



Department of Agriculture

PHILIPPINE CARABAO CENTER

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ANNUAL REPORT

2018



ANNUAL REPORT 2018
HIGHLIGHTS OF ACCOMPLISHMENTS

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ANNUAL REPORT

HIGHLIGHTS OF ACCOMPLISHMENTS

2018



#GreatToShareAndCelebrate!

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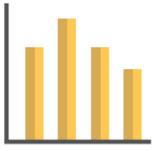
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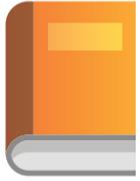
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ABOUT US

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.

GENETIC IMPROVEMENT PROGRAM



Institutional Herd Status

- **Inventory.** Total inventory for institutional herd (native carabaos, purebred buffaloes, and crossbred buffaloes) in the 12 network centers and the National Gene Pool was 2,467 head, which is composed of 796 cows, 666 heifers, 509 calves, 462 bulls, and 34 draft and training animals. Of this population, there were 258 native carabaos, 1,758 Murrah (Bulgarian, Brazilian, Indian and US), 197 Italian Mediterranean, and 254 crossbred buffaloes.
- **Calf Production.** There were 497 calves born during the year.
- **Milk Production.** A total of 634,259.87 kg of milk was produced by the institutional herds from an average of 363 cows in the milking line which equates to an average of approximately 5.82 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 286,361 doses of frozen semen, which were deposited in the PCC's semen bank. Of this total, 175,880 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.

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 67,212 AI services conducted covering 9,200 barangays, 971 municipalities and cities in 74 provinces of the 17 regions of the country. These AI services were made possible by 1102 AI technicians, subdivided among the Village-based AI Technicians (n=356), LGU AI Technicians (n=676), and PCC AI Technicians (n=70). An additional 99 AI technicians (VBAIT and LGU) were trained this year in the five (5) PCC Training centers (PCC at CLSU, PCC at CSU, PCC at CMU, PCC at UPLB, and PCC at USF), which added to the pool of trained AI Technicians in the country. The monitored calves on the ground based on the 2017 AI services were 18,745 calves.

Bull Loan Program (BLP). This program caters those communities where AI services are not easily accessible. As of December 2018, a total of 150 bulls were loaned out to farmers, which brings the total number of purebred breeding bulls in the villages to 1,025. Active bulls registered 2,107 services during the year. Likewise, monitored calves in 2018 as a result of natural mating services in 2017 totaled 1,544.

Genetic Evaluation

The Philippine Buffalo breed or "Pinoy Buffalo" was formally launched in 2018. It is a product of crossbreeding and successive backcrossing over four generations, which marks a significant milestone in the implementation of the PCC's genetic improvement program. Likewise, a structured breeding program and genetic evaluation system for the riverine buffaloes was established and continuously improved to identify the best genetics, which will become parents of the next generation.

The year 2018 also saw the presentation of the first batch of young semen donor bulls (Philippine Buffalo breed) with genomic breeding values, also called "genomically tested bulls" or "DNA-proven bulls" (Figure 1).



BEST MILK PRODUCTION PERFORMANCE

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

2GP15042
EBVMilk: 256.4 kg; EBVMilk: 14.2 kg; EBVMilk: 8.7
Genomic breeding value (GEBV): 262 kg.
Sire: WILSON 2UP10023
Dam: K18 2GP00094

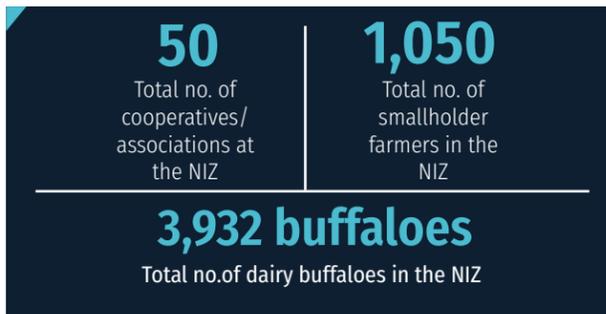
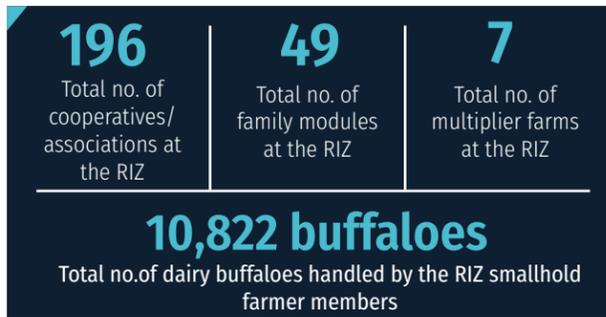


One of the first genomically tested bulls from the latest generation of Philippine buffalo bulls selected to become semen donor.

CARABAO-BASED ENTERPRISE DEVELOPMENT



The CBED activities are generally being implemented in areas called “impact zones”, which signifies focused efforts by PCC in providing social preparation, production, marketing, extension, monitoring and evaluation services for carabao or buffalo-related enterprises being engaged in by cooperatives, associations, and family households. The province of Nueva Ecija serves as the National Impact Zone (NIZ) while select municipalities being covered by the PCC’s regional centers serve as Regional Impact Zones (RIZs). The usual approaches are built around (1) entrustment of purebred dairy buffaloes to cooperatives, associations, or families; and (2) crossbreeding (and continuous backcrossing) of native carabaos with purebred dairy buffaloes along with social preparation, community organization, facilitation of various learning events, and provision of other support services. Such standardized and interrelated approaches or interventions to CBED are generally referred as “modules”.



Newly created CBED modules

- At the NIZ, two more farmer-groups were organized to be part of the dairy buffalo development initiatives in the rural communities. These are the San Carlos Agricultural Cooperative in Aliaga and the Sustainable Carabao Owners Association in Palayan City, which were entrusted with 19 and 11 dairy buffaloes, respectively.

Existing CBED Modules

- At the RIZ, there are 196 cooperatives/associations, 49 family modules, and 7 multiplier farms, which take care of 10,822 buffaloes (4,109 purebred, 3,105 crossbred, and 3,608 native). Meanwhile, at the NIZ, there are 50 cooperatives or associations consisting of 1,050 smallholder farmer-cooperators managing a total population of 3,932 head dairy buffaloes (3,540 purebred and 392 crossbred), one federation, 50 village milk collection centers, and four cooperative processing facilities.
- Milk Production and Marketing.** The dairy buffaloes in the NIZ and RIZs produced 1,197,848.21 kg and 1,379,487.96 kg, respectively, or a total of 2,577,336.17 kg of raw milk, which was either sold as fresh milk to the local processors or was sold as processed milk products (basically, pastillas, kesong puti and flavored milk) to the local market. The total volume of milk traded was 2,288,700.45 kg, which was valued at Php148,027,879.59.
- Dairy Buffalo Multiplier Farms (DBMF).** To date, a total of 429 head Italian Mediterranean buffaloes are being maintained in the 8 assisted dairy buffalo multiplier farms all over the country. In 2018, the said farms produced a total of 282,967.25 kg milk.

Capability Building Support

- The PCC Regional centers facilitated 245 types of trainings and seminars on various aspects of buffalo production and management in support of the assisted farmers, cooperatives, and associations (Appendix 1). These learning events were participated in by 6,633 individuals from across the country.
- The NIZ coordination unit also facilitated 20 types of training, seminars or workshops participated in by 1,190 farmer-trustees of cooperatives and associations in Nueva Ecija (Appendix 2).
- The agency has continued the adoption of Farmer Livestock School on Dairy Buffalo Production (FLS-DBP) modality as a learning platform for facilitators and for farmer-clients in selected localities. In 2018, a total of 250 farmer-participants from Ilocos Norte, Cagayan, Zamboanga del Norte, Zamboanga Sibugay, Bukidnon,



Bohol, Tarlac, and South Cotabato have participated in a season-long (once-a-week session for 34 weeks) FLS-DBP. Three batches of FLS-DBP have been completed while six batches are still on-going. Likewise, a three-week Facilitators’ Learning Workshop (n=25 participants) and two-day Participatory FLS-DBP Evaluation (n=35 participants) were also held in Nueva Ecija.

- The first ever School-on-the-Air (SoA) on Dairy Buffalo Production in Panay Island was facilitated by PCC at West Visayas State University in partnership with the DA Regional Field Office 6 (DA-RFO 6) and Agricultural Training Institute (ATI) Regional Training Center 6. The SOA titled “Karbawan: Husto nga Kinaalam para sa Mainuswagon nga Pangkarbawan” was aired from August 4 to December 15, 2018 over DYFM Bombo Radyo Iloilo every Saturday (every first and third week at 8:15am to 8:30am; and every second and fourth week at 8:30pm to 9:00pm). Hosted by regional information officers from DA-RFO 6, the SOA topics aired were strategically designed based on the best practices of farmers and PCC’s recommendations. It culminated on December 20, 2018 at the Covered Gymnasium of Leon National High School in Leon, Iloilo, with some 380 farmers who graduated from the learning event.
- A total of 14 trainings on Artificial Insemination and Pregnancy Diagnosis was also participated in by some 229 village technicians all over the country.

RESEARCH AND DEVELOPMENT



Research for Development (R4D) is one of the major thrusts of PCC. 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 are being proposed to address the plaguing issues in the carabao sector that limit its growth and development. Some issues were addressed and offered solutions but majority of which, still need more efforts to unearth their solutions. In 2018, the following activities were undertaken by the 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 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 CDP.

In 2018, 40 researches were completed while another 74 were still being conducted (Table 1, Appendices 3a, 3b). Twenty-six of these research projects are externally funded (Appendix 3c). These researches were also presented in the agency's Pre In-House and Annual R4D In-House Reviews held at the PCC National Headquarters.

Thematic Areas	Completed	Ongoing
Production Management System	1	10
Biosafety	2	20
Genetic Improvement Animal Genomics/Genetic Diversity and Cryopreservation	4	9
Reproductive and Cryopreservation Techniques	24	20
Product Development	8	4
Enterprise Development	-	3
Socio-Economics Dimension of CDP	1	4
Technology Transfer	-	1
Environment and Climate Change	-	-
Industry and Policy	-	-
Institutional Development	-	3
TOTAL	40	74

Table 1. Type, number, and status of researches.

R4D Annual Inhouse Review

The PCC's R4D pre-inhouse and inhouse 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 R4D Inhouse Review was held on July 4-6, 2018. There were 41 research studies presented, 12 of which were completed and 29 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, technology transfer, and product development. Moderators, who served during the paper presentations were (1) Ms. Patrizia Camille O. Saturno, (2) Ms. Ma. Theresa R. Sawit, (3) Ms. Charity I. Castillo, (4) Mr. Ivan Carl J. dela Rosa, (4) Ms. Melinda N. Reyes and (5) Ms. Noemi C. Ramilo.

Three experts were tapped and served as panel of external evaluators, namely, (1) Dr. Jose Arceo N. Bautista, Associate Professor IV, Animal and Dairy Sciences Cluster, University of the Philippines Los Baños; (2) Dr. Fe L. Porciuncula, University Professor, Research, Extension and Training Office, Central Luzon State University; and (3) Mr. Peter James C. Icalia, Instructor, College of Agriculture, Mariano Marcos State University.

Several awards were competed for during the activity. The completed research paper entitled "Development of Loop Mediated Isothermal Amplification (LAMP) Assay-Based Test Kit for the Detection/Screening of Caprine Arthritis Encephalitis Virus (CAEV)" presented by Dr. Daryl G. Dela Cruz garnered the Best Paper Award. The presenter, Dr. Daniel L. Aquino, of the research paper entitled "Nutritive Value, Digestibility and Performance of Buffaloes Using Banana By-Products and Water Lily as Alternative Feed Sources" was conferred the Best Presenter Award. Moreover, the research paper entitled "Genome-wide association study for milk traits in Philippine dairy buffaloes" presented by Dr. Jesus Rommel V. Herrera, won the Best Student Thesis Award.

In addition, special awards were also given to recognize notable contribution in the field of research.

The Most Number of Approved Research Proposals for the Year 2018 award was given to PCC at Ubay Stock Farm. The Animal Breeding and Genomics Section captured two awards, the Most Number of Presentations and the Most Number of On-going Researches Presented during the R4D In-House Review 2018.

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 (Appendix 4). There were 21 research papers published in refereed journals, 12 research papers are still under review while 14 papers (Appendix 5) were included in scientific proceedings (Appendix 6).

Technical Seminars Conducted and/or Facilitated

The RDD has conducted or facilitated series of Technical Caucus/Seminars on various topics (Table 2) with the help of concerned section or unit. 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.

Technical Caucus		
Date (2018)	Title and/or Topic Presented	Resource Speaker
February 12	Analysis of Immunosuppression in Bovine Mycoplasmosis	Ms. SHINYA GOTO, PhD Student of the Graduate School of Veterinary Medicine, Hokkaido University
March 19-20	IP Management Orientation seminar and workshop	Atty. JERRY C. SERAPION, ITSO Manager, Philippine Rice Research Institute (PhilRice) Mr. NOEL A. CATIBOG, Innovation and Technology Center Manager, DOST-PCAARRD
March 23	Advanced Animal Health Technologies for Disease Surveillance and Diagnosis	Dr. ERWIN P. ENRIQUEZ, Professor of Ateneo de Manila University Dr. THERESE MARIE A. COLLANTES, Project Leader of UP CVM-DA PL-480 Disease Profiling Project
June 13-15	Technical Caucus on Basic and Advanced MS Excel	Dr. ESTER B. FLORES, Head of ABGS Ms. JENNIFER F. MARAMBA, Lab aide II of ABGS
July 31	Bovine Genetics, Reproductive Technologies and Fertility Management	Mr. RENÉ COUMANS, Vice President of Alta Genetics Inc. Canada Dr. JORGE S. VILLAMIL, Associate Professor V, College of Veterinary Medicine, PSAU Technical Consultant of Tetra Consulting Corporation
August 6-10	Training Workshop on Writing Project Proposal for Funding Application	Dr. DANILDA H. DURAN, Scientist I Dr. CLARO N. MINGALA, Scientist III Dr. ERIC P. PALACPAC, Chief, KMD Dr. EUFROCINA P. ATABAY, Scientist I Dr. ESTER B. FLORES, Head, ABGS
September 26	Determination of Enteric Methane Generated from the Digestive System of the Buffalo	Ms. CHRISTINE AIRA HAYAG Ms. DANIELLE PAPA MAPUA Students
September 26	S&T Interventions for Improved Meat and Milk Production of Buffalo	Dr. DANIEL L. AQUINO, Center Director of PCC-CLSU
October 3	Developmental of Management Strategies for Detection and Reducing Embryonic Loss in Dairy Cows	Dr. EDWIN C. ATABAY, Scientist I
October 3	JSPS BRIDGE Fellowship	Dr. DANILDA H. DURAN, Scientist I
November 28-29	Technical Caucus on Data Analysis using Statistical Packages for Social Sciences (SPSS)	Dr. MA. EXCELSIS ORDEN, Assistant Professor Research Office Central Luzon State University (CLSU) Dr. ANNA MARIA LATONIO, Associate Professor, Central Luzon State University (CLSU)
December 10	Technical Seminar on 7S	Mr. RANDY P. UMALI, Division Manager of NCH

Table 2. List of Technical Caucus/Seminars conducted for CY 2018.

Awards and Recognitions

The PCC staff members continued to gain recognition from various award-giving bodies in 2018 (Table 3a). Several PCC researchers were also cited in their paper or poster presentations in scientific conferences (Table 3b).

Awardee	Title of Recognition	Award-Giving Body
Dr. Marvin A. Villanueva	2018 PSAS-UNAHCO, Inc. Outstanding Young Professional in Animal Science	Philippine Society of Animal Science (PSAS)
Dr. Eric P. Palacpac	2018 PSAS Outstanding Professional in Animal Science Extension	Philippine Society of Animal Science (PSAS)
Dr. Eric P. Palacpac	2018 Alumni Award	Ford Foundation International Fellowships Program
Ms. Lilian P. Villamor	Scholarship for Dissertation Doctorate Degree (FY:2018-2021)	Tokyo University of Agriculture-Southeast Asian Regional Center for Graduate Study and Research in Agriculture (Tokyo NODAI-SEARCA)
Dr. Danilda Hufana-Duran	Gintong Butil Award – Science and Technology	CLSU Alumni Association, Inc
Dr. Eufrocina P. Atabay	Gintong Butil Award – Veterinary Medicine	CLSU Alumni Association, inc
Dr. Danilda Hufana-Duran	Brotherhood Through Service to Fellowmen	University of the Philippines System Kappa Epsilon Fraternity, Inc.
Dr. Danilda Hufana-Duran	2018 Outstanding Filipino JSPS Fellow in the Field of Agriculture and Fisheries	Department of Science and Technology - Japanese Society for the Promotion of Science Alumni Association of the Philippines Inc
Dr. Eufrocina P. Atabay	Outstanding Alumni in Research, Central Luzon State University	College of Veterinary Science and Medicine Alumni Association, Central Luzon State University
Dr. Cecilio Castañeda	Outstanding Alumni, Central Luzon State University	College of Veterinary Science and Medicine Alumni Association, Central Luzon State University

Table 3a. Recognitions received by PCC staff members.

Awardee	Title of Recognition	Award-Giving Body
Balbin MM, dela Cruz DG, Gautane JJ, Mingala CN	Best Paper Award for the completed research	Research and Development Division – Philippine Carabao Center
Balbin MM, dela Cruz DG, Gautane JJ, Mingala CN	Best R&D Paper Gold Award, Agriculture and Fisheries Modernization Act (AFMA), Applied Research (Technology Generation/ Information Generation)-Agriculture Animal Science category	DA-Bureau of Agricultural Research
Balbin MM, dela Cruz DG, Gautane JJ, Mingala CN	Bronze Award, AFMA Best R&D Poster Category	DA-Bureau of Agricultural Research
Pagaduan MWA, Villanueva MA, Garcia GG, Mingala CN	Best Paper, Applied Research Category, PSAS “Monitoring of Aflatoxin M1 and Dairy Farm Management of Water Buffalo”	Philippine Society of Animal Science
Pagaduan NRA, Gaban PBV, Undan JR, Mingala CN	Best Paper, Disease and Diagnostics Category	Philippine Society of Animal Science
Pineda PS, Delos Santos J, Flores EB	1st Prize Poster Category	Philippine Society for Biochemistry and Molecular Biology (PSBMP)
Herrera RJV, Flores EB	Best Student Thesis 2018	Research and Development Division – Philippine Carabao Center
Miguel R, Atabay EP, Atabay EC, Ortiz JG, Tilwani R, Apolinario JP	Best Paper Award in Biotechnology, Philippine Society of Animal Science,	Philippine Society of Animal Science

Table 3b. Citations for PCC staff members who presented papers or posters in scientific conferences.

KNOWLEDGE MANAGEMENT



Communication for Development Campaign

The PCC through its Knowledge Management Division (KMD) started conducting a project titled “Strengthening Carabao Development Program Communication for Development (ComDev) Campaign in Visayas and Mindanao”, which aims at understanding the concerns and needs (related to communication) of farmer-clients in the PCC’s expansion areas in Panay Island, South Cotabato, Bukidnon, and Zamboanga del Norte and designing and implementing appropriate communication interventions.

In 2018, the ComDev project team evaluated the results of situational analysis held the previous year in the said areas and devised appropriate communication interventions. A series of activation program dubbed as “Karbawan” was then facilitated in Leon, Iloilo, Don Carlos, Bukidnon, Polanco, Zamboanga del Norte, Ipil, Zamboanga Sibugay, and Sto. Niño, South Cotabato. Different IEC materials were distributed during the activation program. Likewise, learning events such as FLS-DBP and SoA were facilitated in select areas.



183,094

→ Total no. of IEC materials distributed



79,105

→ Total no. of recipients of IEC materials



144

→ Total no. of media exposures in diverse news platforms



55

→ Total no. of trade fairs and exhibits



5,885

→ Total no. of scheduled and walk-in visitors received and oriented with a satisfaction rating of 4.76

Production and Distribution of Information, Education and Communication (IEC) Materials

In support of the agency’s external KM and technology transfer initiatives, the KMD has produced and distributed the following IEC materials in 2018:

- Six issues of NIZ Balitaan
- Four issues of Karbaw Magazine
- One special issue of Karbaw Magazine
- Four issues of Bubalus Newsletter
- One issue of R4D Highlights
- Six kinds of communication materials were developed and produced in support of the communication campaign project in Visayas and Mindanao
- Nine other IEC materials were produced and updated: “Sire Directory, Service Guide, 2017 Annual Report, Anniversary and NCC Souvenir Programs, Four Knowledge Products
- 16 Knowledge products (iASK Series) were updated and laid out
- A total of 183,094 copies of IEC materials were distributed by the KMD and regional centers to 79,105 identified PCC stakeholders, visitors, clients, and partner institutions

Other Media Forms

Three Knowledge café/media fora were organized and held on February 21, 2018 in Koronadal City, on March 27, 2018 during the PCC 25th Anniversary, and on October 8, 2018 during the 1st Livestock Technology Exposition in Tagbilaran City, Bohol.

Likewise, the KMD has facilitated 144 media exposures in diverse news platforms (TV, Radio, Press, Online, and Social Media). The agency, through the KMD and regional centers, has also participated in 55 trade fairs and exhibits.

Assistance to Visitors and Customers’ Satisfaction

A total of 5,885 (276 groups) scheduled and walk-in visitors were received, oriented on the PCC’s programs and services, and toured to the PCC’s facilities. The visitor’s bureau earned a satisfaction rating of 4.76.

Scientific Library Services

The agency has sourced additional 64 reference materials on its web-based Electronic Integrated Library System (EILS) and additional 502 titles of buffalo researches on its web-based International Buffalo Knowledge Resource Service (IBKRS). A total of 60 active linkages to external journal databases for sources of buffalo and livestock information have been established. Likewise, the KMD and RDD have facilitated the subscription to Science Direct Journal, which enables researchers and scientists to access over 4,495 journal titles.

BUSINESS DEVELOPMENT AND COMMERCIALIZATION



Business Talk and iREB Client Dashboard

The PCC's Business Development and Commercialization Unit (BDCU) formally launched the iREB Client Dashboard to the Regional CBED Coordinators during the "Business Talk 2018: "FIT (Future is in IT) for Business". This is in relation to PCC's commitment to promote business confidence among CBED Coordinators and the agency clients, particularly smallholder dairy buffalo farm business owners.

The event was conducted in two batches (Batch 1 in Iloilo on June 13-15, 2018 and Batch 2 in Nueva Ecija on July 11-13, 2018) with similar line-up of program and activities. The program aimed to set a vivid foundation of each participant's self-concept, locate their contributions in the "Learning Continuum", provide a quick and comprehensive review and assessment of basic business concepts, and ultimately roll-out the iREB Client Dashboards.

First Dairy Box Summit

The Dairy Box is envisioned as the primary marketing outlet for dairy products of impact zones in major towns and cities across the PCC network. As a business portfolio with life-stages, this feasible investment venture is progressing and evolving commendably in its introductory stage. New stores in PCC at USF are being established at a rapid phase. Consequently, the Dairy Box has proven its viability and has created remarkable impact on local dairy farmers. Several potential investors have in turn expressed their commitment in supporting the Dairy Box initiative.

The need to support the dynamic growth of five existing Dairy Boxes and the immense potential of establishing more stores have resulted in the conduct of the First Dairy Box Summit on September 24-26, 2018 at the PCC National Headquarters, Science City of Muñoz, Nueva Ecija. The event served as a venue for conveying a vivid picture of Dairy Box as launched and operated by managing cooperatives and for sharing practical strategies to overcome hurdles and reach milestones.

Business Research Writeshop

A Business Research Writeshop held on December 5-8, 2018 in Pampanga pooled together CBED coordinators, PMO managers and Cooperative BOD members who are spearheading dairy business enterprise in their respective locale. They were educated and inspired by speakers on simplified business modeling and enterprise marketing, as well as smart and basic ways to conduct business research that can be readily applied to their strategy formulation.

A day of learning and sharing was followed by a collaborative workshop on identifying researchable areas in within their enterprise. Titles of proposals and concepts were formulated under the Supply and Demand clusters, thus a list of each participant's commitments on business case analyses that will push forth improvements in their business models.

1ST DAIRY BOX SUMMIT



Business Enhancement Series Training (BEST)

Held on October 30, 2018, BEST was a hands-on capsule training on the latest tools developed for clients of PCC at UPLB such as Magdalena Dairy Raisers Association, Gentri, Bansud Goat Raisers and Other Ruminants Assoc., and Llano MMPC. Carrying the vision of BEST to advance the dairy farm businesses through capability build-up, the short course effectively introduced tool packages such as Business Talk Capsule Lecture, PMO Dashboard for Dairy Processing Business Units of Cooperatives, Client Dashboard Orientation & Commitment Setting, and Dairy Box Prototype Investment Potential for Dairy Cooperatives.



Basic Financial Reporting Concepts and Interpretation Workshop

The workshop, spearheaded by the PCC's NIZ coordinating team in collaboration with the BDCU was held on June 9, 2018 at the PCC National Headquarters, aimed at continually supporting the development of assisted cooperatives doing carabao-based enterprise.

The workshop covered basic finance and cash management concepts leading to formal FS preparation and a review of the role of internal and external audits and how they can take advantage of their external accountants or auditors.



INTEGRATED MANAGEMENT SYSTEM



The PCC through its Management Systems Audit Office (MSAO) ensured the successful transition of certification of the PCC National Headquarters and Gene Pool to ISO 9001:2015 (Quality Management System) and ISO 14001:2015 (Environmental Management System). Likewise, it has facilitated the renewal of the agency's certification to OHSAS 18001:2007 (Occupational Health and Safety Management System). The MSAO also assisted the transition of PCC at MMSU, PCC at USF, PCC at CSU, and PCC at USM to ISO 9001:2015 and assisted PCC at UPLB in re-gaining its ISO 9001 certification. It also facilitated trainings and internal quality audits to PCC at CMU and PCC at LCSF, both are now ready for certification audits to ISO 9001:2015.

HUMAN RESOURCE MANAGEMENT

The major accomplishments of the agency's Human Resource Management Section (HRMS) were summed up in terms of a continued transformation of its functions from purely transactional to strategic HRM. Specific highlights of accomplishments are as follows:

- Completed and submitted to the Civil Service Commission (CSC) the needed evidence requirements to maintain the Agency Level 2 PRIME HRM accreditation.
- Approval of the PCC Competency Manual. Transitioned into a Competency-based Human Resource Systems specifically in the Recruitment Process of the Agency.
- Approval of the PCC-Enhanced Strategic Performance Management System in line with the requirements of the CSC.
- Facilitated the recruitment, selection and placement of 16 research and administrative plantilla positions including the Deputy Executive Director position of the Agency and 25 Job Order staff.
- Facilitated capability building and continuing professional development of PCC staff by way of participation in various trainings, conferences, symposia, and other learning events held locally and abroad (Appendix 7).
- Spearheaded the Selection of the 2018 Most Outstanding Employees (PRAISE Awardees).
- Started the Competency Assessment with its expected completion in the 1st semester of 2019, as an input to the preparation of the agency's long-term HRD Plan.
- Started the creation of the Human Resource Management Information System with its expected completion and operationalization in the first semester of 2019.

- Facilitated the request of 30 schools to establish partnership with PCC in relation to the On-the-Job Training (OJT) Program of some 370 students.
- Conducted the 2018 Human Resource Summit to update all Supervisors and HR Designates of the 12 Regional Centers on the implementation of the Strategic Performance Management System (SPMS) and the Omnibus Rules on Appointments and Other Human Resource Actions.
- As of December 31, 2018, the PCC has workforce comprised of 198 permanent employees (Table 4) and 529 personnel under the Job Order (J.O.) Status.



Particulars	Administrative Staff	Support to Technical	Technical	Total
Office of the Executive Director	18	9	37	64
PCC at CLSU	3	4	19	26
PCC at UPLB	5	10	7	22
PCC at CSU			10	10
PCC at MMSU	1	2	6	9
PCC at DMMMSU			6	6
PCC at USF	1		6	7
PCC at VSU		1	5	6
PCC at WVSU	1	4	4	9
PCC at LCSF	1	2	5	8
PCC at CMU	3	5	7	15
PCC at USM	1		7	8
PCC at MLPC		4	4	8
Grand Total	34	41	123	198

Table 4. Distribution of PCC Plantilla (Regular) Personnel, CY 2018



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 2018, specifically addressing the following critical areas of the agency financial management system:

- **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.

- **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.

- **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 2018. 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 2018 Budgetary Expenditures

The FY 2018 PCC expenditures were focused on its 4th year commitment to its medium-term strategy in sustaining "intensified research-based enterprise buildup" (iREB). In particular, the emphasis was on implementing a more organized and wide-scale genetic improvement program, systematic extension and technology delivery, and creation of favorable environment for enterprise development. These are anchored on strengthened human resource competencies

and growing linkages and active partnership. The iREB's felt effect is seen at the community level where 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 and wider market reach.

In general, a shift in terms of the CDP's major strategies was undertaken to effectively manage program output and outcome at the sectoral level. Thus, the PCC's engagement in the conduct of meaningful Research for Development (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. 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.

Specifically, the usage of funds is channeled to meet the requirements for the expansion of R&D implementation in three areas:

- **Genetic Improvement Program (GIP).** This program focuses on the improvement of the genetic potential of carabaos for milk and meat through organized breeding and selection and conduct of R&D and related production support activities. In 2018, expenditures were focused to redesign the GIP to emphasize efforts towards the attainment of common medium and long-term goals of breed development. Development of animal sanctuary for genetic conservation were undertaken in Cagayan

through the efforts of PCC at CSU.

- **Cryobanking of Animal Genetic Resources.** Conservation of genetic materials of important livestock species and breeds is the main thrust of this sub-program component. This would include characterization of indigenous and introduced breeds. In 2018, PCC sustained the implementation of the in-vitro conservation of animal genetic materials of economically important carabao and livestock species/breeds for long term breeding requirements and in response to changing global environment.
- **Intensified Research and Development.** A good portion of the budget supported the efforts towards the development of DNA-based technologies for GIP that would be of great contribution to livestock industry development. R&D efforts supported the conduct of the development of DNA-based biotechnologies, marker-assisted selection, genetic defects screening, parentage and breed identification, product traceability (focused on meat products) to ensure food safety, product development, improved application of reproductive biotechniques for water buffaloes, and improving semen quality and AI efficiency.
- **Modelling CBEs.** Overall, the support to smallholder rural farming communities was implemented by way of PCC's compliance to RA 10611 (Food Safety Act of 2013), which is a tall order and commitment to carabao-based product consumers and RA 7307 (Philippine Carabao Act of 1992) clients. This shall prompt value chain players to come up with quality and standardised products in key areas. In effect, this will expand consumer satisfaction and advance PCC's social marketing approach in improving the welfare of its smallholder farming families. Likewise, this involved the conduct of extension and enterprise researches that facilitates technology transfer, harnesses skills of program clients, and improves business confidence amongst carabao-based micro-small-medium entrepreneurs (MSMEs).

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 5 presents the details of allotment and utilization.

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

Fund Source	Authorized Allotment (Php M)	Usage (Php M)	% Utilization
GAA	506.53	506.17	99.93
Personnel Services	129.62	129.26	99.70
Maintenance & Other Operating Expenses	345.96	345.96	100.00
Financial Expenses	0.05	0.05	100.00
Capital Outlay	30.90	30.90	100.00
Revolving Fund- Dairy Business Module and PCC Hostel	299.71	110.59	36.90
Externally funded special projects/ research funds	142.34	125.25	87.90
Foreign Assisted Projects	-	-	-
TOTAL	788.46	672.40	78.20

Table 5. PCC Sources and Utilization of Funds as of December 31, 2018 (Php Million).

PCC's Financial Condition

Table 6 presents the PCC's Statement of Financial Position at the end of FY 2018. The agency's total assets as of December 31, 2018 are valued at Php1,852.72 million comprising mainly of the agency's Property, Plant and Equipment (PPE) and biological assets. The new standard for accounting for biological assets as per the Philippine Public Sector Accounting Standards affected the decrease in agency's biological assets. The number of death of the said animals is within the acceptable rate of mortality.

Total liabilities posted was Php241.68 million and total accumulated surplus reached Php1,611.04 million. The increase in liabilities represents payables from various suppliers and contractors and increase of funds from the externally funded projects at year end.

Particulars	FY 2018	FY 2017	% Change
Assets			
Current Assets	625.16	602.36	4
Property, Plant & Equipment	1,048.44	1,120.89	-6
Biological assets	175.21	182.45	-4
Other assets	3.91	5.17	-24
Total Assets	1,852.72	1,910.87	-22
Liabilities	241.68	232.14	4
Accumulated Surplus	1,611.04	1,678.73	-4
Total Liabilities & Gov. Equity	1,852.72	1,910.87	-3

Table 6. Statement of Financial Position as of December 31, 2018 (Php Million).

Particulars	FY 2018	FY 2017	% Change
Revenue			
Business Income	114.14	106.77	6.9
Other Income	32.79	38.40	-14.6
Total Revenue	146.93	145.17	1.2
Current Operating Expenses			
Personnel Services	124.76	115.29	8.2
Maintenance & Other Operating Expenses	429.04	362.16	18.5
Other expenses	104.55	564.82	-81.5
Total Current Operating Expenses	658.35	1,042.27	-36.8
Surplus (Deficit) from Current Operation	(511.42)	(897.10)	-43.0
Assistance and Subsidy	481.28	412.82	16.6
Gain/(Loss) of Assets	(6.23)	(25.27)	-75.3
Surplus (Deficit) for the period	(36.37)	(509.55)	-92.9

Table 7. Statement of Financial Performance for the period ending of December 31, 2018 (Php Million).

Table 7 presents the PCC's Statement of Financial Performance for the year end FY 2018. The agency's total revenue for the year reached Php146.93 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. Likewise, income from hostels/dormitories and other similar facilities was started to be reported in 2018 under the revolving fund account (06207553 – Off-Budgetary Funds) as per authorization given by DBM. These incomes represent the revolving fund of the agency.

Personnel Services expenses posted Php124.76 million, while total maintenance and other operating expenses including other expenses totaled Php533.59 million giving a deficit from current operation of Php511.42 million. The increase in personnel services is due to the 3rd tranche implementation of the Salary Standardization Law of 2016. The significant decrease by 81.5% of the other expenses is due to the recognition of loss from changes in fair value less costs to sell biological assets due to physical change.

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
1	Dairy Buffalo Production and Management	January	30	LCSF
2	Advance in Animal Health	January	20	USF
3	Calf Rearing Management	January	2	CMU
4	Dairy Farmers Dashboard Baseline Workshop	January	49	USF
5	Dairy Management	January	2	CMU
6	Farmers Livestock School - Basic Financial Management Enterprises	January	19	MMSU
7	Farmers Livestock School - Milking the Buffalo Cow	January	17	MMSU
8	Feedlot Management	January	3	CMU
9	Fieldtrip at Genepool / Silage Making / Vermi Composting	January	20	DMMMSU
10	FLS San Miguel (Housing and Body Condition Scoring Training)	January	18	USF
11	Forage Production and Management Training	January	120	USF
12	Gender-Based Entrepreneurial Skills Training on Organizational	January	36	USF
13	Info Drive / Training	January	34	DMMMSU
14	Intro to Social Preparation Training for Participants of Carabao Fattening Program	January	25	USF
15	Leadership Build	January	10	USF
16	Milk Control and Processing	January	11	LCSF
17	On-the-job Training	January	5	MMSU
18	On-the-job Training	January	2	CLSU
19	On-the-job Training	January	25	USF
20	Orientation SLP - Dairy Buffaloes	January	20	DMMMSU
21	Pasture Management	January	2	CMU
22	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	January	1	MMSU
23	SPT and "SMILE" Loan Disbursement Training	January	14	USF
24	SPT Orientation Session For "Grow-out" Program	January	21	USF
25	Training on Soap Making	January	18	WVSU
26	Basic Buffalo Management Training	February	32	MLPC
27	Basic Training Course on Artificial Insemination and Pregnancy Diagnosis on Large Ruminants	February	15	USF
28	Bull Handlers Training	February	13	CMU
29	Calf Rearing Management	February	30	CMU
30	Dairy buffalo production and management	February	139	LCSF
31	Dairy Buffalo Production & Management Training	February	79	DMMMSU
32	Dairy Management	February	30	CMU

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
33	Farmers Livestock School - Forage-based and Manure-based	February	23	MMSU
34	Farmers Livestock School - Meat-based Enterprises	February	21	MMSU
35	Farmers Livestock School - Milk-based Enterprises	February	27	MMSU
36	Feedlot Management	February	29	CMU
37	Hands-on Training for milk handling walk-ins	February	2	USF
38	Marketing Management	February	10	CMU
39	Milk and Milk Processing	February	6	CMU
40	Milk handling and processing	February	18	LCSF
41	Milk Processing	February	10	CMU
42	On-the-job Training	February	4	CLSU
43	On-the-job Training	February	9	USF
44	Orientation SLP - Dairy Buffaloes	February	61	DMMMSU
45	Pasture Management	February	25	CMU
46	Practical Training on Milk Handling	February	6	UPLB
47	Practical Training on Semen Handling	February	2	UPLB
48	Seminar on Dairy Carabao Management	February	151	DMMMSU
49	Social Preparation Training	February	31	CSU
50	Social Preparation Training	February	73	MLPC
51	Training on Milk Quality Testing	February	5	UPLB
52	Work Immersion	February	10	VSU
53	Calf Rearing Management	March	18	CMU
54	Dairy Buffalo Enterprise Development	March	63	LCSF
55	Dairy Buffalo Production & Management Training	March	50	DMMMSU
56	Dairy Management	March	18	CMU
57	Feedlot Management	March	18	CMU
58	Hand Milking & Milk Processing	March	22	USM
59	Hands-on Training for Milk and Milk Handling	March	2	USF
60	Marketing Management	March	7	CMU

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
61	Milk and Milk Processing	March	7	CMU
62	On-the-job Training	March	1	CLSU
63	Pasture Management	March	18	CMU
64	PCC Program, Animal Health Training	March	76	VSU
65	Practical Training on CBE Operation	March	9	UPLB
66	Technical Training on Dairy Buffalo production and Management	March	28	UPLB
67	Technical Training on Dairy Production and Management	March	30	UPLB
68	Work Immersion	March	5	VSU
69	Dairy buffalo enterprise development	April	12	LCSF
70	Practical Practices for Farmer on Buffalo	April	28	MLPC
71	Advances in Animal Health	April	85	LCSF
72	Basic Training Course on AI & PD in Large Ruminants	April	8	UPLB
73	Calf Rearing Management	April	34	CMU
74	Carabao Milk Soap Processing Training	April	28	USF
75	Carabao Milk Soap Processing Training	April	39	USF
76	Dairy Buffalo Production and Management	April	59	LCSF
77	Dairy Buffalo Production and Management	April	114	WVSU
78	Dairy Management	April	6	CMU
79	Feedlot Management	April	20	CMU
80	Hand Milking and Milk Processing	April	11	USM
81	Hands-on Training for Milk and Milk Handling	April	3	USF
82	Hands-on training for walk-in	April	56	LCSF
83	Marketing Management	April	5	CMU
84	Milk and milk handling	April	56	LCSF
85	Milk and milk handling	April	227	WVSU
86	Milk and Milk Processing	April	5	CMU
87	Milk handling and milk processing	April	29	LCSF
88	Milk Quality Control and Processing	April	1	WVSU

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
89	Milking & Dairy Management	April	28	CMU
90	On-the-job Training	April	114	WVSU
91	On-the-job Training	April	10	CLSU
92	On-the-job Training	April	4	USF
93	Orientation on Importance of Milk/Milk Feeding	April	145	DMMMSU
94	Pasture Management	April	35	CMU
95	Practical Training on basic recording of dairy operation	April	2	UPLB
96	Practical Training on basic recording on animal production	April	9	UPLB
97	Practical Training on basic recording on animal production, Bull Breeding and calf Drop	April	1	UPLB
98	Practical Training on Milk Quality Testing	April	9	UPLB
99	Practical Training on Milking, Milk Handling and Quality Testing	April	4	UPLB
100	Practical Training on Product Costing	April	4	UPLB
101	Training Course on Dairy Buffalo Management, Milk Collection, Processing and Marketing	April	17	CSU
102	Training on Buffalo Production and Management	April	23	CSU
103	Training on Dairy Buffalo Management	April	13	UPLB
104	Advances in Animal Health	May	8	LCSF
105	Bull Management Training	May	25	CLSU
106	Calf Rearing Management	May	18	CMU
107	Dairy Buffalo Production and Management	May	39	LCSF
108	Feed/ Forage Conservation Training	May	12	USF
109	Feeding Management Training	May	17	USF
110	Feedlot Management	May	32	CMU
111	Hands-on Training for Milk and Milk Handling	May	2	USF
112	Hands-on training for walk-in	May	27	LCSF
113	Milk and milk handling	May	57	LCSF
114	Milk Collection, Handling & Processing	May	8	VSU
115	Milk Processing	May	3	CMU
116	Milking & Dairy Management	May	18	CMU

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
117	On-the-job Training	May	16	CLSU
118	On-the-job Training	May	8	USF
119	On-the-job Training	May	20	VSU
120	Ovarian Palpation Training	May	15	CLSU
121	Pasture Management	May	17	CMU
122	Practical Training on basic recording and database mgt of AI services and calf drop	May	1	UPLB
123	Practical Training on Milk Handling and Quality Testing	May	5	UPLB
124	Practical Training on Organizational Development and Planning-Worshop on CBE	May	9	UPLB
125	Short Training Course on Pregnancy Diagnosis	May	28	CLSU
126	Training on Milk Handring and Processing	May	13	CSU
127	Training-Coaching on CBE Operation	May	4	UPLB
128	"SMILE" Leadership Training	June	31	USF
129	Basic Training Course on Artificial Insemination & Pregnancy Diagnosis in Water Buffaloes	June	17	CLSU
130	"Basic Training Course on Pregnancy Diagnosis & Artificial Insemination on Water Buffaloes"	June	12	CMU
131	Calf Rearing Management	June	4	CMU
132	Dairy Buffalo Enterprise Development	June	14	LCSF
133	Dairy Management	June	4	CMU
134	Farmers Livestock School on Dairy Buffalo Production (FLS-DBP)	June	88	CSU
135	Feedlot Management	June	14	CMU
136	Hands-on Training on Milk Evaluation and Processing (Choco milk and Pastillas)	June	1	CLSU
137	Hands-on Training on Milk Processing (Choco milk and Pastillas)	June	2	CLSU
138	Hands-on Training on Milk Processing (Yogurt)	June	1	CLSU
139	Launching of Farmers Livestock School on Dairy Buffalo Production (FLS-DBP)	June	30	CSU
140	Milk and milk handling	June	41	LCSF
141	Milk Based Enterprise	June	26	MLPC
142	Milk Control and Processing	June	58	LCSF
143	On-the-job Training	June	6	CLSU
144	On-the-job Training	June	2	USF

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
145	On-the-job Training	June	2	USF
146	On-the-job Trainin+B155:E182g	June	10	VSU
147	Pasture Management	June	8	CMU
148	Practicum	June	105	VSU
149	Pregnancy Diagnosis (Lecture & Demo)	June	27	CSU
150	Skills Training On Carabao Raising and Management leading to Raw	June	35	MMSU
151	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	June	29	MMSU
152	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	June	1	MMSU
153	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting (Field Exposure)	June	18	MMSU
154	Technical training on Dairy Buffalo Production & Management	June	16	CMU
155	Training on Calf Rearing Management	June	4	CMU
156	Training on Dairy Processing	June	11	UPLB
157	Calf Rearing Management	July	2	CMU
158	Dairy Buffalo Enterprise and Development	July	113	LCSF
159	Dairy Buffalo Production & Management Training Cum GAD Orientation	July	18	DMMMSU
160	Dairy Buffalo Production and Management	July	10	LCSF
161	Dairy Management	July	2	CMU
162	Farmers Livestock School on Dairy Buffalo production	July	60	CSU
163	Farmers Livestock School on Dairy Buffalo production	July	40	MLPC
164	Hand's on Training on Milking	July	2	USF
165	Hand's-on Training on Milking Machine	July	3	USF
166	Leadership Training	July	24	USF
167	Marketing Management	July	6	CMU
168	Milk Processing	July	6	CMU
169	On-the-job Training	July	15	USF
170	on-the-Job Training in Carabao Production and Management	July	5	MMSU
171	Practicum	July	76	VSU
172	Refresher Course on AI and Ovarian Palpation with the help of Ultrasonography	July	16	USF

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
173	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	July	61	MMSU
174	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting (Field Exposure)	July	13	MMSU
175	Technical Training on Dairy Buffalo production and Management	July	31	UPLB
176	Training on Animal Health & CBED	July	2	VSU
177	Training on carabao management & animal health	July	49	VSU
178	Animal, Breeding and Heat Detection Training	August	62	WVSU
179	Artificial Insemination Technician's Enhancement Seminar	August	44	USF
180	Dairy Food Safety Training	August	41	VSU
181	Farmers Livestock School on Dairy Buffalo production	August	38	MLPC
182	Leadership Training on Organizational Strengthening	August	15	USF
183	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	August	31	MMSU
184	Training on Buffalo Production and Management	August	70	CSU
185	Training on Carabao Upgrading Program and Buffalo Production and Management	August	60	MMSU
186	Training on Dairy Processing	August	13	UPLB
187	Training on Milk Quality Testing	August	5	UPLB
188	Carabao-Based Livelihood opportunities	September	21	MLPC
189	Dairy Buffalo Production and Management	September	33	UPLB
190	Farmers Livestock School on Dairy Buffalo production	September	34	MLPC
191	FLS - DBP First Session	September	16	USF
192	FLS - DBP Second Session	September	22	USF
193	FLS - DBP Third Session	September	20	USF
194	Leadership Training	September	2	USF
195	Milk Handling	September	56	CMU
196	Milk processing Carabao Dairying and Artificial Inseminated	September	151	LCSF
197	Practical Training on Milk Quality Posting	September	7	UPLB
198	Quarterly Stakeholders Consultation and Leadership Training	September	97	USF
199	Refresher Course on AI and Ovarian Palpation with the help of Ultrasonography	September	17	USF
200	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	September	58	MMSU
201	Social Preparation Training	September	25	MLPC
202	Training on Milk processing	September	29	LCSF
203	Advance AI On Clinical Aspects of Ovarian Palpation of Water Buffalo	October	14	CMU
204	Advance Training on Ovarian Palpation in Water Buffaloes	October	12	CSU
205	AI & PD Training	October	9	UPLB

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
206	Basic Training Course on Artificial Insemination and Pregnancy Diagnosis on Large Ruminants	October	15	USF
207	Bull Management Training	October	16	USM
208	Conduct milking	October	6	VSU
209	First-hand information and experience in dairy farm	October	102	VSU
210	FLS - DBP Training Fourth Session	October	9	USF
211	Hands-on Training for Milk and Milk Handling	October	2	USF
212	Milk Processing and Feeds and Feeding	October	67	WVSU
213	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting	October	70	MMSU
214	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting (Field Exposure)	October	33	MMSU
215	Training Course Buffalo Bull Management	October	22	CSU
216	Training on Carabao Production Management System	October	17	USM
217	Unified Artificial Insemination Training	October	21	USM
218	Capacity building of existing coops	November	49	LCSF
219	Advances in Animal Health	November	39	LCSF
220	Dairy Buffalo Production and Management	November	45	WVSU
221	Entrepreneurial Development	November	49	LCSF
222	Farmers Livestock School on Dairy Buffalo production	November	20	CSU
223	FLS - DBP Training Fifth Session	November	11	USF
224	FLS - DBP Training Sixth Session	November	9	USF
225	Hands-on Milk Collection Training	November	9	VSU
226	Hands-on Processing of Milk & Milk Products	November	30	MMSU
227	Milk and milk handling	November	45	WVSU
228	On-the-job Training	November	45	WVSU
229	Skills Training On Carabao Raising and Management leading to Raw Milk Production Cum Vermi-Composting (Field Exposure)	November	29	MMSU
230	Training on Pasture Management	November	5	CMU
231	Basic Buffalo Management	December	24	MLPC
232	Basic Training Course on Artificial Insemination & Pregnancy Diagnosis in Water Buffaloes	December	11	CSU
233	Basic Training Course on Artificial Insemination & Prenancy Diagnosis in Water Buffaloes	December	12	CLSU
234	Dairy Buffalo Production and Management	December	20	CLSU
235	Farmers Livestock School on Dairy Buffalo Production (FLS-DBP)	December	27	CSU
236	Farmers Livestock School on Dairy Buffalo Production (FLS-DBP) Educational Trip	December	64	CSU
237	Farmers Training for Calf Rearing	December	25	CLSU
238	Good Animal Husbandry Practices	December	16	CSU
239	Hands On Milking	December	2	DMMMSU
240	Hands-on Processing of Milk & Milk Products	December	11	MMSU

Appendix 1. CY 2018 Trainings Conducted by PCC and Number of Participants.

No.	Title of Training Conducted	No. of Participants	Month	Center
241	Milk and Milk Processing	December	21	CMU
242	Silage Training	December	25	CLSU
243	Training Course on Dairy Buffalo Management, Milk Collection, Processing and Marketing	December	16	CSU
244	Training Course on Dairy Buffalo Management, Milk Collection, Processing and Marketing	December	16	CSU
245	Training on Dairy Management	December	4	CMU
		Grand Total	6,633	

Appendix 2. CY 2018 Trainings Conducted for the National Impact Zone (Nueva Ecija).

No.	Trainings/Seminar/Fora Conducted	No. of Participants	Month	Center
1	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping Via iREB Dashboard	12	January	PCC Training Hall
2	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping Via iREB Dashboard	23	February	San Jose City
3	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping Via iREB Dashboard	25	February	Catalanacan, Science City of Munoz
4	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping Via iREB Dashboard	23	February	Pulong Buli, Sto. Domingo
5	Social Preparation Training	21	February	Imelda Valley I, Palayan City
6	Women Entrepreneurs Inspiring Women Entrepreneurs	50	March	PCC Training Hall
7	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping with the use of iREB Dashboard	15	March	PCC Training Hall
8	Basic Buffalo Management Training	31	April	Palayan City
9	Animal Health Care Training	17	April	PCC Training Hall
10	Bull Management Training	25	May	Digdig, Ranch
11	11th Gatas Festival	630	May	Municipal Hall, Talavera
12	Basic Financial reporting and Interpretation	57	May	PCC Training Hall
13	Seminar-Workshop on Dairy Regulations and Standards Cum Record Keeping with the use of iREB Dashboard	26	May	Municipal Hall, San Jose City
14	On-site Training on Feeding Management, Forage Production, Conservation and Utilization	50	July	Municipal Hall, Palayan City
15	Basic Buffalo Management Training	34	July	Ariendo, Bongabon,
16	Seminar on Good Management Practices (GMP) and Food Safety	31	August	PCC
17	On-site Training on Feeding Management, Forage Production, Utilization and Conservation	45	September	Municipal Covered Court, Bongabon
18	Trouble Shooting for Milking Machine for SSF Dairy Cooperators	25	September	PCC
19	Social Preparation Training	24	November	San Carlos, Aliaga
20	Basic Buffalo Management Training	26	November	PCC
	Total	1,190		

Appendix 3a. List of On-going Researches, CY 2018

Thematic Areas	Program/Project Title	Project Leader/ Proponents
BIOSAFETY	Bovine vaccine trial of Schistosoma japonicum paramyosin	CNMingala, MSLJiz
	Investigation on the extent of Leptospira infection among different water buffaloes in the Philippines	MAVillanueva
	Genetic assessment of Trypanosoma spp. towards vaccine development	CN Mingala; NS Abes,
	Application of a cheap, sensitive and rapid point-of-care diagnostic kit for brucellosis detection in water buffalo	MAVillanueva, CNMingala
	Project 3: Development of health care technologies and practical farm practices in support of increasing buffalo milk production	CN Mingala; MA Villanueva
	a. Bacterial Diversity of Mastitic Milk of Water Buffalo in Selected Cooperatives of the National Impact Zone	NRA Pagaduan
	Epidemiological surveillance and development of diagnostic protocols for neglected disease of large ruminants (water buffalo and cattle) in the Philippines	CN Mingala, NS Abes
	Correlates of immunity to Hemorrhagic Septicemia in water buffaloes	SH Gamol
	Surveillance and characterization of antimicrobial resistant Escherichia coli and Salmonella from livestock farms, egg, milk and meat in the Philippines	CN Mingala
	Circulation of Leptospira in wild rodent and livestock in Philippines and serological investigation of Leptospirosis in domesticated livestock	CN Mingala
	In vivo application of mixed herbal medicine Shin Nakamori Juisan for the treatment of diarrheic domesticated animals	CN Mingala
	Isolation and Purification of Cathepsin L Proteinase and Paramyosin from Mature Fasciola spp.	CN Mingala
	Molecular Characterization of Lactic Acid Bacteria Isolated from Water Buffalo's Milk Functioning as Reservoirs of Mobile Antibiotic Resistance Genes	CN Mingala
	Molecular Characterization of Coccidia spp. in water buffaloes towards vaccine development	NS Abes
	Molecular characterization and Gene Expression of TLR4 and MHC II-DRB3 genes in lactating water buffaloes and goats	NP Medina; CN Mingala
	Molecular Characterization of TLR4 and MHC class II DRB3 genes in Cattle and their Association with the Occurrence of Subclinical Mastitis	C Libong
	Prevalence, Molecular Epidemiology and Antibiotic Resistance of Resistant Staphylococcus aureus (MRSA) from Milk and Nasal Samples of Dairy Buffaloes	CN Mingala
	Development of Highly Sensitive Immunochromatographic Test Strip using Gold Nanoflowers for Staphylococcus aureus Detection in Milk	CN Mingala
Prevalence and risk factors of Trypanosoma evansi infection among water buffaloes in Ubay, Bohol, Philippines	EP Tapdasan	
Antibiotic Residue Detection and Antimicrobial Resistance Profile of Staphylococcus aureus and Escherichia coli from Raw Milk of Water Buffaloes (Bubalus bubalis) in Nueva Ecija, Philippines	RB Tolentino	

Thematic Areas	Program/Project Title	Project Leader/ Proponents
GENETIC IMPROVEMENT	Establishing baseline parameters for eye muscle area in buffaloes using real-time ultrasound	KJ Prades
	Association of single nucleotide markers with estimated breeding values (EBVs) for milk yield and milk component traits of Philippine dairy buffaloes	EB Flores
	Association of bovine genetic markers with marbling and tenderness in buffaloes (<i>Bubalus bubalis</i>)	J de Los Santos
	Screening for additional microsatellite markers for second stage validation protocol of parentage testing in buffaloes (<i>Bubalus bubalis</i>)	MN Reyes
	Molecular Characterization and Screening of β -casein gene (β -casein milk variants) in different breeds of Buffaloes in the Philippines	PS Pineda
	Detection of Foreign Body in Rumen and Reticulum of Buffaloes Using Real-time Ultrasound	KJ Prades
	Evaluation of Milk Production Performance in selected dairy cooperatives in Nueva Ecija.	GG Gantioque
	Molecular Characterization and Polymorphism of Inhibin (INH β A) Gene in Water Buffalo	SC Babera
	Genetic Diversity of the Philippine Carabao mtDNA (COI) and microsatellite markers (FAO STRs)	LP Villamor
	Gene Expression Analysis and Detection of Heat Shock Protein (HSp70) and Its Association with Semen Quality and Seasonal Variation	ERS Maylem
	a. Detection of HSp70 gene in blood lymphocytes of water buffaloes and its relevance to heat stress	ERS Maylem
	Intervention in Post-Partum Management to Improve Artificial Insemination Efficiency in Water Buffaloes	BH Granada
	Enhancing AI Efficiency Through Synchronized Ovulation and Fixed Time AI in Water Buffaloes	EP Atabay
	Early Pregnancy Diagnosis by Detection of Pregnancy-Associated Glycoproteins Using Various Biotechnologies in Water Buffaloes	EP Atabay
	Improving artificial insemination efficiencies using fertility-indexed bulls selected by Fourier Harmonic Analysis and Screened from Environmental Instabilities	PG Duran
	a. The Use of Cattle Oocytes in the In vitro fertilization Assay of High and Low Fertile Bulls Selected by Fourier Harmonic Analysis	DH Duran
	b. Incidence and Management intervention of reproductive disorders in dairy buffaloes of smallhold farmers in Nueva Ecija	PG Duran
c. Quality at Fresh and Post-Thawed Spermatozoa of High and Low Fertile Bulls Selected by Fourier Harmonic Analysis	DH Duran	
Project 2. Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes	EC Atabay	

Thematic Areas	Program/Project Title	Project Leader/ Proponents
GENETIC IMPROVEMENT	a. Serum Determination of Pregnancy Associated Glycoprotein during and after Pregnancy in Riverine Buffaloes (<i>Bubalus bubalis</i>)	LM Rigos; EC Atabay
	b. Pregnancy Associated Glycoproteins (PAGs) and Progesterone Concentration in Milk as Pregnancy Indicator for Lactating Water Buffaloes	EC Atabay
	Optimizing Artificial Reproductive Technologies (ART) in Water Buffaloes Through the Regulation of Ovarian Function	EP Atabay
	a. In Vitro Embryo Production from OPU-derived Oocytes for Vitrication and Embryo Transfer in Water Buffaloes	EP Atabay
	b. Validation of Ovulation Synchronization Protocols and Optimization of its Efficiency in Water Buffaloes	EP Atabay
	c. Factors Affecting Efficiency of FTAI in Water Buffaloes	EP Atabay
PRODUCT DEVELOPMENT	Product Standardization Across Regional Centers of the Philippine Carabao Center	MP Abella
	Project 4: Milk Quality and Safety Assurance from Farm to Milk Processing Plant	MP Abella
	Quality Characteristics of Flavored Dulce de Leche as Affected by Different Levels of Fat Content of Buffalo's Milk Dulce de Leche	PCO Saturno
	Sensory, Physico-Chemical and Microbiological Assessments of Carabao's Milk Products of Dairy Box of the Catalanacan Multi-Purpose Cooperative (CAMPC)	ZG Battad
PRODUCTION MANAGEMENT SYSTEM	Development of Feeding Protocols and Practices to Support the Nutritional Requirement of Dairy Buffaloes	DL Aquino
	Effects of Chitosan from Shrimp Shells on the Growth and Yield in Forage Grasses	RD Amido
	Performance of Growing Buffalo Calves Fed with Mulato II Grass (<i>Brachiaria</i> sp.) with or without Concentrate Supplementation	LC Paraguas
	Performance of dairy buffaloes fed ration with baker's yeast (<i>Saccharomyces cerevisiae</i>) – fermented cassava pulp	CB Salces
	Growth and Reproductive Performance of Dairy Buffalo heifer with Mineral Block and Locally Formulated Mineral Supplement	GP Bajenting
	Nutritive Value, Digestibility and Performance of Buffaloes Using Banana Stalks and Water Lily	DL Aquino
	Herbage Yield and Nutrient Composition of Five Improved Forage Grasses Applied with Biogas Sludge as Fertilizer	VG Lopez
	Nutritional Evaluation of Hydroponic Corn Fodder and its Effect as Substitute for Feed Concentrates for Feeding Buffalo Calves	CI Castillo

Thematic Areas	Program/Project Title	Project Leader/ Proponents
GENETIC IMPROVEMENT	Screening for Sperm-factor (Phospholipase C-zeta) by Molecular Technique as a Novel Biomarker of Bull Fertility for Genetic Improvement in Water Buffaloes	EP Atabay
	PLCz1 mRNA expression in buffalo sperm and its correlation with In-vitro Fertilization in Water Buffalo (<i>Bubalus bubalis</i>)	EP Atabay
	Factor affecting Artificial Insemination Efficiencies in the Villages	DH Duran
	The effect of season on the fertility of water buffalo bulls	DH Duran
	Epididymal Sperm Cryopreservation as a Tool for the Conservation In vitro of Indigenous Livestock and/or Endangered Wildlife in the Country: Prospects for Animal Genetic Resources (AnGR)	LC Ocampo
	a. Quality and fertilizing potential of epididymal sperm from Philippine water buffalo.	MB Ocampo
	b. Viability of goat epididymal sperm from post-mortem testicles kept at refrigeration temperature during transport	LC Ocampo
	c. Temperature effect on the quality of post mortem derived epididymal sperm from Corriedale ram (<i>Ovis aries</i>) and Sahiwal bull (<i>Bos taurus</i>) testicles during transport	MB Ocampo
	Utilization of Epididymal sperm of slaughtered livestock for basic research using Assisted Reproductive Techniques (ART's)	LC Ocampo
	a. Relationship between testicular biometric traits and epididymal characteristics in Philippine carabao (<i>Bubalus bubalis carabanensis</i>)	LC Ocampo
	b. Kinetics of meiosis and embryogenesis of bovine, bubaline and porcine oocytes matured and fertilized in vitro	MB Ocampo
	c. Utilization of Testicular sperm for gametes preservation and its applicability in species conservation of endangered wildlife ruminants in the Philippines	LC Ocampo
	d. Sperm Analysis by Computer Assisted Sperm Analyzer (CASA) of ejaculated sperm retrieved from Philippine native pigs (<i>Sus scrofa</i>)	IC dela Rosa
	e. Epididymal sperm recovery by retrograde flushing from post mortem testicles of butchered native pigs (<i>sus scrofa</i>)	JO Lofranco
	f. Microscopic anatomy of the reproductive organs of female Philippine native pig (<i>Sus scrofa</i>)	VD Viernes Jr.
	g. Completion of 1st meiosis of Philippine native pig oocytes in vitro after vitrification	MB Ocampo
	h. Gross morphometry of the male reproductive organs of Philippine native pig	VMP Cruz
	i. Timing of sequential changes during the 1st meiotic division of Philippine native pig oocytes cultured in vitro	MB Ocampo

Thematic Areas	Program/Project Title	Project Leader/ Proponents
GENETIC IMPROVEMENT	j. Scrotal circumference, testicular and epididymal sperm characteristics of cattle after 5 hr and 24 hr transport at refrigeration temperature	LC Ocampo
	Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes	EC Atabay
	a. Follicular Dynamics and Hormonal Profile During Estrous Cycle and of Ovulation Synchronization Treatment In Water Buffaloes (<i>Bubalus Bubalis</i>)	EC Atabay
	b. Follicular Dynamics and Hormonal Profile During Ovulation Synchronization by Ovsynch Treatment In Water Buffaloes (<i>Bubalus Bubalis</i>)	EP Atabay
	c. Effect of Different Prostaglandin (PGF2α) Analogues during Synchronization in Dairy Buffaloes (<i>Bubalus bubalis</i>)	EC Atabay
	d. Enhancing Prostaglandin-based Estrus Synchronization Protocol for Artificial Insemination in Water Buffaloes	EC Atabay
	Optimizing Artificial Reproductive Technologies (Art) in Water Buffaloes Through the Regulation of Ovarian Function	EP Atabay
	a. Improved Pregnancy in Water Buffaloes through Synchronization of Ovulation and Fixed Time Artificial Insemination Technique in Water Buffaloes	EP Atabay
	b. Comparison of Transrectal Ultrasonography and Pregnancy-Associated Glycoprotein Analysis in Detection of Early Pregnancy in Water Buffaloes (<i>Bubalus bubalis</i>)	RC Tilwani
	Genotyping the Philippine Water Buffaloes Using Medium Density 90K SNP Panel	EB Flores
	Genome-wide association study for milk traits in Philippine dairy buffaloes	JR Herrera
	Growth and Weight Estimate of Philippine Swamp Buffalo (<i>Bubalus bubalis</i> Linn.) in Piat, Cagayan	JF Maramba
	BIOSAFETY	Monitoring of Aflatoxin M1 (AFM1) and dairy farm management of water buffalo
Alpha-2-macroglobulin gene polymorphism in water buffaloes with subclinical mastitis		AMP Wy
PRODUCT DEVELOPMENT	Quality Improvement of Acidified Buffalo Milk Products Through Stabilization with Locally Produced Mango Peel Pectin	MP Abella
	Study 1. Physico-Chemical Properties and Sensory Characteristics of Whey Drink Stabilized with Locally Produced Mango Peel Pectin	MP Abella
	Study 2. Physico-Chemical Properties and Sensory Characteristics of Fermented Whey Beverage	MP Abella
	Study 3. Stabilization of Fermented Milk Products (Yogurt Drink and Yogurt Set) with Locally Produced Mango Peel Pectin	MP Abella

Appendix 3b. List of Completed Researches, CY 2018

Thematic Areas	Program/Project Title	Project Leader/ Proponents
GENETIC IMPROVEMENT	Sensory, Physico-Chemical and Microbiological Assessments of Carabao's Milk Products of Dairy Box of the Catalanacan Multi-Purpose Cooperative (CAMPC)	ZG Battad
	a. Physico-Chemical Characterization and Molecular Profiling of Bacteria Associated with Pasteurized Buffalo Milk from a Dairy Cooperative of Nueva Ecija	ZG Battad
	b. Microbial Isolation and Characterization of Carabao-Based Product (Espasol de Leche) Sold in Dairy Cooperatives of Nueva Ecija	ZG Battad
	c. Physico-Chemical Characterization and Microbial Isolation of Bacteria Associated with Pasteurized Buffalo Milk from a Dairy Cooperative in Nueva Ecija	ZG Battad
	d. DNA Barcoding and Characterization of Microflora Associated with Bibingkang Gatas, a Carabao-based Product of Dairy Cooperatives of Nueva Ecija	ZG Battad
	e. Bacterial Isolation and Characterization of Bibingkang Kanin, a Carabao-based Product of Dairy Cooperative of Nueva Ecija	ZG Battad
PRODUCTION MANAGEMENT SYSTEM	Determination of Enteric Methane Emission Generated from the Digestive System of the Philippine Female Buffalo	CA Hayag; D Papa
SOCIO-ECONOMIC DIMENSIONS OF CDP IMPLEMENTATION	An Evaluation of the Financial Viability of Buffalo Dairy Farming Business in Nueva Ecija and Pampanga	ZG Sanchez
OTHER LIVESTOCK SPECIES	Cryopreservation of Spermatozoa collected from Excurent ducts of Nondescript rooster	FP Aquino
	Utilization of DNA Marker Selection in Breeder and Commercial Swine Farm Units.	EB Flores

Appendix 3c. List of Externally Funded and Collaborative Researches, CY 2018

Project Title	Project Leader	FUNDING/ COLLABORATING AGENCY
Gene Expression Analysis and Detection of Heat Shock Protein (HSP70) and its Correlation with Buffalo Semen Quality and Seasonal Variation	ERS Maylem	DA-Biotech
Improving Artificial Insemination Efficiencies using Fertility Indexed Bulls Selected by Fourier Harmonic Analysis and Screened from Environmental Stabilities	PG Duran	DA-Biotech
Genetic Diversity of the Philippine Carabao mtDNA (COI) and microsatellite markers (FAO STRs)	LP Villamor	DA-Biotech
Molecular characterization and gene expression of TLR4 and MHC II DRB3 genes in water buffaloes and goats	CNMingala, NPMedina	DA-Biotech
Operationalization of Livestock Biotechnology Center	CN Mingala	DA-Biotech

Appendix 3c. List of Externally Funded and Collaborative Researches, CY 2018

Project Title	Project Leader	FUNDING/ COLLABORATING AGENCY
Gene Expression Analysis and Detection of Heat Shock Protein (HSP70) and its Correlation with Buffalo Semen Quality and Seasonal Variation	ERS Maylem	DA-Biotech
Improving Artificial Insemination Efficiencies using Fertility Indexed Bulls Selected by Fourier Harmonic Analysis and Screened from Environmental Stabilities	PG Duran	DA-Biotech
Genetic Diversity of the Philippine Carabao mtDNA (COI) and microsatellite markers (FAO STRs)	LP Villamor	DA-Biotech
Molecular characterization and gene expression of TLR4 and MHC II DRB3 genes in water buffaloes and goats	CNMingala, NPMedina	DA-Biotech
Operationalization of Livestock Biotechnology Center	CN Mingala	DA-Biotech
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	CN Mingala	DA-Biotech
Nutritive Value, Digestibility and Performance of Buffaloes Using Banana Stalks and Water Lily	DL Aquino	DA-BAR
Development of Sustainable Rice Straw Management Practices and Technologies for Ruminant Fodder in the Philippines (RiceStrawPH) - PCC Component	AN del Barrio	DA-BAR
Utilization of Epididymal sperm of slaughtered livestock for basic research using Assisted Reproductive techniques (ART's)	LC Ocampo	DA-BAR
Application of Genomic Information in Dairy Buffalo Breeding Program: Genotyping the Philippine Water Buffalo using Medium Density 90k Buffalo SNP Panel	EB Flores	PCAARRD
Genome analysis and establishment of germ cell cryopreservation for Philippine native pigs	LC Ocampo	PCAARRD
Program Title: Enhancing Milk Production of Water Buffaloes through S&T Interventions	AN del Barrio	PCAARRD
Project 1: Development of Feeding Protocols and Practices to Support the Nutritional Requirement of Dairy Buffaloes	DL Aquino	
Project 2: Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes	EC Atabay	
Project 3: Development of Health Care Technologies and Practical Farm Practices in Support of Increasing Buffalo Milk Production	CN Mingala	
Project 4: Milk Quality and Safety Assurance from Farm to Milk Processing Plant	MP Abella	
Project 5: Strengthening San Agustin Crossbred Carabao-Based Enterprise Development (CBED) Model	AS Sarabia	

Appendix 3c. List of Externally Funded and Collaborative Researches, CY 2018

Project Title	Project Leader	FUNDING/ COLLABORATING AGENCY
Utilization of DNA Marker Selection in Breeder and Commercial Swine Farm Units	EB Flores	PCAARRD
Establishment of Dairy Cattle Foundation Breeder Herd Thru ET Using Imported Pedigreed Frozen Embryos	J Lopez EP Atabay	PCAARRD
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	EP Atabay	PCAARRD
Surveillance and Characterization of Antimicrobial Resistant Escherichia coli and Salmonella from Livestock Farms, Milk and Meat in the Philippines	CN Mingala	World Health Organization
Quality Improvement of Acidified Buffalo Milk Products Through Stabilization with Locally Produced Mango Peel Pectin	PCO Saturno	PHILMECH
Bovine Vaccine Trial of Schistosoma japonicum Paramyosin	CN Mingala MSL Jiz	Research Institute for Tropical Medicine
Investigation on the Extent of Leptospira Infection Among Different Water Buffaloes in the Philippines	MA Villanueva	Hokkaido University
Genetic assessment of Trypanosoma spp. towards vaccine development	CN Mingala	NIMBB, UP Diliman
Circulation of Leptospira in wild rodent and livestock in Philippines and serological investigation of Leptospirosis in domesticated livestock	CN Mingala	Japan Veterinary Products Association
In vivo application of mixed herbal medicine Shin Nakamori Juisan for the treatment of diarrheic domesticated animals	CN Mingala	Japan Veterinary Products Association

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
Training on Laboratory Test to predict Estrus in Carabao and Breeding Management	Farmers Training Center, Bulacan Agricultural State College	January 12	1
International Open Conference on Diagnosis and Control of Trypanosomes and their Vectors in Animals and Humans in Southeast Asia	Philippine Carabao Center National Headquarters and Gene Pool	January 15-19	1
3rd Part of the Seminar Series on Scientific Career System	Manila	January 31	1
Strategic Planning Workshop for Regional AMR Coordinators	Manila	February 5-7	1

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
Training on Laboratory Test to predict Estrus in Carabao and Breeding Management	Farmers Training Center, Bulacan Agricultural State College	January 12	1
International Open Conference on Diagnosis and Control of Trypanosomes and their Vectors in Animals and Humans in Southeast Asia	Philippine Carabao Center National Headquarters and Gene Pool	January 15-19	1
3rd Part of the Seminar Series on Scientific Career System	Manila	January 31	1
Strategic Planning Workshop for Regional AMR Coordinators	Manila	February 5-7	1
DOST-NRCP Technical Seminar and General meeting	Bureau of Plant Industry, Los Baños	February 19	2
NRCP Division XIII 10th General Membership Assembly and Scientific Seminar	UPLB, Los Baños, Laguna	February 26	2
Training Workshop on Writing and Presenting Proposals Towards Building Science Culture in Central Luzon	Clark, Pampanga	February 28	1
Seminar-Workshop on Enhancing the Research/ Thesis Writing Capabilities of Special High School Teachers in Central Luzon	Clark, Pampanga	March 1	1
NRCP Annual Scientific Conference and 85th General Membership Assembly	PICC, Manila	March 14	2
Intellectual Property Management Orientation Seminar and Workshop	Philippine Carabao Center National Headquarters and Gene Pool	March 19-20	120
Pre-In House Review	PCC National Headquarters and Genepool, Science City of Muñoz, Nueva Ecija	March 21-22	95
Root Cause Analysis Seminar	Baguio City	April 4-6	8
Regional Technical Training Workshop on Construction and Use of Respiration Chambers for Small Ruminant Studies	University Putra Malaysia, Serdang, Malaysia	April 9 – 13	1
Seminar Workshop on Audit Finding Statement, Root Cause Analysis and Corrective Action Determination	Philippine Carabao Center National Headquarters and Gene Pool	April 10-12	2
DA Laboratory Services Focal Group Meeting	BPI, Quezon City	April 12	1
Focal Group Discussion: Administration and Analysis of Results	Philippine Statistical Research and Training Institute, South Triangle, Quezon City, Manila	April 16-20	1

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
UPLB-CVM Graduate Seminar Series	UPLB, Los Baños, Laguna	April 27	1
Seminar on 5S (Good Housekeeping)	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	April 30	1
Supervisory Training Workshop on Strategic Performance Management System and Orientation on Omnibus Rules on Appointment and Other Human Resources Action	Philippine Carabao Center National Headquarters and Gene Pool	May 2-4	2
Reproductive Biotechnology for Defining, Delineating, and Displaying World of Human and Animal; Training on Sperm Evaluation using the EasyCyte™ Flow Cytometer	Taipei, Taiwan	May 2-8	2
Seminar/ workshop on Gov't. Procurement featuring 2016 Revised IRR of RA 9184	Manila	May 9-12	1
21st Dairy Congress and Expo	Cultural Center, Tagbilaran City, Bohol	May 23-25	39
Training-Workshop on Patent Search and Invention Spotting	Los Baños, Laguna	May 29-31	1
Seminar on Reviewing WHO AGISAR Research Call: Japan, Philippines and Thailand	Thammasat University	May 29-31	2
2nd International Veterinary Students' Association (IVSA) Philippine National Conference	Tagaytay, Cavite	June 1	1
DOST-DA Complementation Meeting	Manila	June 4-5	1
23rd Course on Food Safety	Tropicana Suites Residence Hotel, Manila	June 4-8	2
MS Excel Training and Workshop	Conference Hall 2, 3rd Floor, LIB Complex, PCC National Headquarters and Gene Pool	June 13, 14 & 18	45
Seminar in College of Fisheries, CLSU	CLSU, Science City of Muñoz, Nueva Ecija	June 22	1
2018 Fulbright Philippine Agriculture Alumni Association National Conference and Agri-fisheries R&D Festival.	Sorsogon State College, Sorsogon City	June 25-27	3
FEASD Training	Catarman, Eastern Samar	June 25-30	1
Training of Trainers on Rice straw baler	IRRI, Los Baños, Laguna	June 28-29	1

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
Barista Training	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	June 28-29 and July 2-3	6
Advance Training on Ovarian Palpation in Water Buffaloes	PCC at Ubay Stock Farm, Ubay, Bohol	July 2-5	2
PCC-RDD In-house Review	PCC National Headquarters and Genepool, Science City of Muñoz, Nueva Ecija	July 4-6	109
Applications of PacBio Sequencing Technology	Manila	July 5	2
OYSI Scientific Seminar and Annual Convention	Manila	July 10	1
Launching of Schistosoma Control Program in Northern Samar	Clark, Pampanga	July 11-12	1
Business Talk 2018: FIT for Business	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	July 11-13	4
3rd International Livestock Biotechnology Symposium	University of the Philippines, Cebu City	July 16	17
APEC-HLPDAB Meeting at the DA OSEC	Manila	July 19	1
6th National Congress and 2018 Philippine Agriculturists' Summit	Waterfront Hotel, Lahug, Cebu City	July 22-26	7
Climate Change Adaptation and Disaster Risk Reduction: Role of Philippine Agriculturist	Lahug, Cebu City	July 23-25	3
UEP NRCP Networking and Outreach Activities	Samar	July 25-27	1
Buffalo Genetics, Reproductive Technologies and Fertility Management	PCC, Science City of Muñoz, Nueva Ecija	July 31	45
18th AAAP Conference	Kuching Malaysia	August 1 - 5	1
AMR Meeting	Manila	August 2-3	1
PCC Technical Writing Workshop for researchers from Regional Centers	Madamba Hall, PCC National Headquarters and Gene Pool	August 6-10	9
Seminar Workshop on Internal Auditing with Emphasis on Finding Statement and Audit Report Writing	Xenia Hotel, Clark Field, Pampanga	August 8-10	7
IP Master class Workshop	PCAARRD, Los Baños Laguna	August 8-10 September 4-7 October 3-5 November 7-9 December 3-7	2

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
Workshop on the revision of PCC Dairy Buffalo Production Handbook	Mabalacat, Pampanga	August 13-17	23
Biotech 101 Workshop	Manila	August 16	1
2nd Veterinary Practices Association of the Philippines	Cordillera Administrative Region	August 27	2
AMR-AIHO Meeting	Manila	August 28	1
Basic training on handling and preservation of non-reproductive cells for downstream genotyping and species identification	PCC National Headquarters & Gene Pool, Science City of Muñoz, Nueva Ecija	August 29-31	13
ICAMR Meeting	Manila	August 31	1
Standard First Aid and Basic Life Support CPR/AED Training	(Philippine National Red Cross Headquarter, Cabanatuan City, Nueva Ecija)	September 3-6	4
Training Series on Selected Advanced Quantitative Approaches to Project Impact Evaluation	RET Complex Hall, Central Luzon State University, Science City of Muñoz, Nueva Ecija	September 17-21 December 10-14	2
Meeting on Availment of DOST Magna Carta Benefits for DA Laboratories	Manila	September 19	1
Japanese Society for the Promotion of Science (JSPS) BRIDGE Seminar	Hokkaido University, Japan	September 19	1
Advance Training on Ovarian Palpation in Water Buffaloes	Philippine Carabao Center at Cagayan State University, Piat, Cagayan	September 19-30	2
PhilAAST Convention	Manila	September 20-21	2
Animal Biotechnology Regulatory Meeting	Manila	September 26	1
Ovarian Palpation Training	Philippine Carabao Center at Mindanao Livestock Production Center, Kalawit, Zamboanga, del Norte	September 28-October 1	2
Basic Meat Processing	APDC, Marulas, Valenzuela	October 2-5	2
22nd Pinoy Pork Challenge	Manila	October 4	1
National Carabao Conference	Tagbilaran, Bohol	October 7-10	12
DOST-NAST Round Table Discussion on Tamaraw Conservation	San Jose Mindoro	October 10-12	2

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
Improving Pregnancy through Synchronized Ovulation and Fixed Time AI in Water buffaloes, Continuing Professional Development for Veterinarians Scientific Conference	Central Luzon State University, Science City of Muñoz, Nueva Ecija,	October 12	4
Gender and Development (GAD) Focal Point System Meeting and GAD Planning and Budget Workshop	A. Venue Hotel, Makati City, Manila	October 16-17	1
55th Philippine Society of Animal Science Scientific Seminar and Convention	Grand Menseng Hotel, Davao City	October 16-19	36
Consultative Meeting to Develop the Philippines' Action Plan to Combat AMR 2018-2022	Manila	October 18	1
Product Demonstration of Molave Trading	Manila	October 19	4
Agriculture Biotechnology Study Mission in Canada	Canada	October 22-26	1
Seminar Workshop on Government Procurement Law Feat. RA 9184 and its Revised IRR	Manila	October 24-27	1
3rd Food Safety Summit	Crowne Plaza Hotel, Ortigas, Pasig City	October 26	1
Advance Artificial Insemination Training on the Clinical Aspects on Ovarian Palpation in Water Buffaloes and Cattle	Philippine Carabao Center at Central Mindanao University, Musuan, Bukidnon	October 29- November 10	2
National Research Symposium of DA-BAR	PICC, Manila	November 7-8	5
Current Good Manufacturing Practices	CDCPF, PCC NHQ	November 14	20
NRCP Division XIII 11th General Membership Assembly and Scientific Seminar	UPLB, Los Baños, Laguna	November 14	2
Presentation of a Package Project proposal for Tamaraw Conservation	Occidental Mindoro State College	November 22	1
2018 Future Science Leaders' Forum	Manila	November 22-23	1
45th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB)	Iloilo City	November 27-30	6
PVMA Central Visayas Annual Convention and Scientific Conference	One Hotel, Cebu City	November 28-29	5
Statistical Package for Social Science	Philippine Carabao Center	November 28-29	29
Business Research Writeshop	Park Inn Hotel, Clark, Pampanga	December 3-6	7
Gender and Development (GAD)Focal Point System Meeting and Year End Assessment	El Cielito Hotel, Makati City, Manila	December 4-5	1
5th Cagayan Valley Dairy Business Conference	Tuguegarao City, Cagayan	December 6-7	3

Appendix 4. Conferences, Seminars, Symposia, Workshops, and Trainings Participated in by PCC Researchers, CY 2018

Title	Venue	Date (2018)	No. of PCC participants
PCC-RDD Externally-Funded Projects Year-end Evaluation Workshop	PCC, Science City of Muñoz, Nueva Ecija	December 6-7	43
Training Workshop on Life-Cycle Assessment in Agriculture	International Rice Research Institute, Los Baños, Laguna	December 11-14	1
Livestock Biotechnology Center-Research and Development Division Technical Writing Workshop	Subic, Zambales	December 12-14	35
CLSU-IAO, Department of Biological Sciences – CAS and JAAP Joint Continuing Education Series and JSPS BRIDGE Fellowship Symposium	Central Luzon State University, Science City of Muñoz, Nueva Ecija	December 20	3

Appendix 5. Research articles published in refereed journals, CY 2018

Authors	Title of Paper	Title of Journal
Carpio JMC, Mingala CN	Outer membrane proteins: Its role in Brucella virulence and immunogenicity	2018. International Journal of Veterinary Science. 7(1):33-37.
Ganareal TACS, Balbin MM, Monserate JJ, Salazar JR, Mingala CN	Gold nanoparticle-based probes for the colorimetric detection of Mycobacterium avium subspecies paratuberculosis DNA.	2018. Biochemical and Biophysical Research Communication. 496(3):988-997.
Miguel MA, Mingala CN	Screening of swine (Sus scrofa) bactericidal permeability-increasing protein (BPI) gene as marker for disease resistance.	2018. Animal Biotechnology. DOI: 10.1080/10495398.2018.1450266
Dianso JA, Garcia GG, Belotindos LP, Mingala CN	Molecular identification of Buxtonella sulcata from associated-diarrhea in water buffaloes in the Philippines.	2018. Annals of Parasitology. 64(2):93-100.
Lapira JEE, Balbin MM, Belotindos LP, Vioria VV, Abes NS, Mingala CN	Molecular detection of ephemeral fever virus among large ruminants in the Philippines.	2018. Virus Disease. 29(3):400-404.
Uy MRD, Miguel MA, Cruz JL, Salinas MBS, Lazaro JV, Mingala CN	Serological and Molecular Evaluation of Mycobacterium avium subspecies paratuberculosis (Johne's disease) infecting riverine-type water buffaloes (Bubalus bubalis) in Philippines.	2018. Comparative Immunology, Microbiology and Infectious Diseases. 61:24-29.
Tubalinal GASP, Balbin MM, Villanueva MA, Domingo CY, Mingala CN	Evaluation of loop-mediated isothermal amplification for detection and/or screening of Leptospira spp. infection among domestic animals in the Philippines.	2018. Journal of Advanced Veterinary and Animal Research. 5(4): 459-465.
Domingo CY, Pascual HG, Mingala CN	Detection of Cryptosporidium parvum DNA in fecal samples of infected cattle (Bos indicus) and water buffaloes (Bubalus bubalis) in the Philippines using loop-mediated isothermal amplification method.	2018. Annals of Parasitology. 64(4):331-338.
Paraguas, A.M., Cailipan, T.P. C., Flores, E. B., Villamor, L.P.	Morphology and Phylogeny of Swamp Buffaloes (Bubalus bubalis) in Calayan Island, Cagayan.	Philippine Journal of Veterinary and Animal Science, 2018. 44(1), 59 – 67.
Hufana-Duran, D	Livestock Reproductive Biotechnologies: Role in Land Preservation and Green Agriculture	ISSAAS J 2018; 24(1):162-170

Appendix 5. Research articles published in refereed journals, CY 2018

Authors	Title of Paper	Title of Journal
Maylem ERS, Aquino FP, Ocampo LC, Atabay EP, Atabay EC	The Use of Computer Assisted Sperm Analyzer in Evaluating Kinematics of Fresh and Frozen-Thawed Buffalo Semen.	Philipp. J. Vet. Anim. Sci. 2018; 44 (1): 42-50
Maylem ERS, SM Rivera, Ma. EDC Leoveras, EV Venturina, EP Atabay, EC Atabay EC	Thermotolerance Identification in Water Buffalo Using Heat Shock Protein 70 (HSP70) and Its Effect to Semen Quality in Varying Environmental Conditions.	Philipp. J. Vet. Anim. Sci. 2018; 44 (1): 22-31
Hufana-Duran D, Peralta M, Venturina EV, Venturina FA, Duran PG, Mamuad FV, Venturina HV, Parrish JJ	Water buffalo bull fertility selection by sperm nuclear shape: Model Development and Evaluation	Abstracts/Animal Reproduction Science 194(2018)et-e27 https://doi.org/10.1016/j.anireprosci.2018.04.019

*Submitted under review

Authors	Title of Paper	Title of Journal
Tilwani RC, Ortiz JGM, Apolinario JPR, Maylem ERS, Atabay EC, and Atabay EP	Comparison of Transrectal Ultrasonography and Pregnancy-Associated Glycoprotein Analysis in Detection of Early Pregnancy in Water Buffaloes (Bubalus bubalis).	Phil. Jour of Veterinary Medicine
Atabay EP, Fajardo ZP, Tadeo RD, Atabay EC, Venturina EV, Mingala CN and Fissore R	PLCz1 mRNA expression in buffalo sperm and its correlation with In-vitro Fertilization in Water Buffalo (Bubalus bubalis)	Livestock Science
Atabay EP, Atabay EC, Maylem ERS, Flores EB, Tilwani RC, and Sarabia AS	Improved Pregnancy in Water Buffaloes through Synchronization of Ovulation and Fixed Time Artificial Insemination Technique	Buffalo Bulletin
Atabay EC Atabay EP, Maylem ERS, Flores EB, Tilwani RC, and Sarabia AS	Enhancing Prostaglandin-based Estrus Synchronization Protocol for Artificial Insemination in Water Buffaloes	Buffalo Bulletin
Ocampo MB, Ocampo LC, Aberilla MAJM, De Leon VB, Salinas MBS	Quality and fertilizing potential of epididymal sperm from Philippine water buffalo	Asian J. Agric and Biology
Ocampo LC, Harada HLM, Aquino FP, Ocampo MB	Viability of goat epididymal sperm from post-mortem testicles kept at refrigeration temperature during transport	International Journal of Agricultural Technology
Ocampo MB, Victorio MM, Salinas MBS, Ocampo LC	Timing of sequential changes during the 1st meiotic division of Philippine native pig oocytes cultured in vitro	International Journal of Agricultural Technology
Cruz VMP, Viernes VD, Ocampo LC, Ocampo MB	Gross morphometry of the reproductive organs of male Philippine native pig (Sus scrofa)	Asian J. Agric and Biology
Ocampo MB, Duyaguit RP, Tamang CV, Salinas MBS, Ocampo LC	Completion of 1st meiosis of Philippine native pig oocytes in vitro after vitrification	Asian J. Agric and Biology
Viernes VD Jr., Villalon MMG, Salinas MBS, Ocampo MB, Ocampo LC	Microscopic anatomy of the reproductive organs of female Philippine native pig (Sus scrofa)	International Journal of Agricultural Technology
Ocampo MB, Ocampo LC, Dela Rosa ICJ, Lofranco JO	Temperature effect on the quality of post mortem derived epididymal sperm from Corriedale ram (Ovis aries) and Sahiwal bull (Bos taurus) testicles during transport	Asian J. Agric and Biology
Cailipan TC and Villamor LP	Molecular Characterization of SRY Gene in 24 Populations of Philippine Carabao (Bubalus bubalis Swamp-type)	Livestock Science

Appendix 6. Research articles published in scientific proceedings , CY 2018

Authors	Title of Paper	Title of Proceedings
Villamor LP	Animal Genetic Resources Conservation Through Cryobanking in the Philippines: Management Initiatives and Future Directions	13th Asian Reproductive Biotechnology Congress, Taipei, Taiwan, May 2-8, 2018
Villamor LP and Paraguas AM	Phylogeny, Phylogeography, and Haplotypes Median-Joining Network Structure of Philippine Carabao (<i>Bubalus bubalis</i>) within and Relationships Among Asian Populations using Cytochrome C Oxidase Subunit I (COI)	45th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB) Iloilo City, November 27-30, 2018
Villamor LP and Cailipan TC	Cytochrome C Oxidase Subunit I (COI) and SRY Gene Markers Differentiate Male Philippine Carabao and Crossbreds (<i>Bubalus bubalis</i>)	45th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB) Iloilo City, November 27-30, 2018
Villamor LP, Escuadro AJDS, and Paraguas AM	Genetic Diversity and Population Structure of Swamp Buffaloes (<i>Bubalus bubalis</i>) in 13 Luzon Populations using 10 Microsatellite DNA Markers	45th Annual Convention of the Philippine Society of Biochemistry and Molecular Biology (PSBMB) Iloilo City, November 27-30, 2018
Herrera JRV, Flores EB, Duijvesteijn N, Gondro C and van der Werf JHJ	Genome-wide association study for milk traits in Philippine dairy buffaloes.	Proceedings of the World Congress on Genetics Applied to Livestock Production. Volume Species - Other, p. 825, 2018. http://www.wcgalp.org . World Congress on Genetics Applied to Livestock Production Digital Archive
Ferrer AV, Raterta RA, Usi JD, Duran PG and Duran DH	Artificial Insemination (AI) as a Tool for Livestock Genetic Improvement	2018 Fulbright Philippine Agriculture Alumni Association National Conference and Agri-fisheries R&D Festival. Sorsogon City. June 25-29, 2018. Pp. 42
Duran PG	Milking the buffalo Cow; The Scientific Career System of the National Academy of Science and Technology: Path to a Fulfilling Scientific Career	2018 Fulbright Philippine Agriculture Alumni Association National Conference and Agri-fisheries R&D Festival. June 25-29, 2018.
Ocampo LC, Dela Rosa ICJ, Lofranco JO, Seralde RN, Aquino FP, and Ocampo MB	Utilization of Testicular sperm for gametes preservation and its applicability in species conservation of endangered wildlife ruminants in the Philippines	Proceedings ISSAAS conference, Sept 26-28, 2018, San Jose Mindoro. Abst.
Dela Rosa ICJ, Lofranco JO, Seralde RN, Santiago RC, Monleon AM, and Ocampo LC	Sperm Analysis by Computer Assisted Sperm Analyzer (CASA) of ejaculated sperm retrieved from Philippine native pigs (<i>Sus scrofa</i>)	Proceedings ISSAAS conference, Sept 26-28, 2018, San Jose Mindoro. Abst.
Lofranco JO, Dela Rosa ICJ, Ocampo MB, Seralde RN, Aquino FP and Ocampo LC	Epididymal sperm recovery by retrograde flushing from post mortem testicles of butchered native pigs (<i>Sus scrofa</i>)	Proceedings ISSAAS conference, Sept 26-28, 2018, San Jose Mindoro. Abst.
Aquino KE, Abella EA, Dela Rosa ICJ, Lofranco JO, Aquino FP, and Ocampo LC	Recovery of viable Epididymal sperm from post mortem testicles of Philippine native pigs	Proceedings of the 55th PSAS Scientific Seminar and Annual Convention. October 16-19, 2018; Davao City
Dela Rosa ICJ, Aquino KE, Lofranco JO, Seralde RN, Ocampo LC and Ocampo MB	Sperm Analysis from computer assisted sperm analyser from post mortem testicles of Philippine native pigs (<i>Sus scrofa</i>)	Proceedings of the 55th PSAS Scientific Seminar and Annual Convention. October 16-19, 2018; Davao City
Aquino FP, Gajeton M, and Ocampo LC	Cryopreservation of Spermatozoa collected from Excurrent ducts of Nondescript rooster.	Proceedings of the 55th PSAS Scientific Seminar and Annual Convention. October 16-19, 2018; Davao City
Duran PG and Duran DH	Application of ultrasound guided ovum pick-up and pregnancy associated glycoprotein technologies for the genetic improvement in water buffalo and cattle	Abstract, International Conference of Animal Science and Technology, ICAST 2018, Hasanuddin University, Indonesia November 6-7, 2018.

Appendix 7. Local and International Trainings, Seminars and Conferences participated in by PCC Staff, CY 2018

TITLE OF TRAINING, SEMINAR AND CONFERENCES	NO. OF PARTICIPANT	DURATION	VENUE
LOCAL			
2018 National Conference of eNGAS and eBudget System users	1	Nov 19-21, 2018	Cebu City
2018 Public Sector HR Symposium: Achieving Breakthrough Results Through Strategic HR	8	Jul 18-20, 2018	Davao City
21st Dairy Congress and Expo	44	May 23-25, 2018	Bohol
23rd Course on Food Safety	2	Jun 4-8, 2018	Manila
3rd Food Safety Summit	1	26-Oct-18	Quezon City
3rd International Livestock Biotechnology Symposium	15	Jul 15-17, 2018	Cebu City
40th National Academy of Science and Technology Annual Scientific Meeting	3	Jul 11-12, 2018	Manila Hotel
45th PSBMB Annual Convention	7	Nov 27-30, 2018	Iloilo City
4th PAGBA Quarterly Seminar and Meeting	6	Nov 21-24, 2018	Davao City
4th Philippine Engineering	4	Mar 7-8, 2018	Manila
55th PSAS Scientific Meeting and Annual Convention	24	Oct 16-19, 2018	Davao City
5th Dairy Business Conference and Stakeholders' Forum	2	Dec 6-7, 2018	Tuguegarao City
6th National Congress & 2018 Philippine Agriculturist Summit	7	Jul 22-26, 2018	Cebu City
85th PVMA Scientific Conference and Annual Convention	9	Jan 14-16, 2018	Pasay City
Barista Basic Course	6	Jun 18-19, 2018	Milka Krem
Barista Basic Course	6	Jun 25-26, 2018	Milka Krem
Basic Life Support and First Aid Training	9	Sep 3-6, 2018	Cabanatuan City
Basic Meat Processing Course & Sausage Manufacture	2	Oct 2-5, 2018	Valenzuela City
Basic Meat Processing Course & Sausage Manufacture	2	Nov 26-29, 2018	Valenzuela City

Appendix 7. Local and International Trainings, Seminars and Conferences participated in by PCC Staff, CY 2018

TITLE OF TRAINING, SEMINAR AND CONFERENCES	NO. OF PARTICIPANT	DURATION	VENUE
LOCAL			
Basic training course on AI & PD in water buffaloes	2	May 28-Jun 21, 2018	Carranglan, Bull Farm
Basic training on handling and preservation of non-reproductive cells for downstream genotyping and species identification	3	May 29-31, 2018	LIB Bldg.
Business Talk 2018	2	Jun 12-15, 2018	Iloilo City
Effective Business Writing	1	Jul 24-25, 2018	Makati City
Fiber Optic Network technology	1	Oct 10-12, 2018	Manila
Focus Group Discussion: Administration and analysis of results	1	Apr 16-20, 2018	Quezon City
Gender and Developmental Focal Point System Activity	1	Oct 15-19, 2018	Makati City
IIEE Annual Convention	1	Nov 14-17, 2018	Pasay City
IRCA Approved ISO 9001:2015 QMS Lead Auditor Course	1	Sep 17-21, 2018	Manila
ISO 19011:2018 Internal Quality Audit Training	2	Nov 12-13, 2018	Pasig City
ISO 9001:2015 Awareness Seminar	2	5-Nov-18	Pasig City
ISSAAS National Conference and General Meeting	4	Sep 26-28, 2018	Occidental Mindoro
Laws & Rules on Government Expenditure (LARGE)	6	Oct 19-12, 2018	COA-Regional Office IV
Mastering withholding taxes	1	29-Sep-18	Cabanatuan City
Microbiological Analysis Techniques for Food(Conventional and Petrifilm Method)	1	Jun 18-22, 2018	Quezon City
Networking Essentials	3	Apr 23-27, 2018	Valenzuela City
Orientation cum training workshop for the formulation of the Agriculture and Fisheries Modernization Plan (AFMP) 2018-2023.	1	Apr 11-13, 2018	Quezon City
Philippine Association for Government Budget Admin (PAGBA)	8	Aug 8-11, 2018	Cebu City
Proposal Packaging Writeshop	1	Feb 27-28, 2018	DOST, PCAARRD

Appendix 7. Local and International Trainings, Seminars and Conferences participated in by PCC Staff, CY 2018

TITLE OF TRAINING, SEMINAR AND CONFERENCES	NO. OF PARTICIPANT	DURATION	VENUE
LOCAL			
RA 9184 Government Procurement Reform Act-Featuring 2016 Revised Implementing Rules and Regulations	19	May 9-12, 2018	Baguio City
RA 9184 Government Procurement Reform Act	12	Oct 24-27, 2018	Manila
RA 9184 Government Procurement Reform Act	2	Dec 12-15, 2018	Baguio City
Records and Information Management Seminar	1	Apr 17-18, 2018	Pasay City
Records Counter Disaster Preparedness & Business Continuity	4	Sep 18-20, 2018	Cagayan de Oro City
Revised Agency Procurement Complaint and Performance Indicators (ADCPI)	2	Nov 7-10, 2018	Tagaytay City
Seminar Workshop on Audit Finding Statement, Root Cause Analysis and Corrective Action Determination	15	Apr 10-12, 2018	Baguio City
Seminar Workshop on Internal Auditors	14	Aug 8-10, 2018	Clark, Pampanga
Training course on environmental laws, rules & regulations for pollution control officers(PCOS)	3	Sep 11-14, 2018	Clark, Pampanga
Training on Public Procurement & Accountability Congress	3	Aug 7-9, 2018	Quezon City
Training Workshop on Diagnostic Techniques against Schistosomiasis	1	Jun 25-30, 2018	Northern Samar
Training Workshop on Life cycle Assessment in Agriculture	1	Dec 11-14, 2018	Los Banos Laguna
Understanding Gelato and the Business	2	Oct 29-30, 2018	Makati City
INTERNATIONAL			
13th Asian Reproductive Biotechnology Congress(ARBC)	2	May 2-8, 2018	Taipei, Taiwan
18 Asian Animal Production Congress	1	Aug 1-5, 2018	Malaysia
Embodying the World's New Condition and value	1	Jul 24-26, 2018	Thailand
JSPS BRIDGE	1	Jul 17-Sep 13, 2018	Japan
Regional Training Workshop on construction and use of respiration chamber for small ruminant studies	1	Apr 9-13, 2018	Malaysia

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