



Department of Agriculture  
**PHILIPPINE CARABAO CENTER**  
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Philippine Carabao Center - Department of Agriculture



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2019

# ANNUAL REPORT



Department of Agriculture  
**PHILIPPINE CARABAO CENTER**  
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ANNUAL REPORT 2019  
HIGHLIGHTS OF ACCOMPLISHMENTS

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Kalawit, Zamboanga Del Norte



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# ANNUAL REPORT

HIGHLIGHTS OF ACCOMPLISHMENTS

2019

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# ABOUT US

## ABOUT US

The Philippine Carabao Center (PCC) operates as an attached agency of the Department of Agriculture (DA). PCC is mandated under Republic Act No. 7307 or the Philippine Carabao Act of 1992 to conserve, propagate and promote the carabao as a source of draft animal power, meat, milk and hide to benefit the rural farmers.

Per DA Administrative Order No. 9, series of 2008, PCC likewise is the lead Institution in Livestock Biotechnology research and development.

## VISION

A premier Research and Development institution propelling sustainable growth of the livestock industry.

## MISSION

Improve the general well-being and competitiveness of the livestock industry stakeholders through:

- a) Animal Biotechnology and Technology Development;
  - Genetic Improvement
  - Food safety and environment compliance
- b) Technology dissemination and knowledge resource management;
- c) Active private sector participation
- d) Livestock-based enterprises
- e) Policy reforms to sustain development of livestock enterprises;

Thus, ensuring socio-economic empowerment for nation-building.

## POWERS AND FUNCTIONS

---

RA 7307, which was signed on March 27, 1992 and operationalized on April 1, 1993, provides that PCC's powers and functions are:

- Conserve, propagate and promote the Philippine carabao as a source of draft animal power, meat, milk and hide;
- Enable the farmers, particularly smallholder-farmers and CARP beneficiaries, to avail themselves of good quality carabao stocks at all times and at reasonable prices through an organized program of production, breeding, training, and dispersal;
- Undertake training programs for farmers, particularly smallholder-farmers and CARP beneficiaries, designed to transfer technology on the proper care and reproduction of the carabao and the processing of its meat and milk;
- Encourage backyard dairy development in rural areas by raising carabaos so as to meet the nutritional needs of the smallholder-farmers and their families and reduce dependence on imported milk by-products;
- Undertake research activities in all disciplines that lead to the improvement of the overall productivity of the Philippine carabao;
- Increase the existing annual population growth of the Philippine carabao to keep pace with human population growth;
- Enter into memoranda of agreement and receive donations through the Department of Agriculture from local and foreign sources. Upon the recommendation of the PCC Advisory Board, the individual carabao centers may enter into agreements directly with funding agencies through their respective board of regents or head of agency.

### PCC's New Ways of Thinking

As a manifestation of strong support and adherence to the “New Thinking” being espoused by the Department of Agriculture (DA), the PCC crafted its version of the DA's 8 Paradigms, as they are applied to the Carabao Development Program (CDP), which was also integrated in the PCC's Strategic Plan or Medium Term Plan 2020-2025 (please see Section IV). Figure 1 summarizes the components of “New Thinking” as applied to PCC.

### Modernization (Mechanization) Initiatives

Consistent with the “New Ways of Thinking” and in support of the modernization of the carabao value chain, the agency prepared a proposal for the creation of a Livestock Engineering Division (LED) at its national headquarters. The LED is envisioned to perform the following functions:

- Prepare plans and programs that applies research, development, and extension in the livestock engineering services of the PCC, which include the following:
  - a. Upgrading of animal facilities in the PCC Regional Centers
  - b. Mechanization of milk collection
  - c. Forage and silage production and animal waste management
  - d. Road network and irrigation system improvement
  - e. Soil and water conservation and management
  - f. Other engineering/mechanization works related to carabao production and other activities along the carabao industry value chain
- Supervise and implement the construction, operation, maintenance and management of irrigation systems, dairy processing facilities, waste management structures/facilities, farm machineries and equipment.
- Provide extension activities to ensure technical capability of PCC staff and clients (dairy farmers) in the installation, operation and maintenance of irrigation facilities, dairy processing facilities, and farm machineries.
- Provide partnerships and linkages with Local Government Units (LGUs), State Universities and Colleges (SUCs), and other government agencies in strengthening of livestock production mechanization, which includes the promotion, and commercialization of matured agricultural engineering technologies in relation to milk production and dairy processing.
- Conduct Research for Development Activities applying engineering interventions in congruence with relevant Division/Section on the fields of animal breeding, reproduction, biosafety, environment, production system and nutrition, product development, enterprise development, cryobanking, and other related activities.

The proposal was initially submitted to the Bureau of Agricultural and Fisheries Engineering (BAFE) for subsequent endorsement to the DA then to the DBM.

Likewise, the agency has crafted a five-year mechanization plan for its network of regional centers including its gene pool facility. Essentially, it entails the procurement and use of modern farm equipment, implements, and machineries for forage and feed production, milking, and milk processing, storage, and handling.

# Farm Consolidation

(Clustering of Services for Smallholder Dairy Buffalo Farmers)



The PCC spearheaded a series of convergence meeting and discussions towards the creation of “dairy hubs” in strategic areas of the country. A dairy hub is an “economically active producer organization and set of business relationships and linkages with other public and private agribusiness partners, which provide dairy-related inputs, milk market outlets, extension and advisory services, and financing services” (Mutinda, Baltenweck, and Omondi, 2015)<sup>1</sup>. It, thus, entails a clustering of services that enable smallholder farmers to access production inputs along with support for extension and marketing.

The initial convergence meeting of stakeholders held at Central Mindanao University on November 14, 2019 led to the creation of Technical Working Group per Island cluster that will be responsible for the assessment of the present industry scenario in the area and in coming up with a concrete feasibility study for the creation of a profitable business hub.

A follow-through activity was conducted at the Dohera Hotel, Cebu on December 5, 2019 for the identification of the hub’s lead cooperative and for the development of industry hub framework. It was agreed that Lamac Multi-Purpose Cooperative shall be the lead of the Visayas Business Hub. Other cooperatives, including the National Dairy authority (NDA)-assisted cooperatives, shall be tapped as members of the hub. It was also agreed that the next activity should be a joint meeting workshop of NDA and PCC to finalize the proposed components and description of the hub.



<sup>1</sup> Mutinda, G., Baltenweck, I., Omondi, I. (2015) Setting up sustainable dairy business hubs: A resource book for facilitators.

# A FOOD-SECURE PHILIPPINES WITH PROSPEROUS FARMERS AND FISHERFOLK.



1



## MODERNIZATION MUST CONTINUE

- Breed development and improvement
- Carabao Herd Improvement Program Services (CHIPS)
- Crop-livestock integration and diversification
- Mechanization of carabao value chain services

2



## INDUSTRIALIZATION IS THE KEY

- Carabao value chain business hub development
- iREB Client Business Dashboard as guide for productivity and profitability
- Ancillary service-oriented business facilitation
- Access to credit and investment

3



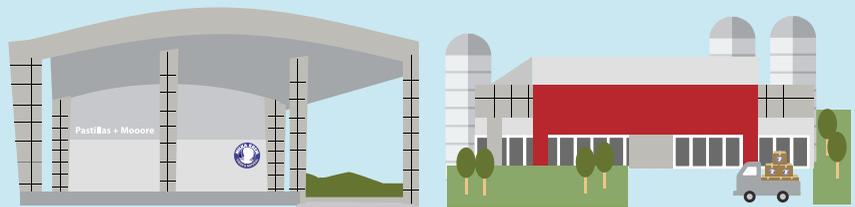
## PROMOTION OF EXPORT IS A NECESSITY

- Strengthen research and development for export-ready products





5



## INFRASTRUCTURE DEVELOPMENT SHOULD ALSO BE CRITICAL

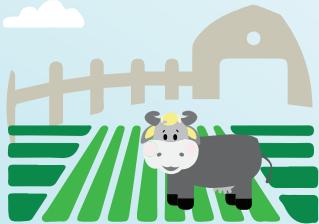
- FDA-accredited carapreneurs' processing plants across service impact areas
- Establishment of a carabao-based advocacy hub in Visayas and Mindanao
- Development of business portfolio and dairy marketing network

# PARADIGMS TO LEVEL UP AGRICULTURE

'NEW WAYS OF THINKING'

Illustrations by Rowena Bumanlag, Chrissalyn Marcelo and Jan Czarina Salas

4



## CONSOLIDATION OF SMALL- AND MEDIUM-SIZE FARMS

- Clustering of farms and development of production zones
- Coopreneur and corporate clusters buildup
- Development of province-wide agricultural extension systems
- R4D Refocus: Client-driven and solution-oriented researches on productivity and business models to engage stakeholders in technology development and utilization

6



## HIGHER BUDGET AND INVESTMENT FOR PHILIPPINE AGRICULTURE

- Investment for Carabao-based Business Improvement Network (CBIN) for province-wide Carabao Development Program (CDP)
- Encourage public-private collaboration for carabao-based enterprise development

7



## LEGISLATIVE SUPPORT IS NEEDED

- Creation of National Livestock Genetics Board
- Credit access facilitation for milk supplementation
- Save Buffalo Genetics Fund

8



## ROADMAP DEVELOPMENT IS PARAMOUNT

- iREB 2.0 Championing Carapreneurship: 2020-2025 Roadmap toward "Innovative and Research-Based Enterprise Buildup thru Value Creation to Improve Productivity, Profitability and Sustainability" (iREB VIPPS)

MASAGANANG

MATAAS NA

ANIKITA

## II. Accomplishments Relative to the 15-Point Agenda of Secretary Dar

### Enhancing Skills of Small Farmers

- The PCC Regional centers facilitated 1,176 types of trainings and seminars on various aspects of buffalo production and management in support of the assisted farmers, cooperatives, and associations. These learning events were participated in by 27,146 individuals from across the country. Meanwhile, the PCC's National Impact Zone (NIZ) coordination unit facilitated 17 types of training, seminars or workshops, which were participated in by 812 farmer-trustees of cooperatives and associations in Nueva Ecija. These trainings and other learning events included Social Preparation Training, Basic Buffalo Management, Farmers' Field Day on Sorghum Production, Training on Artificial Insemination, Urea-Molasses Mineral Block Making, Training on Milk Processing, Leadership and Values Realignment Training, Toned Milk Processing Training, Kesong Puti Festival, and NIZ Year-End Consultative Meeting.
- Since 2017, the PCC through its Knowledge Management Division (KMD) has been facilitating a learning modality titled "Farmer Livestock School on Dairy Buffalo Production" (FLS-DBP), which aims to promote improved practices in dairy buffalo production systems and accompanying technology options for smallholder dairy buffalo farmers to help increase their efficiencies and income.

In 2019, the Learning Events Coordination Section (LECS) under the KMD facilitated eight FLS-DBP season-long (34-week) learning sessions involving participants from Polanco, Zamboanga del Norte, San Miguel, Bohol, Tarlac, Don Carlos, Bukidnon, South Cotabato, Zamboanga Sibugay, PCC at Don Mariano Marcos Memorial State University, and PCC at Mariano Marcos State University. Likewise, three batches of FLS-DBP Training of Trainers, also known as Facilitator's Learning Workshop, were held at the PCC National Headquarters involving participants from various areas being assisted by the agency. A total of 267 participants were trained during the conduct of these learning events. Among the participants, 198 were farmers and 69 were facilitators or trainers from the LGUs and the PCC regional centers.



No. of types of trainings and seminars on various aspects of buffalo production and management in support of the assisted farmers, cooperatives, and associations facilitated by the PCC Regional Centers.



No. of individuals from across the country who participated in the learning events facilitated by the PCC Regional Centers.



No. of types of training, seminars or workshops the PCC's National Impact Zone (NIZ) coordination unit facilitated.



No. of farmer-trustees of cooperatives who participated in the training, seminars or workshops the PCC's National Impact Zone (NIZ) coordination unit facilitated.



No. of FLS-DBP season-long (34-week) learning sessions facilitated by KMD-LECS.



No. of participants trained during the conduct of these learning events. Among the participants, 198 were farmers and 69 were facilitators or trainers from the LGUs and the PCC regional centers.



- To continuously disseminate the PCC’s programs, services, and technologies on dairy buffalo production, the PCC at University of Southern Mindanao together with the Agricultural Training Institute (ATI) Regional Training Center XII, DA Regional Field Office XII (DA-RFO XII), Provincial Veterinary Office, and Municipal Agricultural Offices, joined forces in the radio broadcast of the School-on-the Air (SoA) on Dairy Buffalo Production targeting smallholder carabao keepers in South Cotabato.

This four-month long SoA first aired on October 8, 2019 (and every Wednesday thereafter, from 11:00 AM to 11:45 AM) and lasted until February 5, 2020 over Radyo Bandera 98.1 News FM in Surallah, South Cotabato. Its graduation ceremony is set to be conducted on February 26, 2020 with more or less 400 carabao keepers (enrollees). The SOA topics were strategically designed based on the combined best practices of farmers and PCC.



- The PCC through its Business Development Coordinating Unit (BDCU) facilitated two “Business Talk or BIZTALK” learning events as follow:

a. BIZTALK for Clients: Coopreneurs’ Profile, Propositions, and Performance (June 17-21, 2019, Los Baños, Laguna). The event allowed the participants to understand and gain knowledge on the importance of branding, internal audit and inventory, the Dairy Box investment, along with addressing the issues encountered by the cooperative-entrepreneurs (or coopreneurs). The event was participated in by the PCC’s NIZ and Regional Impact Zone Coordinators along with the managers, directors, and bookkeepers of the following cooperatives or associations being assisted by the PCC:

1. Rosario Dairy Producers Association	10. Rosario Dairy Raisers Association
2. Bantug Samahang Nayon Multipurpose Cooperative	11. Tambo-an Farmers Multipurpose Cooperative
3. San Agustin Dairy Cooperative	12. Compostela Market Vendors Multipurpose Cooperative
4. Nueva Ecija Federation of Dairy Carabao Cooperatives (NEFEDCCO)	13. Lamac Multipurpose Cooperative
5. Eastern Multipurpose Cooperative	14. Bohol Dairy Cooperative
6. Catalanacan Multipurpose Cooperative	15. Leon Confederation Farmers Dairy Association (LECOFADA)
7. Calumpang Association (Representing Lambakin)	16. Calinog-Lambunao (CLB-CARES)
8. ACAR (Representing Lambakin)	17. Iloilo Science and Technology (ISAT-U)
9. Gen-Tri Multipurpose Cooperative	18. Baybay Dairy Cooperative

b. BIZTALK for Clients: Financial Management (August 26-30, 2019, Pampanga). The training/workshop aimed to impart to the participants the knowledge and skills on financial analysis as well as the basis and considerations on financing and investment decisions. The event was participated in by all managers and audit inventory representatives of selected cooperatives from Luzon and Visayas as follow:

1. Tamboan Multipurpose Cooperative	10. Rosario Dairy Cooperative
2. Lamac Multipurpose Cooperative	11. Bantug Samahang Nayon Multipurpose Cooperative
3. Bohol Dairy Cooperative	12. ACAR
4. Compostela Market Vendors Multi-Purpose Cooperative	13. AFAA
5. Catalanacan Multipurpose Cooperative	14. ISAT-U
6. Eastern Primary Multipurpose Cooperative	15. CLB-Cares Cooperative
7. Nueva Ecija Federation of Dairy Cooperatives	16. LECOFADA
8. General Trias Multipurpose Cooperative	17. Baybay Dairy Cooperative
9. Rosario Dairy Raisers Association	18. San Agustin Dairy Cooperative

# Conduct of Food Summit with Key Stakeholders

In 2019, the PCC spearheaded and facilitated the conduct of the following events to highlight the important role of water buffaloes as a food animal, i.e., as a significant source of milk and meat, apart from being an instrument for livelihood opportunities.

- **5th National Carabao Conference, held on November 14-15, 2019 at the Central Mindanao University (CMU), Maramag, Bukidnon**

The confab, hosted by the PCC at CMU and co-hosted by CMU, revolved around the theme “Masaganang Ani at Mataas na Kita sa Pagkakatibay”, in support of the DA’s vision of a food-secure country with prosperous farmers and fisherfolks. It aimed to gather participants, trustees, and all those who are benefitting from the dairy carabao-based industry. It served as a venue for meaningful interaction among the participants and a source of significant information, ideas, and good practices for sharing and disseminating, which is expected to inspire more to participate in the Carabao Development Program (CDP).

The two-day event, which featured plenary sessions pertaining to the “new thinking” in dairy management and carabao industry in general, aimed at contributing towards more abundant harvest and higher income among farmers. Specifically, it involved topics and discussions on “Milk Feeding Program” by Ms. Laraine Villaver of the Department of Social Welfare and Development and Myra Yee of the Department of Education Region X; best practices on “Artificial Insemination (AI) and Breeding” by Dr. Edwin Atabay, PCC’s Scientist I; “Forage Production and Animal Feeding” by Dr. Daniel Aquino, PCC at Central Luzon State University’s center director; and “Animal Health and Management” by Dr. Virgilio Lopez, PCC at University of Southern Mindanao’s Farm Superintendent II; “Barangay Livestock Aide” by Dr. Stella Marie Lapiz, Bohol Provincial Veterinarian; and “Farmer Livestock School and School on the Air on Dairy Buffalo Production: Platforms for Increased Technology Adoption” by Dr. Eric Palacpac, PCC Knowledge Management Division Chief.

Apart from the plenary sessions, a convergence meeting of dairy cooperatives was also conducted to strategize the plan on how to meet the increasing demand for milk due to the National School Feeding Program. The 5th NCC also featured Knowledge Exhibition, technology demonstration, launching of PCC at CMU’s Bull Barn, Semen Processing Laboratory and ‘Bukidnon Dairy’ Processing and Marketing Outlet, ceremonial awarding of dairy buffaloes to conduit cooperatives under the Accelerating Livelihood and Assets Buildup (ALAB) Karbawan project, Knowledge Café, and milk toast with elementary schoolchildren and PCC’s mascots Kalaboy and Kalagirl.

Some 600 carabao keepers, dairy farmers, partners, entrepreneurs, local government officials and representatives from various government agencies and private organizations gathered in the two-day event.



● *13th Gatas ng Kalabaw Festival, held on October 8, 2019, at General M. Natividad, Nueva Ecija*

The annual Gatas ng Kalabaw Festival, in partnership with the Department of Trade and Industry (DTI), is one way of promoting carabao's milk not only for its economic benefits but also for its important contributions to the health and nutrition of smallholder dairy farmers and their families as well as milk consumers in general. It is made possible through a technical working group participated in by DTI, PCC, Department of Agrarian Reform (DAR), DA as well as the provincial and local government units. The highlight of the celebration was the symbolic "tagay-pugay (toast of salutation)", a simultaneous milk toasting and drinking featuring day care students and representatives from partner private institutions and government agencies. It accentuated the significance of multi-sectoral efforts in the increased programs of the local dairy industry in Nueva Ecija. During the event, the PCC, was recognized by the DTI as its most outstanding partner agency for the "promotion and development of dairy cooperatives and of the whole dairy industry cluster in Nueva Ecija".

After the program, a kick off activity of milk feeding program was conducted involving 400 elementary students at General Natividad Central School. The milk was provided by the Nueva Ecija Federation of Dairy Carabao Cooperatives (NEFEDCCO).

The festival and the celebration of 1st 100 days in service of Mayor Arocena was attended by 800 stakeholders from the private sector, LGUs, government agencies, students, teachers, dairy farmers, and others.



# Enhanced Partnership with the LGUs, Private Sector, Other Government Agencies

- *Sustaining the active partnership among LGUs, DA-RFOs and village-based artificial insemination technicians (VBAIT) in the massive monitoring and upgrading of carabaos and production of genetically improved calves*

Wide-scale upgrading of carabaos to benefit more families is being carried out through the judicious use of artificial insemination (AI) and natural mating (via the PCC's Bull Entrustment Program) in key carabao development areas. In the earlier years of PCC operations, the AI activities were carried out largely by the technicians of the PCC and the Local Government Units (LGUs). Recent initiatives were undertaken by PCC to develop and empower hundreds of private VBAITs who are currently providing more than 50% of the total AI output (services) in water buffalos across the country. More VBAITs shall be trained, as the AI program continues to expand in the coming years. For purpose of monitoring and assessment of the program, the PCC through its regional centers facilitated a series of regular consultative meetings and workshops with the AI Technicians, LGUs, and DA-RFOs (Table 1). The said partnerships resulted in increased calf drop monitoring, enhanced pregnancy diagnosis services, enhanced use of breeding receipts as basis for incentives, and creation of Panay-Guimaras interim dairy stakeholders' association.





Table 1. Consultative meetings with LGUs, DA-RFOs and VBAITs in 2019.

Title	Date and Venue	No. of Participants
3rd Quarter Meeting and Planning	September 11, 2019, Visayas State University	54 (VBAIT, LGU, RAIC, NDA and PAIC)
AI Technicians' Meeting	October 7, 2019, MMSU Hostel Mess Hall	28 (AI Technicians, PCC staff)
Stakeholders' Meeting and Accomplishment Review	October 11, 2019, Pavia, Iloilo	44 (LGU, AI Technicians, Coop members)
Unified National AI Program (UNAIP) Year-end Accomplishment and Planning	November 13-14 2019, Talisay, Negros Occidental	60 (DA, VBAITs and LGU technicians)
AI Technicians' Year-end Assessment and Planning for 2020	December 11, 2019, Tagbilaran City, Bohol	55 (RAIC, PAIC, PCC, NDA, LGU, VBAITs)



- **Strengthening partnership with LGUs, NGAs, and cooperatives and increasing productivity and profitability in dairy enterprises by way of the Carabao-based Business Improvement Network (CBIN) project, a 2019 project aimed to support the cara-business start-up in 17 new areas**

**a. Entrustment of buffaloes.** This is one of the major activities of the recently approved and funded projects titled “Carabao-based Business Improvement Network (CBIN)” and “Establishment of Dairy Hub in the Province of Antique” through the initiative of Sen. Cynthia Villar. It is popularized as ALAB KARBAWAN (Accelerating Livelihood and Asset Buildup) for easy recall of the beneficiaries and partners in the identified 17 project sites. ALAB KARBAWAN is an expansion of the Carabao-Based Enterprise Development (CBED) program, the ultimate goal of which is to establish carabao-based dairy enterprise value chains across the Philippines. It also aims to open business opportunities for the cooperative partners and livelihood for its farmer-members.

So far, the PCC has completed the entrustment of 316 animals (311 female and 5 bulls) to 9 cooperative-conduits in 7 project sites (Table 2).

Entrustment of buffaloes is also a regular activity under the Carabao Upgrading Program using a Cooperative Conduit Scheme wherein strong cooperatives are tapped to implement the program, particularly herd-build up and enterprise development, in the localities. Animal inputs and technical support services are provided by PCC while the partner-cooperatives are expected to provide animal and processing facilities as counterpart. In 2019, the PCC entrusted a total of 60 dairy buffaloes to Bohol Dairy Cooperative and Lamac Multi-Purpose Cooperative as coop-conduits in the Visayas Region. This is in preparation to the creation of a dairy industry hub in the said region (Table 3).

Table 3. Animal entrustment to coop-conduits in 2019.

Province	Coop-Conduit Beneficiaries	Animals Dispersed
Bohol	Bohol Dairy Cooperative	10 heads
Cebu	Lamac Multi-Purpose Cooperative	50 heads



Ceremonial Entrustment of Animals in Hamtic, Antique for the Hamtic MPC and Pandan MPC



Ceremonial Entrustment of Animals in Dinalupihan, Bataan for the Makabagong Agrikultura ng Dinalupihan Marketing Cooperative

# CARABAO-BASED BUSINESS IMPROVEMENT NETWORK (CBIN) PROJECT

Report as of December 2019

The Carabao-based Business Improvement Network (CBIN) popularized as “ALAB” (Accelerating Livelihood and Asset Buildup) - Karbawan is a locally-funded project launched in October 2019, thru Sen. Cynthia Villar’s office. It aims to establish a robust carabao-based enterprises in identified provinces, thereby creating livelihood for farmers. It will kick-start the development of the dairy sector in the province through herd build-up of genetically improved dairy carabaos, provision of processing equipment and supplies, establishment of market outlets, and continuous provision of capacity building activities and support services.

Table 2. CBIN animal entrustment in 2019.

Province	Name of Cooperative-Conduits	No. of Animals Dispersed	
		Breedable Female	Bull
Ilocos Sur	Nueva Segovia Consortium of Cooperatives and Northern Ilocos Sur Agricultural Cooperative	15	1
Dinalupihan, Bataan	Makabagong Agrikultura ng Dinalupihan Marketing Cooperative	10	
Orani, Bataan	Tapulao Multipurpose Cooperative	40	
Negros Oriental	San Julio Agrarian Reform Beneficiaries Cooperative	40	
Zamboanga Del Norte	Antipolo Primary Multipurpose Agricultural Cooperative	60	
Zamboanga Del Sur	Baclay Multipurpose Cooperative	61	2
Antique	Hamtic MPC and Pandan Multipurpose Cooperative	160	2
	<b>Total</b>	<b>311</b>	<b>5</b>

## 17 PROJECT SITES

-  Ilocos Sur
-  Pangasinan
-  Tarlac
-  Bataan
-  Albay
-  Palawan
-  Negros Oriental
-  Antique
-  Zamboanga del Sur
-  Zamboanga del Norte
-  Misamis Oriental
-  Davao Del Sur
-  Davao de Oro
-  Davao Oriental
-  South Cotabato
-  North Cotabato

### ENTRUSTMENT OF DAIRY CARABAOS



**316**

distributed dairy buffaloes (311 female buffaloes, 5 bulls) to 9 cooperative-conduits in 7 project sites

### PROCESSING FACILITIES AND MARKET OUTLETS



**1** processing facility in Pinamungajan, Cebu



**1** dairy market outlet in Dinalupihan, Bataan

**ALAB**  
**KARBAWAN**

Meanwhile, initial implementation of dairy hub in Antique resulted in the active engagement of the provincial government with support from other national agencies in putting up a dairy processing plant cum marketing outlet infrastructure to be completed by end of 2020. The said project expects to cater 55 households who were provided with 160 dairy animals. The Antique project will be replicated in three other sites (two in Luzon and one in Visayas) in 2020 in collaboration with LGUs, strong cooperatives, and other national agencies supporting dairy development. The hub shall be managed by a strong cooperative-partner that will be capacitated by PCC to ensure its profitability and sustainability.

**Animal entrustment led to the cooperative-beneficiaries' increase in assets ranging from PHP500,000 (for coops that received an initial of 10 heads) to PHP3,000,000 (for coops that received 60 heads). The increase in assets is expected to be sustained once the animals entrusted produce calves and are re-loaned or passed on to other interested cooperative members.**



Ceremonial Entrustment of Animals in Orani, Bataan for the Tapulao MPC



Ceremonial Entrustment of Animals in Ilocos Sur for the Northern Ilocos Sur Agricultural Cooperative



Ceremonial Entrustment of Animals in Negros Oriental for the San Julio Agrarian Reform Beneficiaries Cooperative



Ceremonial Entrustment of Animals in Zamboanga del Sur for the Baclay MPC



Ceremonial Entrustment of Animals in Zamboanga del Norte for the Antipolo Primary Multi-Purpose Agricultural Cooperative

**b. Inauguration of Dairy Processing Plant.** Market is considered as the ‘pull’ of any business. A business will not be sustained unless there is a strong demand for its products and/or services. It is for this reason that the PCC provides support services that address the gaps of the sector along the value chain including the demand side. The specific strategy of the agency on this area is to assist strong and able partner-cooperatives in establishing processing and marketing outlet.

One partner-cooperative in Pinamungajan, Cebu invested and inaugurated a dairy processing plant on September 2, 2019 while a cooperative-partner in Dinalupihan, Bataan opened a Dairy Box Store on September 17, 2019.

Product value adding contributed to at least 15% increase in income of the partner-cooperatives.



Inauguration of Processing Plant of Lamac MPC in Pinamungajan, Cebu



Inauguration of Dairy Box of Makabagong Agrikultura Ng Dinalupihan Marketing Cooperatives in Dinalupihan, Bataan



● **Strengthening collaboration with PCA, ATI, BAI, DA RFUs and other NGAs for the diversified/integrated farms favorable for the sustained development (e.g. forages, legumes, pasture areas, product development)**

Farmers are one of the poorest sectors in the country with poverty incidence recorded at 34.3% in 2015. Low farm productivity, lack of value-adding and few alternative sources of income are seen as the major factors why the income of farmers are still low. There is a need for farmers to diversify crop production not only to lessen risks brought by climate change but also to improve farm profitability. Carabao raising is an enterprise that can be integrated to crop production to increase farmers' income. The integration model, however, may depend on the existing farming system already established and practiced in a specific area. It is for this reason that the Philippine Coconut Authority (PCA) and PCC proposed to have a convergence project to help coconut farmers improve their productivity and profitability. The collaboration aims to establish a coconut and carabao-based enterprise development model for increased productivity and income of farmers in the target coconut areas.

Along this line, a convergence meeting between the PCC and the PCA was conducted on November 26, 2019, with the following initial agreements:

1. 15 target sites and focal persons identified.
2. Fund of PHP10M per site to be provided by PCA.
3. Project document including MOA to be approved by the Board of Directors of PCA.
4. PCA regional managers to meet with PCC Regional Center Directors to discuss program presentation to the focal person.



- *Sustaining partnership with DSWD and DepEd for the stable co-implementation and continued participation of co-operators to the milk supplementation program (RA 11037) as active allies in helping address malnutrition and poverty alleviation*

The dairy industry in the Philippines is still in its infancy stage accounting to only 1.8% of the total demand in the country. A good opportunity to help boost the local dairy industry has been laid down when the RA 11037, otherwise known as “Masustansiyang Pagkain Para Sa Batang Pilipino Act”, was signed by the President in June 2018. The law institutionalizes the National Feeding Program with Milk Feeding Program as one of the components. It is explicitly stated in the law that fresh milk and fresh milk-based products to be incorporated in the fortified meals and cycle menu for undernourished children shall be purchased, as far as practicable, from local dairy farmers. The PCC and the NDA are both responsible in linking the suppliers of locally-produced milk to the national government agencies, i.e., DSWD and DepEd, which are mandated to implement the program. Along this line, a series of planning workshops was held starting July 2019.

So far, eight (8) cooperatives were given the opportunity to acquire business experience particularly on supplying milk for the Milk Feeding Program. These cooperatives were also assisted by PCC in securing a license to operate (LTO) from FDA. Other PCC-assisted cooperatives and private partners are also willing to participate in the Milk Feeding Program in partnership with DepEd. The Philippine Cooperative Central Fund Federation (PCF), a microfinance institution, was also invited to help strengthen the dairy cooperatives’ financial capacity to engage in the program.



**A total of 26 cooperatives and 2 private businesses committed to supply milk for 377,289 children-beneficiaries across the country. The total projected income of these businesses from the program is PHP33,956,010 (Table 4).**

Table 4. PCC-assisted enterprises' commitment in the Milk Feeding Program.

Name of Cooperative/Enterprise	No. of Children-Beneficiaries to be fed	Projected Income (PHP)
ACDI	13,524	1,217,160
Albay Dairy Processing Plant	4,446	400,140
Baclay MPC	15,168	1,365,120
Bantog Samahang Nayon Multi-Purpose Cooperative (BSNMPC)	35,619	3,205,710
Baybay Dairy Cooperative	12,525	1,127,250
Bohol Dairy Cooperative	11,695	1,052,550
CAF-Agri Cooperative	12,350	1,111,500
Catalanacan Multi-Purpose Cooperative (CAMPC)	36,315	3,268,350
D & L Paclibar Dairy farm	13,388	1,204,920
Eastern Primary Multi-Purpose Cooperative	8,048	724,320
General Trias Dairy Raisers MPC	31,717	2,854,530
Ilocano Artificial Inseminator Agriculture Cooperative	5,389	485,010
Integrated Farmers' Cooperative (IFC)	10,897	980,730
Lamac Multi-Purpose Cooperative	38,895	3,500,550
Llano Farmers Multi-Purpose Cooperative	10,721	964,890
Magdalena Dairy Processing Plant	1,549	139,410
Makabagong Agrikultura ng Dinalupihan Marketing Cooperative	1,901	171,090
Mindoro Dairy Cooperative	3,546	319,140
Muleta Side Buffalo Dairy Farmers Association	1,028	92,520
Northern Ilocos Sur Agriculture Cooperative	7,239	651,510
Nueva Ecija Federation of Dairy Carabao Cooperative (NEFEDCO)	44,611	4,014,990
Pulong Buli Multipurpose Cooperative	10,746	967,140
Rosario Dairy Farmers Cooperative	10,255	922,950
San Agustin Dairy Cooperative (SADACO)	11,095	998,550
San Julio Agrarian Reform Beneficiaries Cooperative	6,839	615,510
Siari Valley Agrarian Reform Beneficiaries MPC (SVARBEMCO)	7,678	691,020
The Rosario Livestock and Agriculture Farming Cooperative	8,936	804,240
Yamang Bukid Farm Palawan	1,169	105,210
<b>Grand Total</b>	<b>377,289</b>	<b>33,956,010</b>



● *Sustaining Partnership with Magnolia Corporation and San Miguel Corporation (SMC) thru Milka Krem as Market Link of Nueva Ecija Carapreneurs' Fresh Carabao's Milk*

The Philippine Carabao Center started its partnership with SMC last 2017 to benefit the Nueva Ecija carapreneurs. The SMC reached out to Nueva Ecija farmers through its Social Corporate Responsibility as part of its advocacy to help the smallholder farmers of the Philippines through marketing of ice cream made from locally available ingredients. The PCC has then communicated to different cooperatives and federations to collect milk from small farmers and link their available milk to major markets through Magnolia Ice Cream that is displayed in most of the supermarkets and stores in the Philippines.

**Participants**

- Nueva Ecija Federation of Dairy Carabao Cooperatives (NEFEDCCO) – source of carabao's milk
- StephenHann Dairy Farm (Multiplier Farm) – source of carabao's milk
- Philippine Carabao Center – toll processing of carabao's milk from the dairy cooperatives for delivery to Magnolia
- San Miguel Corporation-Magnolia Ice Cream Plant – market for pasteurized carabao's milk

**Beneficiaries**

Name of Cooperative/Association	Address
Cinense Dairy Producers Cooperative	Guimba, Nueva Ecija
Ayos Lomboy Dairy Producers Cooperative	Guimba, Nueva Ecija
Bagong Pag-asa sa Bagong Talavera Dairy Cooperative	Talavera, Nueva Ecija
Catalanacan Multi-Purpose Cooperative	Science City of Muñoz, Nueva Ecija
Licaong Dairy Producers' Cooperative	Science City of Muñoz, Nueva Ecija
Cabisuculan Dairy Cooperative	Science City of Muñoz, Nueva Ecija
Eastern Primary Multi-Purpose Cooperative	San Jose City, Nueva Ecija
Simula ng Panibagong Bukas Multi-Purpose Cooperative	San Jose City, Nueva Ecija
Brother's Keepers Cooperative	San Jose City, Nueva Ecija
Melchor Correa (Individual Farmer)	San Jose City, Nueva Ecija



### Highlights/Outputs of the Conducted Activities

The partnership has brought the milk produced by the smallholder dairy buffalo farmers into the mainstream market through the ice cream manufactured by Magnolia utilizing fresh carabao's milk, thus creating an assured market for the locally produced carabao's milk. Improved volume and quality of farmers' milk resulted to compliance to the stringent milk quality standards of Magnolia.

#### ● *Collaboration with Other Private Institutions/Enterprises on Product Development*

Partnership with private institutions' enterprises hastens the development and promotion of carabao-based milk products, thus expanding the products' market reach. It can mutually complement resources whenever necessary to effectively undertake an R4D partnership on carabao milk product development. An advocate of locally produced dairy produced, Mr. Ed Saldajeno approached PCC for collaboration on the development of specialty dairy products for athletes, particularly high protein and low sugar milk products.

### Highlights/Outputs of the Conducted Activities

An advocate of locally produced milk products, Mr. Ed Saldajeno collaborated with PCC to develop specialty products for athletes, particularly high protein and low sugar milk products such as high-protein chocolate milk with coco sugar, reduced coco sugar, yogurt smoothie and milk tea. Product prototypes were developed and promoted to UP men's football team and women's volleyball team, for sensory evaluation, of which results showed high acceptability.

Sterilized milk was considered for the milk feeding program, particularly for the undernourished children in hard to reach schools. Discussions were made for a collaborative R&D of the sterilized carabao's milk with a toll manufacturer, Republic Refreshments Inc., for the toll manufacture of the sterilized carabao's milk from local dairy farmers.

# Sustain Massive Information and Communication Campaign Highlighting Countryside Heroes

The PCC through the Knowledge Management Division's (KMD) Applied Communication Section (ACS) has spearheaded the production and distribution of the following information, education, and communication (IEC) materials in 2019:

6

Six (bimonthly) issues of CaraBalitaan (Newsletter for the National and Regional Impact Zones written in Tagalog)

One issue of R4D Highlights (written in English)

1

4

Four (quarterly) issues of Karbaw Magazine (written in Tagalog)

One Coffee Table Book and accompanying video production titled "Faces of Success in Carapreneurship" launched during the PCC's 26th Anniversary Celebration last March 27, 2019.

4

4

Four (quarterly) issues of Bubalus Newsletter (written in English)

27 audio-visual materials for aggressive promotion of various components of CDP

27

137,597

copies of IEC materials were distributed by the KMD and regional centers



59,782

Total no. of identified PCC stakeholders, visitors, clients, and partner institutions who received the IEC materials

## Other Media Forms

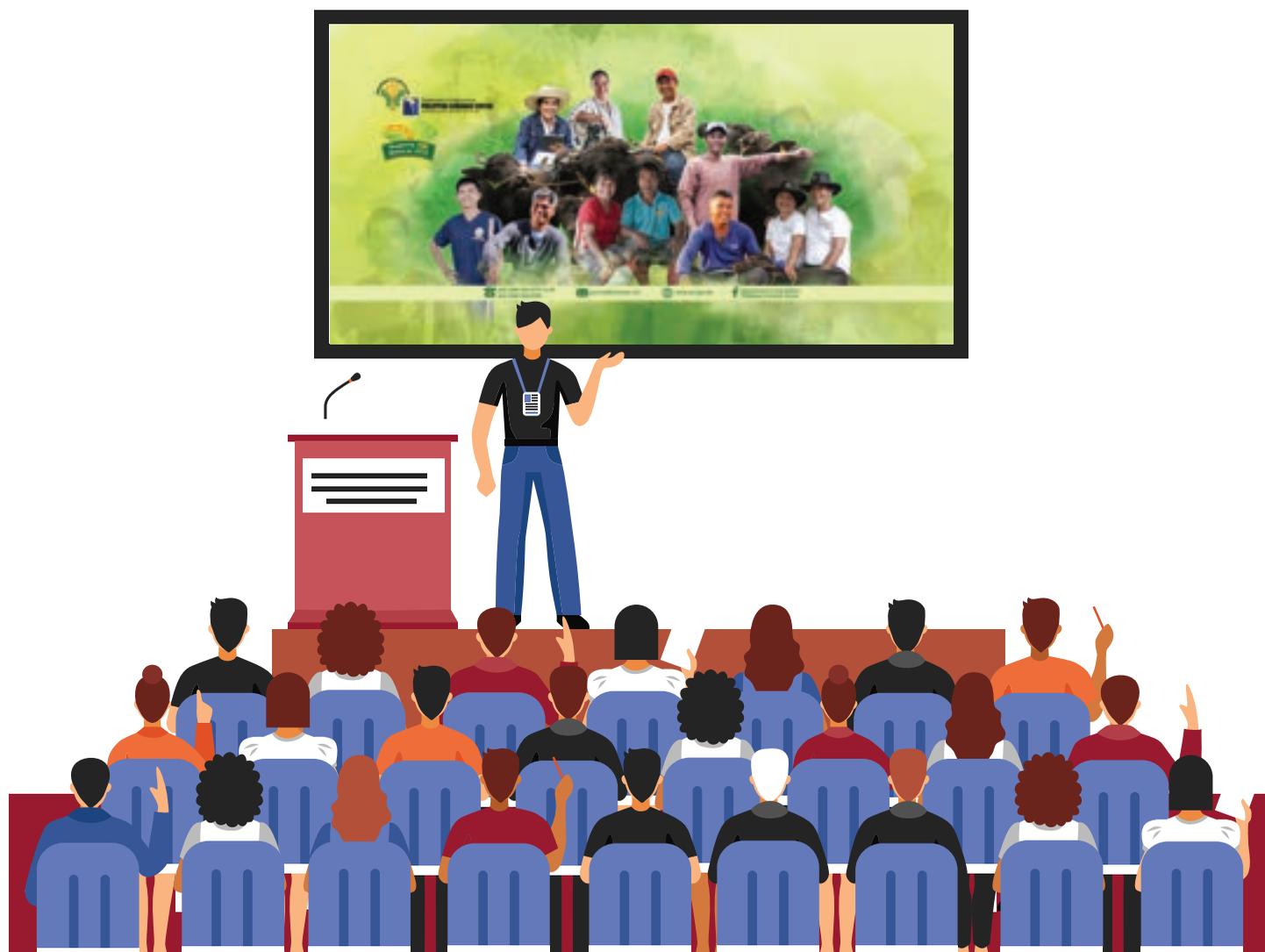
Two Knowledge café/media fora were organized and held on March 27, 2019 during the PCC's 26th Anniversary and on November 14, 2019 during the 5th National Carabao Conference in Bukidnon.

Likewise, the KMD has facilitated 115 media exposures in diverse news platforms (TV, Radio, Press, Online, and Social Media) and has uploaded 59 articles to the PCC website and popular social media (Facebook). The agency, through the KMD and regional centers, has also participated in 50 trade fairs and exhibits.



## Assistance to Visitors and Customers' Satisfaction

Through the KMD's Learning Events Coordination Section (LECS), a total of 5,579 (150 groups) scheduled and walk-in visitors were received, oriented on the PCC's programs and services, and toured to the PCC's facilities. The LECS earned a satisfaction rating of 4.94 (5 as the highest rating possible).



**5,579**  
(150 groups)

Scheduled and walk-in visitors received, oriented on the PCC's programs and services, and toured to the PCC's facilities through the KMD's Learning Events Coordination Section (LECS)

**4.94**

Satisfaction rating earned (5 as the highest rating possible)

### III. Other Notable Accomplishments

## Genetic Improvement Program

### Dairy Buffalo Breeding Program

In 2019, the Genetic Improvement Program Laboratory (GIPL) continued the genetic evaluation with the use of multi-trait random regression test day model (MT-RRM) for breeding value estimation (EBV) in Philippine dairy buffaloes. Pedigree and performance records of animals from 10 enrolled herds of PCC (NGP, UPLB, CSU, MMSU, VSU, USF, CMU, USM, MLPC, CLSU) up to December 2018 were included in the genetic evaluation run. There were 2,518 buffaloes in the pedigree file extending six generations with 14,153 monthly milk test day records as well as 8,403 and 8,284 fat and protein test day records, respectively. Based on the MT-RRM model, there were 197 bulls with progeny performance and breeding values; 81 of which were island born. The youngest bull reported with progeny performance was born in 2012, although the young bulls added in 2019 genetic evaluation run were actually born in 2011 with the exception of the lone bull born in 2012. From the top 10 ranked bulls based on total merit index, combined EBVs for milk, fat and protein yield traits, eight (8) were semen donor bulls, two of which were among the youngest (Table 5). Incidentally, the highest-ranking daughter of the top 5 bulls were all born in 2015, the youngest or latest generation of cows in the genetic evaluation run. This validates the genetic evaluation system being used and is consistent with the breeding principle that with proper selection and breeding, “the younger generation is better than the older generation”. We are now looking at the younger generation starting to surpass the previous one.

**Table 5. Top ten ranking riverine bulls based on daughter performance**

Rank	ID	NO. OFFSPRING	TMI	EBVMilk	EBVFat	EBVProt	Highest ranking daughter
1	2CM12021	1	102.7	627.6	42.2	25.4	2CM15050
2	2GP01102	51	102.7	556.0	48.2	22.5	2GP15113
3	2GP10076	4	102.5	562.2	41.5	22.5	2GP15154
4	2GP03020	10	102.3	551.5	37.6	20.9	2GP08021
5	2CM11002	4	102.3	483.6	40.9	20.3	2ML15021
6	2GP08064	41	102.2	544.8	37.2	19.5	2LS14005
7	2CM07036	7	102.1	519.4	31.2	20.5	2CM11047
8	2CM08066	3	102.0	453.3	37.5	17.8	2CM13059
9	2LS02001	17	101.9	546.5	22.5	21.7	2LS10001
10	2GP02071	5	101.9	499.5	28.1	19.3	2CM07024

*TMI – Total Merit Index, EBV – Estimated Breeding Value*

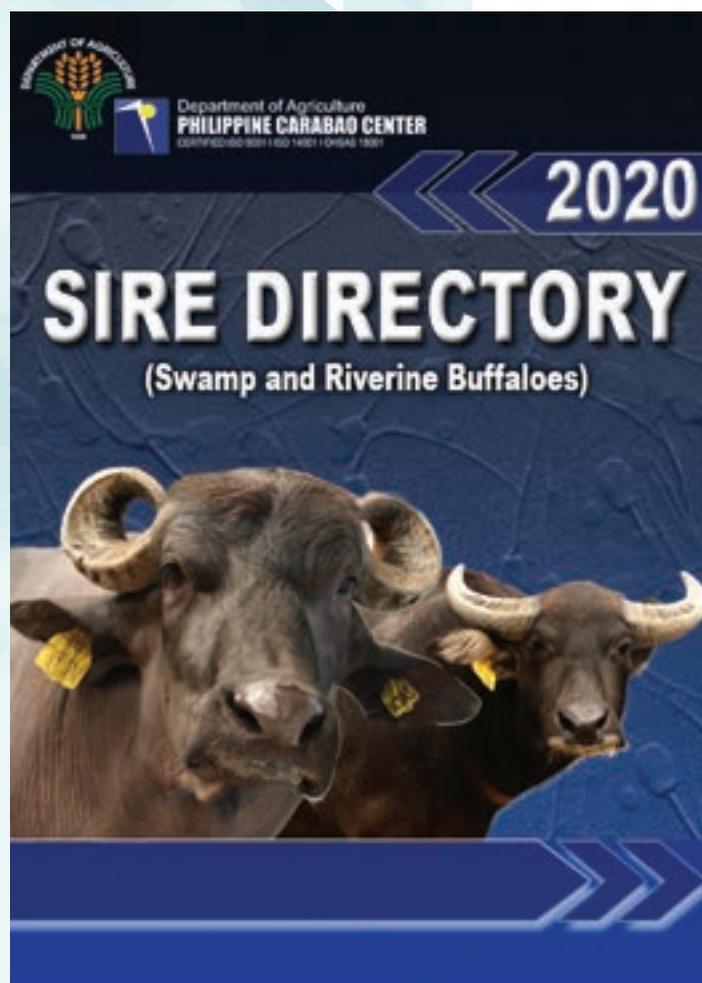
There were also 2,320 cows reported with breeding values for milk, fat and protein yields. Top performing centers, bulls (Table 5) and cows (Table 6) based on EBVs were reported to the concerned Center during the GIP Coordinator’s meeting on July 31, 2019. Top ranked cows came exclusively from CMU, VSU and NGP herds. Notable was the fact that except for three, the top ranked cows were from the latest generation. Good genetics truly runs in the family and that, the genetic contribution of the dam is as equally important as the sire. Among the top ranked cows was a grand dam-dam-daughter trio.

Table 6. Top 12 cows based on estimated breeding values (EBVS)

ID Number	EBV Milk	EBV Fat	EBV Prot	TMI	SIRE	DAM	MILK, Kg	DIM	AMP	AAC, Mos.
2GP15113	832.2	59.3	33.7	103.9	2GP01102	BR091960	2116.5	272	7.8 (ON-GOING)	34.5
2GP08021	780.7	59.3	31.3	103.7	2GP03020	2GP04029	1828.6	307	6.0	28.5
2CM08001	729.9	51.1	30.4	103.4	2GP01102	2CM04046	1949.8	307	6.4	34.3
2GP15001	565.8	60.0	23.2	103.0	BR090037	2GP11166	2067.8	291	7.1 (ON-GOING)	43.2
2GP11166	681.1	45.9	27.4	103.0	2GP00097	2GP08021	2452.31	336	7.3	37.5
2CM11075	691.6	42.3	28.8	103.0	2GP06055	2CM09015	2342.1	309	7.6	46.1
2LS14005	703.9	41.2	28.1	103.0	2GP08064	2LS05006	3008.7	376	8.0	36.1
2CM07024	706.2	38.9	29.3	102.9	2GP02071	BUL96844	2491.2	297	8.4	44.1
2GP16039	665.5	44.3	27.0	102.9	2GP01102	BR090231	1298.8	178	7.3 (ON-GOING)	33.0
2GP12066	608.9	45.8	26.6	102.9	2GP03015	BR090279	1997.8	346	5.8	28.2
2GP14085	472.8	62.9	20.7	102.8	BR090037	BR091672	1759.7	340	5.2	39.2
2GP14069	597.1	47.1	23.9	102.8	2GP08064	2GP11193	2519.9	327	7.7	38.8

EBV – Estimated Breeding Value, AAC – age at calving

**A full list of available semen donor bulls and their genetic merit per the 2019 genetic evaluation run has been reported to the various PCC Regional centers. The same information will also be available in the 2020 Sire Directory. This publication is expected to be printed in time for the PCC anniversary. A web-based version is also being planned in coordination with the Knowledge Management Division-Applied Communication Section (KMD-ACS) of PCC.**



The phenotypic and genetic trend for milk yield was positive as indicated by increasing average milk yield per cow per lactation and average estimated breeding value (EBVmilk) (Figure 2).

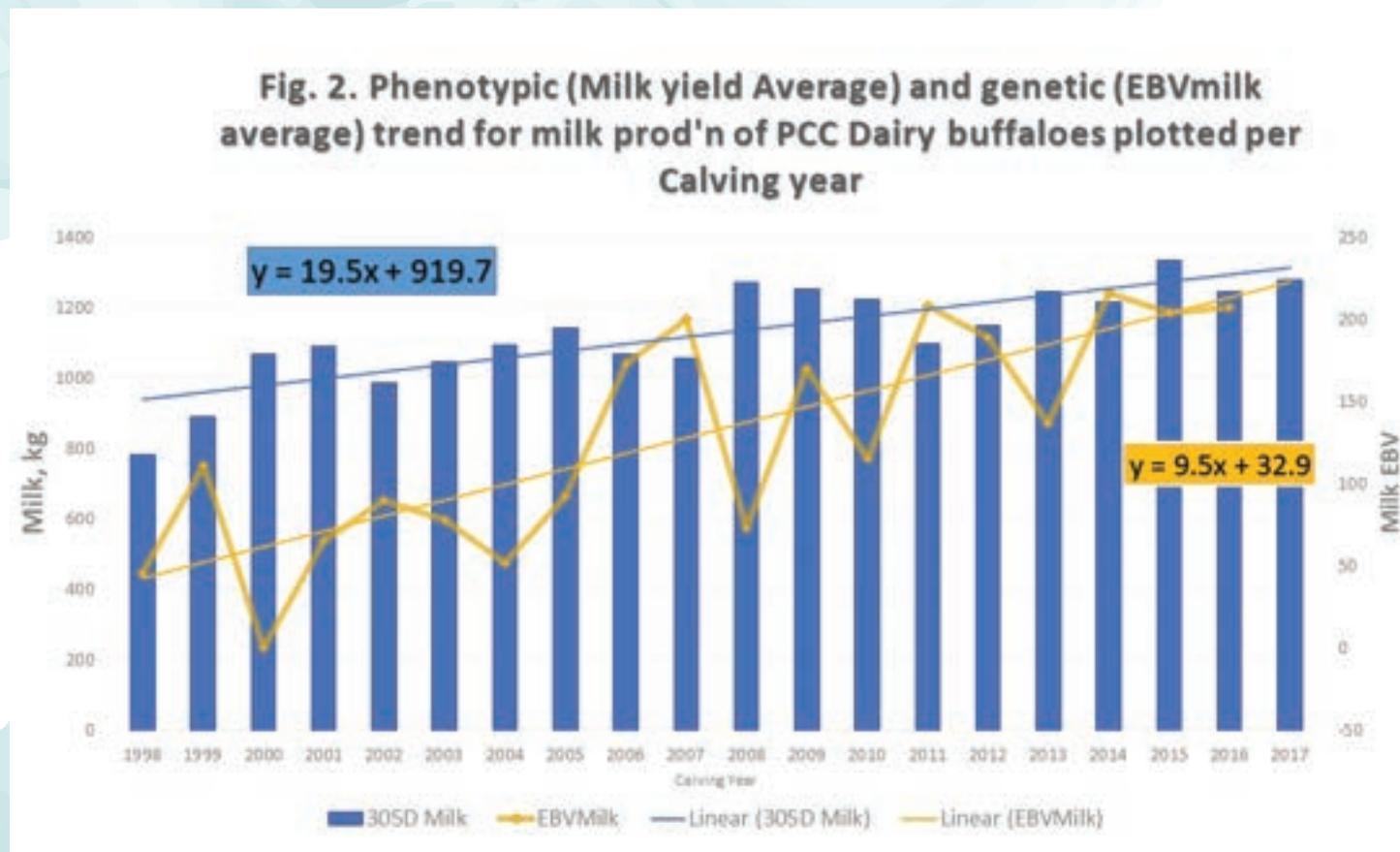


Figure 2. Phenotypic (milk yield average) and genetic (EBV milk average) trend for milk production of PCC dairy buffaloes plotted per calving year

On the other hand, the average milk fat (Fat%) and milk protein (Prot%) percentage has been decreasing at a steady rate (Figure 3A). However, the slow decrease in the milk fat and protein composition was not noticeable because fat yield and protein yield (Figure 3B) was increasing as a correlated response due to selection for higher milk yield.

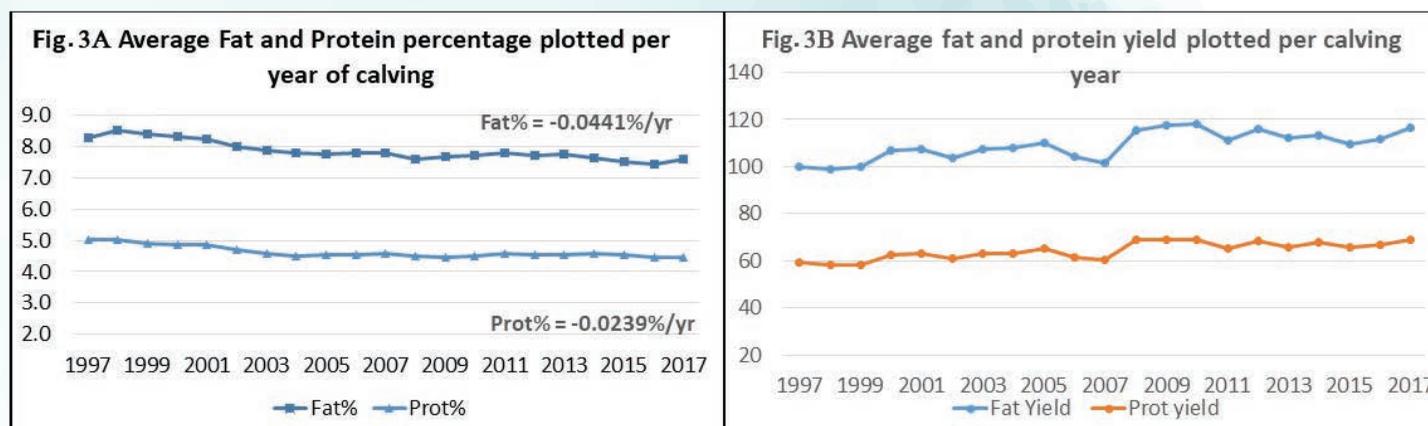


Figure 3. Average Fat%, Prot%, Fat yield and Protein yield of Philippine Dairy buffaloes from PCC institutional herds plotted per calving year

The decrease in Fat% and Protein% was expected due to a negative genetic correlation of the two traits to milk yield. The first set of young semen donor bulls selected based on Total Merit Index (TMI) was in 2014. TMI combines an individual's estimated breeding values of milk, fat and protein yield with different weight for each trait into a single value index ranking. More weight was given to fat and protein yield compared to milk yield.

In 2019, the daughters of these young bulls have started giving lactation performance and EBVs. The result of giving more emphasis to selection for fat and protein resulted in higher response to fat yield and protein yield albeit, smaller in value (Figure 4). Genetic trend for fat yield increased to 0.89 kg/yr in 2019 from 0.47 kg/yr last year. Response to selection for milk yield is still positive but slower than what was observed in 2018. This is to be expected as more emphasis was given to fat and protein yield. However, a re-estimation of the weight on fat yield EBV may need to be reviewed given the big increase in response and the reduction in response to milk yield.

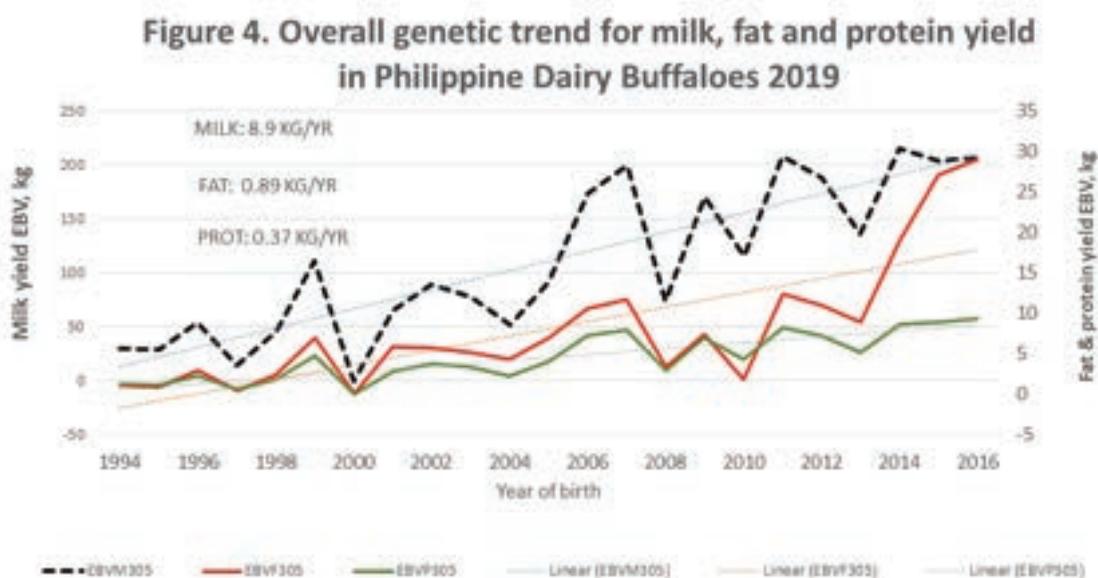


Figure 4. Average Estimated Breeding Values (EBV) of first parity Philippine Dairy Buffaloes plotted per calving year

Based on parent-average EBVs, 17 young bulls were short listed for training to become semen donor bulls. The actual number of bulls to become semen donor will depend on these 17 young bulls passing the semen quality evaluation. At the same time, 11 currently active young semen donor bulls were nominated for progeny testing.

## Breed Development

Last year, it was reported the first time that young crossbred bulls with 93% riverine blood, sons of the crossbred cows that were included in the genetic evaluation the previous year, were selected to become breeder bulls. Three were loaned out at San Agustin, Isabela and one was selected to become semen donor. This bull named “Lakas” (Figure 5), passed semen quality evaluation, hence, frozen semen is already available and is now being used by technicians to service crossbred and purebred cows in various dairy cooperatives.



Figure 5. Philippine Dairy Buffalo named “Lakas” (8UP15002)



2GP15042

EBVMilk: 256.4 kg; EBVFat: 14.2 kg; EBVProt: 8.7  
 Genomic breeding value: (GEBV): 262 kg.  
 Sire: WILSON 2UP10023  
 Dam: K18 2GP00094

Best Milk Prod'n Performance

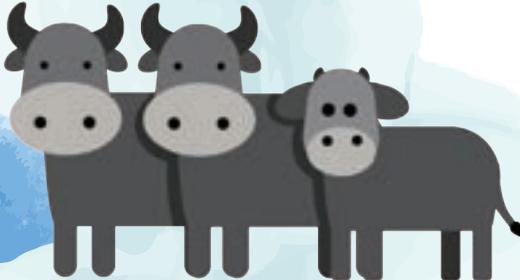
	305D Milk	DIM	EBV
Dam	3,3195 kg.	305	378.7
Sire's dam	3,038 kg	305	239.2

Figure 6. One of the first genomically tested bulls from the latest generation of Philippine Dairy buffalo bulls selected to become semen donor

While the correlation between conventional EBV prediction and genomic breeding values is high at 0.82, test mating is now being done to verify the genomic prediction. By 2020, there will be a transition from conventional BLUP breeding value estimation to genomic breeding value prediction. Full implementation of genomic selection will shorten progeny testing from the current 7-8 years to just about 3.5 years. The implication of shortening the progeny testing is on the rate that the genetic potential of dairy buffaloes, that is, faster genetic improvement.

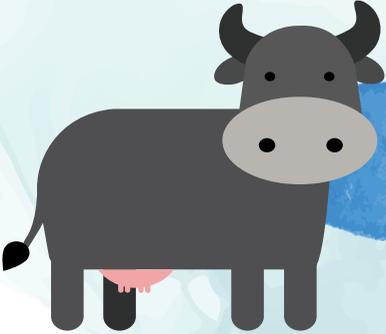
## Institutional Herd Status

- Inventory. Total inventory for institutional herd (native carabao, purebred buffaloes, and crossbred buffaloes) in the 12 network centers and the National Gene Pool was 2,448 head, which is composed of 758 cows, 680 heifers, 541 calves, 412 bulls, and 57 draft and training animals.

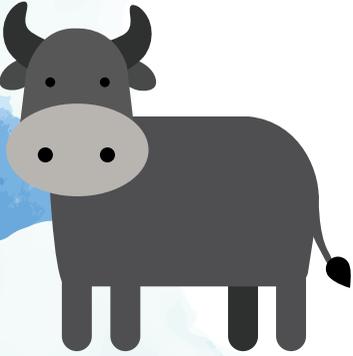


**2,448**  
head

Total inventory for institutional herd  
(native carabao, purebred buffaloes, and  
crossbred buffaloes) in the 12 network  
centers and the National Gene Pool



**758**  
COWS



**680**  
heifers



**541**  
calves

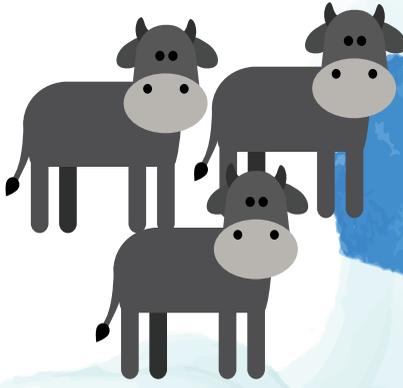


**57**  
draft and training animal



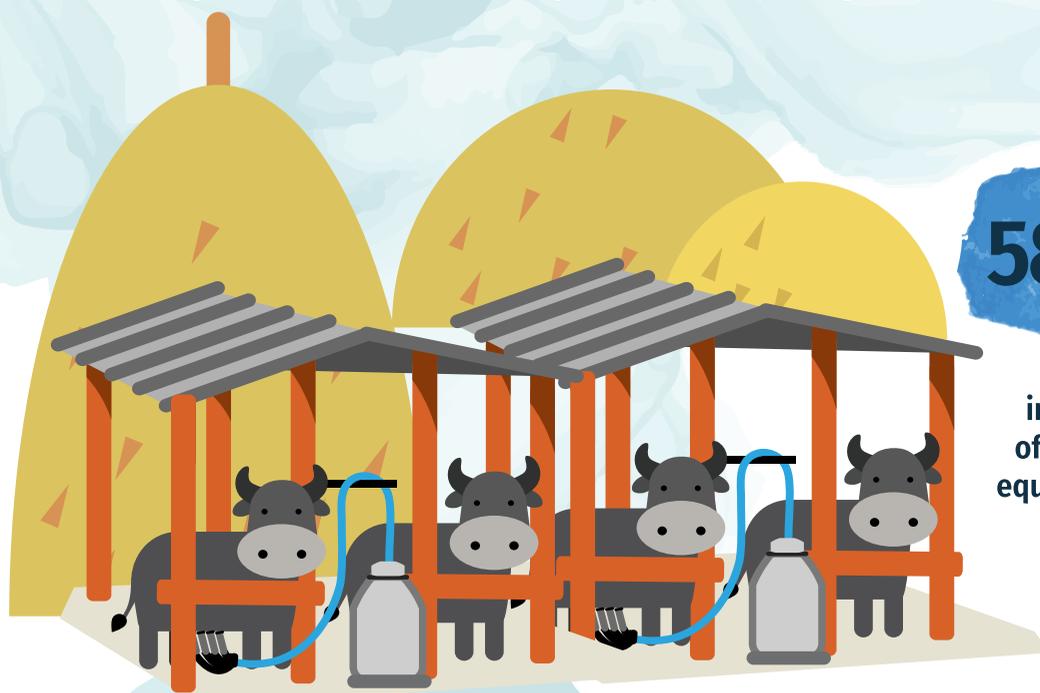
**412**  
bulls

- Calf Production. There were 497 calves born during the year.



**497**  
calves born during  
this year

- Milk Production. A total of 588,387.25 kg of milk was produced by the institutional herds from an average of 367 cows in the milking line, which equates to an average of approximately 5.34 kg milk per cow per day.

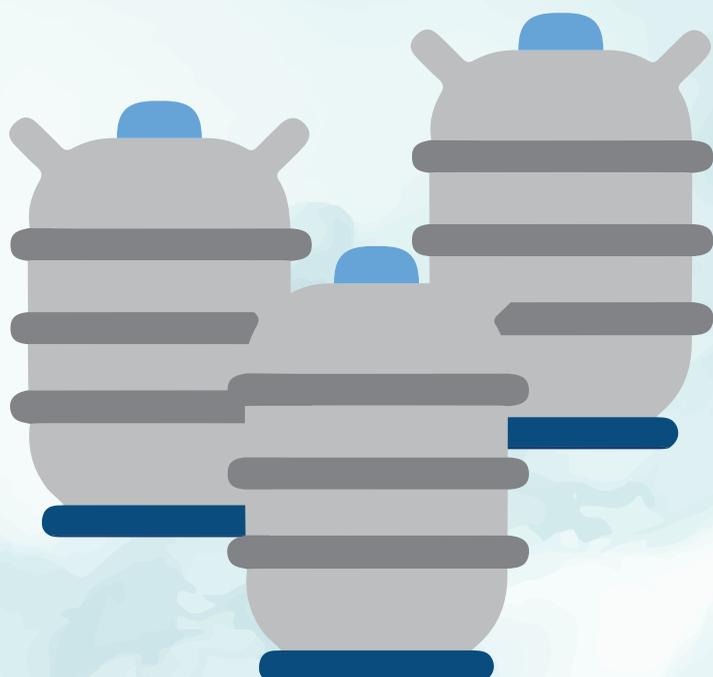


**588,387.25 kg**

Total of milk produced by the institutional herds from an average of 367 cows in the milking line, which equates to an average of approximately 5.34 kg milk per cow per day.

#### ***Bull Farm, Semen Production and Distribution***

- Bull Farm. A total of 59 head of donor bulls were maintained at the animal facilities in PCC at CLSU (n=48) and PCC at UPLB (n=11) for semen collection and processing in line with the agency's artificial insemination (AI) program.
- Semen Production and Distribution. The semen processing facilities at the PCC at CLSU and PCC at UPLB produced a total of 241,929 doses of frozen semen, which were deposited in the PCC's semen bank. Of this total, 172,203 doses were distributed to the PCC regional centers and other partner agencies and individuals for the conduct of nationwide AI for water buffaloes. The remaining doses were stored for reference and/or future research work.



**241, 929**  
doses of frozen semen

The total doses of frozen semen produced at the semen processing facilities at the PCC at CLSU and PCC at UPLB

**172,203**  
doses distributed

The total distributed doses of frozen semen to the PCC regional centers and other partner agencies and individuals for the conduct of nationwide AI for water buffaloes.

## Carabao Crossbreeding Program

The long-term goal of crossbreeding is to develop a Philippine dairy buffalo breed adaptable under the Philippine conditions. Two approaches were implemented to produce crossbred buffaloes in the country, as discussed below:

- Artificial Insemination (AI). There were 62,269 AI services conducted covering 9,200 barangays, 971 municipalities and cities in 74 provinces of the 17 regions of the country. The monitored calves on the ground based on the 2018 AI services were 18,752 calves.



**62,269**  
AI services conducted

**18,752**  
monitored calves  
on the ground

- Bull Loan Program (BLP). This program caters those communities where AI services are not easily accessible. As of December 2019, a total of 173 bulls were loaned out to farmers, which brings the total number of purebred breeding bulls in the villages to 1,093. Active bulls registered 2,524 services during the year. Likewise, monitored calves in 2019 as a result of natural mating services in 2018 totaled 2,819.

**173**  
No. of bulls loaned out to  
farmers

**2,524**  
Registered active bull services



# Research for Development

Research for Development (R4D) is one of the PCC's major thrusts. It helps propel the agency to work towards a better understanding of the foundation and dynamics of genetic improvement, animal health and nutrition, buffalo-based enterprises, and the underlying socioeconomic issues related to program implementation. In each year that passed, there were science-based innovations created and were being proposed to address the plaguing issues in the carabao sector that limits its growth and development. Some issues were addressed but majority of which, still need more efforts to unearth their solutions. In 2019, the following activities were undertaken by the PCC's Research & Development Division (RDD), its sections and units, with the aim of offering solutions to some of the challenges that threaten the stakeholders' engagement in pushing the carabao industry's progress as well as to enhance the capabilities of the research team of the agency.

## Completed and Ongoing Researches

The PCC has continued conducting researches in various disciplines and particular thematic areas as determined under the agency's R4D Agenda. Many of the researches have applied the concepts and methodologies in biotechnology. This is in keeping up with the designation of PCC by the Department of Agriculture as its lead agency for livestock biotechnology R&D. The latter is complemented by relevant researches that explore and address problems or issues that are being encountered in the course of the agency's implementation of the Carabao Development Program.

In 2019, 26 researches were completed while another 70 were still being conducted (Tables 7, 7a, 7b and 7c). These researches were also presented in the agency's Pre In-House and Annual R4D In-House Reviews held at the PCC National Headquarters.

**Table 7. Type, number, and status of researches.**

Thematic Areas	Completed	Ongoing
Production Management System	5	12
Biosafety	3	17
Genetic Improvement Animal Genomics/Genetic Diversity and Cryopreservation	6	10
Reproductive and Cryopreservation Techniques	4	18
Product Development	4	4
Enterprise Development	1	2
Socio-Economics Dimension of CDP	1	3
Technology Transfer	-	1
Environment and Climate Change	-	-
Industry and Policy	-	-
Institutional Development	2	3
<b>TOTAL</b>	<b>26</b>	<b>70</b>

**Table 7a. List of On-going Researches, CY 2019**

<b>Production Management System</b>		
1	Performance of dairy buffaloes fed ration with baker's yeast ( <i>Saccharomyces cerevisiae</i> ) – fermented cassava pulp	Gundolino P. Bajenting
2	Growth and Reproductive Performance of Dairy Buffalo heifer with Mineral Block and Locally Formulated Mineral Supplement	Gundolino P. Bajenting
3	Herbage Yield and Nutrient Composition of Five Improved Forage Grasses Applied with Biogas Sludge as Fertilizer	Virgilio G. Lopez
4	Establishment of Tropical Feed Library Utilizing Locally Available Feed Resources for Ruminant Production in the Philippines	Daniel L. Aquino
5	Effects of Chitosan from Shrimp Shells on the Growth and Yield in Forage Grasses	Reynaldo D. Amido
6	Development of Sustainable Rice Straw Management Practices and Technologies for Ruminant Fodder in the Philippines (RiceStrawPH) - PCC Component	Arnel N. Del Barrio
7	Nutritional Evaluation of Hydroponics Corn Fodder and its Effect as Substitute for Feed Concentrates for Feeding Buffalo Calves	Charity I. Castillo
8	Influence of Probiotic Bacteria Supplementation in the Growth Performance of Growing Calves	Charity I. Castillo
9	In vitro Digestibility of Rice Straw Treated with <i>Pleurotus florida</i>	Reynaldo D. Amido
10	Feeding Evaluation of Yellow Corn Sprouts as Supplements for Dairy Buffaloes in Transition Period to Peak Lactation	Manuel D. Gacutan
11	Characterization of bacterial microbiome across the gastrointestinal tract (GIT) of buffalo	Phoebe Llantada
12	Optimization of urea and molasses concentration in improving rice straw quality and digestibility as feedstock for ruminants	Charity Castillo

<b>Biosafety</b>		
	Gene Marker Identification Targeting Toll-like Receptor 4 (TLR4), Breast Cancer 1 (BRCA1), and Adenosine Triphosphatase 1 Alpha 1 (ATP1A1) Genes: Assessing Their Association with Subclinical Mastitis Cases in Dairy Water Buffaloes, <i>Bubalus bubalis</i>	
13	a. Molecular characterization and Gene Expression of TLR4 and MHC II- DRB3 genes in lactating water buffaloes and goats	Salvador S. Soquila/Claro N. Mingala
14	b. Molecular Characterization of TLR4 and MHC class II DRB3 genes in Cattle and their Association with the Occurrence of Subclinical Mastitis	Chester Libong/Claro N. Mingala
15	Bovine Vaccine Trial of <i>Schistosoma japonicum</i> Paramyosin	Claro N. Mingala
16	Isolation and Purification of Cathepsin L Proteinase and Paramyosin from Mature <i>Fasciola</i> spp.	Claro N. Mingala
17	Molecular Characterization of Lactic Acid Bacteria Isolated from Water Buffalo's Milk Functioning as Reservoirs of Mobile Antibiotic Resistance Genes	Claro N. Mingala
18	Molecular Characterization of <i>Coccidia</i> spp. in water buffaloes towards vaccine development	Lawrence P. Belotindos
19	Epidemiological Surveillance and Development of Diagnostic Protocols for Neglected Disease of Large Ruminants (Water Buffalo and Cattle) in the Philippines	Marvin A. Villanueva/ Biosafety and Environment Section
20	Hematology, Serum Chemistry and Treatment of <i>Trypanasoma evansi</i> -Infected Pigs Using Melarsomine Dihydrochloride (Cymelarsan)	Marvin A. Villanueva/ Biosafety and Environment Section

<b>Biosafety</b>		
21	Application of a Cheap, Sensitive, and Rapid Point of Care Diagnostic Kit for Brucellosis Detection in Water Buffalo	Joel Miguel
22	Surveillance and Characterization of Antimicrobial Resistant Escherichia coli and Salmonella from Livestock Farms, Milk and Meat in the Philippines	Claro N. Mingala
23	Development of Highly Sensitive Immunochromatographic Test Strip using Gold Nanoflowers for Staphylococcus aureus Detection in Milk	Leonard Paulo Luceros
24	Prevalence, Molecular Epidemiology and Antibiotic Resistance of Resistant Staphylococcus aureus (MRSA) from Milk and Nasal Samples of Dairy Buffaloes	Alona T. Badua/Claro N. Mingala
25	Philippines' Pilot Surveillance on the Extent of Antimicrobial Resistance of Commensal and Enteric Zoonotic Bacteria Isolated from Livestock and the Environment	Claro N. Mingala
26	In vivo application of mixed herbal medicine Shin Nakamori Juisan for the treatment of diarrheic domesticated animals	Gabriel Alexis SP. Tubalinal
27	Circulation of Leptospira in Wild Rodent and Livestock in Philippine and Serological Investigation of Leptospirosis in Domesticated Livestock	Gabriel Alexis SP. Tubalinal
28	Identification and Seasonal Abundance of Tabanid Flies (Tabanus spp.) (Diptera: Tabanidae) in Selected Dairy Buffalo Farms in Nueva Ecija, Philippines	Nancy S. Abes
29	Antibiotic Residue and Antibacterial Resistance Profile of Staphylococcus aureus and Escherichia coli from Raw Milk of Water Buffaloes (Bubalus bubalis) in Nueva Ecija, Philippines	Randolph Tolentino

<b>Genetic Improvement</b>		
<i>Animal Genomics/Genetic Diversity and Cryopreservation</i>		
30	Association of Bovine Genetic Markers with Marbling and Tenderness in Buffaloes (Bubalus bubalis)	Kristine Joy B. Prades
31	Molecular Characterization and Screening of $\beta$ -Casomorphin Gene ( $\beta$ -Casein Milk Variants) in Different Breeds of Buffaloes in the Philippines	Paulene S. Pineda
32	Screening for additional microsatellite markers for second stage validation protocol of parentage testing in buffaloes (Bubalus bubalis)	Melinda N. Reyes
33	Association of single nucleotide markers with estimated breeding values (EBVs) for milk yield and milk component traits of Philippine dairy buffaloes	Ester B. Flores
34	Evaluation of milk production performance of dairy buffaloes in selected cooperatives in Nueva Ecija	Gillanne G. Gantioque
35	Ultrasonographic Measurement of Carcass Traits in Male Buffaloes (Bubalus bubalis)	Kristine Joy B. Prades
36	Molecular Characterization and Polymorphism of Inhibin (INH $\beta$ A) Gene in Water Buffalo Bull	Sanny C. Babera
37	Genetic Diversity of the Philippine Carabao mtDNA (COI) and microsatellite markers (FAO STRs)	Lilian P. Villamor
38	Development of real-time ultrasound scanning and DNA markers selection protocols for meat, carcass and fertility traits of the Philippine native pigs	Ester B. Flores
39	Establishment of Reference Database on Genotypes of Crossbred Buffaloes using Combined Microsatellites and SNPs: What is the Percentage of Riverine Bloodline?	Lilian Villamor

<b>Genetic Improvement</b>		
<i>Reproductive and Cryopreservation Techniques</i>		
40	Establishment of Dairy Cattle Foundation Breeder Herd Thru ET Using Imported Pedigreed Frozen Embryos	Eufrocina dP. Atabay NDA
41	Intervention in Post-Partum Management to Improve Artificial Insemination Efficiency in Water Buffaloes	Bonifacia H. Granada
42	Improving Artificial Insemination Efficiencies using Fertility Indexed Bulls Selected by Fourier Harmonic Analysis and Screened from Environmental Instabilities	Peregrino Duran
	Optimizing Artificial Reproductive Technologies (Art) in Water Buffaloes Through the Regulation of Ovarian Function	Eufrocina dP. Atabay
43	b. In Vitro Embryo Production from OPU-derived Oocytes for Vitrification and Embryo Transfer in Water Buffaloes	
44	d. Validation of Ovulation Synchronization Protocols and Optimization of its Efficiency in Water Buffaloes	
45	e. Factors Affecting Efficiency of FTAI in Water Buffaloes	
46	The Kinetics of Sperm Penetration and Embryo development as Predictors of Fertility of Frozen Buffalo Semen	Excel Rio S. Maylem
47	Genetic Propagation of Girolando Dairy Cattle by Reproductive Techniques	Edwin C. Atabay
48	Production of Genetically Superior Goat/Sheep and Germplasm Cryopreservation Through Assisted Reproductive Techniques	Marlon B. Ocampo
49	Cryopreservation of Chicken Sperm for Cryobanking	Flocerfida P. Aquino
50	Early Pregnancy Diagnosis by Detection of Pregnancy-Associated Glycoproteins Using Various Biotechnologies in Water Buffaloes	Eufrocina P. Atabay
51	Genome analysis and establishment of germ cell cryopreservation for Philippine native pigs	Lerma C. Ocampo
52	Utilization of Epididymal sperm of slaughtered livestock for basic research using Assisted Reproductive techniques (ART's)	Lerma C. Ocampo
53	Networking of Heat Stress Related Genes for Thermotolerance Identification and Development of Reproduction Strategies for Climate Resilient Water Buffalo Production	Excel Rio S. Maylem
54	Gene Expression Analysis and Detection of Heat Shock Protein (HSP70) and its Correlation with Buffalo Semen Quality and Seasonal Variation	Excel Rio Maylem
55	The Use of Sex-Sorted Semen and Reproductive Biotechnologies in Enhancing Buffalo Dairy Production in the Philippines	Eufrocina dP. Atabay/In collaboration with Chunbok National University, Korea
56	Association of Expression of GDF-9, IGF-1, BMP-15 and FGF-10 Genes in Collected Blood on Fecundity in Bubalus bubalis	Hans Patrick D. Dumayas/ Peregrino G. Duran
57	Characterization of FBN1 mRNA and asprosin receptor abundance in water buffalo ovarian cells and its relation to follicular development	Excel Rio S. Maylem

<b>Product Development</b>		
58	Product Standardization Across Regional Centers of the Philippine Carabao Center	Mina P. Abella
59	Sensory, Physico-Chemical and Microbiological Assessments of Carabao's Milk Products of Dairy Box of the Catalanacan Multi-Purpose Cooperative (CAMPC)	Zosimo G. Battad II
60	Development of Mozzarella Cheese from Concentrated Skimmed Carabao's Milk	Ms. Mina P. Abella/UST
61	Development of Coconut-Water-Infused Carabao's Milk Products	Guillerma Abay-Abay/CTU

<b>Socio-Economics Dimension of CDP</b>		
62	Facebook Users' Knowledge, Attitude and Practices towards Consumption of Bohol Dairy Products influenced by Facebook Page	Leinefe B. Libres
63	Effects of Buffalo's Milk Compared with Cow's Milk on Growth Indices of 10-12 Years Old Girls: A Randomized Controlled Trial	Marivic S. Samson/Thelma A. Saludes
64	Analysis of Socioeconomic Dimensions Influencing the Carabao Development Program (CDP) Implementation in Southern Luzon	Thelma A. Saludes

<b>Technology Transfer</b>		
65	Extension Methods for Adoption of Dairy Buffalo Technology in Selected Barangays in Nueva Ecija and Ilocos Norte	Eric P. Palacpac/Erwin Valiente/Rovelyn Jacang

<b>Enterprise Development</b>		
66	Best management practices of a primary farmers' cooperative in Visayas: A case study on the organizational culture and performance of Lamac Multipurpose Cooperative (LMPC)	Leinefe B. Libres
67	Consumers' Preferences for dairy Buffalo milk and milk products in Bohol Tourism Areas: An Analysis on Market	Guillerma Abay-Abay

<b>Institutional Development</b>		
68	Developing the Intellectual Property and Technology Business Management (IP-TBM) Operations in Consortia Member Agencies – Batch 2 Project 5. Establishment of Intellectual Property and Technology Business Management (IP-TBM) in Philippine Carabao Center	Eufrocina dP. Atabay
69	Strengthening and Maximizing the research capability of the Livestock Biotechnology Center as Lead Coordinator of the Value Chain-Based Livestock Biotechnology Research, Development and Extension Agenda	Claro N. Mingala
70	Enhancing Livestock Sector Performance	Liza G. Battad

**Table 7b. List of Completed Researches, CY 2019.**

<b>Production Management System</b>		
1	Performance of Growing Buffalo Calves Fed with Mulato II Grass ( <i>Brachiaria</i> sp.) with or without Concentrate Supplementation	Lowell C. Paraguas
2	Characterization of Buffalo Gastrointestinal (GIT) Bacterial Microbiome Using PCR-Based Analysis	Phoebe Llantada
3	Development of Feeding Protocols and Practices to Support the Nutritional Requirements of Dairy Buffaloes	Daniel L. Aquino
4	Improving In Situ Digestibility of Native Improved Grasse Species through Urea-Treatment and Concentrate Supplementation in Cattle ( <i>Bos indicus</i> Linn.)	Ric B. Posas
5	Nutritive Value, Digestibility and Performance of Buffaloes Using Banana Stalks and Water Lily	Daniel L. Aquino

<b>Biosafety</b>		
6	Prevalence and risk factors of <i>Trypanosoma evansi</i> infection among water buffaloes in Ubay, Bohol, Philippines	Emerson P Tapdasan
7	Development of Health Care Technologies and Practical Farm Practices in Support of Increasing Buffalo Milk Production	Claro N. Mingala
8	Prevalence and Molecular Characterization of <i>Eimeria</i> spp. Among Caracalves in Water Buffalo Farms in Eastern Samar	Ivy Fe M. Lopez

<b>Genetic Improvement</b>		
<i>Animal Genomics/Genetic Diversity and Cryopreservation</i>		
9	Detection of Foreign Body in Rumen and Reticulum of Buffaloes ( <i>Bubalus bubalis</i> ) Using Ultrasonography	Kristine Joy B. Prades
10	Correlation of Meat Characteristics and Weight by Age Category of Philippine Swamp Buffalo ( <i>Bubalis bubalus</i> ) in Piat, Cagayan	Jennifer F. Maramba
11	Comparison of Animal Relationships and Milk Yield Breeding Values Obtained from Pedigree BLUP and Single-Step GBLUP in Philippine Dairy Buffaloes ( <i>Bubalus bubalis</i> )	Jesus Rommel V. Herrera
12	Utilization of DNA Marker Selection in Breeder and Commercial Farms (Genes related to fertility traits)	Ester B. Flores
13	Utilization of DNA marker Selection in Breeder and Commercial Farms (Genes related to meat quality)	Ester B. Flores
14	Microsatellite-Based Parentage Verification of Bovine Breeds in the Philippines	Melinda N. Reyes

<b>Genetic Improvement</b>		
<i>Reproductive and Cryopreservation Techniques</i>		
15	Early Pregnancy Diagnosis in Buffaloes through Detection of Pregnancy-Associated Glycoproteins (PAGs) in Milk using Enzyme-Linked Immunosorbent Assay	Danica D. Matias/Edwin C. Atabay
16	Determination of Pregnancy Associated-Glycoproteins (PAGs) during and after Pregnancy in Riverine Buffaloes ( <i>Bubalus bubalis</i> Linn.)	Lucia M. Rigos/Edwin C. Atabay
17	Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes	Edwin C. Atabay
18	Analysis of Technician and Farmer Factors Affecting Artificial Insemination Success Rate in Carabaos of Leyte Province, Philippines	Mary Jane Alacio/Ivy Fe M. Lopez

<b>Product Development</b>		
19	Physico-Chemical Properties and Sensory Characteristics of Fermented Whey Beverage	Mina P. Abella
20	Quality Characteristics of Flavored Dulce de Leche as Affected by Different Levels of Fat Content of Buffalo's Milk	Teresita P. Baltazar
21	Maintaining Quality of Milk Through Cooling of Milk Using Salt Ice Mixture	Ewy-Joe Antipuesto
22	Milk Quality and Safety Assurance from Farm to Milk Processing Plant	Mina P. Abella

<b>Socio-Economics Dimension of CDP</b>		
23	Factors Influencing the Customers Consumption Behavior and Customer Satisfaction on PCC's Fresh Milk and Choco Milk Products in VSU, Baybay City, Leyte	Lemuel Preciados/Johnson Royo

<b>Institutional Development</b>		
24	Operationalization of Livestock Biotechnology Center	Claro N. Mingala
25	Design and Fabrication of a Human-Powered Vacuum System for Milking Carabaos ( <i>Bubalus bubalis</i> ) and Cows ( <i>Bos taurus</i> )	Ron Paulo D. Cueto, et. al./ Cyril P. Baltazar

<b>Enterprise Development</b>		
26	Strengthening the San Agustin Crossbred Carabao-Based Enterprise Development (CBED) Model	Annabelle S. Sarabia

**Table 7c. List of Externally Funded and Collaborative Researches, CY 2019**

No.	Project Title	Project Leader	Funding Agency
1	Improving Artificial Insemination Efficiencies using Fertility Indexed Bulls Selected by Fourier Harmonic Analysis and Screened from Environmental Instabilities	Peregrino G. Duran	DA-Biotech
2	Strengthening and Maximizing the research capability of the Livestock Biotechnology Center as Lead Coordinator of the Value Chain Based Livestock Biotechnology Research, Development and Extension Agenda	Claro N. Mingala	DA-Biotech
3	Gene Expression Analysis and Detection of Heat Shock Protein (HSP70) and its Correlation with Buffalo Semen Quality and Seasonal Variation	Excel Rio Maylem	DA-Biotech
4	Genetic Diversity of the Philippine Carabao mtDNA (COI) and microsatellite markers (FAO STRs)	Lilian P. Villamor	DA-Biotech
5	Operationalization of Livestock Biotechnology Center	Claro N. Mingala	DA-Biotech
6	Utilization of Epididymal sperm of slaughtered livestock for basic research using Assisted Reproductive techniques (ART's)	Lerma C. Ocampo	DA-BAR
7	Development of Sustainable Rice Straw Management Practices and Technologies for Ruminant Fodder in the Philippines (RiceStrawPH) - PCC Component	Arnel N. Del Barrio	DA-BAR
8	Nutritive Value, Digestibility and Performance of Buffaloes Using Banana Stalks and Water Lily	Daniel L. Aquino	DA-BAR
9	Development of real-time ultrasound scanning and DNA markers selection protocols for meat, carcass and fertility traits of the Philippine native pigs	Ester B. Flores	PCAARRD
10	Establishment of Dairy Cattle Foundation Breeder Herd Thru ET Using Imported Pedigreed Frozen Embryos	Eufrocina dP. Atabay; NDA	PCAARRD
11	Genome analysis and establishment of germ cell cryopreservation for Philippine native pigs	Lerma C. Ocampo	PCAARRD
12	Developing the Intellectual Property and Technology Business Management (IP-TBM) Operations in Consortia Member Agencies – Batch 2 Project 5. Establishment of Intellectual Property and Technology Business Management (IP-TBM) in Philippine Carabao Center	Eufrocina dP. Atabay	PCAARRD
	Program Title: Enhancing Milk Production of Water Buffaloes through S&T Interventions	Arnel N. del Barrio	PCAARRD
13	Project 1: Development of Feeding Protocols and Practices to Support the Nutritional Requirement of Dairy Buffaloes	Daniel L. Aquino	
14	Project 2: Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes	Edwin C. Atabay	
15	Project 3: Development of Health Care Technologies and Practical Farm Practices in Support of Increasing Buffalo Milk Production	Claro N. Mingala	
16	Project 4: Milk Quality and Safety Assurance from Farm to Milk Processing Plant	Mina P. Abella	
17	Project 5: Strengthening San Agustin Crossbred Carabao-Based Enterprise Development (CBED) Model	Annabelle S. Sarabia	
18	Enhancing Livestock Sector Performance	Liza G. Battad	KOICA

## R4D Annual In-House Review

The PCC's R4D pre-in-house and in-house reviews were organized as a monitoring and evaluation tool that ensures alignment of R4D efforts with the R4D Agenda. It is a continuing activity that demonstrates and recognizes the PCC's research initiatives. Likewise, it helps create opportunities for researchers and scientists to present their notable accomplishments, and more importantly, to interact and share learning with one another.

The in-house review was held on July 3-5, 2019. There were 39 research studies presented, 11 of which were completed and 28 were on-going researches. The researches presented covered the thematic areas on biosafety, genetic improvement-reproductive biotechnology, genetic improvement – animal genomics, socio-economic dimensions of CDP implementation, production management system and product development. Moderators, who served during the paper presentations were (1) Ms. Jehan F. Nayga, (2) Mr. Reynald D. Amido, (3) Ms. Ms. Charlene Jade S. Cabral, (4) Ms. Riozel Joy S. Suratos, (4) Ms. Gillanne G. Gantioque and (5) Ms. Roseline D. Tadeo.

Four experts were topped and served as panel of external evaluators, namely, (1) Dr. Maria Excelsis M. Orden, Director, Research Office, Central Luzon State University; (2) Dr. Dr. Amado A. Angeles, Deputy Director, Animal and Dairy Sciences Cluster, University of the Philippines Los Baños; (3) Dr. Consuelo Amor S. Estrella, Associate Professor II, Animal and Dairy Sciences Cluster, University of the Philippines Los Baños; and (4) Dr. Ian Kendrick C. Fontanilla, Director, Institute of Biology, University of the Philippines Diliman.

Several awards were given during the activity. The completed research paper titled “Microsatellite-Based Parentage Verification of Bovine Breeds in the Philippines” presented by DMs. Melinda N. Reyes garnered the Best Paper Award. The presenter, Ms. Lilian P. Villamor, of the research paper entitled “Genetic Diversity of the Philippine Carabao using mtDNA (COI) and microsatellite markers (FAO STRs)” was conferred the Best Presenter Award. Moreover, the research paper entitled “Comparison of Animal Relationships and Milk Yield Breeding Values Obtained from Pedigree BLUP and Single-Step GBLUP in Philippine Dairy Buffaloes (*Bubalus bubalis*)” presented by Dr. Jesus Rommel V. Herrera, won the Best Student Thesis Award.

In addition, special awards were also given to recognize their notable contribution in the field of research. The Most Number of Approved Research Proposals for the Year 2019 award was given to Biosafety and Environment Section (BES) and Reproduction and Physiology Section (RPS). The Animal Breeding and Genomics Section captured the Most Number of Presentations during the R4D In-House Review 2019.

## Conference Presentations and Journal Publications

Consistent with the norm of sharing R4D outputs to wider research and scientific communities, the PCC researchers have actively participated in local and international scientific conferences (Table 8). There were 24 research papers published in refereed journals while 7 papers were included in scientific proceedings (Tables 9 and 10).

Table 8. Conferences, Seminars, Symposia, Workshops, and Trainings, CY 2019

Title	Venue	Date	No. of participants
Echo Seminar on IP Protection and Application	PCCNHQGP, Muñoz, Nueva Ecija	Jan 16, 2019	50
Forum on Procurement	PICC, Manila	Jan 24, 2019	1
Workshop on Recording, Reporting of PDEA Controlled Chemicals and OSCH Updates	Quezon City	Jan 24, 2019	3
Refresher Training for Enhancement of Driver Competence	PCCNHQGP, Muñoz, Nueva Ecija	Jan 30-31, 2019	5
7S Good Housekeeping and Hazard Communication	PCCNHQGP, Muñoz, Nueva Ecija	Feb 4, 2019	40
SCR Fertility and Cow Welfare	PCCNHQGP, Muñoz, Nueva Ecija	Feb 8, 2019	3
Seminar for Livestock and Aquaculture Industries on AMR Control	Pasay City	Feb 12, 2019	3

Table 8. Conferences, Seminars, Symposia, Workshops, and Trainings, CY 2019

Title	Venue	Date	No. of participants
USHS Science Fair	CLSU, Muñoz, Nueva Ecija	Feb 19, 2019	1
86th PVMA Convention and Scientific Conference	Iloilo City	Feb 20-22, 2019	7
Nanosensor: Gold Colorimetric Sensing Technology	PCCNHQGP, Muñoz, Nueva Ecija	Feb 21-23, 2019	14
Seminar on Biosafety and Biosecurity in the Molecular Microbiology Laboratory	Quezon City	Feb. 21, 2019	1
Biosafety and Biosecurity in the Molecular Microbiology Laboratory	Quezon City	Feb 21, 2019	2
NRCP Division 13th General Assembly	UPLB, Laguna	Feb 26, 2019	2
Seminar on Parasite Diversity and Symbiosis for Fasciola spp.	PCCNHQGP, Muñoz, Nueva Ecija	Feb 27, 2019	7
"Orientation on GAD and the Use of Social Network Analysis	PCCNHQGP, Muñoz, Nueva Ecija	Mar 8, 2019	49
NRCP Scientific Symposium and General Membership Assembly	PICC, Manila	Mar 11, 2019	8
International Conference on Schistosomiasis for Local Stakeholders	Alabang, Manila	Mar 12-13, 2019	1
On-site Validation of DA Biotech Program Supported Projects	Manila	Mar 12, 2019	2
Bioprocess Development for the Manufacture of Animals Vaccines and other Biologics	PCCNHQGP, Muñoz, Nueva Ecija	Mar 15, 2019	47
Technology Forum	PCCNHQGP, Muñoz, Nueva Ecija	Mar 26, 2019	60
PCC-RDD Pre In House Review	PCCNHQGP, Muñoz, Nueva Ecija	Mar 25, 2019	60
4th National Research and Development Conference	PICC, Manila	Apr 3, 2019	1
Safety in the Laboratory: Safe Handling of All Reagents as an Environmental Support	PCCNHQGP, Muñoz, Nueva Ecija	Apr 3, 2019	39
Seminar of Bio-pesticide management of pasture flies via push and pull strategy	DLSU, Manila	Apr 4, 2019	1
Seminar Workshop on Research Upgrading and Performance Evaluation: Strengthening the Scientific Foundation	PUP, Manila	Apr 10-11, 2019	1
National Training Workshop on Climate Change	Quezon City	Apr 23-26, 2019	1
CLSU Academic R&D Proposal Writeshop and Screening	CLIRDEC, CLSU, Muñoz, Nueva Ecija	Apr 24, 2019	1
Training on Integrating Digital Animal Weighing Scale and RFID/EID Reader for Buffaloes	PCCNHQGP, Muñoz, Nueva Ecija	Apr 24 -25, 2019	15
PSHS-CLC Science Fair 2019	Clark, Pampanga	Apr 29-30, 2019	1
1st Quarter DA GFPS Assessment and Workshop	General Luna, Siargao Islands, Surigao del Norte	Apr 29 – May 3, 2019	1

Table 8. Conferences, Seminars, Symposia, Workshops, and Trainings, CY 2019

Technical Caucus by ATI	CLIRDEC, CLSU, Muñoz, Nueva Ecija	Apr 30, 2019	6
Scientific Career System Orientation and Research Colloquium	CSU, Tuguegarao City, Cagayan	Apr 30, 2019	1
Molecular Analysis of Antimicrobial Resistant Enterobacteriaceae in the Philippines	PCCNHQGP, Muñoz, Nueva Ecija	May 8, 2019	32
Seminar on Epididymal Sperm Morphology of Philippine Native Buffalo and Pig	PCCNHQGP, Muñoz, Nueva Ecija	May 29, 2019	42
PCLAM Scientific Conference	Manila	May-19	1
Public Forum on Food Security	Manila	May-19	1
Food Safety Product Orientation	PCC NHQ	Jun-19	1
Hands-on Training on Statistics & Measurement Uncertainty in Chemical Analysis	Century Park, Manila	Jun 3-4, 2019	1
Training Workshop on Biosafety for Training Regulators	Acacia Hotel, Alabang, Muntinlupa City	Jun 3-7, 2019	1
Seminar Orientation for Technical Committees & Technical Working Groups for the Development of PNS		Jun 11, 2019	1
47th VPAP Scientific Conference	Crowne Plaza Manila Galleria, Pasig City	Jun 6-7, 2019	1
1st Philippine Smallhold Cattle Raisers Congress	PSAU, Magalang, Pampanga	Jun 19-20,2019	1
Halal Awareness Training	PCCNHQGP, Muñoz, Nueva Ecija	Jun 28, 2019	4
PCC R4D In House Review	PCCNHQGP, Muñoz, Nueva Ecija	Jul 3-5, 2019	60
7th National Congress and 2019 Philippine Agriculturists' Summit	PICC Complex, Pasay, Metro Manila	Jul 7-11, 2019	14
14th Annual Meeting and Scientific Convention, Outstanding Young Scientists, Inc.	Sofitel Philippine Plaza Manila	Jul 9, 2019	1
Gender Sensitivity Training and Workshop on Gender Analysis and GAD Tools	PCC National Headquarters and Genepool, Science City of Muñoz, Nueva Ecija	Jul 9-12, 2019	20
41st Annual Scientific Meeting of the National Academy of Science and Technology	Mandaluyong City	Jul 11, 2019	2
4th International Livestock Biotechnology Symposium	University of San Agustin, Iloilo City, Iloilo	Jul 15, 2019	31
Off-site Training Course on IMS Internal Auditing based on ISO 19011:2018	Savannah Hotel, Angeles, Pampanga	Jul 16-19, 2019	1
Effective Leadership Skills	DTI-Philippine Trade Training Center, Pasay City	Jul 31, 2019	1
Capability Building Training on GM Animals for Biotech Regulators	BSWM, Quezon City	Aug 6-8,2019	5
	PCCNHQGP, Muñoz, Nueva Ecija	Aug 27-29, 2019 Sept 10-12, 2019	10

Table 8. Conferences, Seminars, Symposia, Workshops, and Trainings, CY 2019

PSAS Visayas Chapter 37th PSAS Annual Scientific Seminar and Convention	Haiyan Peak Hotel and Resort, Bislig, Tanauan, Leyte	Aug 28-30, 2019	1
2019 NRCP Regional Basic Research Caravan	Pampanga	Aug 2019	1
14th Asian Reproductive Biotechnology Congress	Suranaree University of Technology, Nakhon Ratchasima, Thailand	Aug 19-23, 2019	7
3rd Quarter DA GFPS Meeting and Assessment Workshop	PCCNHQGP, Muñoz, Nueva Ecija	Aug 28-30, 2019	2
Hog Raising Seminar: Swine Genomics Technology	CLSU, Science City of Muñoz, Nueva Ecija	Sept 7, 2019	1
Seminar on Global Trends in Breeding Biotechnologies and Regulatory Approaches	Seda Hotel, Quezon City	Sept 11, 2019	1
Region III Caravan: “Forging strong partnerships for research programs development” in collaboration with Philippine Genome Center	PCCNHQGP, Muñoz, Nueva Ecija	Sept 13, 2019	20
12th World Buffalo Congress	Istanbul, Turkey	Sept 18-20, 2019	1
Global Regulatory Workshop on Plant and Animal Biotechnology Innovation	Brussels, Belgium	Sept 19-20, 2019	1
Seminar-workshop on Capacity Building of DA National and Specialized Laboratories	La Breza Hotel, Quezon City	Sept 25-27, 2019	2
Fulbright-Philippine Agriculture Alumni Association of the Philippines 2019 National Conference and Agri-Fishery Research and Development Festival	USEP, Davao City	Sept. 25-28, 2019	1
30th Regional Symposium on Research and Development Highlights, Central Luzon Agriculture, Aquatic and Resources Research and Development Consortium (CLAARRDEC)	Pampanga State Agricultural University, Magalang, Pampanga	Sept 27, 2019	2
1st National Training on Sheep Production and Reproductive Biotechnology	TAU, Camiling, Tarlac	Oct 4, 2019	1
1st National Genomics Conference	UP Diliman, Quezon City	Oct 10, 2019	7
International symposium on male fertility and semen cryopreservation techniques in domestic animals	Clark, Pampanga	Oct 14, 2019	47
56th PSAS Scientific Seminar and Annual Convention	Clark, Pampanga	Oct 14-17, 2019	51
31st National Research Symposium	The Sulo Riviera Hotel, Diliman, Quezon City	Oct 16, 2019	5
Stakeholders Consultation for the Development of PNS Code of Practice for Halal Dairy	North Edsa, QC	Oct 17, 2019	1
Food Safety Training Course	Manila	Oct 21-25, 2019	1
National Agricultural Cooperatives: Knowledge, Innovation and Trade Expo	Century Park Hotel, Malate, Manila	Oct 22-25, 2019	1

Table 8. Conferences, Seminars, Symposia, Workshops, and Trainings, CY 2019

Training Writeshop on Risk Management Plan	San Jose Del Monte, Bulacan	Oct 23, 2019	1
Refresher Course on Current Good Manufacturing Practices	PCCNHQGP, Muñoz, Nueva Ecija	Oct 24, 2019	19
Beginner Course on Hazard Analysis Critical Control Point	PCCNHQGP, Muñoz, Nueva Ecija	Oct 25, 2019	4
23rd AAABG Conference	University of New England Armidale New South Wales	Oct 27 –Nov 1, 2019	1
IMS Seminar Orientation/ Seminar on ISO 45001	PCCNHQGP, Muñoz, Nueva Ecija	Oct 29, 2019	3
Training on Meat Processing (KOICA)	PCCNHQGP, Muñoz, Nueva Ecija	Oct 29-31, 2019	2
Mentoring and Coaching on Ethical Leadership	Tagaytay City, Cavite	Nov 4-8, 2019	6
FDA QPIRA Training	Belle Vue Hotel, Alabang	Nov 7-8, 2019	1
46th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB)	The Manila Hotel, Philippines	Nov 12-15, 2019	6
SBFAP and ASBAP Year-End Meeting	Savannah Resort Hotel, Angeles City, Pampanga	Nov 13-15, 2019	1
5th National Carabao Conference	Maramag, Bukidnon	Nov14-15,2019	13
Precision technologies for Sustainable Agriculture and Health diet	Madison Hotel, Quezon City	Nov 20, 2019	1
Externally Funded Projects Year-End Performance Review	PCCNHQGP, Muñoz, Nueva Ecija	Nov 20-21,2019	40
Seminar on the use of Probiotics and Urea-Molasses			
Mineral Block	PCCNHQGP, Muñoz, Nueva Ecija	Nov 22, 2019	35
Seminar on Showcase of Advances in Biotech R&D in Aid of Agricultural Productivity	NKTI, Quezon City	Nov 28,2019	1
55th PAMET Annual Convention	PICC, Pasay City	Dec 2-4, 2019	1
2nd International Conference of the Japan Society for the Promotion of Science Alumni Association of the Philippines	Iloilo	Dec 5-6, 2019	1
Seminar of Strengthening Food Safety Management through Biotechnology Application	DA-OSEC Bldg, Quezon City	Dec 12, 2019	2
IBM SPSS On-site Training for PCC Researchers	PCCNHQGP, Muñoz, Nueva Ecija	Dec 13, 2019	25
DA GFPS Meeting and GAD Year-End Assessment Workshop	El Cielito Hotel, Baguio City	Dec 17-19, 2019	1

Table 9. Research articles published in refereed journals, CY 2019

Authors	Title of Paper	Title of Journal
Atabay EP, Fissore R, Fajardo Z, Atabay EC, Mingala CN, Tadeo R. 2019	Phospholipase C zeta 1 mRNA as a marker of oocyte-activation and fertilization potential of water buffalo ( <i>Bubalus bubalis</i> ) semen	2019. <i>Livestock Science</i> . 225: 103-108
Manalaysay JG, Antonio ND, Apilado RLR, Bambico JF, Mingala CN	Screening of the acid meat condition in the <i>rendement napole</i> gene using polymerase chain reaction-restriction fragment length polymorphism	2019. <i>Indonesian Journal of Agricultural Science</i> . 20(1): 29-34.
Medina NP, De Guia ACM, Venturina VM, Mingala CN	Molecular characterization of MHC II DRB3 gene of swamp- and riverine-type water buffaloes	2019. <i>Journal of Advanced Veterinary and Animal Research</i> . 6(3):308-314
Celestino EF, Gamboa JC, Mingala CN, Padiernos RBC, Uy MRD	Comparative molecular characterization of forkhead box protein 3 ( <i>FoxP3</i> ) gene of swamp-type ( <i>Bubalus carabanensis</i> ) and riverine-type ( <i>Bubalus bubalis</i> ) water buffaloes	2019. <i>Comparative Immunology, Microbiology and Infectious Diseases</i> 64:1-6
Balbin MM, Lazaro JV, Candelaria CR, Cuasay JG, Abes NS, Mingala CN	Evaluation of physico-chemical properties and nutrient components of dairy water buffalo ( <i>Bubalus bubalis</i> ) milk collected during early lactation	2019. <i>International Journal of Veterinary Medicine</i> , 2020, 9(1):24-29
Mingala CN, Wy AMP, Dela Cruz DG, Ermitanio ED, Gaban PB, Castro DP.	Alpha-2-Macroglobulin gene polymorphism in water buffaloes ( <i>Bubalus bubalis</i> ) with subclinical mastitis.	2019. <i>International Journal of Veterinary Medicine</i> , 2020, 9(1):116-120
Gariel R, EC Atabay	Effect of different PGF2 alpha analogues during synchronization of ovulation in dairy buffaloes	<i>Philipp J Vet and Animal Science</i> 2019; 45 (3):178-186.
Hufana-Duran D, PG Duran, EV Venturina, MDB Peralta, JJ Parrish	Predicting bull fertility by sperm nuclear shape in water buffalo ( <i>Bubalus bubalis</i> )	<i>Thai J Vet Med</i> 2019; 49(Supplement 2):78-81
Laruan LS, D Hufana-Duran, HDM Daag, RA Raterta, PG Duran	Efficiency of Buffalo Fetal Calf Serum on the production of Cattle Embryos in vitro	<i>Thai J Vet Med</i> 2019; 49(Supplement 2):24-27
Atabay EP, EC Atabay, ERS Maylem, RC Tilwani, EB Flores, AS Sarabia	Improved pregnancy in water buffaloes through synchronization of ovulation and fixed time AI technique	<i>Philipp J Vet Med</i> . 2019; 56(1):1-9
Ocampo MB, LC Ocampo, ICJ Dela Rosa, JOC Lofranco	Variation in Epididymal Sperm Morphometry of Philippine Carabao ( <i>Bubalus bubalis carabanensis</i> ) and Pig ( <i>Sus scrofa</i> )	<i>Thai J Vet Med</i> . 2019; 49(Supplement 2):67-70
Ocampo MB, MAJM Averilla, MBS Salinas, LC Ocampo	Quality and fertilizing ability of epididymal sperm from butchered Philippine carabao ( <i>Bubalus bubalis carabanensis</i> )	<i>Thai J Vet Med</i> . 2019; 49(Supplement 2):145-149.
Ocampo MB, PB Pedro, LC Ocampo	Relationships between testicular biometric traits and epididymal characteristics in Philippine carabao ( <i>Bubalus bubalis carabanensis</i> )	<i>Thai J Vet Med</i> 2019; 49(Supplement 2): 141-144
Atabay EC ,EP Atabay	Conception rate and embryonic loss in dairy cattle subjected to different FTAI protocols	<i>Thai J Vet Med</i> . 2019. 49 (Supplement 2):40-43
Atabay EP, EC Atabay, and K Imai	Induction of follicular wave emergence and multiple ovulation to produce Girolando ( <i>Bos indicus</i> ) embryos in vitro	<i>Thai J Vet Med</i> . 2019. 49 (Supplement 2):28-32
Ocampo LC, R Seralde, ICJ Dela Rosa, JO Lofranco, MB Ocampo, FP Aquino	Goat epididymal sperm survivability and fertility after storage at cryogenic temperature	<i>Thai J Vet Med</i> 2019; 49(Supplement 2):53-56
Ocampo LC, MB Ocampo, MM Victorio, MBS Salinas	Timing and Sequential Changes During the First Meiotic Division of Philippine Native Pig ( <i>Sus scrofa</i> ) Oocytes Cultured In Vitro	<i>Thai J Vet Med</i> . 2019;49(Supplement 2):85-87.

Table 9. Research articles published in refereed journals, CY 2019

Authors	Title of Paper	Title of Journal
Ocampo MB, LC Ocampo, NK Pardia, VD Viernes Jr.	Isolation and Characterization of Primordial Germ Cells (gPGC) of Selected Fowls in the Philippines	Thai J Vet Me. 2019:49(Supplement 2):88-91.
Ocampo MB, PB Pedro, LC Ocampo	Kinetics of Meiosis and embryogenesis of bovine, bubaline, and porcine oocytes matured and fertilized in vitro	Thai J Vet Med 2019; 49(Supplement 2): 133-137.
Ocampo LC, ICJ Dela Rosa, JOC Lofranco, FP Aquino, MB Ocampo	Epididymal Sperm Head Morphometry of Philippine Native Buffalo ( <i>Bubalus bubalis carabanensis</i> ) and Pig ( <i>Sus scrofa</i> )	Thai J Vet Med. 2019; 49(Supplement 2):129-132
Sakaguchi S, ERS Maylem, RC Tilwani, Y Yanagawa, S Katagiri, EC Atabay EP Atabay, and M Nagano	Effects of follicle-stimulating hormone followed by GnRH on embryo production by OPU and IVF in river buffaloes ( <i>Bubalus bubalis</i> )	Animal Science Journal 2019 May;90(5):690-695. doi:10.1111/asj.13196
Pineda PS, JD Delos Santos and EB Flores	Genetic Polymorphism of $\beta$ -Casein Exon 7 in Buffaloes ( <i>Bubalus bubalis</i> )	Research Note. Philippine Journal of Veterinary and Animal Science, 2019 45(3):197-202
Maramba JF, JAN Bautista, JT Dizon, EB Flores and AJ Salces	Growth Curve and Weight Estimates of Philippine Swamp Buffalo ( <i>Bubalus bubalis</i> Linn.) in Cagayan	Philippine Journal of Veterinary and Animal Science, 2019 45(1):58-74
Gautam K. Deb, Tadulker N. Nahar, Peregrino G. Duran and Giorgio A. Presicce	Safe and Sustainable Traditional Production: The Water Buffalo in Asia	Book: Frazzoli C, Mantovani A, eds. (2019). The Environment-Animal-Human Web: A "One Health" View of Toxicological Risk Analysis. Lausanne: Frontiers Media. doi: 10.3389/978-2-88945-791-5. Chapter 5. Food Safety in Low Income Countries. pp. 146-152

Table 10. Research articles published in scientific proceedings, CY 2019

Authors	Title of Paper	Title of Proceedings
L.P. Villamor, A.M. Paraguas, T.P.C. Cailipan, A.J.D.S. Escuadro, F.T. Rellin, M.A. Villanueva, M.M. Balbin, L.P. Belotindos, and E.B. Flores	Approaches to Swamp Buffalo Conservation in Calayan Island, Cagayan through Species Identification and Screening of Diseases	46th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB), The Manila Hotel, Philippines, November 12-15, 2019.
D Hufana-Duran, MT Peralta, EV Venturina, FA Venturina, PG Duran, FV Mamuad, HV Venturina and JJ Parrish	Selection of water buffalo bull by sperm nuclear shape and relationship to sperm in vitro fertility and Computer Assisted Sperm Analysis	Proceedings of the NAST Annual Meeting, Shangrila Hotel, Manila.
D Hufana-Duran, MT Peralta, EV Venturina, FA Venturina, PG Duran, FV Mamuad, HV Venturina and JJ Parrish	Predicting Bull Fertility by Sperm Nuclear Shape	Proceedings of the PSAS Annual Convention and Scientific Seminar

Table 10. Research articles published in scientific proceedings, CY 2019

Authors	Title of Paper	Title of Proceedings
D Hufana-Duran	The Scientific Career System of the National Academy of Science and Technology: A Path to a Fulfilling Scientific Career	Proceedings and Souvenir Program of the, Japan Society for the Promotion of Science Alumni Association of the Philippines 2nd International Research and Development Conference, Dec. 5-7, 2019, Marriott Hotel, Iloilo City. pp. 18
D Hufana-Duran	Biotechnology in Livestock Reproduction	Proceedings and Souvenir Program of the, Japan Society for the Promotion of Science Alumni Association of the Philippines 2nd International Research and Development Conference, Dec. 5-7, 2019, Marriott Hotel, Iloilo City. Pp.19
D Hufana-Duran	Targets and Prospects of Reproductive Biotechnology Research and Development and Extension in Livestock	Proceedings and Souvenir Program of the, Japan Society for the Promotion of Science Alumni Association of the Philippines 2nd International Research and Development Conference, Dec. 5-7, 2019, Marriott Hotel, Iloilo City. Pp. 20
PG Duran, D Hufana-Duran, MD Peralta, EV Venturina, FA Venturina, FV Mamuad, HV Venturina, and JJ Parrish	Efficiency of Fourier Harmonic Analysis in Predicting Fertility in Water Buffalo Bulls	Proceedings of the PSAS Annual Convention, CLARK, Pampanga

### ***Technical Seminars Conducted and/or Facilitated***

The R&D Division has conducted or facilitated series of Technical Caucus/Seminars on various topics (Table 11) with the help of concerned sections or units. Its aim was to improve and sustain awareness of PCC staff and other invited researchers and students from the academe and government institutions on technical matters and issues relevant to the livestock industry, in general and PCC operations, in particular.

Table 11. List of Technical Caucus/Seminars conducted for CY 2019.

Date (2019)	Title and/or Topic Presented	Resource Speaker
January 16	Echo Seminar on IP Protection and Application	Ms. CHARITY I. CASTILLO, Science Research Specialist I of PSNS-PCC  Dr. KRISTINE JOY B. PRADES, Senior Science Research Specialist of ABGS-PCC

Table 11. List of Technical Caucus/Seminars conducted for CY 2019.

<b>Date (2019)</b>	<b>Title and/or Topic Presented</b>	<b>Resource Speaker</b>
February 4	7S Good Housekeeping and Hazard Communication	Mr. RANDY P. UMALI, Division Manager of NCH
March 8	Orientation on GAD and the Use of Social Network Analysis	Dr. NOMER CANALETA ESMERO, Consultant (on-call) and Subject Expert (Asian Development Bank; The Food and Agriculture Office of the United Nations; Bureau of Fisheries and Aquatic Resources)
March 15	Bioprocess Development for the Manufacture of Animals Vaccines and other Biologics	Ms. ROWENA O. AGUILAR-SINO, Fermentation /Bioprocess Scientist
April 3	Safety in the Laboratory: Safe Handling of All Reagents as an Environmental Support	Mr. SYDNEY DOCE Ms. NONNETTE ALIMAN Ms. MA. GEMMA MENDOZA Ms. BEYNDA DIMAALA Ms. HANNA BRAZA Merck Life Science
April 30	Extension Concepts and Modalities	Ms. REINALYN C. GULEN, Agriculturist II ATI-RTC 3
May 8	Molecular Analysis of Antimicrobial Resistant Enterobacteriaceae in the Philippines	Dr. LAWRENCE P. BELOTINDOS, Science Research Specialist I of BES-PCC
May 29	Epididymal Sperm Morphology of Philippine Native Buffalo and Pig	Dr. MARLON B. OCAMPO, Supervising Science Research Specialist of RPS-PCC
September 24	On-going researches of Nagoya University related on regulatory mechanisms of reproductive functions in domestic goat and cattle	Dr. RYOKI TUTEBAYASHI Dr. SATOSHI OHKURA Dr. SHUICHI MATSUYAMA Dr. YASUHIRO Professors, Obihiro University, Japan
October 14	International Symposium on Male Fertility and Semen Cryopreservation Techniques	DR. PAWAN SINGH, Principal Scientist Head, Division of Livestock Production Management ICAR India DR. EUFROCINA P. ATABAY, Scientist I, PCC  MR. MATT DANIEL B. PERALTA, Science Research Specialist I, PCC  DR. LERMA C. OCAMPO, Senior Science Research Specialist, PCC  DR. KAZUHIRO KIKUCHI, Senior Principal Researcher, Institute of Agro-biological Sciences NARO  DR. SANTIAGO T. PEÑA, Head, Dept. of Veterinary Basic Sciences, College of Veterinary Medicine Visayas State University  DR. JONATHAN N. NAYGA, Professor, Animal Science Department, College of Agriculture, Isabela State University  DR. PONCIANO NOEL M. SOLIMAN III President, Philippine College of Ruminant Practitioners Tarlac City, Tarlac  DR. MING-CHE WU, Chief, Breeding and Genetics Section, Taiwan Livestock Research Institute

Table 11. List of Technical Caucus/Seminars conducted for CY 2019.

Date (2019)	Title and/or Topic Presented	Resource Speaker
October 24	Technical presentation of Neopharma Japan Co., Ltd	Mr. SHIN TANIGUCHI, Livestock Group Manager Ms. YOKO NOGUCHI, Technical Staff Ms. KIM SALVADOR, Brand Manager Neopharma Japan Co. Ltd.
November 22	The use of Probiotics and Urea-Molasses Mineral Block	DDr. EMI YOSHIDA, JOCV, National Dairy Authority, Negros Oriental Field Office Dr. ASUKA KUNISAWA, JOCV, National Impact Zone, Nueva Ecija

### Awards and Recognitions

The PCC staff members continued to gain recognition from various award-giving bodies in 2019 (Table 12a). Several PCC researchers were also cited in their paper or poster presentations in scientific conferences (Table 12b).

Table 12a. Recognitions received by PCC staff members.

Awardee	Title of Recognition	Award-Giving Body
Ms. Wilma T. del Rosario	CSC Pagasa Award	Civil Service Commission
Dr. Claro N. Mingala	Faces of Biotechnology	National Academy of Science and Technology (NAST)

Table 12b. Citations for PCC staff members who presented papers or posters in scientific conferences.

Awardee	Title of Recognition	Award-Giving Body
Ms. Lilian P. Villamor	Best Presenter, R4D in House Review 2019	Philippine Carabao Center
Dr. Danilda Hufana-Duran, Dr. Peregrino G. Duran, Mr. Matt Peralta, Ms. Emma Venturina, Ms. Fe Venturina, Hernando Venturina, Dr. Felomino V. Mamuad, Dr. John Parrish	Best Poster Award, 41st Annual Scientific Meeting	National Academy of Science and Technology (NAST)
Ms. Lilian P. Villamor, Dr. Ester B. Flores, Mr. Alexander M, Paraguas, Ms. Aivhie Jhoy D. Escuadro and Ms. Therese Patricka C. Cailipan	AFMA R&D Paper Award, Qualifier	DA-Bureau of Agricultural Research
Ms. Melinda N. Reyes	3rd place in the Scientific Poster Presentation	Philippine Society for Biochemistry and Molecular Biology (PSBMP)
Ms. Shanemae M. Rivera	2nd place in the Scientific Poster Presentation	Philippine Society for Biochemistry and Molecular Biology (PSBMP)
Dr. Eufrocina P. Atabay	1st Place – Best Poster Award, 2nd DOST-PCAARRD Technology Pitch Day	DOST-PCAARRD and Forest Products Research and Development Institute (FPRDI)

# Engagement of Youth in CDP

Recognizing the important role of youth as the next generation in sustaining continuous and further development of carabao-based and ancillary enterprises, the PCC has spearheaded the conduct of various learning events involving the youth in 2019. These are summarized below.

- Orientation on Lamac Cooperative Youth Planet Program (July 3-4, 2019, PCC National Headquarters)

High-performing cooperatives were invited to join this activity to explore the potential of developing a Cooperative-based Youth Program with Lamac Cooperative Youth Planet Program (LCYPP) framework and performance as reference. Each cooperative has the authority to facilitate learning, continuing education, and community service. This session provided an idea on how to support the younger generations and prepare them as second liners in sustaining the established cooperatives, its management, and operations. The PCC sees the youth as the next entrepreneurs not only focusing on livelihood management but also on the holistic development for their future, their families, and the community.

- General Assembly of Pilot Cooperatives' Youth Program Leaders and Managers (July 20, 2019, PCC National Headquarters)

The activity aimed to build rapport and create connection with the future youth leaders as the Youth Program commences towards the cooperatives' development and sustainability. This assembly was conducted to introduce the program, to familiarize them with one another, and to profile all the participants for the Youth Camp, which was held on August 24-26, 2019. This Youth program will later be adopted and be established by each Pilot Cooperative to support the PCC's goal for the improvement of its clients leading to growth and self-sufficiency.

- Youth Camp: PCC Youth Development Program (August 24-26, 2019, PCC National Headquarters)

Initial participants included 49 youth leaders and 4 Youth Program Managers from 4 pilot cooperatives.

## Highlights of the Event:

### a. Youth Camp

The camp inculcated the value and principles of the cooperative movement to the youth and helped build individual character, confidence, and leadership skills as a way of preparing them to be the next line leaders.

### b. Family Camp

The camp gave quality time for the family to bond with other carapreneur families through fun-learning activities. It encouraged the parents to actively involve their children in their family business.

### c. Youth Talk

A short discussion on Self-Mastery for the youth to know themselves better was conducted. There was also an activity on personal SWOT analysis, which helped them realize their own strengths, weaknesses, opportunities and threats, which will help them become the potential frontliners in the dairy industry.

### d. Team-Building Activities

Outdoor activities were facilitated to unlock their leadership and communication skills. Through this activity, responsible youth leaders were expected to be developed for the promotion and growth of the youth cooperative.

### e. Short Courses (Entrepreneurial Activity and Talent Workshop)

Specific courses were conducted to discover their talents and their capabilities in entrepreneurship. These included singing, dancing, toastmastering, and cooking.

### f. Solidarity Night

### g. Fam-Bond

### h. Sharing of Family Champions

This involved sharing of successful carapreneur family stories to inspire the other families to invest in the dairy business and altogether bring the industry into greater heights.



## Integrated Management System

The PCC successfully passed the surveillance audit that maintained PCC National Headquarters and Gene Pool's IMS Certification based on ISO 9001:2015; ISO 14001:2015 and OHSAS 18001:2007 Standards. Corollary to this, the PCC's Management Systems Audit Office (MSAO) had conducted two (2) batches of Internal Audits covering both core and support processes. The conduct of Internal audits generated a very satisfactory (4.38) rating through a structured survey conducted after each audit. Moreover, performance of individual auditors was monitored to identify areas needing improvement, determine appropriate actions and measure its effectiveness.

The PCC also maintained its zero major accident status by implementing control measures in accordance with the requirements of OHSAS 18001:2007 (Occupational Health and Safety Management System) and 100% compliance to Legal and Other Requirements (LOR) subscribed by PCC. Other activities that contributed to this status are conduct of monthly Safety Inspections in the workplaces enabling concerned officers/ staff to act on hazardous conditions or those that are perceived not in accordance with Occupational Health and Safety Standards. Regular work environment measurement (WEM) and emergency drills were also consistently done.

Socio-ecological responsibility, on the other hand was expressed in terms of maintaining valid permits from the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR). These permits and licenses were granted to PCC National Headquarters and Gene Pool after confirming that no pollutant is irresponsibly released either to land, water, or air that could cause ozone depletion.



## Information Management System

The PCC's Information and Communication Technologies Section (ICTS) through the approved Information System Strategic Plan (ISSP) 2018-2020 from the Medium-Term Information and Communications Technology Harmonization Initiative (MITHI) fund facilitated the development and operationalization of the Management Information System for Buffaloes (MISBuff) as part of the online Buffalo Integrated Database System (BIDS) in coordination with the Animal Breeding and Genomics Section. The ICTS has enhanced the online Intensified Research-based Enterprise Build-up (iREB) Dashboard System as a tool for analysis on the client/farmer aspects as well as the Major Final Output (MFO) dashboard as a means to measure the agency's physical targets and budget utilization.

The ICTS continuously enhanced and upgraded several Desktops, Central Processing Units (CPUs) and laptops, servers at the PCC operating units/section and regional centers with the assistance of (MITHI) fund. The acquisition and upgrading of 100 computers and other ICT peripherals has ensured making workstations up-to-date. Continuous maintenance and patch upgrading of Windows Server Data Center 2019 edition Operating System, SOPHOS Firewall, Secure Socket Layer (SSL) Microsoft Windows 10 32 and 64-bit Operating System and Microsoft Office 2019, Microsoft Exchange 2019 was also achieved.

The ICTS in coordination with the General Services Section facilitated in the replacement of the PCC private automatic branch exchange (PABX) Telephone System and additional 140 nodes of internet data outlets at the Livestock Innovations and Biotechnology complex. Likewise, it continuously assisted in the deployment and maintenance of the newly enhanced Information System of the Electronic National Government Accounting System (e-NGAS) v2.01 to the PCC headquarters and regional centers and the introduction of the COA-led Budget System v1.0.

Regular updating of Symantec End Point Protection Server and Client-based anti-virus were conducted to ensure a virus-free Local Area Network (LAN). This also ensures protection to all computer units joined in the LAN- Active Directory from any fortuitous computer viruses.

# Budget and Finance Management

The PCC has continued its commitments to public expenditures management reform objectives of the government. These commitments were translated in the operating budget of PCC for FY 2019, specifically addressing the following critical areas of the agency financial management system:

- a. **Fiscal discipline.** As a matter of policy, all operating units of the agency are expected to exercise due care and prudence in spending government funds. Effective measures were instituted to ensure prevention of excessive and unconscionable expenditures. All programmed expenditures are aligned to the strategic priorities of the agency.
- b. **Fund management effectiveness.** Consistent with the public financial management reform roadmap of the government, the PCC has continued to enhance the adoption of the Unified Accounts Code Structure (UACS) system across the regional centers. The UACS provides a harmonized budgetary and accounting code classification that will facilitate the efficient and accurate financial reporting of actual revenue collections and expenditures of the center. The institutionalization of the UACS system across the PCC networks has improved the internal controls and risk management through streamlined and simplified financial reporting that redounds to the improvement of transparency and accountability in expenditure management.
- c. **Operational effectiveness.** Enhancement of the engagement of the agency's program implementers/the ground personnel/ frontline service provider in the budget preparation process was pursued in 2019. Consultative mechanism was introduced across partners and key stakeholders in the budget cycle as well during the implementation of the programs.

Budgetary requirements of the operating units of the center were provided on time and in accordance with the approved plans. Appropriate administrative policies, procedures and processes were also implemented to enhance transparency of operation and minimize lead time in the procurement of critical goods and services.

## *Highlights of FY 2019 Budgetary Expenditures*

The FY 2019 PCC expenditures were focused on its 5th and final year, as its medium-term strategy to sustain its commitment to iREB (intensified research-based enterprise build-up) as the lead R&D agency for Livestock Biotechnology and Enterprise Development. Through iREB, PCC shall pursue more emphasized approach in showcasing the relevance and effects of development strategies on genetic improvement and effort in Carabao-based enterprise development to emerging Carabao-based entrepreneurs across the value chain to expand initiatives and creatively prompt partners' toward an 'Intensified Research-Based Enterprise Build-up'. The major focused is to sustain its endeavors in the implementation of more organized and wide-scale genetic improvement program, systematic extension and technology delivery, and creation of favorable environment for enterprise development. This is anchored on strengthened human resource competencies and growing linkages and active partnership. iREB's felt effect is seen at the community level were dairy production bases composed of smallholder farming families achieve expanded supply chain for milk from genetically improved Carabaos and increasing incomes from Carabao-based enterprises from organized groups through value adding wider market reach.

Major strategies were undertaken to effectively manage program output and outcome at the sectoral level. Thus, the PCC's engagement in the conduct of meaningful R4D is fully supported side by side with equally capable partner to render focused efforts on solutions to industry issues and problems. Specifically, this concerns cohesive efforts to genetic improvement, technology development, and exhibition of competitive Carabao-Based Enterprise (CBE) models. The PCC sustains its pragmatism aligned with conduct researches for development strategies and programs to develop the Philippine Dairy Breed through intensified participation of partners in upgrading the buffaloes across farming communities. This shall be complemented by genetic evaluation system performance and pedigree data management system and continued capacity build-up of supply chain players and reactivation of actors along the value-chain to improve the market reach of carabao-based products.

In FY 2019, PCC implemented two locally funded projects amounting to PHP185 million. These are the establishment of Carabao-based Business Improvement Network (CBIN) and the establishment of Carabao Industry Hub in Antique province. The CBIN covers 16 provinces to propel an inclusive, sustainable, and highly competitive local dairy industry while the establishment of Carabao Industry Hub will help empower the dairy farmers in Antique province. These projects are good initiative to empower the private sector, especially cooperatives, and enhance their important role in industry growth and poverty reduction.

## Sources and Usage of Funds

The agency's main sources of funds to support its operation are provided by the national government through the General Appropriation Act (GAA). Table 13 presents the details of allotment and utilization.

**Table 13. PCC Sources and Utilization of Funds as of December 31, 2019 (PHP Million)**

Fund Source	Authorized Allotment	Obligation Incurred	% Utilization
<b>GAA-Current</b>	<b>674.48</b>	<b>672.35</b>	<b>99.7%</b>
Personnel Services	140.08	139.78	99.8%
Maintenance & Other Operating Expenses	378.42	377.05	99.6%
Financial Expenses	0.05	0.00	0.0%
Capital Outlay	155.93	155.52	99.7%
<b>Revolving Fund- Dairy Business Module &amp; Income from PCC Hostel facilities</b>	<b>299.66</b>	<b>154.18</b>	<b>51.5%</b>
<b>Externally funded projects</b>	<b>84.77</b>	<b>70.68</b>	<b>83.4%</b>
<b>Foreign Assisted Projects</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>TOTAL</b>	<b>1,058.91</b>	<b>897.21</b>	<b>84.7%</b>

Externally funded projects funds are the receipts of research funds from various government agencies. Project funds utilization is mainly on the maintenance and operating requirements of the project.

## PCC's Financial Condition

Table 14 presents the PCC's Statement of Financial Position at the end of FY 2019. The PCC's total assets as of December 31, 2019 are PHP1,960.29 million comprising mainly of the agency Property, Plant & Equipment (PPE) and Biological assets. The new standard for accounting for biological assets as per Philippine Public Sector Accounting Standards affected the decrease in agency's biological assets. The decrease by 12% or 21.6 million is the effect of transfer of animal ownership to farmer-beneficiaries, dropping of dead animals, and revaluation of the cost animals at fair value less cost to sell. Total liabilities posted PHP187.72 million and total accumulated surplus reached PHP1,772.57 million. The decrease in liabilities represents expenditures of funds from the externally funded projects completed this 2019.

**Table 14. Statement of Financial Position as of December 31 (PHP Million)**

Particulars	FY 2019	FY 2018	% Change
<b>Assets</b>			
Current Assets	714.41	625.16	14%
Property, Plant & Equipment	1,088.8	1,048.44	4%
Biological Assets	153.61	175.21	(12%)
Other Assets	3.47	3.91	(11%)
<b>Total Assets</b>	<b>1,960.29</b>	<b>1,852.72</b>	<b>6%</b>
<b>Liabilities</b>			
Accumulated Surplus (Deficit)	1,772.57	1,611.04	10%
<b>Total Liabilities &amp; Gov. Equity</b>	<b>1,960.29</b>	<b>1,852.72</b>	<b>(6%)</b>

Table 15 presents the PCC's Statement of Financial Performance for the year end FY 2019. The PCC's total revenue for the year reached Php206.92 million comprising mainly of the business income from the sales of milk, meat, live animals, and other by-products as a consequence of the operation of the institutional dairy business module of the regional centers and Milka Krem and income from PCC Hostel training hall and accommodation. These incomes represent the revolving fund of the agency.

Personnel services expenses posted Php141.80 million, while total maintenance and other operating expenses including other expenses is Php591.9 million giving a deficit from current operation of Php526.78 million. The increase in personnel services is due to the 4th tranche implementation of the Salary Standardization Law of 2016, payment of hazard pay and laundry allowance for CY 2019 under RA No. 8439, and Service Recognition Incentive under AO no. 19. The significant increase by 162% of the other income and donations is due to the recognition of gain from changes in fair value less costs to sell of biological assets due to physical change, gain on sale of agricultural produce and gain on initial recognition of agricultural produce. The posted surplus of 152.15 million for the period is attributed to the increase subsidy from the national government due to the locally funded project budgeted at 185 million, increase in income generated out of the revolving fund and gain of recognition of agricultural produce mentioned earlier.

**Table 15. Statement of Financial Performance for the period ending of December 31 (PHP Million)**

Particulars	FY 2019	FY 2018	% Change
<b>Revenue</b>			
Business Income	121.16	114.14	6%
Other Income & Donations	85.76	32.79	162%
<b>Total Revenue</b>	<b>206.92</b>	<b>146.93</b>	<b>41%</b>
<b>Current Operating Expenses</b>			
Personnel Services	141.80	124.76	14%
Maintenance & Other Operating Expenses	456.50	429.04	6%
Financial & Non-Cash Expenses	135.40	104.55	30%
<b>Total Current Operating Expenses</b>	<b>733.70</b>	<b>658.35</b>	<b>11%</b>
<b>Surplus (Deficit) from Current Operation</b>	<b>(526.78)</b>	<b>(511.42)</b>	<b>3%</b>
<b>Assistance and Subsidy</b>	<b>682.96</b>	<b>481.28</b>	<b>42%</b>
<b>Gain/(Loss) of Assets</b>	<b>(4.03)</b>	<b>(6.23)</b>	<b>(35%)</b>
<b>Surplus (Deficit) for the period</b>	<b>152.15</b>	<b>36.37</b>	<b>318%</b>

### *Recognition and Awards*

- The PCC has been awarded as 3rd place among DA operating units in cash utilization. With a total unused Notice of Cash Allocation (NCA) balance of only Php446.24 for FY 2019, the Philippine Carabao Center (PCC) ranked third among the 31 different operating units of the Department of Agriculture (DA) in terms of the usage of NCA, which was awarded during the FY 2019 DA Year-End Financial Evaluation and Assessment Workshop last January 27-31, 2020 held in Iloilo City.
- The PCC also bagged the 'Gallantry Award' for efficient financial management. The recognition called the "eNGAS/eBudget System Gallantry Award" was given during the GFMIC's 11th Annual National Convention held last June 18-21, 2019 at The Legend Palawan Hotel, Puerto Princesa City, Palawan. The said award is given to government agencies that consistently use the eNGAS and eBudget and have succeeded in rolling-out to their operating units across the Philippines.

## IV. Ways Forward

The PCC's Strategic Plan 2020-2025 is the last phase of the agency's Strategic Plan 2010-2025 titled "Propelling PCC towards a Dynamic Carabao Sectoral Development". It shall focus on value-creating innovations in response to clients' needs with the theme "Value-creating Innovations to Improve Productivity, Profitability, and Sustainability" (VIPS) of carabao-based enterprises. This will be achieved by enhancing programs and technology innovations to expand production base, value chain enterprise improvement, and organizational capability-building to be responsive to a broader industry need.

- There will be new strategies for each program component of the Carabao Development Program (CDP).
- Aside from artificial insemination (AI) and natural mating of carabaos via Bull Entrustment, the CDP's Genetic Improvement Program (GIP) component will utilize a service delivery system dubbed "Carabao Herd Improvement Program Services" or CHIPS. The latter will allow organized data gathering, analysis, and feedback system so that participating farms can have basis for understanding the need to improve animal and herd performance and make necessary decision that would lead to increased profitability and better income.
- Carabao-Based Enterprise (CBE) Development will banner Carabao Value Chain Improvement Service or CVIS. The main goal of CVIS is to (1) harness organizational capacity, business performance, and leadership of existing organized groups as cooperative conduits of emerging family businesses; (2) expand CDP's reach thru the creation of province-wide CBE impact models; and (3) build clients' investment confidence, credit literacy, access, and accountability and insurance habits.
- The agency's extension and advisory services or EAS (focused on animal health, animal breeding, animal nutrition, among others) will be digitized by way of developing learning modules in digital video format as well as developing mobile applications or EAS information systems for use by a cadre of knowledge brokers (PCC, LGU, private technicians, and progressive dairy buffalo farmers).
- Research and Development will utilize the Research for Development and Innovation System or R4DIS. This will scale up the R&D nexus in support of clients' productivity thru modeling research solutions across impact areas to include the following:
  - a. Increasing Farm Productivity
  - b. Increased Adoption Rate of Farm-based practices
  - c. Product Development
  - d. Business Development

### MFO ACCOUNTABILITY REPORT CARD (MARC)

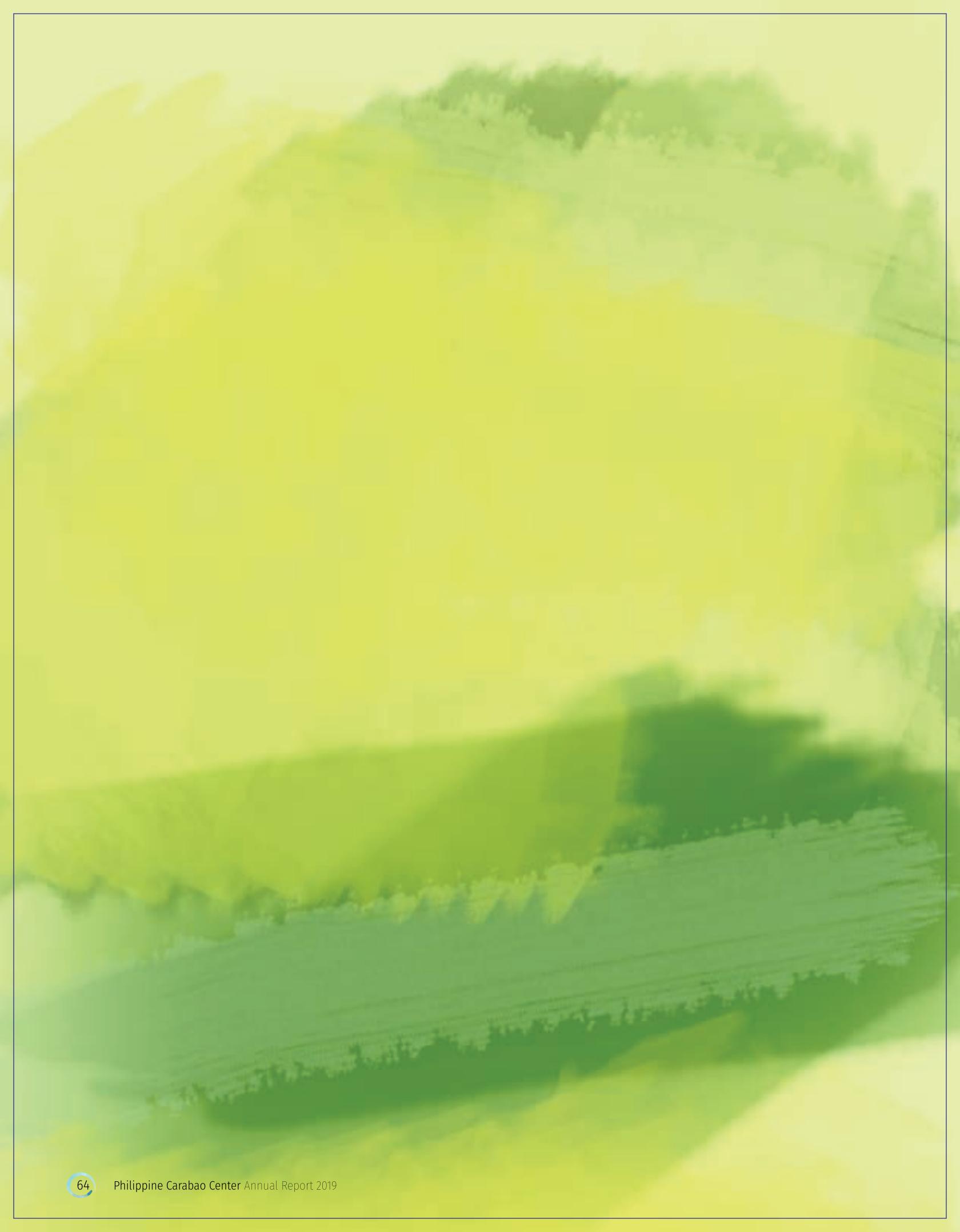
MFO/ Performance Indicator		FORWARD ESTIMATES					
MFO Technical Support Services		2020	2021	2022	2023	2024	2025
PI Set 1	1.1 Production Support Services	Improvement of genetic potential of carabaos for milk and meat thru organized breeding & selection (artificial insemination, natural mating) conduct of R&D and related production support activities					
Quantity:	1.1.1 Clients directly provided with support services	250,000	260,000	270,000	280,000	290,000	300,000
	Production Support Services provided to clients (AI only)	87,327	100,426	115,490	132,813	152,735	175,646
	AI Efficiency (Calving rate) at the client level	25%	27%	29%	31%	33%	35%
Quality:	1.1.2 Percent of clients that rated the production support services as satisfactory or better	95%	95%	95%	95%	95%	95%
Timeliness	1.1.3 Percent of farmers' requests for technical assistance responded to within 3 days	95%	95%	95%	95%	95%	95%
	1.1.4 ROI of Institutional Herd	Increase of 10% or break-even	Increase of 10% or break-even	Increase of 10% or break-even	Increase of 10% or break-even	Increase of 10% or break-even	Increase of 10% or break-even

### MFO ACCOUNTABILITY REPORT CARD (MARC)

MFO/ Performance Indicator		FORWARD ESTIMATES					
MFO Technical Support Services		2020	2021	2022	2023	2024	2025
PI Set 2	1.2 Market Support Services	Provision of market and marketing related services among Value Chain to CDP clients to facilitate value-adding among CDP clients					
Quantity:	1.2.1 No. of Entrepreneurs provided with market development services	200	200	200	200	200	200
Quality:	1.2.2 Volume of production traded (kgs.)	4,274,204	4,915,334	5,652,635	6,500,530	7,475,610	8,596,951
	1.2.3 Value of milk production traded	283,752,056	326,314,865	375,262,094	431,551,408	496,284,119	570,726,737
	1.2.4 ROI of PMO	at least 25%	at least 25%	at least 25%	at least 25%	at least 25%	at least 25%
	1.2.4 ROI of Organized Groups	at least 25%	at least 25%	at least 25%	at least 25%	at least 25%	at least 25%

### MFO ACCOUNTABILITY REPORT CARD (MARC)

MFO/ Performance Indicator		FORWARD ESTIMATES					
MFO Technical Support Services		2020	2021	2022	2023	2024	2025
PI Set 3	1.3 Extension Support, Education and Training Services	Enhance the Carabao related business skills of clients to elicit their active participation to the CDP					
Quantity:	1.3.1 No. of Individuals provided with ESETS	16,986	18,685	20,553	22,609	24,869	27,356
Quality:	1.3.2 Percent of clients that rated ESETS as satisfactory or better	90%	90%	90%	90%	90%	90%
PI Set 4	1.4 Research for Development	Technology development and transfer to address productivity & profitability of CBEs					
Quantity:	1.4.1 No. of Technologies Commercialized	7	8	8	12	12	13
Quality:	1.4.2 No. of Technologies developed/optimized/improved	18	20	27	28	29	29
	1.4.3 IP application filed	12	11	12	15	13	14



## *V. Success Stories*

**(selections from the 2019 “Faces of Success in Carapreneurship” Coffee Table Book)**

# Dairy buffalo raising: A farming couple's stairway to success

by Ma. Cecilia Irang and Anselmo Roque

The couple's devotion for their animals has proved to bring them good fortune. Thanks to "Freda", "Zeny" and "Ola", the couple's daughter Princess has finished a civil engineering course and son Freddie, a degree in agriculture and soon after were gainfully employed. The other son, Alexander, is a welder.

In 2017, Victoriano was bestowed "Outstanding Dairy Buffalo Farmer (Family Module Category)" by PCC during its 3rd NCC.

The award was given in recognition of the couple's good farm practices and animal management resulting in good body condition scores and high milk production of their buffaloes. In that same year, they were able to collect an average of 8 liters per day from one buffalo. That generated a monthly income of Php70,000 from their five lactating buffaloes.





**A farming couple, Victoriano and Dominga Dumale, of barangay Licaong, Science City of Muñoz in Nueva Ecija, was known to many in their village for literally sleeping in pen where their buffaloes are sheltered.**

What's their reason behind the odd practice? "To make sure that our animals can stay healthy, discourage attempts in rustling, and make sure that the returns we will gain is much more," they chorused.

According to Victoriano and Dominga, they treat their buffaloes as their children. That is why they give them their rigid attention.

Victoriano said that he feeds their animal every two hours at night to ensure that their nutritional needs are met.

The couple does not leave the corral even during storm, a practice which has drawn the mockery of neighbors.

"I don't mind them. After all... I earn at least Php15,000 every 15 days from the milk's proceeds," Victoriano said.

The 61-year-old dairy farmer shared the difficult life that he and his family had endured before. According to him, they had to resort to acquiring loans in order to cope with their needs.

Then he got wind of the sure benefits that buffalo dairying bestow on the raisers.

In 1989, after their wedding, Victoriano relied on producing rice at his 3,500-square-meter farm during the rainy season and onions during the dry season. Dominga served as housekeeper for a boarding house and accepted laundry jobs on the sideline.

"I used to harvest 45 cavans of palay and earned Php10,000 from the onion crop," Victoriano says. "Certainly it was not enough for us," he added.

In 2010, Victoriano learned that PCC was providing dairy buffaloes through a "paiwi" (consignment) contract to prospective farmer-trustees. He joined a dairy cooperative and was provided with a Brazilian Murrah buffalo.

He joyfully revealed that he even named the buffalo "Freda", which was taken from the name of his son, Freddie Boy, and treated it like their own family member.

Freda did not fail Victoriano's expectations. Within a year, it gave birth. In four months, his total earnings from the animal's milk amounted to Php68,000.

In 2011, Victoriano decided to expand his venture. He acquired two more water buffaloes from PCC and named them "Zeny" and "Ola". He said the name just came out of the blue.

Later on, the bamboo and cogon grass barn they provided for their animals were replaced by a concrete corral. They also acquired a water pump and other pieces of dairy machines to efficiently carry out their farm works.

Currently, the family owns a herd of 13, five of which are lactating and are expected to provide more income in the coming months.

The Dumale couple has become "a living testimony that investing good intentions and proper management-practices in rearing dairy animals will surely reap good rewards in due time".

# Buffalo farming paves way for closer family ties plus economic benefits, too

by Charlene Corpuz

**Being a member of Pao Producers Cooperative in Lupao, Nueva Ecija, Roderick Tallar, together with his wife Shirley, fulfilled PCC's requirements and had availed of two Brazilian Murrah buffaloes under the agency's dairy buffalo module in 2010. A year after, another dairy buffalo, which was pregnant at that time, was entrusted to them. They got lucky since they joined the program even when they had to encounter challenges along the way, which almost made them quit.**

Among these challenges were the long waiting time until the buffaloes got pregnant, mortality in calves and one case of prolapse.

Their faith, though, in the importance of the program, made them continue on in the venture.

When the Tallars finally started harvesting milk from their lactating animal and gaining income, all that they mutter was: "There is really an absolute truth to what other successful dairy farmers say. There is, indeed, income in dairying!"

For Roderick, he averred that whatever attention, care and investment you give to your dairy buffaloes will be returned to you in greater benefits.

Roderick and Shirley strived to improve their animal housing, forage area, and their management practices. As they gained better understanding of the dairy buffalo production system, they adopted more of the technologies introduced by PCC. At present, they have 19 buffaloes, nine of which are female, one is a bull and nine are calves. Their eight lactating buffaloes give them an average of 55 liters of milk a day sold at Php68 per liter.

In a month, they have a total net income of about Php56,000.

Shirley is in charge of a very important task in the business as she takes care of record-keeping and budgeting the family's income making sure that they save a good portion for their future needs.

Sons Gian Carlo and John Michael also have a very important part in the farm business. Right after their respective classes in school, they either cut and carry grasses to feed the animals or clean the pens. The youngest, Jheron, on the other hand, helps provide clean drinking water to their animals.





**“Since we started rearing and milking dairy buffaloes, we have nothing but gratefulness that we engaged in this business. Aside from having a reason to bond as a family, we are now living a comfortable life”.**

**-Roderick Tallar**  
Member, Pao Producers Cooperative

# Fated to be a successful VBAIT

by Charlene Corpuz

**Eduardo M. dela Cruz, Jr. of San Miguel, Bulacan is a graduate of Bulacan State University (BSU) with the degree Bachelor of Science in Agriculture in 1997. He worked as a para veterinarian for an RP-German project based in BSU from 1998 to 2001.**

He also worked as animal health technician in Saudi Arabia from 2001 to 2006.

After his stint abroad, he went back to his native land and not long after learned about the AI Program of PCC. He then decided to undergo training on Basic AI and Pregnancy Diagnosis in Water Buffaloes.

After his training, he became an active VBAIT covering the nearby towns in Bulacan including a city in Nueva Ecija and in Tarlac. Currently, he has 400 farmer-clients who own buffaloes being submitted to AI.

He describes the AI program as a sustainable source of income as proven by the improved life that they are now living as a family compared to the years he spent as an Overseas Filipino Worker (OFW).

He revealed that he is earning an average monthly income of

Php30,000 as a VBAIT. With his earnings, he already had their house improved and they are able to purchase two motorcycles and other vehicles.

Eduardo said the key to being an effective VBAIT is hard work and establishing good relationships with his farmer-clients. He said he found it interesting that while farmers need his services, they are actually helping him meet his. His customer-focused attitude has rewarded him a network of satisfied and loyal clients who, in many instances, give him gifts in kind aside from paying him in cash.

For clients who cannot afford to pay him right away, he is lenient enough to wait for payment up to when they could. Eduardo is married to Elena with whom he has three children who are all studying.

He said his wife understands the nature of his job and appreciates it very much. In fact, Elena easily pardons him for not being able to attend some family occasions.

"I am almost always on-call by clients but I know that this tells a lot about how my skills and even friendship are valued by them. This job never fails to inspire me and keeps me determined to do even better," Eduardo said.

A man with short dark hair, wearing a blue short-sleeved shirt and a large blue and black backpack, is riding a motorcycle. He is looking off to the side with a focused expression. The background is a bright, slightly blurred outdoor setting with tall grasses or reeds. The motorcycle has a red fuel tank and a large circular mirror.

Throughout the years of practicing his career as VBAIT, Eduardo was recognized as “Outstanding VBAIT” in 2014 by PCC. It was for him a special event in his life considering that there are many other VBAITs like him. It seemed, he said, that fate has decided for him that being a VBAIT would be his lifelong livelihood.

He said his experience in rendering AI services gives him immense joy knowing that the animals will get pregnant and will soon be giving income to the farmers.

**“It’s kind of rewarding when you get to share your knowledge to others. As I always say, if you really love what you’re doing, no matter how laborious it is, it will never be a burden to you. In my own experience, every time I see my buffaloes partaking of their feed and their body condition scores are good, I am really delighted and jitters fade away.”**

**-Michael Pascual**

Chairman, Bagong Pag-Asa sa Bagong Talavera PMPC



# On account of technologies on buffalo production 'In this enterprise, I am the Boss' –Michael Pascual

by Ma. Cecilia Irang

**Michael Pascual, 42, chairman of “Bagong Pag-asa sa Bagong Talavera Primary Multi-Purpose Cooperative” in barangay Minabuyok, Talavera, Nueva Ecija, is one of the dairy farmers who adheres to and adopts the technologies and good practices being catered and implemented by PCC for a more efficient and effective dairy buffalo production.**

Some of the technologies and good practices that he's been adopting and applying are: twice-a-day milking (every 5 a.m. and 5 p.m.), strict monitoring of in-heat buffaloes, use of milk replacer for calves, utilization of appropriate milk utensils/containers, and proper milking and feeding practices such as flushing with concentrates.

Due to his initiative in adopting the PCC's technologies and good practices on buffalo production, he was able to increase the number of his herd, enhance its milk production, and maintain the milk's good quality.

Currently, Michael has 38 buffaloes, 11 of which are lactating and seven are confirmed pregnant. He collects an average of 40 liters of milk daily.

“I make a breeding program for my buffaloes so that calving will occur during the lean season of milk production. This assures me of a year-round milk supply,” he shared.

A middleman from Cabanatuan and the NEFEDCCO buy his collected milk at Php60 per liter. His total monthly net income is Php30,000.

“I can say that buffalo raising is indeed a beneficial venture and I give thanks to PCC for implementing such program. I am one of the many persons whose life has been touched and changed by PCC,” Michael declared.

He added that because of the income from the milk sales, he is now financially able to send his children to good schools, provide for his family's needs, renovate his animals' barn, and even buy home appliances and a second hand 4x4 off-road or military jeep, which he bought for Php270,000. Aside from using it for his travels, he also uses it to haul feedstuff for his buffaloes.

Having enough ability, technologies, and knowledge on buffalo production, Michael registered his farm to the DTI under the business name “MCCR Pascual Agri Ventures” in 2017 to serve as a training ground for those who want to venture in dairying locally and for those who will work abroad.

After participating in and completing his training at a TESDA - accredited farm in Bulacan, he received a “National Certificate II on Animal Production (large ruminants)” to be a legitimate trainer.

According to Michael, the training he conducts usually lasts for 45 days. In that period, he teaches the different theories, technologies, and even demonstrates the actual good practices on dairy animal production. Most importantly, he said, is that he also teaches proper discipline on rearing animals.

# Young farmer finds 'gold' in buffalo dairying

by Ma. Cecilia Irang and Mervalyn Tomas



**“It’s okay to start with small investments as it can lead to big improvements. In fact, most of the thriving businesses started off with small capital. Their owners prospered because of diligence and perseverance.”**

**-Moises Alfonso**

Board of Director, Eastern PMPC

**One of the crucial goals of the DA is for the country to be food self-sufficient. But, it is difficult to achieve this goal if the country’s youths wouldn’t engage and disregard the clarion call for delving themselves in agriculture. Happily, we can find some youths who are fond of farming.**

One of them is Moises Alfonso, 25. He finds dairy farming as a lucrative business.

He is fascinated by the fact that his income in his venture is much higher than those engaged in white-collar jobs. Aside from buffalo dairying, he also participates in his family’s rice farming works.

“We earn around Php2,000 to Php4,000 a day from selling our buffalo’s milk,” he disclosed. That earnings translate to Php60,000 to Php120,000 a month.

Moises finished Bachelor of Science in Marine Transportation but he opted to manage his family’s business in buffalo dairying. “Our earnings from buffalo dairying are certainly much bigger than the salary of a crew member in a shipping line,” he said. Since his high school days, he used to help his late father, Carlito, one of the award-winning PCC-assisted dairy farmers, in their farm in barangay Sibut, San Jose City, Nueva Ecija.

With the help of his older brother Herson, he gradually learned the nuances in dairy buffalo farming.

In 2012, his father got sick and wasn’t able to manage their farm anymore. Moises’ mother initially took on the responsibility of managing their farm until it was passed on to him after his graduation from college.

Moises has since been managing the farm that expanded to about 50 buffaloes. Their milk harvest, owing to the application of the right technologies, has always been excellent. “There are times when we harvest 60 liters of milk a day,” he said.

Moises recalled that before his family was able to have the kind of life they have now, it was always punctured by difficulties and tough times. Onion farming was the first thing Moises’ parents

tried but the income from it was not sufficient.

“We used to live in a nipa hut and my father was a tenant in other farmers’ farm in our village. We had to borrow money to be able to provide for the family’s basic needs,” Moises recalled. Her mother, Julieta, attested that their difficult life goaded them to work harder in order to improve their status in life.

“Gradually, we were able to save money until we were able to pay our debts and buy some pieces of farmland,” Julieta said. In 2007, when they heard of the ventures in buffalo farming, they invested their money in it. They borrowed a number of buffaloes from PCC and dedicated their time and effort in buffalo dairying and, as if in a fairy tale, good fortune smiled on them.

Now that the business is in Moises’ hands, he wants to double the number of his buffaloes.

“I want our farm to become one of the biggest dairy buffalo farms in Nueva Ecija,” he said.

But for now, since feedstuff is crucial to the success of his business, he, with the help of other family members, is concentrating on the propagation of improved forage grasses so that when his dream of having 100 buffaloes is realized, it won’t be problematic feeding them anymore.

“I want to encourage my fellow Filipino youths to try buffalo dairying, as it is not that burdensome contrary to what they may perceive,” Moises said.

He added that aside from the fact that buffalo farming brings high income for the persons and families engaged in it, its contribution and importance in the country’s agricultural industry cannot be underestimated.

“As many of our country’s farmers are aging, the country depends on us to continue what they have started,” he said. He shared that majority of middle-class families in their area started out as farmers. Thus, his advice is: “It’s okay to start with small investments as it can lead to big improvements. In fact, most of the thriving businesses started off with small capital. Their owners prospered because of diligence and perseverance.”

# Benefits of buffalo dairying can't be underrated, a Bukidnon couple avers

by Ma. Cecilia Irang

Nida Abellanosa of Don Carlos, Bukidnon, once harbored doubts and pessimistic outlook about the journey on buffalo dairying that she and her husband Carlo embarked on.

She revealed that she underrated the benefits of buffalo dairying as she had not seen anyone yet who was getting successful in this widely embraced venture in their area.

"I had a negative feeling then when my husband told me that he wanted to join the program in buffalo dairying because I knew, beforehand, that it is not going to be an easy undertaking," Nida said.

But then she agreed especially when she got the feeling that her husband was determined to try it.

"I didn't object when my husband immediately established a concrete barn and converted a few hectares of our farm into a forage area," Nida said.

The Abellanosa family's main source of income is sugarcane farming. Carlo was enjoined to attend an orientation on buffalo dairying conducted by the LGU of Don Carlos and the PCC at CMU in 2016.

The PCC at CMU loaned out to them 10 buffaloes. It turned out that the animals given to them were already pregnant. When the animals gave birth and they started to derive benefits from the enterprise, all of Nida's qualms about the uncertain gains from the enterprise banished.

"I even noticed that sugarcane farming requires a lot of manpower to finish the tasks involved in it than in buffalo dairying. In fact, not even a whole day is required to finish all the chores in buffalo dairying with the help only of our family members," Nida said.

As they both witnessed the unfolding of the good benefits in buffalo dairying, they both agreed in the opinion that this

enterprise will generate more revenues for them and that it can become their primary source of income.

After a few years, their dairy buffaloes doubled. They now have 28 buffaloes and one bull.

Carlo, because of his leadership abilities, was elected chairman of the Muleta-Side Buffalo Dairy Association (MUSBUDA).

From their seven lactating animals, they collect an average of 6-8 liters of milk from each of them daily.

Since they started collecting and selling their milk harvest in September 2017, they had already registered a total gross income of approximately Php1,251,623 from the sales of 20,000 liters of milk.

As for their tandem in this enterprise, Nida is the one milking the buffaloes while Carlo manages the rest of the operations such as feeding, bathing and grazing the buffaloes.

Being a flourishing buffalo-based enterprise, the Abellanosa's farm was accredited in 2018 by the Agricultural Training Institute (ATI) to be a Learning Site for buffalo production.

The farm serves as a venue for practical learning opportunities intended for the establishment of buffalo-based village enterprise for smallholder farmers like them. Both of them are also graduates of "Farmer Livestock School on Dairy Buffalo Production" conducted by PCC.

Aside from this, they even got good news about their enterprise. Dr. Lowell Paraguas, center director of PCC at CMU, announced that a Dairy Box one-stop-shop was already put up in their place. This establishment has become a ready outlet for freshly made products that use buffalo's milk as main ingredient.

Having heard about this development, Nida's and Carlo's goal now is to increase some more the number of their buffaloes. They also plan to acquire machinery for buffalo production and above all, they intend to process their milk harvest into different kinds of milk-based products.

**Because of the family's collective determination, hard work and passion, the Abellanosa's Dairy Farm was awarded as "Best Family Module" during the PCC's 26th founding Anniversary on March 27, 2019.**



# For a dairy farmer in Maramag, Bukidnon, having pains means having gains

by Ma. Cecilia Irang and Chrissalyn Marcelo

Living in a mountainous area, traversing a very rough road just to get to his place, and enduring all consequences brought by the loss of electricity supply, Zosimo Tejano of Maramag, Bukidnon, didn't take all these as hindrances for him to continue his venture in buffalo dairying.

Zosimo, one of the assisted dairy farmers of PCC at CMU, pursued this undertaking despite such limited amenities in his area.

The PCC at CMU provided him an Italian Mediterranean buffalo under its "paiwi" contract in 2015. It served as his personal turning point in life. It provided him the opportunity of venturing from subsistence sugarcane farming to buffalo dairying along with the other "lucky" co-farmers in his area. But for his other colleagues, the venture didn't sit well. Weariness and discouragement set in for them. They surrendered their buffalo when they saw their animals were not getting pregnant.

Zosimo, unlike the others, didn't give up. His reasoning: "No pain, no gain". He was right. Due to his persistence, diligence and hard work, he became the last man standing, the only farmer in his area enjoying the benefits of buffalo dairying.

Zosimo, when asked about his very reason for joining the program, said he is optimistic that buffalo dairying is the key for poverty alleviation. He happened to know about the PCC's program and its advantages while listening to a radio program. Zosimo, however, admitted that buffalo raising is indeed an arduous venture particularly in an area like his. There is no

supply of electricity which can expedite some works to be carried out. He had to manually fetch water for the animals' drink and for cleaning the pen.

Armed with the refusal to fail in his venture, he patiently took care of his animals, understood well their needs, and listened to those who had succeeded in buffalo dairying. To date, he has 15 buffaloes. Two of which are lactating that give him 5-6 liters of milk every day.

His records indicated that from the time his animal gave birth and started to give milk in 2017, he has already earned a gross income of approximately Php1,047,724 from the 17,000 liters of milk he harvested and sold to PCC at CMU at Php60 per liter. Due to his gains, he was able to finance the educational needs of his children, convert their firewood stove into gas stove, purchase a generator set for the needed electric power for lighting and washing machine, and buy a milking machine worth Php52,000. The main reason, he said, why he bought a generator set is for the operation of his milking machine. He uses it as he is milking his buffaloes twice a day. He sells his collected milk at Php60 per liter to PCC at CMU.

In 2018, his income ranged from Php40,000 to Php50,000 a month while his total expenses amounted to only Php15,000. Married to Grace, and a father of five, his livelihood has improved a lot compared to the time when he was engaged in sugarcane farming and serving as a helper to someone else's farm, and in raising a few pigs. His income then wasn't certainly enough to support the needs of his family.

But now, through his dairy enterprise and the improved income he is getting from it, he is able to enjoy a much easier life – which is his gain from his pains.

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# High yield, income with the use of new technology

by Chrissalyn Marcelo

## **Isagani Cajucom's life went through a major shift after he started his business on grass and corn silage production and commercialization in Lupao, Nueva Ecija.**

From being an “employee” as a “chemist” at Clark Pampanga, he is now the “boss” of his own business venture. In fact, he now has 27 regular farm workers aside from on-call laborers who harvest his grass and corn. Apart from that, he was able to acquire some assets through his business, e.g., two tractors, one forage chopper, 12 generator sets, second hand truck, car; and land, which he either purchased completely or mortgaged from other farmers.

He also has other business in livestock and poultry production, which include 15-17 hogs for fattening, seven buffaloes for dairying, which he received from the Philippine Carabao Center (PCC), and 200 native chickens for meat.

### *Start off*

According to Isagani, it was in May 2013 when he started his corn silage business. This, he said, was after the PCC was able to convince him to try out and adopt its technology on silage production. Under the “Commercialization of Grass/Forage Corn Silage for Dairy Buffaloes in Lupao, Nueva Ecija” project of the PCC and Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD), Isagani was designated as the “farm leader” or “product champion” of the said project along with 10 farmer associates.

Isagani along with his co-farmers underwent a series of learning events, as facilitated by PCC and PCAARRD, e.g., proper forage corn production and actual process of making silage, where they were trained on the how-to's of chopping grass using forage chopper, putting the chopped grass inside the plastic or “silo bags”, and fermenting it afterwards before product commercialization. After these trainings were finished, they started planting corn in May 2013.

The recommended age of the corn before it could be

harvested after planting is 75-80 days, according to the experts of the PCC. Thus, it was after this time when Isagani and his co-farmers started harvesting their corn and processed it as corn silage.

During the first cycle of their silage production, PCC purchased their grass and corn silage at the price of Php3 per kg or Php105 to Php120 per sack, according to Isagani. During this time, too, Isagani earned Php33,000 from his produced silage while he earned Php28,000 during the second cycle.

By this time, Isagani said that he was only using one hectare of land for his silage business. He shared that his one-hectare land gave him at least 23,000 kg to 38,000 kg of corn or grass harvest per cycle.

At present, Isagani earns an average of Php300,000 per cycle in his silage business. He harvests an average of 600,000 kg of corn per cycle from his 2.1-hectare of land; 10.92-hectare land mortgages; and outsourced silages from other farmers in Nueva Ecija. Based on the recorded cost and return analysis of his business, it showed that his return on investment significantly increased to 12.88% this year compared to 3.65% last 2013.

### *'Market'*

When Isagani became the project's product champion, PCC and PCAARRD provided all possible assistance for him to establish and expand his market.

Isagani said that even when the project already ended last 2016, his market for silage got bigger through his continuous promotion and “word-of-mouth” by his customers and buyers.

His common customers are the small-scale and large-scale farms that tend cows, carabaos, goats and even rabbits. These farms are located in the provinces of Batangas, Cavite, Bulacan, Pangasinan, Nueva Ecija, Isabela and Baguio.

According to Isagani, his transactions to these markets can be classified as “seasonal”, “continuous”, or “contractual” depending on the needs of his customers for silage. Ordinarily, he sells his silage at Php4 per kg (pick-up price) and Php4.5 per kg when delivered.

A man with grey hair, wearing a grey long-sleeved shirt and dark blue pants, is sitting on a red tractor. He is smiling and looking towards the camera. The tractor is a Massey Ferguson 2635. In the foreground, there are several large white bags filled with silage, each with a yellow vertical stripe. The background shows a field of corn plants and rolling hills under a blue sky with some clouds.

**“When I was an employee before, I didn’t have any other choice but to work straight starting from 8AM to 5PM. My salary was also “fixed” and I was working far away from my family. But now, through silage production business, I now own my time, be with my family, and earn enough income for my family’s needs while helping other farmers in our province when it comes to job provisions and opportunities.”**

**-Isagani Cajuom**  
Lupao, Nueva Ecija

# A broadening perspective builds up in Bohol

by Charlene Joanino and Khrizie Evert Padre



Chocomilk, lactojuice, and pastillas. These are only some of the products that one can relish upon visiting the two Dairy Box outlets ran by the Bohol Dairy Cooperative (BODACO) in Barangay Tamboan, Carmen in Bohol and in the Island City Mall in Tagbilaran City.

The cooperative's history dates back to 1998. At that time, the Ubay Dairy Multi- Purpose Cooperative (UDAMCO) was created and received Bulgarian Murrah buffaloes from the PCC at USF. Additionally, another cooperative sprang up in that town and was named as Mabini Dairy Multi-Purpose Cooperative (MADAMCO).

The PCC at USF trained the members of these cooperatives in processing products from the buffalo's milk. Also, they were given the needed knowledge on the aspects of proper handling of fund and on how to lead and strengthen their camaraderie. To further the marketing of their products, the cooperatives agreed to merge and became the Ubay Carabao Raisers Association. Soon after, the Ubay Federation of Carabao Raisers and Related Associations (UFECARRA) came into being.

But, the federation got entangled with big problems. The sales of its dairy products plummeted and many farmer-members became inactive. Hence, it stopped its operation. To help them, the PCC at USF temporarily handled the processing and marketing of their products.

In 2014, the PCC at USF successfully helped rebuilt what remained of the federation, which led to the birth of "Bohol Dairy Producers Association" (BoDPA). Unlike before, apart from having members from the towns of Ubay and Mabini, others from Alicia, San Miguel and Dagohoy in the same province also joined BoDPA.

After one year, BoDPA obtained a total income of Php6,048,057.84 from the products it sold. It also started to share patronage refund and interest to the share capital of its members. Through the help of PCC, BoDPA was among the cooperatives selected to be one of the beneficiaries of the PRDP, which is funded by the World Bank. The project aims to "establish a modern, climate-resilient and market-oriented agri-fishery



sector.”

Under PRDP’s I-REAP component, the association was granted Php9 million worth of equipment and other related needs for the processing as well as marketing of its products.

In 2016, BoDPA was registered to the Cooperative Development Authority (CDA) as BODACO.

According to Guillerma Abay-Abay, CBED coordinator of the PCC at USF, although BODACO was the registered name of the co-op, BoDPA still exists because it was the association recognized by the PRDP.

Based on 2017 data, the income of both BODACO and BoDPA reached Php15,646,549.17, which registered a 6.64% return on investment.

Meanwhile, to help its members, BODACO included in its program the giving of loans to members for agricultural, education and emergency purposes.

One of its members who had taken advantage of these perks

was Marilou Rojo from Ubay. All that she could say was she was very thankful for being given the chance to engage in dairying. “My family is poor and I have eight children. Thanks to the daily income I got in selling milk. I was able to support the education of my children and our life is much better now than before,” Marilou, with tears in her eyes, said.

She even proudly added that she can now realize her dream of constructing a new house. And unlike before when she could hardly support her family, she is confident that she can achieve many things as she doesn’t have to worry anymore where to get money for their needs.

On the other hand, Pastor Rogelio Damalerio, chairman of BODACO, attested that his neighbor, who owns two buffaloes, can easily pocket Php7,000 every month as an extra income from his milk sales.

“It is our vision to make Bohol the milk capital of Visayas with a daily target of 1,000 to 3,000 liters milk harvest,” Pastor Rogelio proudly said.



## Experiencing a bounty from an alternative livelihood

by Charlene Joanino

**Looking over his buffaloes, Allan Benitez, chairman of Simula ng Panibagong Bukas Multi-Purpose Cooperative (SIPBU MPC) in San Jose City, is often lost for words in describing how grateful he is for the help that he and his colleagues received from PCC. Before SIPBU MPC got its name, it was formerly known as “Simula ng Panibagong Bukas Producers Cooperative” or SIPBUPCO. It started with 21 members who were grouped in order to benefit from the PCC’s 25-Cow Dairy Buffalo Module.**

**Though they still lacked the required membership, PCC, nevertheless, decided to provide them dairy buffaloes on a loan basis.**

“As rice farmers, we tried to engage in dairying to earn additional income. We were surprised when we realized that the income from it is daily and can surpass our earnings from our primary source of livelihood,” Allan said.

The guidance given by the agency led to the debunking of the notion of some members of the group that rearing dairy buffaloes would only involve just letting them loose in the



pasture area or just keeping them under the trees and feed them. PCC made them realize that it is critical to make sure that the animals are well taken care of with proper animal management, provision of appropriate shelter and feedstuff such as Napier.

Gradually, the members satisfied the requirements and were able to propagate their dairy buffaloes. Based on its record last September 2018, SIPBU MPC has 296 dairy buffaloes. Allan, for example, now owns more than 10 dairy buffaloes and earns at least Php1,200 a day depending on the number of lactating buffaloes in the cycle.

**SIPBU MPC is now one of the leading cooperatives in Nueva Ecija when it comes to dairying. In 2018, it registered a total milk harvest of 71,434 kilograms, which was worth more than Php3 million.**

**The cooperative was also selected last year as a credit conduit of the PLEA of the DA's ACPC. Under PLEA, in the aspect of buffalo-based livelihood, the loan is to be used for the purchase of milk processing equipment and in putting up better housing for the animals.**

**Through the help of PCC, 44 members received a loan amounting up to Php50,000 each. Its interest, which is 6% annually, is retained by the cooperative to serve as its additional fund. Thus, under this arrangement, the cooperative itself benefits from the special credit facility.**

In terms of milk production, Arnold Cunanan, who is a member of the board of directors of the co-op, collects as high as 55 liters of milk a day from his dairy buffaloes.

According to Allan, while some of them still engage in rice farming, majority decided to fully concentrate in dairying. He stated that unlike before, they don't need to borrow money anymore just to get by. Now, all they have to do is wake up early and diligently milk their buffaloes and shortly enough they pocket the day's income.

"What PCC has done for us is to lead us to this comfortable life that we are enjoying now. It never gets tired of nurturing us in the process. In return, we vow to be continuously dedicated to keep succeeding in this venture," Allan proudly shared.

"I believe that when you plan to engage in dairying as a livelihood, you must be prepared for any eventuality. Don't be discouraged when you face many struggles because those will teach you how to get stronger as you face and succeed from one struggle to the next," Allan said as advice to all aspiring dairy farmers.

# LEOPOLDO Y. MARCOS

## Outstanding Dairy Buffalo Farmer Smallhold Category

**Leopoldo Marcos, 43, San Jose City, is a former Overseas Filipino Worker in Saudi Arabia who decided to pursue dairying. His fatherly instinct to guide his two growing children and longing to be with his family brought him back to his homeland, the Philippines.**

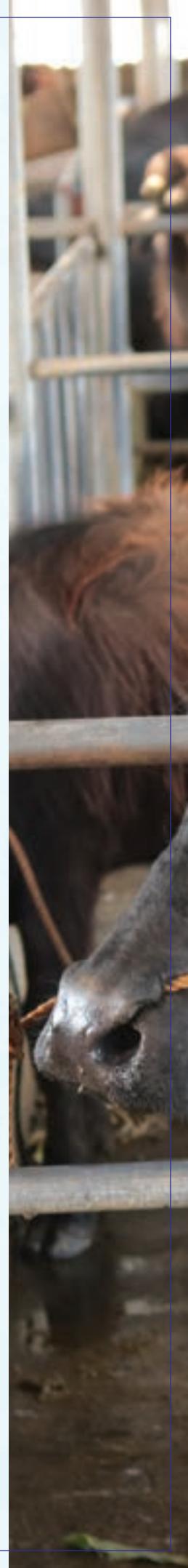
In 2015, Leopoldo gained interest in dairy buffaloes. According to him, the buffalo raisers who lived near his farm enticed him to join the Eastern Primary Multi-Purpose Cooperative (EPMPC) and to engage in dairying. To his luck, on the same year, he was able to join a training on dairy buffalo management and production. He then bought a dairy buffalo from a colleague. In 2016, he was entrusted with two dairy buffaloes by PCC and another one the following year.

However, it was not all smooth sailing for Leopoldo. One of his pregnant buffaloes died due to severe sprain and a male calf died of diarrhea. Despite these misfortunes, Leopoldo never thought of giving up.

Due to his persistence, Leopoldo's dairy herd increased to seven head. He makes sure that his animals are supplied with sufficient feedstuff.

At present, he harvests 19 liters of milk from his lactating animals. He sells the milk to EPMPC at Php60 per liter. This gives him a daily income of Php1,140 which he uses to finance his children's education and their family's daily expenditures. Because of the stable income that he derives from dairying, he was able to buy some farm equipment and a tricycle. The gains he received and continues to receive from his dairy buffaloes motivate him to plan out how he could further improve his dairy business.

Apart from dairying and corn farming, Leopoldo is also engaged in rice farming. His farm is thus modelling an integrated crop-livestock production system.









## **ELISEO C. MISLANG**

**Outstanding Dairy Buffalo Farmer  
Semi-commercial Category**

**Eliseo “Eli” Mislant, is a member of the Eastern Primary Multipurpose Cooperative (EPMPC) in San Jose City, the top buffalo milk producer in Nueva Ecija. He used to be employed with one of the leading manufacturers of soft drinks in the country but decided to give up his job in 2010 and ventured into buffalo dairying instead.**

Currently, Eli has 23 buffaloes, 10 of which are confirmed pregnant and are expected to give birth within the year. Eli is practicing twice-a-day milking and collects 25 liters of milk a day from his lactating buffaloes which he sells to EPMPC at Php60 per liter. This gives him an income of Php1,500 daily. Eli considered it a blessing when he became one of the cooperators of the dairy buffalo project. He and his wife are now enjoying their sustainable income from the milk sales and other income generating projects in the buffalo-based enterprise.

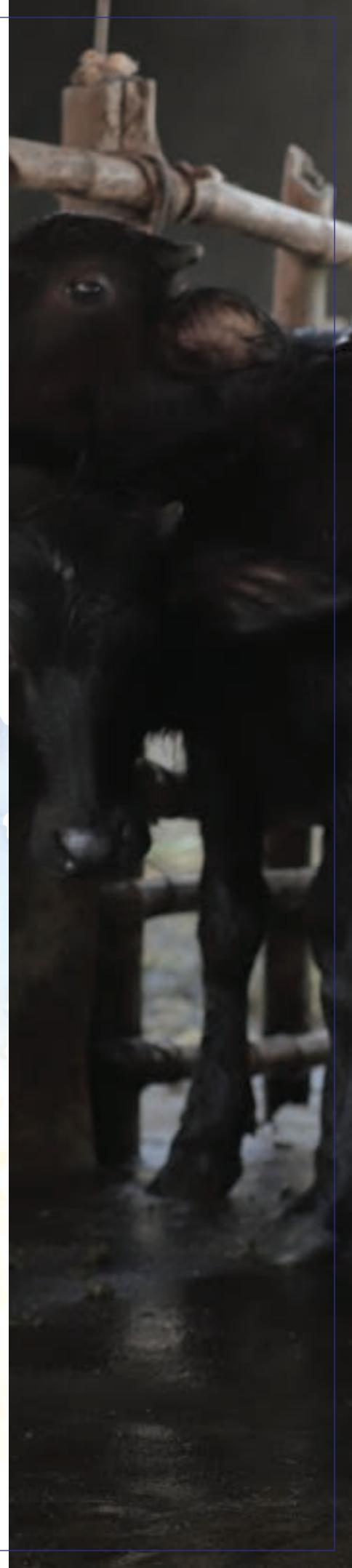
# ANDY POE P. GARCIA

## Outstanding Dairy Buffalo Farmer Commercial Category

**Andy Poe P. Garcia of Magalang, Pampanga started rearing buffalo in 1998 when his parents gave him a calf. He later on was able to harvest a good volume of milk from that animal. After several years, he became one of the recipients of PCC at CLSU's Paiwi Program that enabled him to increase the size of his buffalo herd.**

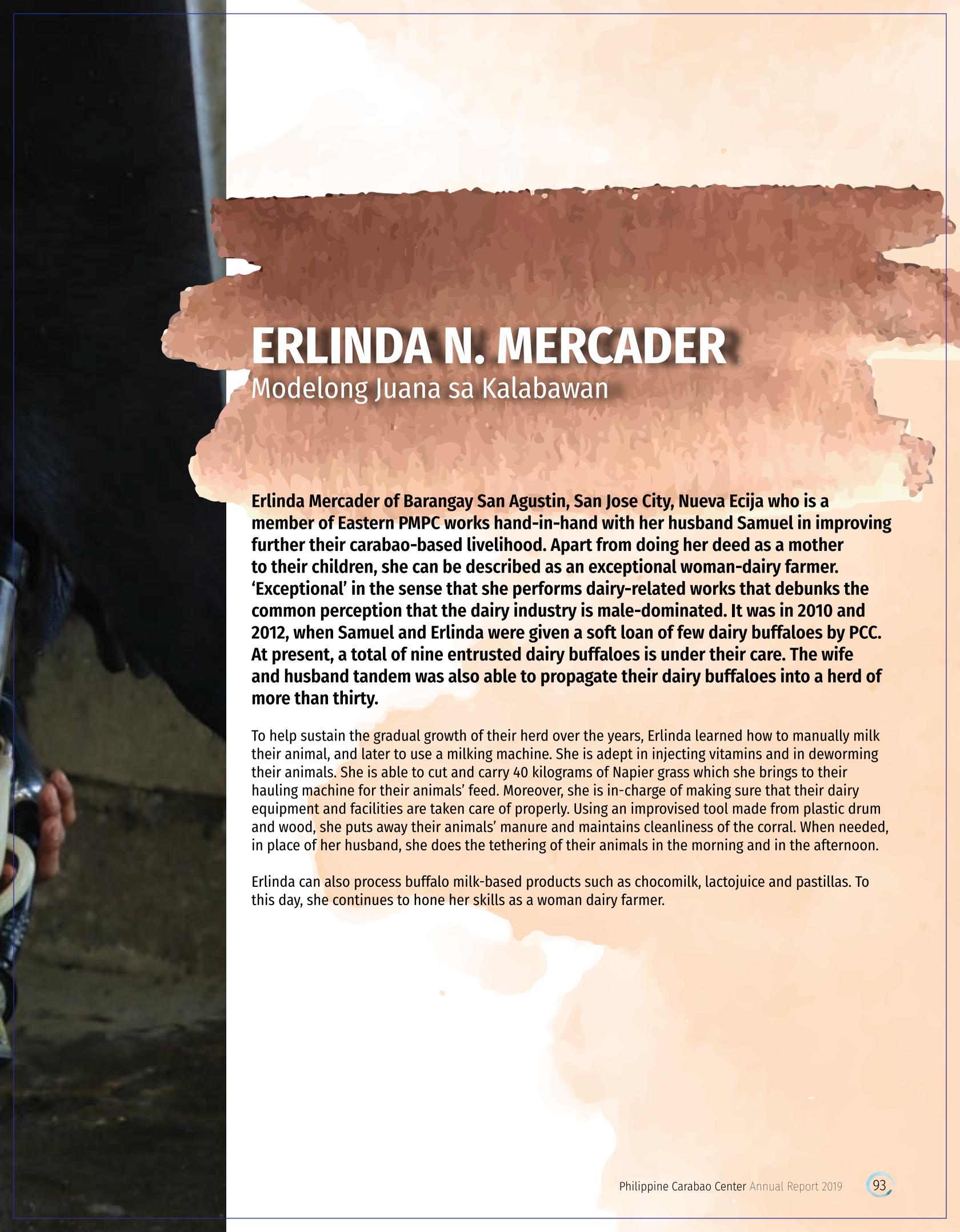
At present he has 60 buffaloes, 40 of which are cows and 18 are lactating. He collects an average of 80 liters of milk a day which he sells at Php80 per liter. He also earns an additional income from selling male calves. He recognizes that the good performance of his dairy business can be attributed to his adoption of good dairy buffalo management and production practices. Aside from feeding his herd with corn silage, he also includes spent grain in the ration. He maintains the cleanliness of his animal pen to ensure the quality of milk and to protect his animals from diseases.

With his dairy business, Garcia is able to easily afford the education of his three children. Two of them had already earned their respective college degrees while one is about to enter college. He plans to invest on buying a corn harvester with chopper to save time and minimize labor cost for feedstuff preparation.









## ERLINDA N. MERCADER

Modelong Juana sa Kalabawan

**Erlinda Mercader of Barangay San Agustin, San Jose City, Nueva Ecija who is a member of Eastern PMPC works hand-in-hand with her husband Samuel in improving further their carabao-based livelihood. Apart from doing her deed as a mother to their children, she can be described as an exceptional woman-dairy farmer. 'Exceptional' in the sense that she performs dairy-related works that debunks the common perception that the dairy industry is male-dominated. It was in 2010 and 2012, when Samuel and Erlinda were given a soft loan of few dairy buffaloes by PCC. At present, a total of nine entrusted dairy buffaloes is under their care. The wife and husband tandem was also able to propagate their dairy buffaloes into a herd of more than thirty.**

To help sustain the gradual growth of their herd over the years, Erlinda learned how to manually milk their animal, and later to use a milking machine. She is adept in injecting vitamins and in deworming their animals. She is able to cut and carry 40 kilograms of Napier grass which she brings to their hauling machine for their animals' feed. Moreover, she is in-charge of making sure that their dairy equipment and facilities are taken care of properly. Using an improvised tool made from plastic drum and wood, she puts away their animals' manure and maintains cleanliness of the corral. When needed, in place of her husband, she does the tethering of their animals in the morning and in the afternoon.

Erlinda can also process buffalo milk-based products such as chocomilk, lactojuice and pastillas. To this day, she continues to hone her skills as a woman dairy farmer.

# ROLLY RICHARD O. ZALAMEDA

Huwarang Kabataan sa Kalabawan

**Rolly Richard O. Zalameda, 23, a resident of Brgy. Lao, Ormoc City, Leyte is engaged in the carabao upgrading program as an Artificial Insemination (AI) Technician since 2011. His participation in the AI training was influenced by his father. Due to financial difficulties, he temporarily stopped from schooling and continued to work as an AI technician instead. He was able to produce a total of 43 calves from 326 AI services from 2013 to present with an average income of Php24,000 per month.**

He also participates in the management of their family's small carabao-based enterprise. He used to milk their lactating carabaos and sell the milk to their neighbors and friends. Currently they earn Php20,000-Php180,000 per month from milk production and milk sales.





# CATALANACAN MULTI-PURPOSE COOPERATIVE

## Best Dairy Buffalo Farmer Cooperative

**The Catalanacan Primary Multipurpose Cooperative (CAMPC) originated from the Samahang Nayon, Incorporated (SNI) in 1987. With a seed capital of Php68,000.00 in 1987, CAMPC is now worth Php2.5 million in share capital. This fund is used for providing agricultural loan services to members. The cooperative has now a total of Php15.39 million in assets. In 2019, CAMPC made history in the Science City of Muñoz in Nueva Ecija as the oldest running cooperative. They celebrated their 32nd Annual General Assembly on March 19, 2019.**

CAMPC started its dairy buffalo enterprise in 1999 when it heard of the PCC's 25 Dairy Buffalo Module. Because of their proven track record, CAMPC's application for the incubator module was approved in the same year. Thirty-six of their members became recipients who did not wait long before they started gaining from their newfound livelihood.

Among the organized groups assisted by PCC, CAMPC appears to be the most aggressive in terms of value adding and marketing



their milk-based products. They voluntarily approached PCC to occupy and solely manage one of the three stalls that PCC has erected at the Dairy Hub where Milka Krem was also located. With some assistance, they closed a deal with PCC last July 13, 2015 to lease the stall to exhibit their delicatessen products and began to establish a “pasalubong” shop. With the help of PCC, the shop was later on designed and named “Dairy Box: One-Stop-Dairy-Delicatessen Shop”. According to the officers of CAMPC, dairying had created additional jobs and has now become a stable source of additional income for its members. Their herd size has now increased to 120 head of purebred buffaloes. Currently, the cooperative has a total of 86 breedable female buffaloes with 19 more turning breedable this year. The herd gives the cooperative a stable supply of 180-200 kg of milk daily.

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