shop” which serves as a venue for trainings and workshops and as a technology display for organically grown cacao processed technologies and products.

Apart from food products, ISU offers non-food cacao products such as organic fertilizers and fossilized colored cacao leaves used to create handmade lamps and other handicrafts.

According to Dr. Perlita Raymundo, former CVCDC director and proponent of the three DA-BAR funded cacao projects at ISU, the CVCDC is a model venue to conduct capability building activities “from bean to chocolate”

since the experts, researchers, and generated protocols and technologies are available anytime not only for farmers, but also for students and other clients.

Hands-on trainings on cacao production and processing also catered farmer groups from various provinces in the Philippines. The Ilocos Sur Cacao Growers Cooperative; Anona, Inc. in Malolos, Bulacan; Cacao Growers Association in Malvar, Batangas; Cacao Growers Association, Aurora Province; and Cacao Growers Association in Tabuk, Kalinga Province were some of the many associations based outside Cagayan Valley that were trained at CVCDC.

Moreover, the Food and Drug Administration of the Philippines conducted a series of inspection to boost further the process in producing competitive cacao food products, from which the processing center garnered the License to Operate.

Currently, CVCDC is partnered with institutions nationwide such as DA-ATI-Cagayan Valley, Department of Trade and Industry-Cagayan Valley, Philippine Cocoa Foundation, Cacao Growers Association and Cooperatives, De La Salle

University, DOST-Cagayan Valley, and various local government units.

In November 2020, the Guam-based Beacon Cacao Agricultural Development Corporation adopted CVCDC’s matured technology in producing fine tablea, hot choco, and natural cacao vinegar funded by DA-BAR. Through this partnership, the technology licensing agreement and confidentiality agreement of CVCDC will escalate into the global market.

While the contribution of Cagayan Valley to the cacao industry in the Philippines is still small (2,000 metric tons average annual produce) compared to the volume of produce by the country’s top-cacao producing provinces, the continuous investments through R4D will not only boost the cacao industry in the region, but also the livelihood of smallholder and community cacao farmers. ###

For more information:  
**Dr. Myleen R. Corpuz**  
Director, CVCDC  
Isabela State University  
Echague, Isabela  
myleen.corpuz@yahoo.com  
perlita\_raymundo@yahoo.com



# PH 1<sup>st</sup> nutraceutical R4D facility stands in Pampanga

Jacob Anderson C. Sanchez and Ericson M. Guiao

**T**he growing interest in naturally grown plant-based herbal products resulted in a number of small to medium enterprises in the country. These small businesses develop nutraceutical products in capsule form, healthy beverages, and tea for human consumption.

Nutraceutical products for veterinary purposes, however, have not been fully explored.

In response to this need, the Department of Agriculture (DA) tapped veterinary universities in the Philippines to innovate and look into incorporating herbal products in feed or fodder to improve animal health.

The Pampanga State Agricultural University (PSAU), through funding from the DA-Bureau of Agricultural Research (BAR), heeded the call and established the Nutraceutical Research for

Development Laboratory (NRL) in Magalang, Pampanga.

Inaugurated in 2017, the laboratory has tissue culture and microbiology capabilities and an animal facility for experiments utilizing laboratory mice.

Headed by Dr. Geraldine C. Sanchez, NRL was permitted by the DA-Bureau of Animal Industry to operate as an animal model research facility.

Since its establishment, NRL has continuously served as a hub for research for development (R4D) initiatives of the university. It has been a silent witness to numerous R4D feat and attempts.

### Nutraceutical product for native pigs

Among the successful ones is the project titled “Utilization of Soybean to Enhance Growth, Estrus, and Health among Native Pigs in Pampanga.”

Funded by DA-BAR, the project bridges the gap in the production of native pigs. Since most native pigs are raised at the backyard, gilts or *dalagang baboy* are less receptive to sexual reproduction.

Led by Dr. Sanchez, the project aimed to understand what will happen when native pigs are fed with a secret recipe of soybean feed meal.

“Ang PSAU-formulated soybean feed meal ay nakapagparami ng hanggang 12 biik kumpara sa karaniwang walong biik,” she said.

Previously, Dr. Sanchez found that genistein, the active compound in soybean, could prolong the estrus of laboratory mice from a day to a day and a half.

With this, Dr. Sanchez and her team studied the growth

performance of soybean feed meal in native pigs; physical and clinical signs showing sexual receptivity; effects of soybean to gastrointestinal and respiratory conditions; and technology verification to farmer cooperators.

Data showed that the experimental animals doubled in size and weight compared with native pigs grown under traditional practice. Gilts had early redness and enlargement of vulva, their sexual organ, which means they are ready for mating.

To motivate farmers to plant soybean, the project also established soybean production areas where crop’s uses and potential were showcased while ensuring availability of raw material.

“Ang farmer kasi hindi yan agad nag-aadopt ng technology kung hindi rin nila nakikita talaga yung benefits. Isang activity ng study na ito ay nagtanim ang ating farmer cooperator ng soybean at sinubukan nila ang soybean feed meal sa mga native pigs,” Dr. Sanchez added.

### NRL’s other research initiatives

NRL has already produced several research outputs on the antidiabetic properties of mushrooms (*Pleurotus florida*, *Coprinus comatus*, *Ganoderma lucidum*, *Volvariella volvacea*),

red mold rice and brown rice extracts; anticlastogenic of red mold rice, pigeon pea, black rice, turmeric, and mulberry; anticancer benefits of malabar nightshade; and hypocholesterolemic effect of pigeon pea.

The laboratory was also tapped by DA to investigate whether organic pork and poultry products sold in organic markets are really free from such antibiotic residues.

Under the DA-Central Luzon Integrated Organic Agriculture, PSAU conducted investigative research using local and supermarket organic products and found that some products sold as organic were actually contaminated with antibiotics.

Research findings brought to life at the laboratory collated in one chapter titled “Uses and Regulation of Nutraceuticals for Animals in the Philippines” has also been published in the Nutraceuticals in Veterinary Medicine by Springer in 2019. ###

For more information:  
**Dr. Geraldine C. Sanchez**  
Director, Extension and Training Office  
Pampanga State Agricultural University  
Magalang, Pampanga  
(0917) 393 1262  
gengsanchez@yahoo.com

### Integrated agri lab...from page 6

The results of organic fertilizers were used by DA-Cagayan Valley Research Division and experiment stations to achieve GAP certification.

Conducting pesticide residue analysis through rapid test kit for pesticide-safe vegetables to support the region's Food Safety Program was also one of CVIAL's notable achievements.

### Reviving from the crisis

As shared by Secretary William Dar on his year-end report, 2020 took a heavy toll on the agriculture and fishery sector of the Philippines; from the shortage of food supply due to the Taal Volcano eruption, the African Swine Fever infection in the hog industry, the *santacruz* of typhoons that incurred millions worth of agricultural damages, and the COVID-19 pandemic that crippled the country's food mobility and economy due to nationwide lockdowns.

In response to the African Swine Fever outbreaks, the RADDL conducted real time polymerase chain reaction tests to diagnose ASF. The laboratory can process 44 samples per two-hour cycle and can provide results within one to three days from testing.

The prompt release of ASF results controlled the spread of the disease through livestock culling. Hog raisers in the region were also compensated to minimize their losses.

"The [Cagayan Valley] region is still bird flu- and foot and mouth disease-free through continuous monitoring and surveillance activities," said Dr. Gerly T.



Production of compost fungus activator



Analysis of potassium using flam photometer

PHOTOS COURTESY OF CVIAL/DA-CAGAYAN VALLEY

Zulueta, Integrated Laboratory Division OIC, when asked about CVIAL's achievements in controlling other livestock and poultry diseases in the region.

To address the agricultural losses inflicted by the high rise flooding on November 2020, DA-Cagayan Valley, along with the CVIAL team, contributed in the relief operations to the affected areas in Cagayan and Isabela.

CVIAL indeed lived beyond its expected outcomes, from being a one-stop-laboratory providing centralized various agricultural diagnostic services to serving

the region to encouraging collaborative efforts to survive from different types of crisis. ###

For more information:

**Lovelyn A. Gaspar**  
OIC-Chief, Research Division  
DA-Cagayan Valley  
Tuguegarao City, Cagayan  
(078) 377 0263  
lovygaspar@yahoo.com  
ild.darfo2@gmail.com

**Dr. Gerly T. Zulueta**  
OIC-Chief, Integrated Laboratory  
Division  
DA-Cagayan Valley  
Tuguegarao City, Cagayan  
zgerly@yahoo.com

# Attracting foot traffic

Jireh Alodia R. Laxamana

“Technology commercialization is the process of converting ideas into businesses and consequentially, jobs. . . . It plays a critical role in economic development, as it effectively transfers ideas from the mind or the laboratory to the marketplace,” said Bradley University’s Technology Commercialization Center Assistant Director Shad Sleeth.

Technology commercialization centers were strategically established and equipped across the country to improve and sustain the agriculture and fishery sector’s competitiveness through the continued support to market-oriented programs and projects.

Cognizant of this, the University of Southern Mindanao (USM) established its own R4D technology commercialization center. The Department of Agriculture-Bureau of Agricultural Research (DA-BAR), through its Research Facilities and Development Grant, funded the center in 2016.

The technology commercialization center has four sections: 1) publications and information, education and communication materials, 2) souvenir items, 3) dry goods, and 4) fruits, vegetables, meat, eggs, tablea, and other frozen products.

Located in Kabacan, North Cotabato, the one-story facility was deliberately placed near the main entrance of the university, welcoming its guests with open arms. The location was chosen to promote foot traffic from potential customers such as farmers, transient travelers, university students, researchers, and faculty members and staff.

However, due to travel restrictions brought by the pandemic, foot traffic has temporarily ceased. To offset this loss, USM looked into attracting foot traffic virtually by selling its products online.

Despite setbacks, USM continued to develop new products from the region’s various agricultural resources. Farmer and producers played a vital role to realize this as they provided the raw materials used for the research-based products.

The center became a channel between farmers and consumers and served as an outlet for product development and production.

Through it, USM could now showcase the quality of its agricultural and animal products as well as information materials (brochures, pamphlets, manuals, and journals). To make their knowledge products more accessible to farmer communities, USM extension workers translated it into different dialects.

The products featured at the center were outputs of the university’s research projects. Most of the products displayed at the center were developed by the High Value Crops Food Processing Center.

Among the products on display were corn and rice seeds, vegetables, eggs, milk, meat, and fruits such as chico, *rambutan*, and *durian*.

Teas, powdered coffees, dehydrated food products, virgin coconut oil, cookies, wines, and condiments were also displayed.

By promoting USM’s latest research-based technologies, the center is expected to expand market linkages and strengthen the academe’s partnership with its intended beneficiaries.

Among its goal was to bridge the gap between the academe and the local community it aspires to better serve. Thus, the university aspires to improve its R4D and encourage researchers to develop more research-based products to be displayed and marketed at the center. ###

For more information:  
**Dr. Edward A. Barlaan**  
Vice President for Research,  
Development & Extension  
University of Southern Mindanao  
(064) 572 2138  
edwbar03@yahoo.com



PHOTOS COURTESY OF UNIVERSITY OF SOUTHERN MINDANAO



These products were some of the developed and commercialized technologies displayed at the center.



PHOTO COURTESY OF UNIVERSITY OF SOUTHERN MINDANAO

# It's not 'OA' to go OA

Jhon Marvin R. Surio

**W**ith the incessant change happening in the world, the agriculture sector cannot help but adapt to the demands of society to keep up.

As people become more and more conscious about the food that they eat, the demand for organic and sustainable produce recently called attention.

Organic agriculture suddenly rings a bell, and some even

started engaging in organic farming.

According to the Food and Agriculture Organization of the United Nations, organic agriculture is a management system that “considers potential environment and social impacts” of farming inputs; hence, the elimination of the use of synthetic ones.

With the passing of Republic Act No. 10068, more popularly known as the “Organic Agriculture Act of 2010,” organic agriculture took a huge step forward in the country.

The said act paved the way for concerted efforts to establish national, regional, and provincial organic research for development, and extension centers for the agriculture sector.

In line with the said objectives, the Department of Agriculture-Bureau of Agricultural Research funded the establishment of an Organic Agriculture Research for development Center (OARDC) at the University of Southern Mindanao (USM), Kabacan, Cotabato.

This was done through the Research Facilities Development Grant of the bureau, which is dedicated to the renovation, upgrading, improvement, and establishment of research facilities.

The OARDC serves as venue for the conduct of various research for development, training, and extension engagements in relation to organic agriculture production, processing, and entrepreneurship.

Some of the farming inputs produced in the center are organic fertilizers and soil amendments, concoctions, extracts, and herbal nutrients.

Further, the center acts as a hub where researchers and other stakeholders on organic and organic-related agriculture production systems are capacitated.

In June 2020, the potentials of the OARDC were targeted to be maximized with the launching of the enhancement of organic vegetable production in USM for their farm tourism initiative.

Establishing a farm tourism site was eyed to further help in the promotion of organic agriculture in the region.

Dr. Adeflor Garcia and Dr. Purification Cahatian, senior

faculty members of the College of Agriculture, spearheaded the work to establish a linkage with the region's farm tourism association.

The association then encouraged USM to have their agriculture projects accredited by the Department of Tourism (DOT) as a farm tourism site.

Dr. Garcia and Dr. Cahatian then underwent a series of trainings and mentoring with no less than former Tourism Secretary Mina Gabor herself.

Some of the trainings include a course on farm tourism in and outside the country, organic agriculture, and edible landscaping.

The Rio Grande Farms @ USM was accredited by DOT as a farm tourism site on 13 June 2018.

Among the milestones of USM's organic agriculture center through the years include the establishment of concrete plots for growing of various organic vegetables, herbs and spices, and ornamental plants; small-scale organic compost site; and small-scale vermicomposting area.

Currently, USM has an ongoing comparative study on two botanical extracts for the development of a biofertilizer and biopesticide for the production of organic cucumber.

Squash beetle was identified as the most prominent insect pest infesting cucumber as early as when its first true leaves emerge.

Their initial assessments revealed that pre-treatment for "Botanical 1" was 38.48 percent

and reduced to 8.10 percent after four days of application. Meanwhile, pre-treatment for "Botanical 2" was recorded at 44.36 percent and reduced to 13.21 percent after four days of application.

Crops yielded 18.07 and 16.45 kilograms, respectively, for the two botanical extracts. Comparative trials are still ongoing.

Other activities undertaken through the OARDC are the upgrading of organic vegetable production and edible landscaping, both still part of their farm tourism initiative.

The center also serves as venue for their training initiatives for Technical Education and Skills Development Authority national certifications. Vegetable gardens were established and used as training ground for scholars and trainees.

Further, USM established a demo farm for precision agriculture through the center.

The continuous success of the OARDC project was recognized in 2018 when Rio Grande Farms @ USM won as second runner-up in the Regional Edible Landscaping Contest sponsored by the DA-Agricultural Training Institute, DOT-SOCCSKSARGEN, and the Villar SIPAG Foundation. ###

For more information:

**Adeflor G. Garcia**  
Head, Organic Agriculture  
Research and Development  
College of Agriculture  
University of Southern Mindanao  
Kabacan, Cotabato  
(0977) 835 5854  
adeflor\_garcia@yahoo.com

# ORGANIC AGRICULTURE R4D CENTERS IN THE PHILIPPINES

Rena S. Hermoso

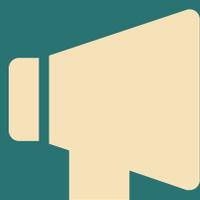
## what is organic agriculture?



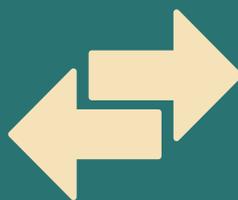
Organic agriculture has the means to cumulatively condition and enrich the fertility of the soil, increase farm productivity, reduce pollution and destruction of the environment, prevent the depletion of natural resources, further protect the health of farmers, consumers, and the general public, and save on imported farm inputs.

National Organic Agriculture Act of 2010 (Republic Act No. 10068)

## why the need for it?



To promote organic agriculture technologies and interventions to farmers and stakeholders



To accelerate the transfer of package of technologies on organic agriculture



To intensify research for development activities focused on organic agriculture



To strengthen the capacity of regions in addressing challenges on organic agriculture

| ZAMBOANGA PENINSULA  
| Zamboanga Sibugay

| NORTHERN MINDANAO  
| Bukidnon

| DAVAO REGION  
| Davao del Sur

| SOCCSKSARGEN  
| South Cotabato

| CARAGA  
| Agusan del Norte

| BANGSAMORO AUTONOMOUS REGION  
| Maguindanao

## how it came to be?

In 2013, the Department of Agriculture-Bureau of Agricultural Research, through its Institutional Development Division, invited representatives from Ilocos, CALABARZON, Eastern Visayas, Zamboanga Peninsula, and SOCCSKSARGEN regions. The meeting resulted in the funding of Organic Agriculture Research for Development (R4D) Centers, initially with the five regions present during the meeting. These pilot sites were selected due to its strategic locations, thereby making the Organic Agriculture R4D centers accessible to three major islands in the country. The remaining 11 regions were given funds soon after.

# THE REGIONS

**CORDILLERA ADMINISTRATIVE REGION** | Benguet

**ILOCOS REGION** | Pangasinan

**CAGAYAN VALLEY** | Nueva Vizcaya

**CENTRAL LUZON** | Tarlac

**CALABARZON** | Batangas

**MIMAROPA** | Palawan

**BICOL** | Camarines Sur

**WESTERN VISAYAS** | Iloilo

**CENTRAL VISAYAS** | Cebu

**EASTERN VISAYAS** | Leyte

S REGION IN MUSLIM MINDANAO

convened with  
ing resulted to  
g the meeting.  
ible across the

# OARDC complements NMACLRC's organic agriculture, agri-tourism hub in Northern Mindanao

Mae Odimyrl A. Morales

**T**he Department of Agriculture (DA)-Northern Mindanao moves forward in its transformation as a competitive, multi-faceted research for development facility for technology generation and dissemination.

These developments include the construction and effective operationalization of the Organic Agriculture Research for Development Center (OARDC) in the Northern Mindanao Agricultural Crops and Livestock Research Complex (NMACLRC), one of DA-Northern Mindanao research stations, located in Dalwangan, Malaybalay City.

The edifice, constructed through funding support from the DA-Bureau of Agricultural Research's Research Facilities Development Grant (RFDG), became a rigorous venue for trainings, batches of educational project tours, and other local and national activities and events.

Thereby pursuing OARDC's intent for more clients served and better information and technology services delivered. OARDC addressed the limited

capacity of NMACLRC's 20-year-old conference room and dormitory which could only accommodate 50 participants at most.

To provide a comfortable venue for trainings and small workshops, the center was equipped with offices and conference rooms, organic concoctions production room and dormitory.

Meanwhile, the surrounding experimental and demonstration plots were established and utilized for hands-on practice for training participants.

Medicinal herbs, organically-grown livestock and poultry were grown and cultivated for demonstration purposes.

Livestock and poultry sheds which housed farm animals were also constructed in the vicinity of the center.

These facilities were procured through DA-Northern Mindanao's regional regular program funds as counterpart for this RFDG project.

The experimental and technology demonstration area also include the three-hectare Intensified Rice-based Agri-Bio System (IRBAS) which provides practical demonstration on organic agriculture technologies.

The IRBAS adopted crop-livestock integrated production systems which reduces, or at best eliminates, the use for synthetic fertilizers, herbicides, fungicides, pesticides, feeds, and antibiotics.

Project staff, through NMACLRC technical personnel and field workers, were designated to maintain the technology demonstration areas, particularly the IRBAS, and to ensure the health of the farm animals.

NMACLRC technical staff also served as lecturers on organic agriculture and related fields.

Farmers and organic agriculture practitioners were trained on organic nutrient management on rice and vegetable production, organic pesticides for vegetable production, organically-grown seeds for organic crop

production, and vermicompost production, among other topics.

On-the-job training students from different agricultural academes in Northern Mindanao and neighboring regions received first-hand learnings on organic farming in the production-to-harvest and

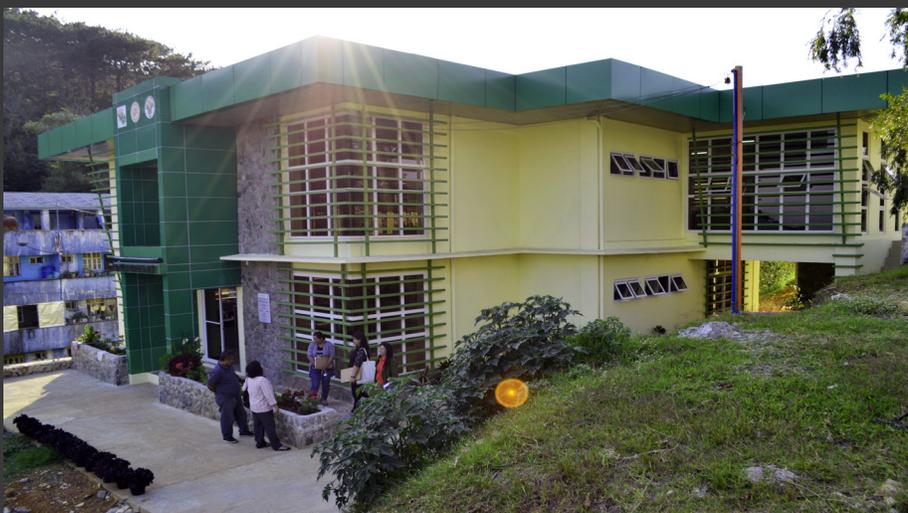
growth stages of crops and farm animals.

All these activities of the OARDC continually contributes to the attainment of the Organic Agriculture program's vision of sustainable, resilient, and food-secure Northern Mindanao through effective adoption of organic agriculture practices and

technologies, and production of sufficient, safe, healthy, and accessible food for the Filipinos. ###

For more information:  
**Carmelito R. Lapoot**  
OIC, Research Division  
DA-Northern Mindanao  
Cagayan de Oro City  
(0945) 310 1097





# Strengthening R4D amid the pandemic

Jireh Alodia R. Laxamana

In the country's Creative City of Crafts and Folk Art, where panoramic views and gigantic pine trees are found, lies the Research for Development (R4D) Multi-Purpose Facility of the Department of Agriculture-Cordillera Administrative Region (DA-CAR).

It features a library and information technology room that are essential for technology dissemination. It also houses a function room for R4D meetings, seminars, conferences, and workshops.

The R4D Multi-Purpose Facility continually serves as a conducive venue for the research staff to develop viable agricultural technologies suitable for the farmers' needs. This is also fully captured in its vision of showcasing agriculture as a science, as an art, and as profitable enterprise."

The Cordillera Integrated Agricultural Research Center (CIARC) initiated the establishment of the facility to enhance the capacity of its existing facilities in showcasing technologies and products

derived from the center's R4D activities.

DA-Bureau of Agricultural Research (BAR), through its Research Facility Development Grant (RFDG) program, funded the Baguio City-based facility in 2016.

Inaugurated on 4 December 2018, the two-storey facility adorned with flowers on its sloping landscape and a stone terrace, continues to prioritize R4D and extension activities in support to the modernization of the agriculture and fishery sector by developing more technologies and products. Various applied and adaptive researches to address site specific problems affecting farm resource systems and commodities in the highlands and lowlands of the region were conducted by the Research Division of DA-CAR.

## R4D initiatives during the community quarantine

With the ongoing health crisis, DA-CAR extended its support to DA's Ahon Lahat Pagkaing Sapat (ALPAS) Kontra COVID-19 program that aims to increase

and sustain food security and sustainability in the country.

DA-CAR launched Cordillera's urban gardening project led by Dr. Luis P. Lang-oy, agricultural center chief.

Through the R4D Multi-Purpose Facility, DA-CAR continually distributes seedlings to different barangays in Baguio City. Thus, inspiring every beneficiary to produce their own food at the comfort of their own homes.

Seedling pots out of tissue rolls and used bond papers were also made by the region's researchers and were distributed as potted vegetable seedlings—containing the transplanted bell pepper seedlings.

Through the urban gardening project, dekalb brown or white chickens were also distributed to those financially capable to raise such for egg production. This is to help ensure the continuous supply of eggs in the city.

The eggs produced were supplied to various public markets in the cities as well as neighboring municipalities

during the two-month enhanced community quarantine that restricted movement.

Aside from that, the mushroom project team also distributed various oyster mushroom fruiting bags to selected beneficiaries, especially those who were gravely affected by the pandemic crisis, in Barangays Balacbac and Dontogan.

Relief goods were also packed and distributed to said barangays; exhibiting generosity and camaraderie among DA-CAR, research stations, and communities.

### Continuing researches and projects

The R4D Multi-Purpose Facility has two ongoing researches in their midst.

The first one aims to address the issue on the dwindling coffee production in the region. Hence, the application of mokusako or most commonly known as wood vinegar— a liquid that can be obtained from heated organic materials such as wood, bamboo, coconut husk or shell, and grass. Aside from being fertilizers, this wood vinegar can also act as soil enhancer and pest repellent, among others.

The second project aims to improve the production of strawberries through an efficient system vis-à-vis the usage of various containers for vertical gardening.

### Technology demonstrations

To promote the beauty and benefits of urban agriculture, the facility housed technology demonstrations container gardening, edible landscaping, anthurium integration under forest trees, and anthurium and herbs collection.

These demonstrations aimed to 1) serve as a learning site for interested growers about the different technologies introduced; 2) showcase simple yet practical ways of growing crops, vegetables, fruits, and herbs in a limited space; 3) encourage household communities to produce sustainable organic food through edible landscaping; 4) maintain the aesthetics of a well-taken care landscape garden and functional spaces; and 5) maximize space under the shade of different trees in the forest for anthurium plant species and herbs, with compost leaves serving as organic fertilizers.

### Upcoming researches in the works

DA-CAR has two new researches on coffee. The first one aims to evaluate the incidence of Ochratoxin A (OTA) in coffee beans and analyze its concentration in the region's coffee. This OTA, which is a mycotoxin, refers to a toxic substance that is produced by various fungi.

While the second new research delves on the harvest, postharvest, and processing technologies for coffee in CAR, determining their viability in connection with production and profit that could benefit its intended beneficiaries.

### The bigger picture

With various competitive R4D multi-purpose facilities funded and established across the country, more farming communities can be reached.

In lieu with the growing development need towards a more responsive delivery of technological interventions and services in the agriculture and fishery sector, these kind of facilities will serve as melting pots for agricultural research for development in the regions.

Hence, transforming the agri-fishery sector of the Cordillera, and hopefully the other provinces, from a resource-based to that of a technology-based industry. ###

For more information:

**Dr. Cameron P. Odsey**

OIC-Regional Executive Director  
DA-Cordillera Administrative Region  
(074) 445 4973 | 423 4621  
da\_carfu@yahoo.com

**Dr. Luis P. Lang-oy**

Agricultural Center Chief  
DA-Cordillera Administrative Region  
(074) 444 8986 | 442 7194  
ciarc\_da@yahoo.com

# Postharvest R4D strengthened through appropriate infrastructures

Ma. Eloisa H. Aquino



PHOTOS COURTESY OF PHTRC/UNIVERSITY OF THE PHILIPPINES LOS BAÑOS

**A**bundant in natural resources, the Philippines has a vast range of horticultural crops that can augment food needs. But the potential for an enterprise development can be limited due to increasing percentage of losses after harvest with an estimated range of 36 to 60 percent.

Thus, the Postharvest Horticulture Training and Research Center (PHTRC) was established through the Association of South East Asian Nations (ASEAN)-Australia Economic Cooperation Program in response to the United Nation's call to reduce postharvest losses.

With a multi-disciplinary pool of experts providing valuable collaborative experiences in ASEAN and Asian countries in terms of assistance and support services both to the academe and industry, the center needs further improvement through laboratory equipment provision and infrastructure rehabilitation.

“PHTRC was very fortunate to receive this grant, as it has helped realize that postharvest horticulture aspect of agriculture is relevant.”

Appropriate infrastructure and facilities provide a conducive environment in the conduct of research activities and capacitating its workforce. True enough, an up-to-date R4D facility is parallel to producing quality research outputs from efficient and effective researchers and scientists.

Established in 1977, PHTRC serves as the research, development, and extension (RDE) unit on postharvest science of the College of Agriculture and Food Science (CAFS), University of the Philippines Los Baños (UPLB).

The center is guided by its three major mandates: 1) generate basic information and develop and upgrade technologies, protocols, and processes; 2) enhance capability of extension workers; and 3) improve instructional capability of agricultural colleges and schools to integrate postharvest science in their curriculum.

PHTRC is the only center in the country that implements comprehensive RDE programs on postproduction of perishable crops aimed at food loss reduction.

These reasons prompted PHTRC to submit a proposal to the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) to rehabilitate the center's annex building and upgrade its laboratory equipment to strengthen its

capability to implement RDE programs and address the postharvest problems of the horticultural industry.

“With the Research Facility Development Grant (RFDG) support from BAR and supplanted by UPLB administration, PHTRC is envisioned to be at par with its counterparts in the ASEAN region and will be able to fulfill its mission of taking the lead in developing postproduction technologies and providing assistance to stakeholders of the horticultural industry with the end view of enhancing their quality of life,” said Dr. Edralina Serrano project leader.

Idle and unutilized for almost 20 years, the Php 10-million grant from BAR in addition to the Php 6.3-million grant from UPLB administration rehabilitated the annex building resulting to two additional training room and lecture hall that were used for seminars and other extension activities of PHTRC, and as classroom of large class offerings of the Institute of Crop Science and other CAFS activities.

Further, Crop Biophysics, Quality Assurance, and Heat Treatment laboratories, staff room, lounge, and conference room were built.

The three laboratories were utilized in the conduct of various experiments of PHTRC researchers and thesis of undergraduate and graduate students not only of CAFS but

of other colleges (College of Engineering and Agro-industrial Technology and College of Arts and Sciences-Institute of Chemistry).

Under the BAR-UPLB RFDG project, the gas chromatograph (GC) equipped with flame ionization detector (FID) and thermal conductivity detector (TCD) was acquired.

“The GC-FID/TCD is a fundamental equipment for postharvest research which measures ethylene and carbon dioxide produced by a commodity during maturation or ripening or the ethylene, oxygen and carbon dioxide levels in a package containing a fruit or vegetable,” explained Wella Absulio-Morales, PHTRC university researcher.

“Data generated using the GC-FID/TCD describes the physiological behavior of a commodity which provides information on the commodity classification, maturity, state of the commodity. These data are also vital in the development of appropriate postharvest handling, packaging, and storage protocols,” she added.

Dr. Elda Esguerra, former PHTRC director, shared that the support was significant and timely, and greatly appreciated.

“PHTRC was very fortunate to receive this grant, as it has helped realize that postharvest horticulture aspect of agriculture



is relevant. PHTRC is continually gaining popularity together with the increasing awareness and realization that postharvest loss reduction is a complementary method of solving food needs,” said Dr. Esguerra.

She added, “through the rehabilitation and upgrading, postharvest horticulture researches are conducted efficiently and continuously and we have a facility that can be showcased and available for use of all interested stakeholders.”

With the availability of the GC, PHTRC researchers and students interested in postharvest as their area of specialization will benefit from the improved facilities and upgraded equipment.

Other researchers of UPLB and non-UPLB clients requiring determination of ethylene, oxygen and carbon dioxide level can also use this equipment.

“Researchers are now able to conduct their experiments in a conducive and better equipped laboratory to generate basic data for postharvest technology development that addresses problems on food loss, food safety, and quality maintenance for profitability of production,” Dr. Esguerra shared.

As of writing there were four ongoing projects funded by various government research institutions.

Students who are taking up Bachelor and Master of Science used the facilities and GC during the conduct of their theses on modified atmosphere packaging of minimally processed moringa leaves, retardation of ripening of guava, and crown rot disease control in Bungulan banana (Musa AAA).

Dr. Esguerra shared that research activities of PHTRC were not hindered by the pandemic,

though slightly slowed down by some restrictions.

She said that, “during the quarantine period, results of researches were analyzed and prepared as scientific paper, brochures, and infographics that makes technologies more available to all.”

“Proposals were also prepared and submitted. Therefore, generating postharvest technologies will continue with the enthusiastic, resilient, and persevering researchers of PHTRC through its core funds and UP funds, and support of external research funding agencies,” Dr. Esguerra ended. ###

For more information:  
**Dr. Dormita R. Del Carmen**  
Director, PHTRC  
University of the Philippines Los Baños  
Los Baños, Laguna  
(049) 536 3259 | 536 0081  
phtrc.uplb@up.edu.ph

# Powering CALABARZON agriculture R4D through a technology commercialization center

Jhon Marvin R. Surio



The appointment of Agriculture Secretary William Dar marked a new era for the sector with the introduction of the “Eight Paradigms to Level Up Agriculture” as he sat at the helm of the department.

Infrastructure development ranked fifth among the priorities which was characterized as critical to the development of the sector.

Generally, infrastructure encompasses physical structures and facilities such as buildings, roads, and other equipment crucial to the operation of an activity.

Part of the Department of Agriculture’s (DA) mandate is the continued support to the strengthening of institutional capacities and its components,

pursuant to the Agriculture and Fisheries Modernization Act.

Similarly, the DA-Bureau of Agricultural Research established the Research Facilities Development Grant program to cater to the same aspirations.

The program allows funding of scientific equipment and the renovation, upgrading, improvement, and establishment of research facilities critical to the needs of research for development centers under the National Research and Development System in Agriculture and Fisheries.

One successful project supported under the said program was the technology commercialization center of DA-CALABARZON located at the Lipa Agricultural Research and

Experiment Station (LARES) in Marawoy, Lipa City, Batangas.

LARES is DA-CALABARZON’s outreach station which focuses on commodities such as citrus, coffee, corn, rice, vegetables, cassava, and tissue-cultured macapuno and banana.

As such, the need for the establishment of a technology commercialization center and a postharvest facility was realized to strengthen the research, development, and extension capacity of the station.

Aside from its relevance in conducting downstream research and in showcasing of various packages of technology on crop production and distribution of quality planting materials, the facility was eyed to aid in the station’s extension functions.

Mainly, local government units and farmer stakeholders benefit because of its establishment.

Technical assistance, field visitation, and conduct of seminars and trainings are among the services conducted through the center.

The technology commercialization center serves as the display area of products developed by LARES. The center houses matured technologies and facilitates market linkages with various stakeholders.

Through this, different stakeholders and visitors get to see the station's products.

According to project leader Avelita Rosales, DA-CALABARZON research division OIC-chief, "all the products developed by the station were displayed in the center. Through the facility, students from different schools in CALABARZON as well as farmers and agricultural technicians can see their products."

Some of the products featured in the technology commercialization center are macapuno products (strings, balls, soap, and seedlings), raspberry and lipote wine, adlay champorado, cassava grates and chips, corn grits, pili candies, macopa jam and candies, and mushroom chips and powder.

One of the recent collaborators of the station that benefitted from the commercialization center was the Marawoy Women's Association, Inc. (MWAI). In coordination with the University of Batangas-Lipa City Campus, the women's

association was established in 2018 and was registered at the Department of Labor and Employment.

Stakeholders were capacitated through a series of livelihood trainings and business planning in a span of 16 weeks.

The products being developed by MWAI are displayed at the technology commercialization facility for promotion to various stakeholders.

To date, LARES is focused on integrating crop value chains to foster commercialization of various sustainable agricultural enterprises in the region in collaboration with the agricultural marketing division of DA-CALABARZON. ###

For more information:

**Avelita M. Rosales**  
OIC-Chief, Research Division  
DA-CALABARZON  
Marawoy, Lipa City, Batangas  
(043) 756 7215  
ammrosales@gmail.com



Women's group training and sample products





# Showcasing new industry-driven food products and technologies

Ma. Eloisa H. Aquino and Anecita I. Telabangco

**A**imed to facilitate the dissemination of technologies to stimulate new business and economic development, establish linkages and networks, and preserve the environment and improve the quality of life of farmers and fishers, the Department

of Agriculture-Bureau of Agricultural Research (DA-BAR) institutionalized one of its flagship programs, the National Technology Commercialization Program.

In 2009, the research for development (R4D) technology

commercialization center of the bureau was established to showcase various products, generated technologies, and research outputs produced through the bureau's programs.

The center served as a venue to disseminate new, reliable, and

research-based information agriculture technologies and products.

This has inspired many regions to establish their own technology commercialization centers. This aspiration, at least for DA-Davao region, was realized through the bureau's Research Facilities and Development Grant.

"DA-BAR has its noble purpose in providing this facility because of its relevance to people's basic need and the industry. Food and technologies need to be dynamic because these are basic needs of people and society which government agencies like [the bureau] is supportive at, because of the impact it made to most regions who are ahead of us, in terms of income, skills, and knowledge it provides," said Engr. Ricardo M. Oñate, DA-Davao regional executive director.

On 12 September 2018, the technology commercialization center of DA-Davao Region was inaugurated.

The center aimed to serve as a hallmark and link of R4D and extension] endeavors of DA-Davao region from research outputs to utilization," said Melani Provido, DA-Davao Region research division chief.

Provido added that, "aside from establishing and strengthening linkages and collaborations of researchers with product producers, processors, entrepreneurs, Davao region's technology commercialization center aims to create new mechanisms in technology transfer and product improvement, source of

knowledge products, and further enhance awareness of farmers to produce emerging crops with new commercial value."

Among the products showcased at the center were adlay (grits, flour, instant mami, polvoron, flavored cookies, instant brew, instant breakfast cereal, wine, and beauty soap); apali (flour product, dehydrated apali, flavored cookies, polvoron, nuggets); mushroom (crisp oyster mushroom, mushroom crackers); and other emerging products from commodities such as cacao, mangosteen, and indigenous corn.

To enhance promotion of technologies and products, information materials were displayed and distributed for free at the center. Videos featuring local projects on adlay, off-season mangosteen, and package of technologies (POTs) on various crops were also played inside the center. The newest addition to this roster was the POTs of the ITIK-Pinas project which was funded by the Department of Science and Technology-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development.

"With the ITIK-Pinas project, 10,000 pieces of fresh and salted eggs have been shared to various communities in Davao region through the Department of Social Welfare and Development and Davao City Government," shared Nida E. Gigayon, project leader.

Technology matching and sourcing, market linkaging, capacity development, knowledge learning

enhancement, and on-farm visits for technology demonstration were among the services offered at the center.

Other services offered were pre-arranged consultations and referrals with agriculture experts and marketing contacts with DA Agribusiness and Marketing Assistance Division of the regional office.

Partnership with small and medium cooperatives boosted the adoption and commercialization of some newly developed food products.

To date, the center opened windows to strengthen collaborations among local government units, private sector, and adlay growers. A Memorandum of Agreement to commercialize adlay instant mami was signed by DA-Davao Regional Technical Director Angelina Pancho and United Farmers Agriculture Cooperative Head Jovito Cadigal.

With DA-Davao Region Research Division's goal to promote food adequacy through maximizing research outputs, the R4D technology commercialization center shall further serve to create more livelihood opportunities from research outputs to benefit the various stakeholders. ###

For more information:  
**Anecita I. Telabangco**  
Senior Science Research Specialist, Research Division  
DA-Davao Region  
Manambulan, Tugbok, Davao City  
(082) 286 2092  
(0946) 260 1821



PHOTO COURTESY ICCEM/CENTRAL LUZON STATE UNIVERSITY

# Raising climate change awareness at CLSU through a dedicated center

Rena S. Hermoso

In the wake of Typhoon Ulysses, people from several parts of Cagayan called for rescue on social media from the roofs of their houses as they tried to evade the rapidly increasing flood. Water released from Magat dam aggravated their situation further. Flood rose to 13.1 meters surpassing the 11-meter critical level.

Nataniel Cruz, GMA resident meteorologist, explained that when Ulysses poured over Luzon, the soil was saturated with water after three typhoons successively hit the country. Thus, causing runoffs due to

the reduced capacity of soil to absorb rain water.

Meanwhile, the water level at Marikina river reached 21.9 meters, which is 3.9 meters higher than the height for Alarm Level 3 requiring forced evacuation of the residents. People were reminded of the nightmare they experienced 11 years ago when Typhoon Ondoy poured a month's worth of rain in just six hours.

The disaster not only claimed lives but also destroyed the livelihoods of people.

While natural hazards like typhoons come and go, its impact on the lives and livelihood of farmers, fishers, and other vulnerable sectors leaves a gaping wound that might not heal.

“For Typhoon Ulysses alone, the initial damage on crops and livestock is PhP 79 million covering 11,512 hectares with estimated 15,867 affected farmers,” said Narciso Edillo, regional executive director of the Department of Agriculture (DA)-Cagayan Valley, in an interview.

Climate change is characterized by erratic and severe weather disturbances like the consecutive typhoons that hit the country this year. Agriculture and fisheries are among the most vulnerable sectors to climate change with its high dependence on climate and weather conditions.

Understanding the sectors' risks and formulating research- and science-based solutions is crucial. To achieve this, the research for development sector needs opportunities to strengthen their capacity and conduct various sound research that will in turn help the country.

In its efforts to help capacitate researchers, the DA-Bureau of Agricultural Research (BAR) funded the Climate Change Center at the Central Luzon State University (CLSU) in the Science City of Muñoz, Nueva Ecija.

Inaugurated on 9 December 2015, the project was initiated by Dr. Annie Melinda Paz-Alberto, CLSU-Institute for Climate Change and Environmental Management (ICCEM) director.

It features an environmental monitoring laboratory, amphitheater, digital viewing museum, and regional learning center that focuses on climate change risk reduction management.

To date, the amphitheater has hosted 21 seminars, training, conferences, and other activities on climate change with 1,958 participants.

The most recent activity conducted was the Local Climate Change Action Plan (LCCAP) seminar on 9-13 March 2020.

LCCAP describes the local government's policies, programs, and measures to increase the community's resilience to the impacts of climate change and reduce their greenhouse gas emissions.

The digital viewing museum showcases research outputs and best practices on climate change adaptation while the regional learning center features the various natural and climate change-influenced disasters that occurred in Central Luzon and disaster risk reduction management practices.

Meanwhile, four research undertakings funded by various government agencies were conducted at the environmental monitoring laboratory.

"All the research activities and studies conducted at the [laboratory] have significant findings that could help local communities in terms of disaster preparedness and climate change adaptation through the provision of flood hazard maps, disaster risks maps, vulnerability maps, crop suitability maps," said Dr. Paz-Alberto.

She added that the results of these researches helped the locals understand and be aware of climate risks and adaptation measures they could do to keep them resilient and safe.

One of the projects is the BAR-funded research that assessed the climate change impacts and vulnerability of Bongabon, Gabaldon, and Cabanatuan City, Nueva Ecija. Led by Dr. Paz-Alberto, the said project developed and generated highly accurate 44 vulnerability maps and 69 suitability maps.

The Department of Science and Technology (DOST) funded the other two projects.

The first one generated and validated flood hazard maps of the eight river basins in Central Luzon and Pangasinan using Light Detection and Ranging (LiDAR) technology. LiDAR uses light energy emitted from a laser to scan the surface and record the heights of the objects on the ground. Measurements collected from this were used to create accurate three-dimensional maps.

While the second is a program that assessed and monitored the various ecosystems and stream flow and water quality in Pantabangan-Carranglan Watershed Forest Reserve, Nueva Ecija. The program also monitored the annual and perennial croplands as well as pest and diseases.

The Commission on Higher Education funded the last one which is an ongoing project on coastal resource management in Zambales.

Since its inception, the Climate Change Center at CLSU continuously serves as a learning hub on climate change science, climate risk management, and disaster risk reduction management for the researchers, faculty, students, and local community. ###

For more information:  
**Dr. Annie Melinda Paz-Alberto**  
Director, ICCEM  
Central Luzon State University  
Science City of Muñoz, Nueva Ecija  
(044) 456 5843  
melindapaz@gmail.com

# Boosting climate change R4D in Isabela

Rena S. Hermoso

**W**hile technical expertise is crucial in crafting responsive research for development (R4D) programs and projects, it is also equally important that researchers are provided with facilities and grants to elevate their game.

Thus, to foster the growth of climate change R4D in Cagayan Valley region, the Isabela State University (ISU) institutionalized its Climate Change Center in 2011.

The country's location makes its agriculture and fishery sector vulnerable to the drastic effects of climate change. One of the solutions to address this concern is to ensure that researches are undertaken.

The hub fostered collaborative programs, projects, and activities by and for various national government agencies, its local counterparts, and state universities and colleges (SUCs).

Two special projects conducted at the center were under the Department of Science and Technology-funded Phil-LIDAR 1 and 2 programs that was spearheaded by the University of the Philippines Diliman and co-implemented by 14 higher education institutions and SUCs across the country.

Under these projects, ISU turned over flood hazard maps generated through Light Detection and Ranging (LiDAR) technology to the local government units covered

by the river basins assigned to the university. ISU also conducted hands-on trainings on geographic information system (GIS) for LiDAR data products utilization.

This led to the development of LiDAR-based flood advisory system in northeastern Luzon river basins. Thus, enabling local authorities to plan and develop proactive stance toward typhoon-induced disasters.

ISU furthered its commitment toward climate change adaptation, mitigation, and disaster risk reduction strategies by establishing another facility.

Funded by the Department of Agriculture (DA)-Bureau of Agricultural Research, the facility features a large function hall that will serve as laboratory and classroom for geomatics and climate change adaptation-disaster risk reduction management.

Agriculture Secretary William, together with the DA-Cagayan Valley regional office and ISU officials, led the inauguration of the said facility on 12 December 2019.

Hands-on trainings on flood hazard mapping, crop suitability analysis, soil fertility mapping, and hydrologic modelling and biomass and carbon assessment for agriculture, forestry and other land uses were conducted.

“The conduct of capacity building activities and workshop

aimed to strengthen ISU researchers' ability to develop and implement research proposals that have both local and regional significance,” shared Dr. Januel Floresca, ISU Geomatics and Climate Change Center director.

He added that these activities “will serve as building blocks and seed ideas for the preparation of relevant project proposals .”

Like most of the plans that were put on hold during the community quarantine, ISU also deferred its scheduled trainings since March 2020 for its faculty and students as well as the local government units.

Despite the hurdles brought by the pandemic, Dr. Floresca emphasized that ISU will continually conduct classes, hands-on trainings, seminars, and workshops to capacitate more faculties, students, local government units, and other stakeholders.

He also said that plans to conduct virtual seminars on cloud GIS and flood hazard mapping using rainfall-runoff inundation modelling are already in their pipeline. ###

For more information:  
**Dr. Januel P. Floresca**  
Director, Geomatics and Climate Change Center  
Isabela State University  
San Fabian, Echague, Isabela  
(078) 305 3467  
januelpf@isu.edu.ph



# CLIMATE CHANGE R & D SUPPORT FACILITY



# More than just a pile of bricks

Chantale T. Francisco

**A**part from just being a façade, a building affects minds and ideas. Thus, when put into use, should be physically and technically equipped to effectively deliver new agricultural technologies.

Cognizant of the role a facility holds, the Department of Agriculture-Central Luzon Integrated Agricultural Research Center (DA-CLIARC) ensured that the establishment of the Mushroom Technology and Development Center (MTDC) will generate products and technologies beneficial to its stakeholders and the public.

True to their words, MTDC indeed fulfilled the needs of mushroom growers, processors, and other stakeholders since 2015 not just in Central Luzon, but also in other regions.

Mushroom production and processing is one of DA-CLIARC's agricultural strengths. Holding seminars and forums on mushroom growing, the center gained credibility and expertise in this field. And one aspect that the researchers have been continually developing are value-adding processing techniques to prolong mushroom shelf-life while also producing more job opportunities.

DA-CLIARC believes that processing plays a critical role in the growth of the mushroom industry. Hence, the center explored significant operations conducted in MTDC. These are segmented into three: research for development (R4D), production, training and Extension.

MTDC housed a wide-array of research studies in its first five years. And it would not be wrong to assume that more valuable research will thrive in the next years to come.

The project "Formulation and Suitability Testing of Low-Cost Alternative Culture Media for Mushroom" was the foundation project of some of the projects MTDC take pride on. Rice wash sucrose agar was utilized to identify a low-cost yet viable media for mushroom culture.

Three sub-studies followed that were aimed to prolong the shelf life of mushrooms and generate a mushroom product line for additional income of farmers.

These products were marketed as food with high nutritional content and an alternative to those who are closely monitoring their health. These sub-studies featured pleurotus-based mushroom frozen products,

mushroom sweets and pastries, and mushroom-infused condiments.

These researches are among CLIARC's pride because more goods were developed in MTDC to be added in the product line.

An example of this was the mushroom crackers that was developed in support to "Ahon Lahat, Pagkaing Sapat (ALPAS) kontra COVID-19" or Plant, Plant, Plant which is a program of DA that mandates heightening food security and accessibility amidst the pandemic.

Another project focused on the growth improvement and yield performance of pleurotus species through the incorporation of different substrates. While the latest research study that was completed this year was about the development of Lingzhi mushroom (*Ganoderma lucidum*).

Meanwhile, with the researchers' relentless efforts, MTDC accommodated the production of quality mushroom pure cultures, grain spawn bags, and fruiting bags of these mushroom varieties like white oyster (*Pleurotus ostreatus*), grey oyster (*Pleurotus sajor-caju*), pink oyster (*Pleurotus djamor*), yellow oyster (*Pleurotus citrinopileatus*), straw



(*Volvariella volvacea*), milky (*Calocybe indica*), and Lingzhi (*Ganoderma lucidum*).

Once matured, these will be distributed to individuals and groups who are interested in venturing in mushroom production and processing.

Further, MTDC also serves as a venue for on-station hands-on training and workshops. These are usually done monthly and quarterly with only 30

participants per batch. But due to the restrictions in light of the pandemic, the center transitioned to webinars via Zoom. As of writing, 10 webinars on mushroom production and processing were conducted.

Apart from that, MTDC staff have also distributed mushroom planting materials in support to DA's Plant, Plant, Plant program.

Looking into it, buildings have given more than what people

gave it. And anyone can attest that just like MTDC, a facility affects people's productivity. Because apart from just being a face of an industry and a pile of bricks, it has witnessed and helped ideas come to life. ###

For more information:  
**Dr. Emily A. Soriano**  
 Agricultural Center Chief III  
 DA-CLIARC  
 Sto Niño, Magalang, Pampanga  
 (0906) 245 0622  
 easoriano@gmail.com

In this Site will soon rise

Cagayan Valley Cacao Processing Center

With research for development serving as its pillars, every established infrastructure contributes to shaping the agriculture and fishery sector as it did and always does.



(02) 8461 2900 | 8461 2800    www.bar.gov.ph    kmisd@bar.gov.ph    /DABAROfficial

# RESEARCH FOR DEVELOPMENT BARDIGEST

DA-BUREAU OF AGRICULTURAL RESEARCH  
RDMIC Bldg., Elliptical Rd. corner Visayas Ave.  
Diliman, Quezon City, Philippines 1104



---

---

---

---