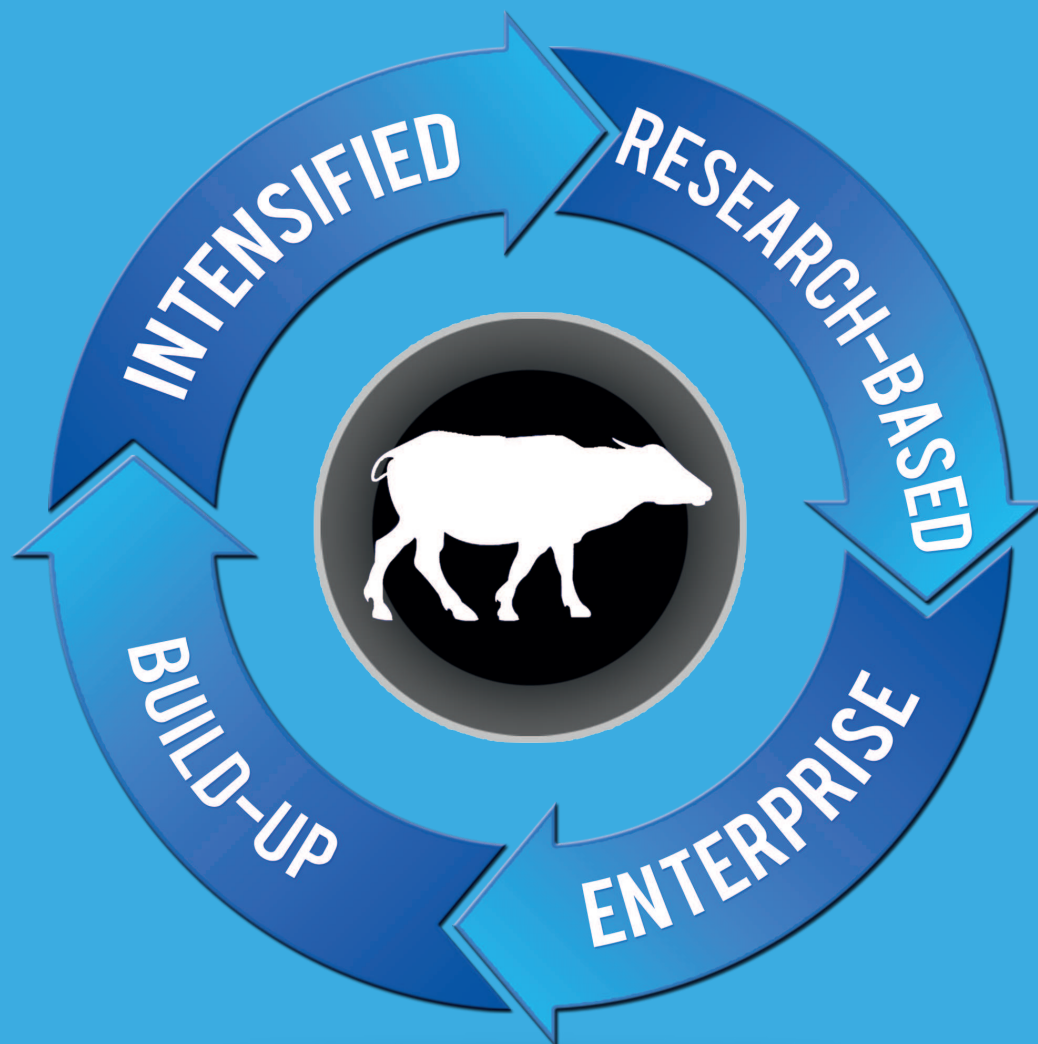


PCC Newsletter

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Multiplying **opportunities in carabaos** thru Multiplier Dairy Farms

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Editorial Staff

Eric P. Palacpac Editor-in-Chief

Almira P. Bentadan/
Ma. Cecilia C. Irang
Khризie Evert Marcelo-Padre
Editorial Assistant/Layout Artist/
Photographer

Ma. Cecilia C. Irang
Chrissalyn L. Marcelo
Circulation Managers
Writers

Almira P. Bentadan
Ma. Cecilia C. Irang
Chrissalyn L. Marcelo
Khризie Evert M. Padre
Reden C. Reyes
Anselmo S. Roque

Anselmo S. Roque Editorial Consultant

Eric P. Palacpac Chief, Knowledge
Management Division

Arnel N. del Barrio
Executive Director/Editorial Adviser

Contributors are welcome!

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Success stories of farmers, cooperatives, and other beneficiaries and stakeholders of the Carabao Development Program are preferred.

PCC encourages reproduction of articles from this publication with proper acknowledgment.

Topic suggestions and comments are also welcome.

Please send your articles or comments to
pccnewsletter@ic@gmail.com or mail them to:

THE EDITOR-IN-CHIEF
PCC Newsletter
Applied Communication Section
Knowledge Resource Management Division
Philippine Carabao Center
National Headquarters and Gene Pool
CLSU Cmpd., Science City of Muñoz
3120 Nueva Ecija
or call Tel. No.: 044-456-0731 (loc) 479

www.pcc.gov.ph

about the cover



In 2016-2025, PCC is committed to carry out continuing and expanding initiative in intensified research-based enterprise build-up (iREB) in rural communities. The major focus is on organised and wide-scale genetic improvement program, systematic extension and technology delivery, and creation of favourable environment for enterprise development.

Achievement of the set objectives and targets is heavily grounded on a strengthened human resource competencies and growing linkages and partnership. (Dr. Libertado C. Cruz)



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Biotech complex set-up in PCC to boost livestock industry; agency celebrates its 22nd anniversary

By Chrissalyn L. Marcelo



Agriculture Secretary Proceso J. Alcala (left) and Dr. Arnel N. Del Barrio, acting executive director of the Philippine Carabao Center (PCC), lead in the unveiling of the marker of the new PCC Livestock Innovations and Biotechnology (LIB) complex in the Science City of Muñoz, Nueva Ecija last March 20 at the PCC national headquarters.

The government's push to ramp up research, development and extension activities related to animal genetics, health and nutrition has been concretized thru the completion and inauguration recently of the Livestock Innovations and Biotechnology (LIB) Complex at the compound of the Philippine Carabao Center (PCC) National Headquarters and Gene Pool in the Science City of Muñoz.

Agriculture Secretary Proceso Alcala and PCC Acting Executive Director Dr. Arnel Del Barrio led the inauguration of the Php336-million facility.

The facility, according to Dr. del Barrio, houses laboratories for animal genetic resources, cryobank, reproductive biotechnology and physiology, animal breeding and genetics, molecular genetics,

milk analysis, animal health and biosafety, product development and a sperm bank, and a training area.

Funds for its establishment were provided under Public Law 480 (PL 480) of the United States or the Agricultural Trade Development and Assistance Act and the Philippine Government.

Alcala said in his remarks that the PCC, with this facility, has become the center of livestock biotechnology research and development not only for dairy carabao but also for cattle, goat and sheep.

The PCC, in a previous DA order, was identified as the lead center for livestock (ruminant) biotechnology for research and development.

The inauguration of the facility was one of the highlights of the 22nd PCC

anniversary celebration last March 19-27.

Other activities conducted during the celebration were various presentations, seminars, farmer's field day (FFD), exhibits, Farm-Industry Encounters through the Science and Technology Agenda (FIESTA) event, technology demonstration, media forum and others. The celebration's theme was "Enhancing Rural Enterprises through Livestock Innovations and Biotechnology".

Honored during this recognition program were:

Mr. Roderick I. Tallar, a dairy farmer member of PAO Producers cooperative in Lupao, Nueva Ecija, as outstanding dairy buffalo farmer in the category of "family module"; Mr. Carlito Alfonso of the Eastern Primary Multi-Purpose Cooperative (EPMPC) in San Jose City, Nueva Ecija as outstanding dairy buffalo farmer under the semi-commercial category and for his carabao which was adjudged as the best senior dairy cow in the category of cooperative/dairy farmer herd; Mr. Eduardo M. Dela Cruz Jr. of San Miguel, Bulacan as outstanding Village-based Artificial Insemination Technician (VBAIT); and the EPMPC in San Jose City as outstanding dairy buffalo farmer-cooperative.

They were all given cash prizes and certificate of recognition.

Aside from them, outstanding animals were also given award by the PCC.

Adjudged as outstanding carabaos were those from the PCC at Visayas State University as best senior dairy carabao while the carabao from the PCC National Gene Pool won as best junior dairy carabao. The two carabaos owned by Roberto Garbino of Calinog, Iloilo won as best senior crossbred dairy carabao, and best junior crossbred dairy carabao.

Special awards were also given to the DTI and the Department of Agrarian Reform (DAR) as secondary stakeholders' champion for their outstanding support to the dairy carabao industry; Buffalo Raisers Association of the Philippines, and to the 2014 outstanding PCC employees. 



PCC-UPLB Product development expert Dr. Rosalina Lapitan, one of the cooking contest judges, and Dr. Arnel N. Del Barrio, PCC acting executive director award a certificate and cash prize to Jenny Cruz and Julie Balanag of Eastern Primary Multi-Purpose Cooperative for winning the contest with their dish "Caratouille".

PCC partners with PCAARRD for staging FIESTA events

By Reden C. Reyes

An array of activities was conducted by the Philippine Carabao Center (PCC) in partnership with the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) in pursuit of the latter's Farm-Industry Encounters through the Science and Technology Agenda, or FIESTA project.

The activities unfolded from March 25 to 27, 2015 during the PCC's weeklong 22nd anniversary celebration.

Several farmers, government employees, media practitioners and students took part in the different activities held during the three-day celebration, which included photography and essay writing contests, cooking contest, Farmer's Field Day and media forum.

Six schools from San Jose City and the Science City of Muñoz fielded in competitors in the photography and essay writing contests. Emerging as the top winner in the photography contest was Leo Bert A. Orpilla from Central Luzon State University – University Science High School while Maxine Baculo of the Muñoz National High School – Main grabbed the top prize in the essay writing contest.

Each received P5,000 as cash prize and a certificate of recognition.

The other winners in the contests were Lordjay Nolie Bueno and Joshua Alexis Santos, both students of the Agriculture Science and Technology School, who placed second and third places, respectively, in the

photography category while Mark Lester Cuaresma of the Muñoz National High School – Main and Dana Cahilig, also from Muñoz National High School – Main stashed away the second and third places, respectively, in the essay writing contest. Each received P3,000 and P1,500 for placing second and third places respectively, and a certificate of recognition in their respective competitions.

The rest of the contestants were given consolation prizes.

In the cooking tilt, 13 cooperatives from the different barangays of Nueva Ecija fielded in contestants who prepared their dishes using carabao's meat. The entry of the Eastern Primary Multi-Purpose Cooperative cooked its way to the top plum which carried the name of its recipe as "Caratouille". The name was from the words carabao and touille which is French for "to stir". It was given a cash prize of P7,000 and a certificate of recognition.

The Nueva Ecija Federation of Dairy Carabao Cooperative's "Pigar-pigar" was adjudged as second prize winner carrying a cash prize of P5,000 while the Simula ng Panibagong Bukas Cooperative's "Carabeef Patties in Hawaiian Salsa with Buttered Potatoes" placed third with a cash prize of P3,000. Both also received certificates of recognition.

Also held was a seminar on "Prolapse and Bloat Management" in which hundreds of dairy farmers attended. The seminar, >>

Sec. Alcala leads in inauguration of PCC LIB complex

By Ma. Cecilia C. Irang

Agriculture Secretary Proceso J. Alcala has stressed the importance of possible and sustainable help from the government in addressing farmers' problems.

He made the point in his remarks before leading in the ribbon-cutting and unveiling of the building marker of the new Livestock Innovations and Biotechnology (LIB) Complex of the Philippine Carabao Center (PCC) at its headquarters in the Science City of Muñoz, Nueva Ecija on March 20.

"I will grab this opportunity to talk about our direction. Where is PCC heading to? Let's have a complete program on how we will solve the problems. The government will definitely help. I can see efficient technicians, doctors, veterinarians here, let's make use of their competence to guide us towards a sustainable roadmap. We want your group to expand," he emphasized.

For his part, Dr. Arnel N. del Barrio, acting executive director, mentioned some of the latest steps taken by PCC as it continues to assist dairy buffalo farmers.

"We are very lucky because Sec. Alcala is here with us today to witness what has PCC achieved and become. Since our milk production this year jacked up plentifully, our solution is to award milk cooling tanks (cont.p8)

>> which also featured actual demonstrations, was conducted by Dr. Lester S. Verona and Dr. Cyril Baltazar. The farmers were also guided to a visit of the PCC's Demonstration Site for Forage Establishment and the Small Ruminant Center at the Central Luzon State University campus.

Meanwhile, practitioners from print, broadcast and even online media attended the media forum, which discussed different issues about the carabao industry. Dr. Arnel N. Del Barrio, PCC acting executive director, with assistance from the technical experts of PCC, gave a briefing of the programs, projects and activities of the agency and answered questions from the media persons. >



Joyce Ramones, DAR-provincial agrarian reform officer (2nd from right), hands over the symbolic key to the new shared service facility to Melchor R. Correa, chairman of the Eastern Primary Multi-Purpose Cooperative (EPMPC). Witnessing the turnover are (l-r) San Jose city Mayor Marivic V. Belena and PCC acting executive director Dr. Arnel N. Del Barrio.

San Jose City's top dairy co-op inaugurates newly-established shared service facility

By Reden C. Reyes

The Philippine Carabao Center (PCC) hopes that by 2016 the carabao fresh milk production level of the country's buffalo dairy farmers shall have reached the two-million liter mark.

This was the optimistic forecast made by Dr. Arnel N. del Barrio, acting PCC executive director, in his message during the inauguration of the newly completed shared service facility of the Eastern Primary Multi-Purpose Cooperative (EPMPC) of San Jose City, Nueva Ecija held March 18 at the co-op's headquarters in Brgy. Sibut.

The shared service facility houses the co-op's refrigerators, freezers, cooking equipment and a new cooling tank donated by PCC. The unit was handed over by DA secretary Proceso Alcala to the co-op in a ceremony held March 20 at the PCC headquarters.

The cooling tank can store 300 liters of milk under a temperature of 4 degrees Celsius and can keep milk safe for three days.

The shared service facility was jointly put up by PCC, Department of Agrarian Reform (DAR), Department of Trade and Industry (DTI) and the San Jose City local government unit.

The EPMPC was organized and accredited in 1992. It first ventured into farming onions and rice but due to the limited seasonal harvest of crops, its members were unable to cope with their loan obligations and the coop experienced serious financial problem. In 2000, the coop was granted by PCC a 25-head module of purebred dairy buffaloes and one bull. From that point on, the coop started its successful recovery.

The cooperative, which currently has 50 active members, registered an income of Php503,325 in 2014.

Noting that the EPMPC is among the top-performing dairy cooperatives being assisted by PCC, Del Barrio congratulated the cooperative for being the first coop to milk carabaos twice a day in the entire Philippines.

"Ngayon, sumasaludo na ako sa inyo, kayo pala talaga ang number one (dairy cooperative) [Now I salute you, you are the real number one]," del Barrio declared.

Aside from being a PCC-assisted group, the EPMPC is also a part of DAR's Village Level Processing Center Enhancement Project (VLPCEP). The VLPCEP aims to help "develop market-competitive Agrarian

Reform Beneficiaries Organizations' products and enhance enterprise and livelihood activities at the community level in selected agrarian reform areas through assistance in product value-adding, improvement of facilities, and assistance in documentation and license application."

In a statement during the program, Iryn R. Magcalas, VLPCEP regional director, said that being a part of the VLPCEP is not an easy feat. Every cooperative must pass a set of criteria to be included in the project. Such criteria include the following: that a cooperative must have existing products and processing center, raw materials for products, must have a sustainable source, owns a lot and building that serve as its headquarters and if not, at least has the landowner's permission for the coop's building, products sold or the enterprise must have a regular market, and workers should have health certificates.

DAR deemed it worthy for the EPMPC to be part of the VLPCEP and started helping the co-op in 2014.

Also present in the event was Eladio L. Duran, DTI Nueva Ecija division chief. Aside from his brief congratulatory message, he donated in behalf of his department a refrigerator for milk storage.

For her part, San Jose City Mayor Marivic V. Belena recognized the carabao as a year-round source of income. She said that compared to rice and onions, which are also primary commodities of the city, the carabao can be a source of income for the whole year while the crops are only harvested bi-annually.

She also wished that someday, the city will be recognized for its being a top producer of carabao milk and hailed for its quality carabao milk products.

"Kaya po kami naging successful, tiningnan po namin ang gatas ng kalabaw [bilang] negosyo. Na sa negosyong ito ay walang lugi at may kita araw-araw. Di katulad ng palay at sibuyas na takot sa bagyo at ulan, lahat ng panahon ay pabor sa kaniya basta may tamang pag-aalaga at pagtingin sa kita [We became successful because we saw the carabao milk as a business. That in this business, there is no waste, everyday there is profit. Not like rice and onions that can be destroyed by storm and strong rains, all seasons are in favor of the carabao, so long as you give it proper care and treatment]," Melchor R. Correa, EPMPC chairman, said. 

PCC, KOICA award additional grant-aid items to GenTri coop

By Reden C. Reyes



Mr. Son Soo Bin, Korean overseas volunteer, and Mr. Seo Dong Song, KOICA senior deputy (2nd and 3rd from right, respectively), hand over various dairy-related grant aid items to Samuel Potante, chairman of General Trias Dairy Raisers Multi-Purpose Cooperative (GTDRMPC). The awarding ceremony was witnessed by (l-r) Gary Grepo, GenTri ABC president, Councilors Kerby Salazar and Jonas Glyn P. Labaguen, PCC acting executive director Dr. Arnel N. Del Barrio, Vice Mayor Maurito C. Sison and Mayor Antonio 'Ony' A. Ferrer.

The General Trias Dairy Raisers Multi-Purpose Cooperative (GTDRMPC) in General Trias, Cavite, an assisted-group of the Philippine Carabao Center (PCC), got an added boost with the recent turnover of several equipment and other items needed to further improve its operations.

In a simple ceremony held February 26 at the coop's headquarters in Brgy. Santiago, Gen. Trias town, the PCC and its development partner, the Korea International Cooperation Agency (KOICA), awarded to the coop the grant-aid items that included forage choppers, brush cutters and aluminum milk cans.

Dr. Arnel N. del Barrio, PCC acting executive director, and Sung Min Hyeon, KOICA resident representative, presented the items to Samuel Potante, GTDRMPC chairman, in the presence of GenTri Mayor Antonio 'Ony' A. Ferrer, other local government official, coop members and Son Soo Bin, KOICA senior volunteer, who identified and facilitated the grant-aid.

The General Trias Dairy Raisers Multi-Purpose Cooperative was established in 2005 with 44 original members. At the start, the

co-op just rented a building that housed as its dairy processing and marketing facilities.

Eventually, the GenTri local government under then mayor and now 6th district Cavite Rep. Luis A. Ferrer IV, with the help of PCC, provided a lot where the cooperative set up its own processing and marketing center. Incumbent Mayor Ony Ferrer, who succeeded Rep. Ferrer, facilitated the acquisition of 38 head of carabao dairy heifers under PCC's Modified Dairy Paiwi Program Module.

Through the years, the co-op, with the full support and active participation of its officers and members, continuously developed processed dairy products, which have become very saleable. This development pushed the Sangguniang Bayan of GenTri to declare dairy products as the municipality's "One Town – One Product (OTOP)" under the Department of Trade and Industry (DTI) program.

At present, the GTDRMPC provides additional livelihood opportunities to its now almost 200 members. From an initial capital of about P14,000, the co-op currently has assets estimated to be worth some P1 million. 

Animal nutrition expert presents study on feed resources in PH

By Ma. Cecilia C. Irang

An associate professor from the Laboratory of Plant and Animal Science of Meijo University, Japan has presented a study titled "Chemical Composition and In Vitro Digestibility of Locally Available Feed Resources in the Philippines" before some 40 researchers of the Philippine Carabao Center (PCC) and visiting students in a technical seminar held January 13 at the PCC national headquarters.

Dr. Yoshiaki Hayashi is currently engaged in a collaborative project with PCC titled, "Evaluation and Utilization of Locally Available Feed Resources for Ruminant Production in the Philippines" which started in 2013.

As part of the joint endeavor, Hayashi conducted his study in the context of a growing demand for milk and meat in tropical Asian countries vis-à-vis feed shortage due to water deficiency during dry season and some issues related to feed productivity.

There are many varieties and yields of locally available feed resources in the tropics. According to Hayashi, while many researchers have already conducted experiments related to feed materials, there are only few reports on chemical composition and in-vitro digestibility on the resources in tropical areas, hence, his study.

The research team, led by Hayashi, did a sample collection in Nueva Ecija and Bukidnon provinces in July 2013 (hot-wet period), October 2013 (cool-wet period), February 2014 (cool-dry period) and May 2014 (hot-dry period) covering four seasons to measure the chemical composition and in-vitro digestibility of the different varieties of feed resources. The sample included different forage families such as Gramineae/Poaceae, Fabaceae/Leguminosae, Acanthaceae, Euphorbiaceae, and Moringaceae.

The chemical composition includes dry matter, organic matter, crude protein and neutral detergent fiber while the procedures used in measuring digestibility include

(cont.p8)

PCC head, five other staff members cited in SCM's teachers', employees' night

By Chrissalyn L. Marcelo



Dr. Arnel N. Del Barrio (2nd from right), acting executive director of the Philippine Carabao Center (PCC), proudly shows a certificate of recognition from the Science City of Muñoz (SCM). Flanking him are (r-l) Mayor Nestor L. Alvarez, Vice Mayor Tekila Grace V. Alvarez and Councilor Edmond Balmeo. The recognition was also accorded to five other PCC technical staff as well as selected employees and teachers in the SCM local government unit (LGU). The awards were presented during the SCM's "Teacher's and employees Night" held on January 9.

Dr. Arnel N. Del Barrio, Philippine Carabao Center (PCC) acting executive director, and five other PCC employees were honored during the "Teachers and Employees Night" spearheaded by the local government unit (LGU) of the Science City of Muñoz (SCM), Nueva Ecija on January 9.

The other honorees were Dr. Claro N. Mingala, Dr. Danilda H. Duran, Dr. Rosalina M. Lapitan and the couple Drs. Edwin and Eufrocina Atabay.

They were cited for their outstanding achievements and awards received in 2014.

Dr. Nestor L. Alvarez, SCM mayor, said the honorees were given due recognition because they bring honor and pride to the city.

Del Barrio, Lapitan and the Atabay couple were recognized for having been conferred the rank of Scientist I by the Scientific Career Council (SCC) on June 30 under the Scientific Career System (SCS).

Mingala, on the other hand, was honored for being chosen as the "Most Outstanding Veterinarian in Veterinary Research Practice"

in 2014 by the Veterinary Practitioners Association of the Philippines (VPAP) and for his conferment as Scientist II by the SCC.

Duran was honored for having received the "Distinguished Researcher in Animal Science" award from the Philippine Society of Animal Science (PSAS) and Bounty Agro-Ventures Inc.

Meanwhile, aside from the PCC honorees, other outstanding teachers and employees from the community were also recognized by the LGU. They serve in other government agencies and schools located in the city.

All the awardees each received a certificate of recognition and token from the LGU and from the Philippine Rice Research Institute (PhilRice), which was the major sponsor of the event.

"Teachers and Employees Night" is an annual activity of the Science City of Muñoz LGU to honor its outstanding teachers and employees. It is an activity that coincides with the city's annual celebration and observance of its charter anniversary and Uhay festival. 

Reproduction physiology expert discusses bull fertility study with PCC researchers

By Almira P. Bentadan

A professor from the Animal Sciences Department of the University of Wisconsin-Madison, USA, met with researchers of the Philippine Carabao Center (PCC) in a technical caucus held December 22 at the PCC national headquarters during which he discussed his paper on the predictability of bull fertility using Fourier Harmonic Analysis.

Dr. John Parrish, who completed his post-doctoral degree on reproductive physiology at UW-Madison, presented his study titled, "Quantifying Sperm Nuclear Shape with Fourier Harmonic Analysis and Relationship to Spermatogenesis and Fertility" in which the fertility levels of cattle bull, boar and stallion were determined by studying the shape of the sperm DNA.

As a result of the study, Parrish developed a software specifically programmed to analyze semen of each of the three species using established parameters.

According to Dr. Danilda H. Duran, Scientist I from PCC's reproductive biotechnology unit, the agency is collaborating with Parrish to adopt the technology and develop parameters specifically for buffaloes.

"There are certain differences among the species. Some parameters used in cattle may not be applicable to buffaloes," Duran said.

She added that the study will greatly help PCC in the ongoing implementation of its artificial insemination project, which is part of its genetic improvement program covering dairy buffaloes, since only bulls with high fertility level will be used in the undertaking.

"The conventional sperm quality analysis we are currently using cannot predict the fertility rate of the bulls. It can only address the issues on the compensable aspects of the semen such as motility and concentration rate. Dr. Parrish's study can detect the uncompensable issues such as DNA-based defects," she explained.

Bulls that are found to be of lower fertility level may be treated and may later be used in the program, she added.

Some 30 PCC researchers participated in the technical caucus. 

Animal nutrition expert...(cont. from p6)



Dr. Yoshiaki Hayashi, an associate professor of Meijo University in Japan, discusses his study titled, "Chemical Composition and InVitro Digestibility of Locally available Feed Resources in the Philippines", as part of his collaborative project with the Philippine Carabao Center (PCC). He presented his study to PCC researchers in a technical seminar held January 13 at the PCC national headquarters.

rumen fluid collection of goats mixed with artificial saliva and dried resource samples.

As a result of his study, the dry matter content of the samples was higher in dry season than in wet season. Fabaceae/Leguminosae tended to be higher than Gramineae/Poaceae in terms of crude protein but lower in terms of the neutral detergent fiber content. Also, digestibility in dry season tended to be lower than in wet season.

"Some of the samples collected like Brizantha, Dwarf Napier (Gramineae/Poaceae), Arachis pintoi (Fabaceae/Leguminosae) and Moringa (Moringaceae) are considered to have high values as feed resources in terms of chemical composition and digestibility. The periods divided by the climate caused variance of chemical composition and in-vitro digestibility of locally available feed resources, that's why we should consider choosing appropriate resources in different periods for efficient nutrient application to livestock," Hayashi explained.

According to Dr. Daniel Aquino, PCC animal nutritionist and one of the researchers involved in the study, the collaborative program's future plan is to

engage the entire PCC network nationwide, including Bureau of Animal Industry (BAI) livestock farms, small ruminant farms and 45 PCC-assisted dairy cooperatives in its National and Regional Impact Zones, in the sample collection and analysis of feed resources in their respective areas.

"I think this project is truly necessary because up to now we don't have an updated and concrete published information on the nutrient composition of the different feed resources in the Philippines," Aquino stated.

On the other hand, Phoebe Llantada, PCC science research assistant, considered the project and study as an open window and baseline for pasture and forage establishment in the country.

Also included in the future plan for the study is the selection of samples of feed resources in the areas mentioned by Aquino. The samples will include not only those purposely planted but also those naturally occurring for the analysis of its nutritive value all throughout the year. The selection is scheduled to start in February this year. Moreover, in terms of studying in-vitro digestibility, the researchers will now use rumen fluid from buffaloes instead of goats. ☺

Sec. Alcalá leads...

(cont. from p4)

to the dairy farmer cooperatives to prolong the shelf life of the milk," he pointed out.

Undersecretary for Operations Emerson U. Palad, Assistant Secretary for Field Operations Edilberto M. De Luna, and Regional Executive Director for DA-Regional Field Unit III and Dr. Andrew Villacorta were present during the occasion along with some 200 dairy farmers, village-based artificial insemination technicians (VBATs) and PCC staff.

In the course of his visit to PCC, Sec. Alcalá awarded several cooling tanks to three dairy cooperatives, namely, Eastern Primary Multi-Purpose Cooperative, Pulong Buli Multi-Purpose Cooperative, and Nueva Ecija Federation of Dairy Carabao Cooperatives. Each cooling tank has a capacity of 300 liters of milk.

The entrustment of additional buffaloes to Parcutela Multi-Purpose Cooperative in Gapan, Nueva Ecija and turnover of a multiplier dairy module to Agustin Multiplier Farm in Camiling, Tarlac was also done during the awarding ceremony.

Sec. Alcalá likewise checked waste management through vermicast production as part of the integrated program in the organic farming of PCC's National Gene Pool.

"There are more than 1,000 farming families that are involved in dairy buffalo production and postharvest. Last 2014, the recorded total milk production of Nueva Ecija was 520,000 liters. If we translate it in peso value, the province contributed Php19 million because of the milk from the genetically improved buffalo or crossbred. PCC significantly participates in the upgrading of breed of buffaloes to improve its milk production," Dr. Liza Battad, chief of planning and special projects division, said.

On April 15, Sec. Alcalá will hold a dairy carabao summit with farmers as well as PCC officials and experts for brainstorming, decision-making and discussion of matters and concerns on agriculture, including the rapid propagation of buffaloes and the setting up of an animal buy-back program. ☺

EDITOR'S NOTE

ERIC P. PALACPAC

Embracing iREB....Some Manifestations

Almost a quarter of a century since its establishment, the Philippine Carabao Center (PCC) is poised to make its presence felt even more as the country's premiere research for development institution in livestock. In the next ten years, the PCC intends to carry forward what former PCC executive director Dr. Lib Cruz dubbed as "iREB" or "intensified research-based enterprise build-up". Basically, it implies a more deliberate application of systematic or organised knowledge in the PCC's genetic improvement, technology delivery, and enterprise development programmes.

As embodiments of this strategic direction, we are featuring in this issue of PCC newsletter specific endeavours of the agency in pursuing iREB. Foremost is the application of genomic information in the breeding and selection of Philippine water buffaloes by way of using 90k SNP (single nucleotide polymorphism) chip, which helps identify which among the buffaloes are carrying favourable genes for particular traits. This marker-assisted selection protocol is complemented by the use of computer-assisted sperm analysis (CASA) in semen evaluation and fixed time AI technology, which enhances reproductive efficiencies among buffaloes through induced ovulation and timed insemination.

Similar initiatives are being undertaken to make sure that technologies generated by the PCC are properly assimilated. Along this line,

a Farmer Livestock School (FLS) for dairy buffalo production is being prepped up by a core team of module developers at PCC. The FLS team anticipates to conduct a training of trainers before the fourth quarter. The first batch of FLS for farmer-trainees in the pilot provinces of Nueva Ecija and Ilocos Norte is expected to take place early next year.

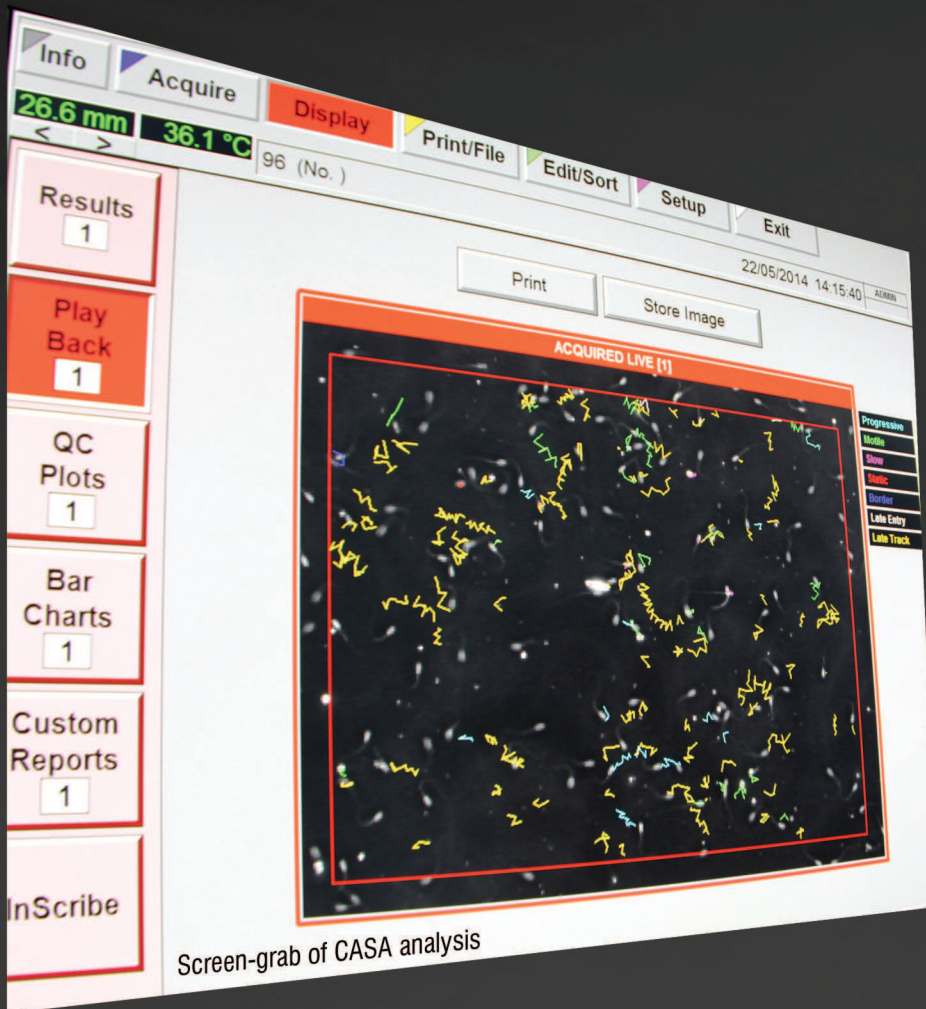
As an all encompassing component of the Carabao Development Programme, enterprise development efforts take a leap forward when, for the first time, the PCC introduces the concept of dairy buffalo multiplier farm (DBMF) in the town of Javier, Leyte. Alongside the DBMF modality is PCC's maiden engagement with a private entity in Canlubang, Calamba, Laguna to demonstrate the viability of a commercial buffalo feedlot fattening (meat production) operation. These two entrepreneurship strategies hope to spur interests especially among commercial producers. Improved pasture management practices and integrated farming approach as being espoused by the "Palayamanan plus NUESTRA" project collaboration with PhilRice can actually benefit the abovementioned initiatives.

The PCC, in all indications, is way past its fledgling stage. It is now ready to explore new horizons, span boundaries, and create more meaningful impacts to the rural communities that it is serving and to the livestock industry that it is contributing.

more objective, a

Assessing COMPUTER

MA. CECILIA C. IRANG



Screen-grab of CASA analysis

Reproduction starts with a good quality oocyte and a good quality semen. This, as a general rule, is what researchers are steadfastly upholding in so far as the reproductive system is concerned. But they are almost always saddled with the problem of having to go through meticulous evaluation of sperm motility and quality to ensure utmost success. This problem, though, can now be overcome auspiciously - thru the use of Computer-Assisted Sperm Analysis or CASA.

The CASA evaluates sperm motility objectively. It provides more accurate data on the speed motion characteristics than the conventional method of sperm motility evaluation which is a subjective microscopic approach.

According to Ms. Excel Rio S. Maylem, lead researcher of the study titled, "Characterization of Sperm Kinematics by Computer-Assisted Sperm Analysis and Its Implication in Genetic Improvement of Water Buffaloes", conventional method of evaluating or assessing semen quality is just based on subjective observation. As it is widely carried out, it uses morphological description, qualitative approximation, and subjective motility grading which vary

among technical staff and from laboratory to laboratory.

Advantage of CASA

The rise of CASA brought a new dimension to semen evaluation, Maylem said.

It provides a quantitative view of the number of moving sperms over the total number of all the sperms counted. It is known to be the most accurate, repeatable, and highly reliable method in determining the kinematics of ejaculates based on measurements of individual sperm cells in almost all species, experts said.

"We need innovation because CASA is

now being used across the world to check the quality of the semen. CASA is more accurate as it is capable of determining the movement of a single sperm unlike the subjective method in which the sperm is just like going with the flow wherein you see the whole movement but not the individual movement of the sperm," Maylem explained.

It also gives a numeric value which is more reliable than the observation method, she added. In going about her study, Maylem collected, analyzed and cryopreserved semen samples from six buffalo bulls. Fresh and frozen semen were then analyzed with the CASA sperm kinematic parameters such as average path velocity, curvilinear velocity, straight line velocity, amplitude of lateral

(continued on next page)

... accurate

ing **SEMEN QUALITY** thru **ER-ASSISTED SPERM ANALYSIS**



“We need innovation because CASA is now being used across the world to check the quality of the semen. CASA is more accurate as it is capable of determining the movement of a single sperm unlike the subjective method in which the sperm is just like going with the flow wherein you see the whole movement but not the individual movement of the sperm.”

- Ms. Excel Rio S. Maylem, Science Research Assistant II

head displacement, beat cross frequency, straightness, linearity and wobble.

According to the research, CASA can provide three levels of classification. The first level was based on motility population, how many were motile, and are progressively motile, which cannot be determined when using subjective quality assessment. The second level, is based on the speed of movement, i.e., whether rapid, medium and slow. The third level, on the other hand, is the use of kinematic parameters that makes CASA really different from subjective method.

“This is the main essence or value of CASA that others don’t have. It can measure the speed from one point to another, the movement of the head, how wide and often they move and how straight they go,” Maylem said.

In doing artificial insemination (AI), the sperm’s movement should be straight to reach the egg. In the subjective method, Maylem emphasized that they cannot determine the path of the moving sperm whereas thru the use of CASA they can see if the sperm is moving backward, straight or diagonal.

“The movement of the sperms present in the straw at post-thaw is of great value so as to ensure that it can reach the oocyte and be able to fertilize it following sperm deposition into the female reproductive tract,” she said.

“When we use CASA, we can only select those with good quality sperms and maximize its use. Our future plan is to trace those bulls with good combination of the sperm movements for it to fertilize the egg,” Maylem said.

Aside from that, the CASA can work across all species, like swine, goat, chicken, horse and even humans. It also has

morphology feature that can detect normal and abnormal shapes of sperms.

Methodologies included in the study are reagents and laboratory supplies, semen sample collection, post thawing of frozen semen and semen evaluation using CASA.

The study was conducted to enable objective characterization of sperm motility and selection of outstanding buffalo semen donors for AI and eliminate undesirable ones through the use of CASA. In addition, the CASA system was used to enable the generation of different sperm populations based on kinematic attributes, which can be further correlated with their capacitation, fertilization, and reproduction ability.

With this final identification of good and bad freezer donors, the research team was essentially assured of the availability of quality buffalo bulls and semen which are critical to the Agency’s National Genetic Improvement and Cryobanking Program in water buffaloes.

CASA standardization

Another plan for the research is to have an association study wherein they will use the AI and pregnancy records as bases in the selection of fertility-rated bulls. They will collect semen of these bulls to determine the sperm combination thru CASA. Maylem added that they need to come up with standard values of CASA for buffalo semen.

“We will start gathering semen from 50 bulls to run under CASA to get the standard values for buffalo. In the study, we only selected and ran samples from 6 bulls and it is not enough to develop a standard that is why we need to conduct another project for standardization of CASA,” Maylem expounded.

She added: “We will select bulls that have high AI efficiency rate and we will assess their sperm thru CASA and associate them with the newly-arrived bulls to develop a standard. It is not possible to use all bulls with good quality semen because our standard values will become high, that is why they should all be homogenous”.

Meanwhile, Dr. Eufrocina Atabay, one of the researchers in the study and head of the PCC reproductive biotechnology unit, said that fertility is equal to high quality semen, perfect timing of ovulation, and good genetics. They are still in continuing with study to verify if the good attribute of CASA is directly associated with fertility rate, she said.

“Our initial results are not yet conclusive. They still need verification in the field and further study as there are other aspects or factors that can affect the over-all fertility. It is not only the semen but also the female’s egg that should be studied,” Atabay said.

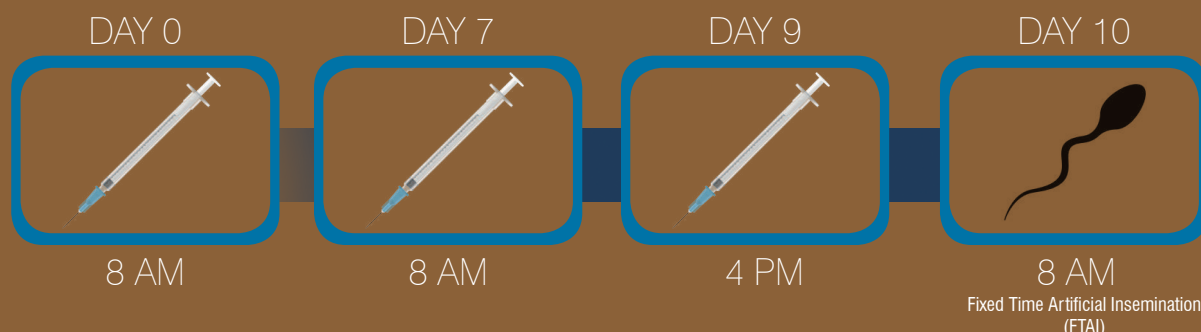
Also involved in the research study team are Dr. Edwin Atabay, Dr. Emma Venturina, Dr. Flocerfida Aquino, and Dr. Lerma Ocampo.

“We cannot declare that CASA can really enhance fertility rate because sometimes, inside the female tract, there are factors to consider. No matter how good the quality of the semen is, the female system has its own way of rejecting it. But for me, since we are not sure if the egg will be fertilized, it would always be wise to start with a very good quality semen,” Atabay said.

As of today, there are also CASAs installed in PCC at CLSU, Digidig, Carrangalan, PCC at UPLB, and PCC at CMU for semen production and hopefully, for the standardization and harmonization of researches. 

PCC to use FTAI as an improved, more efficient REPRODUCTIVE TECHNIQUE

ALMIRA P. BENTADAN



Ovulation Synchronization (OvSynch) - Dairy Buffalo

The Philippine Carabao Center (PCC) is pushing to improve the efficiency of its reproductive techniques, particularly artificial insemination (AI), among the buffaloes in order to hasten the production of the animals.

Among others, it is introducing the use of fixed-time artificial insemination (FTAI), a widely-used technology among cattle and buffalo in other countries that enhances the efficiency of the traditional AI through the combination of induced ovulation and timed AI.

The PCC, through its Reproductive Biotechnology Unit (RBU), is piloting the technology among the difficult breeders in its institutional herd through the conduct of a research.

The agency has been using the traditional AI technique but its practice is found not very effective among difficult breeders and anestrus buffaloes.

According to Dr. Eufrocina Atabay, head of the RBU, the low level of effectiveness of the AI technique may be due to the poor manifestation by the animals of estrus coupled with the poor detection of estrus by human handlers since the buffaloes are generally "silent heaters".

"Normally, we conduct the AI procedure when the animal shows signs of estrus. However, using ultrasonography, we learned that even after 3-5 days of heat detection, there are cases when ovulation has not yet occurred," Dr. Atabay added.

With FTAI, the AI is performed on a pre-determined time upon induced ovulation using different hormones, therefore, heat detection is no longer needed.

Among the protocols developed was the ovulation synchronization or Ovsynch that has yielded higher pregnancy rate among water buffaloes in other countries.

"At the start of the estrous cycle, we inject the gonadotropin-releasing hormone (GnRH) to induce the ovulation of the dominant follicle. A new follicular wave will then emerge that will continue to mature and develop. Seven days after, we administer the prostaglandin to trigger estrus or heat among the animals. A second dose of GnRH is then injected on the ninth day to ovulate the follicle and release the egg cells within 24-32 hours. This is when we conduct the AI," Dr. Atabay explained.

The study also uses ultrasonography to monitor the progress, growth and development of the follicles. The experiment is currently being conducted among the difficult breeders or those that are not responding to normal AI.

"Our partial result shows a higher efficiency among the repeat breeders subjected to the procedure," Dr. Atabay revealed.

With a highly efficient procedure, problems on calving interval will also be addressed since it can be performed on the second estrous cycle of the animal upon calving, she said. This will increase reproductive efficiency or the number of times an animal can give birth throughout its reproductive lifespan, she added.

"It will be less laborious compared to the normal AI procedure when the technician has to monitor the estrous cycle of the animals," she added.

"We can also program the breeding of the animals so that calving will occur on the lean season of milk production. This will ensure an all-year-round milk production," Dr. Edwin Atabay, co-researcher of the study, said.

The study is currently testing the efficiency of the different GnRH and is exploring the possibility of a more cost-effective procedure to make the technology affordable to smallholder dairy farmers.

"The cost of Ovsynch ranges from Php700 to Php1, 000 depending on the hormones used. It is more practical for commercial-scale farming and for propagating genetically superior animals," Dr. Eufrocina Atabay said.

The research team is also employing the technology to reinforce the effort of the PCC to conserve the Philippine Carabao, using FTAI among the institutional Philippine Carabao herd of PCC at Cagayan State University in order to produce a contemporary group of the native carabao.

Apart from Drs. Eufrocina and Edwin Atabay, the other members of the research team are Dr. Ester B. Flores, Ms. Excel Rio S. Maylem, Dr. Marlon B. Ocampo, Dr. Lerma C. Ocampo, Dr. Danilda H. Duran, Dr. Flocerfida P. Aquino, Dr. Daniel L. Aquino, and Dr. Annabelle S. Sarabia. 

PCC to improve production efficiency, rate of genetic gain

among

CARABAOS

CHRISSALYN L. MARCELO

A new research study, titled “Application of genomic information in dairy buffalo breeding program: Genotyping the Philippine water buffaloes using medium density 90,000 (90K) buffalo Single Nucleotide Polymorphisms (SNP) panel” is currently being undertaken by the Philippine Carabao Center (PCC).

Its ultimate aim is to improve the production efficiency of the buffaloes (aka carabaos) and the rate of genetic gain of the animals through the use of genomic information in breeding and selection.

It has two components: (1) Genome-wide association studies (GWAS) for milk production traits in Philippine dairy buffaloes; and (2) Development and application of genomic selection in buffalo breeding program.

“It is being conducted to further expand the number of SNP markers that we currently have in marker-assisted selection (MAS) of our carabaos and to help us set up a reference population (information nucleus) for our dairy buffaloes for use in genomic selection.” Dr. Ester Flores, lead researcher of the study, said. It is also meant to provide us (the researchers) knowledge and skills in analyzing and utilizing dense genomic information that we can use in our buffalo breeding program, she added.

“To do this, we will use an advance technology to identify a set of DNA markers that will enable us to identify which among our animals are having high genetic merit in terms of their milk production and milk

component traits. The technology that we are going to use is the medium density 90k SNP chip,” she said.

Medium density 90k SNP chip

According to Dr. Flores, the “medium density 90k SNP chip” is a type of DNA microarray that is being used to detect polymorphisms (occurrence of two or more clearly different phenotypes or characteristics in the same population of a species) in the buffalo’s genes.

She said that this chip contains 90,000 DNA markers that can help them identify which among their animals are carrying a favorable allele on its gene and, thus, good to be used in their breeding program implementation to further improve the buffalo’s breed.

“The 90k SNP chip is considered as an advanced technology in identifying DNA markers for various or specific traits of carabaos. It was designed through the Expert Design Program, facilitated by Affymetrix, which is a pioneer in microarray technology and a leader in genomics analysis, and the only commercially available high-density buffalo genotyping tool,” Dr. Flores explained.

She added that, the PCC, through its Genetic Improvement Program unit, which she currently heads, is the first agency in the Philippines to use this technology.

Genome-wide association studies (GWAS)

According to the cited literature of the research study, GWAS is now a preferred method for exploring genes associated with quantitative traits and has advantages over quantitative trait loci (QTL) mapping through linkage analysis as it results in greater power of detection. Further, it gives more precise QTL position estimates because it exploits the linkage disequilibrium between the marker and QTL at the population level of the specific DNA marker of the buffaloes.

In the research study, GWAS will be used to analyze the association between markers and phenotype of the gathered SNP markers to determine a list of significant markers associated with milk production and milk component traits of the animals DNA samples that were sent in the laboratory for genotyping using the 90k SNP chip panel. The significant SNP markers that will be identified are valuable for genomic selection of dairy buffaloes in the future.

Genomic selection in buffalo breeding program

Genomic selection, as defined in the research study, is one method to predict further the breeding value of an animal based on its genotype from a dense panel of single nucleotide polymorphism (SNP) markers regularly spaced throughout the whole genome of the buffalo’s DNA.

In fact, as explained by Dr. Flores, a lot of livestock industries in other countries, most notably on dairy cattle, have been implementing genomic selection for several years already with successful results. The

RABAOS

proportion of sires used as semen donor for artificial insemination that are non-progeny tested but have genomic breeding values is growing on a yearly basis even in species or breeds with small population. This is a reflection of the confidence of the industry on genomic selection.

In the current research study, development and application of genomic selection is one of the target outputs of the research. Flores said that by using this, faster generation interval will be achieved and identification of buffaloes having high genetic merits in terms of its milk production and milk component traits will be identified in a lesser time because they are directly working and evaluating the buffaloes' gene.

She added that it is very efficient to spot genetically superior animals that are best to use in the breeding program implementation. "One way to do that is to have higher

accuracy of selection by means of adding additional parameter like of genotyping the dairy buffaloes," she added.

Expected output

The following are the expected deliverables or outputs of the study:

- On the first year of the study, the research is expected to provide genomic information from 90K SNP panels of 900 cows or buffaloes with phenotype and identify 12 significant SNP markers from the buffaloes DNA's.

- On its second year, it is expected to identify eight young bulls nominated or selected for breeding based on its best lineal and bias prediction and estimated breeding values (BLUP EBVs) and its genotype information based on the significant SNP markers that will be derived; and provide

population stratification of local riverine type of buffaloes, and

- On the third year, it is expected to determine the effect of each and every SNP solutions using GWAS; derive a model on estimating the Genomic Breeding Values (GEBV) of the animals in the information nucleus; increase accuracy of selection of buffaloes based on Parent Average Estimated Breeding Values (PAEBV) 0.46 to GEBV 0.56; and finally, to identify eight young bulls nominated and selected for breeding based on its BLUP EBVs and GEBVs

Overall, the research is expected to improve the production efficiency of the buffaloes and expedite the rate of the genetic gain of the animals using the genomic information that can be derived from the study. 

“The “medium density 90k SNP chip” is a type of DNA microarray that is being used to detect polymorphisms (occurrence of two or more clearly different phenotypes or characteristics in the same population of a species) in the buffalo's genes. This chip contains 90,000 DNA markers that can help them identify which among their animals are carrying a favorable allele on its gene and, thus, good to be used in their breeding program implementation to further improve the buffalo's breed.”

- Dr. Ester B. Flores, Unit Head, Genetic Improvement Program



Carabao rises to new-found importance: As farmer's 'BEAST OF FORTUNE'

ANSELMO S. ROQUE

From “beast of burden” to “beast of fortune”, that’s how the carabao has turned-out to be after centuries of neglect, near extinction, low-regard, and becoming second fiddle to farm machines.

Since the beginning of agricultural pursuit in the country, which was several centuries ago, this animal’s importance is as a mainstay in farm works. It is the farmer’s tractable, reliable and uncomplaining ally in myriads of works in the field, hence, it was dubbed as a “beast of burden”.

It is also harnessed as the farmer’s steady power behind transport or cargo facilities, like the kariton (cart) and kareta (sled), in the rural areas.

Without it, the farmer contemplates he is only half-a-farmer. He is infirmed without it as it ungrudgingly helps him breach the farm land with the use of the plow, pulverizes it with the use of the harrow, levels it with the use of wooden planks, and cultivates even difficult terrains till they are ready for planting the crops season upon season.

The crops are mostly rice and, also to a large extent, corn, vegetables, sugarcane, tobaccos and others.

Until small farm machineries, including the hand tractors which have become very handy to the farmers, slowly dislodged off some of its most important works. And because of it, although it was for centuries regarded as an all-important animal in agricultural areas, it was labeled by proponents of the use of agricultural machines as “lowly, slow-footed, and

symbol of backwardness animal.”

But the carabao has risen, thanks to the noble conspiracies of Filipino scientists, a government which paid unprecedented attention for its upgrading, and the men and women who are continuously working for its welfare. This animal has turned-up for a new-found significance- that of changing lives of people and of providing a source for the burgeoning of vibrant carabao-based industries for the country.

Leap in carabao’s milk contribution

“Over the years, we didn’t see the contribution of the carabaos in the local dairy production. But now, their contribution is 34% and is still increasing,” Dr. Arnel del Barrio, acting PCC executive director, said.

The oozing flow of milk is from the upgraded breed of carabaos which used to be the draft-type to dairy breed-type.

Take the case of Andypoe Garcia, a farmer in Sitio Mapiña, Magalang, Pampanga who collects 14 liters of milk a day for three months from his crossbred carabao during peak period and seven to eight liters in the rest of the ten-month lactation period. He has more than 20 other dairy carabaos although they average a little less than his prized carabao.

He sells the milk in a sweets and pastries’ establishment in Angeles City at P80 a litter.

And this nonpareil dairy farmer in Gen. Trias, Cavite, Francisco Solis. Formerly, he was delivering the milk yield from his dairy animal with the use of an owner-type jeep, but now, he is delivering the good using his P1.3-million Ford Everest van.

Solis, a dirt-poor farmer, used the money raised from his wedding gifts for buying one carabao in 1991. In time he built a herd of 23 dairy carabaos and his fortune has smiled considerably enabling him to build a fleet of four passenger jeepneys, an L-200 van, tricycles, hand tractors, threshers, a store and a bakery.

In San Jose City, Melchor Correa earns P2,500 a day for milking twice his six carabaos.

Correa heads a dairy cooperative which produces various milk products for sale to the public.

More than 50 dairy carabao cooperatives banded themselves into “Nueva Ecija Federation of Dairy Carabao Cooperatives” (NEFEDCCO) which runs a milk processing plant in Talavera, Nueva Ecija. The plant earns millions of pesos a year for the processing into various milk products the milk turned in by its member-coops.

In most areas, the carabao’s milk has an



ex-farmgate price of P50 to P60 a liter.

“In terms of carabao meat, our carabao slaughter rate was formerly 11% to-12% but it has gone up to 16%. On the contrary, the importation (of carabao’s meat) is not increasing although the demand is increasing and that means it is another big contribution of the carabaos to the country,” Del Barrio said.

He said a number of bigger projects to firm up the rise of the carabao as source for varied fortunes are pursued by the PCC. One of these is the multiplier farm under whose concept 50 quality dairy carabaos will be provided to individuals or groups to help in the advancement of the carabao development program.

“Under the agreement, these farms will provide all the inputs in tending the animals and turn-over their first offspring to the PCC. They are expected to put viable enterprises from the milk they will collect from the animals and from the other offspring of the animals,” del Barrio said.

The first such farm has already been established in Javier town in Leyte, he added. The second in a Tarlac town.

Another project pursued is the establishment of dairy carabao hubs in various places in the country. These hubs, he said, promotes a well-oiled business chain in the provision of credit, forage production, breeding, products development, promotion, marketing, and other aspects related to a

robust dairy carabao business.

“For one, a forage industry for dairy carabaos must get going. We know that the dairy carabaos can turn out big flows of milk if they are fed well. As you can see, the farmers have limited resources for abundant supply of nutritional feed,” del Barrio said.

He also said:

“The day is not too far when we shall have produced our Philippine Dairy Buffalo breed which is comparable to the best water buffalo breed in the world.”

For sure, that Philippine Dairy Buffalo would be unique in the world as it is a “three-in-one carabao” – for milk, meat and draft power.

Swamp-type water buffalo

Written history indicated that the Philippines imported carabaos from China in the mid-1500.

Theories, however, pointed out that in the country’s history, the first migrants to the country brought with them ancient flora and fauna. For the fauna they brought in, the commonly called “water buffalo” elsewhere in the world was among them.

This animal, according to published archeological findings, was domesticated some 7,000 years ago in the Chekiang province of China. It was of two types - the swamp buffalo and the riverine buffalo.

Both types have distinct and similar

descriptions and characteristics. Their body anatomy is generally the same but their chromosomes differ – the riverine type with 50 and the swamp-type 48. The riverine-type has a black body color and with curled horn while the swamp-type, dark gray and with horns that extend outward and curl backwards like in semi-circle form.

It was the swamp-type that was brought to the country which, by its nature, is excellent for its draft usability. The riverine-type, like those found in India, Pakistan, and in the Mediterranean areas, is for meat and milk.

On Philippine soil, this animal earned the unique name “carabao”. Recent studies on the lineage of the Philippine carabao indicated that it descended from the maternal line of the Chinese buffaloes.

The name carabao is surmised to have come from the Visayan or Cebuano word karabaw which was apparently from kerbau, the Malaysian and Indonesian local name for the water buffalo.

Recently, PCC officials agreed to adopt the name “kalabaw” or carabao in order not create confusions in promoting this animal. They noted that the farmers tended the native carabao as :kalabaw” and the upgraded and purebred animal as buffalo.

Contribution in farm works

“The estimated value of the contributed
(continued on next page)



“The day is not too far when we shall have produced our Philippine Dairy Buffalo breed which is comparable to the best water buffalo breed in the world. For sure, that Philippine Dairy Buffalo would be unique in the world as it is a “three-in-one carabao” – for milk, meat and draft power.”

- Dr. Arnel N. Del Barrio, PCC Acting Executive Director

draft power of the carabao is at US\$ 1.48 million (P21 billion),” said Dr. Libertado Cruz, former executive director of the Philippine Carabao Center (PCC), quoting a research study in 2002 said. “This contribution was divided in the production of rice, corn, coconut, and sugarcane and some other crops in smaller values”, he added.

About 66 percent of the population the Philippines used the carabao for farm works based on that study, Cruz added.

Yet for all the significant role in Philippine agriculture and in supporting the lives of farmers and their families, the carabao’s existence suffered natural and man-occasioned misfortunes that almost wiped out its population more than a century ago.

In the early 1900, diseases, particularly rinderpest, swept through the animal’s population. As if conspiring to that ill-fortune, locust infestation damaged the vegetation that resulted in the poor dietary

supply for the animal. Almost 90 percent of its population was wiped out because of the disease and the calamity.

The locust infestation, particularly, was viewed with alarm by foreign entities worrying about the economy and instability of the country. It thus merited prominence in one of the issues of the New York Times in the latter part of 1902. The paper’s story for the carabao’s adversity carried this headline: Dearth of Field Animals. Pest has Almost Exterminated Carabaos in the Philippines. Agriculture at a Standstill.

But like the resilient people and nation that we are, life moved on for the carabao. In time, its population increased.

During the last World War, however, another catastrophe befell on the carabao. Japanese officials suspected that the carabao was being used by the Filipino guerrillas for transporting weapons and goods in aiding American soldiers. The massacre of the carabao was ordered.

Bullets found their marks on the hapless

animal. All told, about two million of them went down dead.

Their breed, too, suffered.

“The farmers, wanting to have bigger and sturdier animals, usually castrated the best of their bulls. As a result, lesser quality bulls were left for mating and for the propagation of their species,” Cruz said.

Their nutritional needs and health care were not well-attended, too, by the farmers, he added.

Their offspring declined in size and weight. Their draft power dwarfed.

Saving the carabao

It was not all a lost cause for the carabao. In fact, monumental developments took place in the last 42 years that eventually catapulted the carabao to new heights.

Filipino scientists took the cudgels for the improvement of the breed and proper care for the carabaos. Then the Philippine legislature passed a unique law that gave prominent attention for the improvement and propagation of this animal.

From a tiny step, that of including a study on the carabao’s breed, population and health under the beef-chevon research and development studies, developed bigger concerns for this animal.

“That was in 1973 when the Philippine Council for Agricultural Resources Research undertook that step,” said Dr. Patricio Faylon, former executive director of council, in his published account about the carabao’s development in the country.

Three years later, a Carabao Commodity Team was formed by PCARR and was allotted funds for its R&D efforts, he added.

Then in 1981, with a funding provided by the United Nations Development Program (UNDP)-FAO, the “Strengthening of the Philippine Carabao Research and Development Center” was implemented.

The center, among others, was meant to strengthen institutional capabilities in the testing of the performance of crossbreds, which are the offspring of the crossing of the dairy-type buffalos with that of the native carabao.

In its terminal report ten years after, the center reported: “The farmers attested that the developed crossbreds possess relatively higher capacity to produce milk, better growth, and having more meat without lessening the animal’s draftability.”

It further cited in the report the following:

*the Murrah buffalo-Philippine carabao
(cont.p31)



Farmer's livestock school to boost **TECHNOLOGY ADOPTION** among **smallhold dairy farmers**

MA.CECILIA C. IRANG

The Philippine Carabao Center (PCC) is conducting a development project cum research titled “Extension Methods for Adoption of Dairy Buffalo Technology in Selected Barangays in Nueva Ecija and Ilocos Norte”. It is meant to pursue the development of extension modalities for the holistic delivery of its extension services and strengthen technology adoption among village-based dairy buffalo farmers.

The extension research project is composed of two studies for technology transfer or dissemination. They are by conducting a “Farmer Livestock School (FLS) on Dairy Buffalo Production” and engaging a mobile team of communicators of innovations.

Both projects are considered practical tools in adult learning and in creating effective communication toward technology adoption.

“FLS is a three-year project. It is an alternative tool to the usual technical trainings to transfer technology to end-users, particularly farmers. It builds on the concept and methodology of a Farmer Field School (FFS),” Dr. Eric Palacpac, project leader, explained.

He added: “Its difference from the traditional school is that it does not need a building. It’s a ‘school without walls’, a participatory, hands-on, interactive, experiential, adult learning and decision-making approach engaged in by a group of farmers in a training program and conducted right in the farmers’ field or locality”.

He further said that the FLS-DBP is the first FLS study on dairy buffalo production in the Philippines. It is modeled after the successful FLS in integrated goat management (FLS-IGM) implemented by the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD) through its Livestock Research Division (LRD) in 2001.

Module development

Currently, PCC is in the preliminary

phases of FLS. It is in the stage of developing learning modules on buffalo dairy production for FLS with the help of its core teams from the PCC National Headquarters and Gene Pool in the Science City of Muñoz, Nueva Ecija, PCC at Mariano Marcos State University (PCC at MMSU) in Batac, Ilocos Norte and PCC at Central Luzon State University in the Science City of Muñoz, Nueva Ecija.

The core group or module developers are composed of Dr. Eric Palacpac, Dr. Edwin C. Atabay, Dr. Grace Marjorie Recta, Mr. Moses Gil F. Honorio, Ms. Rovelyn T. Jacang, Mr. Erwin M. Valiente, Dr. Anabelle S. Sarabia, Dr. Peregrino Duran, Dr. Ester Flores, Dr. Daniel Aquino, Dr. Nancy S. Abes, Dr. Cyril P. Baltazar, Ms. Wilma T. Del Rosario, Ms. Mina Abella, Ms. Phoebe Lyndia T. Llantada, Ms. Khrizie Evert M. Padre, Ms. Meriam Cabling, and Mr. Florencio Malicad.

The PCAARRD, on the other hand, is assisting the PCC in developing the FLS. An outline of the module was already developed through the help of Ms. Marie Alo, PCAARRD’s FLS expert. Topics to be discussed and some lesson plans have also been developed.

The core group had already undergone three workshops. They were held last September 3-5, December 17-19, and February 9-11, in Tagaytay City, PCC National Headquarters and Gene Pool, and Bagac, Bataan, respectively.

“We are now on module development. Modules are lessons or topics in a course curriculum in which farmers/participants have basket of options to choose what lesson they want to learn depending on their

needs and existing knowledge,” Dr. Palacpac said.

Progressive farmers, LGU technicians and some staff from PCC-NIZ will be trained to teach the farmers. They will then serve as facilitators and trainers for the FLS-DBP pilot classes in Nueva Ecija and Ilocos.

“There will be trainings for the trainers. The module that we are developing will be the trainers’ book guide or session guide in teaching the farmer-participants,” Dr. Palacpac said.

For the mean time, FLS of PCC will only cover two areas as pilot classes. But the project team is planning to expand the area in the future to cover Visayas and Mindanao if the project turns out to be a success.

“The module makes use of games approach. It is better to create learning exercises in the form of games because it is easier to be understood by the farmers. We thought of different kinds of games which will be ingredients in teaching farmers. We need to think of a learning process in an entertaining way,” Dr. Palacpac explained.

The farmers will be taught by the trainers of the identified technologies that will be featured on the FLS on dairy buffalo production.

FLS Extensions methods

FLS extension methods involve five phases.

First phase is the preliminary phase, which is the current stage of the PCC’s FLS that covers the selection of module developers and national facilitators; workshop on module development in which
(cont.p31)



PASTURE MANAGEMENT factors in carabao's productivity, profitability

MA. CECILIA C. IRANG

Pasture managers consider feeding of sufficient forage for livestock, specifically dairy buffaloes, as an important factor toward assurance of good performance and healthier lives of the animal.

They correctly discern that implementing good pasture management and grazing principles increase forage quality and yield, provide a healthier place for the grazing of buffaloes and improve their performance. They also know that they prevent the occurrence of any nutritional problem that eventually affects their productivity.

Moreover, healthy pastures, experts said, are beneficial to the owners, animals and the environment. They prevent degradation of the land through erosion and water loss. In maintaining a good healthy pasture, soil nutrients and pH are managed well as well as the monitoring of forage growth and the consumption of the forage by the grazing animals.

In this regard, pasture managers of the two regional centers of the Philippine Carabao Center, located in Visayas State University (PCC at VSU) in Leyte and in Central Mindanao University (PCC at CMU) in Bukidnon, have their corresponding ways in managing their respective pasture areas to maintain the good production of the buffaloes in their herd.

Pasture area

In PCC at VSU, the actual land area is 15 hectares, 8-10 hectares of which are intended for pasture development for grazing of buffaloes and three hectares for the growing of grasses that are cut and carried to the animals. The area has a rolling topography.

According to Prof. Francisco Gabunada Jr., former center director of PCC at VSU and currently a consultant of PCC on forage development, pasture or forages are the cheapest and most stable (can be available year-round) sources of feed for ruminants.

Ruminant production based on forages is not only economical but can also lead to safe and healthy products.

He added that forages can supply all the nutrients required by the animal at a relatively low cost, thereby enabling adequate production with increased profit.

The existing forages in their pasture area are guinea grass, humidicola, napier, shrubs, rensonii, flemingia, ipil-ipil, and legumes. Grasses that cannot be fed to buffaloes are uprooted, he further revealed.

On the other hand, the PCC at CMU has 45 hectares of pasture area but soon, thru a memorandum of agreement between the regional center and the university, an additional land area of 30 hectares will expand it. It has a flat land area in which some parts are surrounded with trees. The predominant pasture grasses present in the area, according to Dr. Lowell Paraguas, PCC at CMU center director, are *Brachiaria decumbens* or signal grass, *Brachiaria brizantha* and *Brachiaria humidicola*. At least three hectares are now planted to napier grass.

Grazing rotation

One management option to promote a healthy pasture and good forage for grazing buffaloes is to implement rotational grazing, Prof. Gabunada said. This involves using cross fences to divide the pasture into separate units which are called paddocks. Animals are allowed to graze on a paddock and are then moved to the next paddock. As one paddock is being grazed, the other paddocks have the opportunity to recover and grasses can reestablish.

Rotational grazing means periodically moving livestock to fresh paddocks to

allow pastures to regrow. It requires skillful decisions and close monitoring of their consequences. Feed costs decline and the animal's health is improved when they are allowed to feed by way of a well-managed rotational grazing system.

Another benefit to a rotational grazing is that new growth will be much more nutritious and digestible for grazing animals, the experts said.

"The pastures in PCC at VSU were established vegetatively using manual labor. The species we selected was one that was commonly growing well in the surrounding areas. We used relatively small paddocks to assure high utilization rates. After grazing, we cut back the grass as a strategy for the fast regrowth of the forage, and fertilization is done; both will assure adequate regrowth. A pasture that has been grazed will be given adequate time to recover by leaving it undisturbed for 30-45 days," Prof. Gabunada added.

The grazing hours for the buffaloes in PCC at VSU is from 6 a.m. to 10 a. m. It has a total of 66 paddocks. After foraging in the first paddock for 4 hours, the animals are scheduled to feed in another paddock the next day. Only the growing, lactating and pregnant animals are allowed to graze as they need to be fed with fresh grasses. Bulls and dry buffaloes are confined and fed with rice straws and concentrates.

Andres Amihan Jr., PCC at VSU science research analyst and farm manager, said that after four hours of grazing, the buffaloes are brought down to the barn for wallowing and bathing. In the afternoon, they are given concentrates and napier grasses thru cut-and-carry system.

"We have a grazing rotation for more than
(continued on next page)

one month. Grasses like guinea, humidicola and napier regrow within 45 days, so we have 45 days of grazing rotation but we have a total of 66 paddocks therefore we still have 21 paddocks as our back-up for this practice,” Amihan explained.

“Proper feeding management has a very important role in the milk production and performance of buffaloes. If we want positive outcomes, we should do proper feeding and pasture management,” Amihan added.

Forages that are rich in protein and fiber are the best feedstuff for buffaloes. The average liters of milk produce by each buffalo in their herd is 6 liters and 12-15 liters at peak lactation periods.

Extensive management system

The PCC at CMU implements a full-time grazing system for its more than 40 milking cows with an average milk production of six liters a day or 19 liters at peak lactation periods. The only time the animals are returned to total confinement is when they reached their dry-off period. Currently, the center has a total herd inventory of 330 buffaloes.

“The milking cows are fed with very minimal amount of concentrates at the time of milking. After each milking session, they rest for a while before herding them back to the paddocks to allow the closing of their teats’ orifice. This prevents the udders from being infected,” Dr. Paraguas said.

The center has 40 hectares of grazing area with 30 paddocks. Each paddock is one hectare wide and is planted to 1-3 varieties of grasses like signal grass, Brizantha, and Arachis pinto that can feed 40 dairy cows in

a day.

“We are set to establish 30 hectares of napier grass plantation as additional forage and I just recently acquired five 25-kg bags of signal grass from Australia for our planting material. The seeding rate of one hectare is 6-8 kg of signal grass. One bag of it can be planted to 5 hectares of land,” Dr. Paraguas said.

The center also plans to develop forage garden along the highway. “We will plant varieties of forage grasses and legumes. We want to help our farmer-cooperators in acquiring new accession of grasses,” he added.

Also part of their pasture development is the planting of legumes like Arachis pinto and the utilization of animal manure as fertilizers.

“You can see the need of the animal by just looking at its body. You will know there is something wrong with the feeding in terms of its body condition score (BCS). For me, if you don’t have a good pasture area, you will encounter a lot of problems on the animal’s reproductive performance and milk production,” he declared.

Proper feed resources should meet the nutritive values necessary for the animals’ maintenance, lactation, reproduction, growth and good health condition. Dairy animals are in need of important nutrients such as energy, protein, calcium, phosphorus, magnesium, copper and vitamin A. Thus, the center is focusing on the mineral supplementation especially to the milking cows.

“We are supplementing concentrates but we are also planning to reduce its cost so we are establishing a good pasture. We will

now invest more on pasture development because for the past years we overlooked its importance,” he explained.

Improvement of feeding management, he reiterated, is very crucial especially if the buffaloes are pregnant and the feeding system is inadequate. The calves produced might have poor BCS and might be susceptible to diseases if good feeding management is not attended to.

The center also is facing some challenges in the establishment of pasture area, according to Dr. Paraguas. They need to have equipment and machineries in putting fertilizers like manure spreader and loader. They are also planning to make the pasture area irrigated.

On the farmer’s level, Dr. Paraguas has this reminder:

“They cannot adopt this kind of grazing system for now because they only have a small pasture area but they can adopt the cut-and-carry system. They will plant napier grass and these new accession of grasses. They need to learn how to plant forage for their animals and how to maintain the year round forage supply so we need to teach them. They also need to develop their observation scale; just by one look they will immediately know the problem with their feeding system.”

He added:

“They should also know the needed level of dry matter content for the animal to not be drained during milking. The recommended dry matter content is 4-6% of the animal’s body weight for maintenance but if they want to add DM, it should be based on the animal’s milk yield.”

He added that before raising buffaloes,

“Proper feeding management has a very important role in the milk production and performance of buffaloes. If we want positive outcomes, we should do proper feeding and pasture management.”

**- Mr. Andres Amihan Jr., PCC at VSU Science Research Analyst
and Farm Manager**

New varieties of pasture grass

**Brachiaria Cv.
Mulato II**

**Panicum maximum
Mombasa
(IMPROVED GUINEA
GRASS)**

the farmers should also have an established pasture area for the source of forage and that the supply of grasses should be available all-year-round. Utilization of new varieties of grasses, and not settling to just one variant, is also important.

“We planted one hectare of napier as source of planting materials for our dairy farmers,” he said.

New variety of pasture grass

As part of the pasture development of PCC at CMU, Dr. Paraguas acquired new varieties of pasture grasses, namely: Brachiaria Cultivar (Cv.) Mulato II and Panicum maximum Mombasa (improved guinea grass) from the smallhold dairy cattle farmers of the National Dairy Authority. The center started planting them last November.

“I used to attend to some focus group discussion with the farmers since they have concerns on animal nutrition in which I contributed ideas. I acquired the new varieties of pasture grasses from them because they have this RP New Zealand Dairy Project, a support of the New Zealand government to the small-hold dairy cattle farmers. They brought with them this new variety of grasses and identified focus farmers as to where they will plant the new variety so that other dairy farmers will see its nutritional value. I asked for some planting materials and planted it on a certain portion of our pasture area,” he expounded.

Currently, the new variety is not fed to the buffaloes yet as it is intended for the forage nursery. It is still under the multiplication process so that it will be soon planted on a larger area.

They tried to feed the grass to the weanlings from 6 months to 18 months of age and found out that they are the most palatable grasses. They said the animals immediately consumed all the grasses and they have higher dry matter intake compared to other grasses.

“They provide a lot of nutritional value to the buffaloes since they are already the improved variety of grasses. They have high crude protein (CP) and dry matter,” Dr. Paraguas said.

Cv. Mulato II, according to the Hancock Seed Company, has excellent nutritional characteristics in terms of CP content and digestibility. It was developed from three generations of hybridization and selection initiated in 1989 by the Forage Project of the Centro Internacional de Agricultura Tropical (CIAT), in Cali, Colombia, commencing with the original *B. ruziziensis* x *B. decumbens* cross then commercially released by Grupo Papalotla in 2004. It is reported to be highly palatable to grazing ruminants.

Although both parameters vary depending on the age of the grass and the time of the year, in general, this grass yields 14-21% CP and its in vitro dry matter digestibility in regrowths of 25-35 days is 55-66%.

Because of its superior quality and excellent production, Mulato II is suitable for intensive rotational management. Voluntary intake of the grass is high, which results in significantly greater milk production compared with other brachiaria cultivars. The recovery capacity of this grass is high, requiring rest periods of 21-28 days in the rainy season.

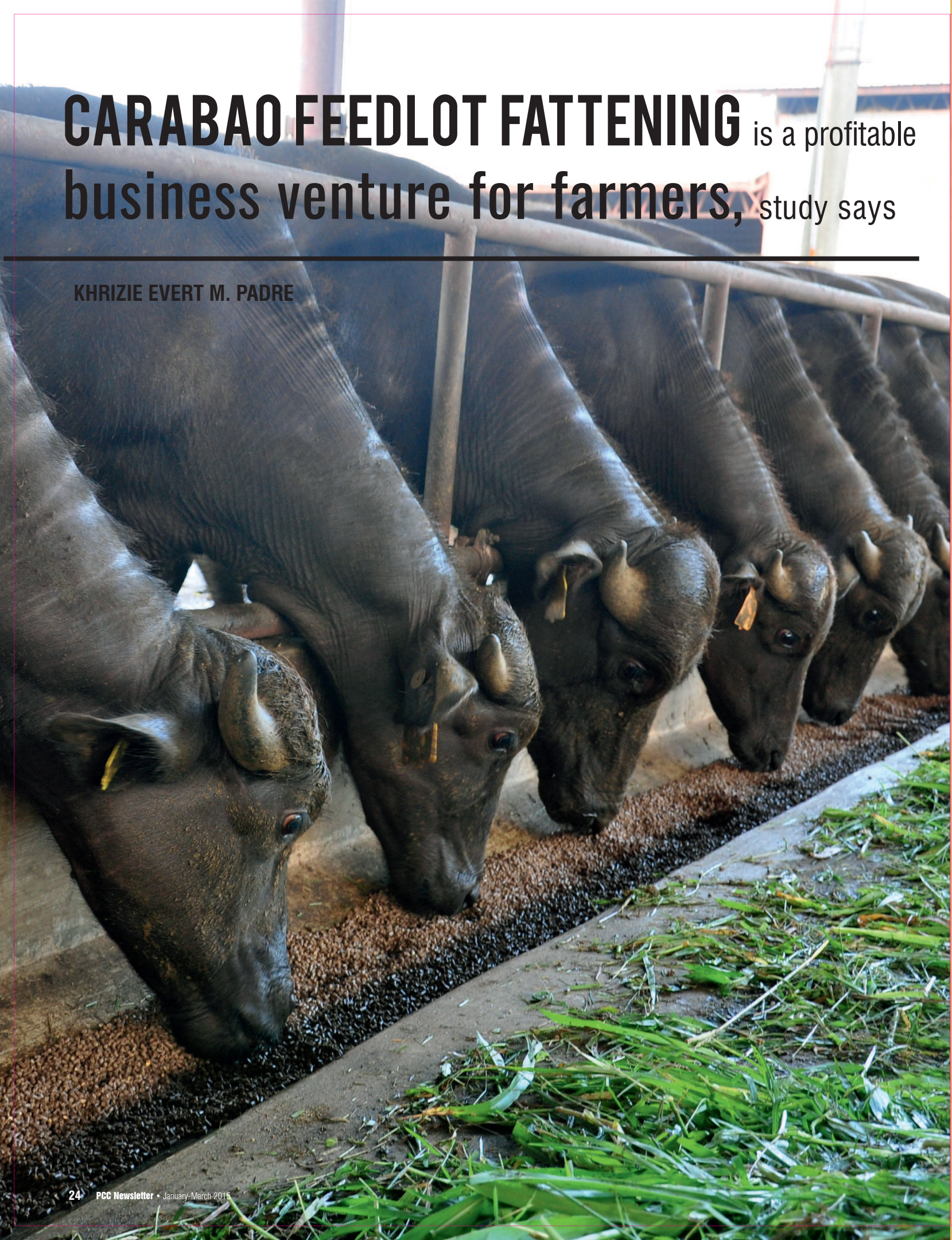
On the other hand, according to the Tropical Seed Company, Mombasa guinea grass is a tall grass, similar to hybrid Napier grass in habit, but far more leafy and is very suitable for cut-and-carry. It was introduced in Brazil from Tanzania in 1993, from near Korogwe, Tanzania. It is a very productive leafy grass, producing between 20 and 40 t/ha dry matter per year. It has 8% to 12% crude protein in Thailand on poor soils and 12% to 14 % crude protein on better soils. It can be either rotationally grazed or set-stocked or use on cut-and-carry basis.

“I am one of the witnesses of what these new varieties can bring. I observed the improvement in the milk yield of the cattle of the farmers by feeding these improved pasture grasses. From 5-6 liters, it jacked up to 10-12 liters,” Dr. Paraguas said.

This rainy season, he said, he is planning to buy sacks of these varieties from the farmers and plant them in PCC at CMU's pasture area. He added that the developed pasture area can result in improved milk production and performance of the buffaloes. ©

CARABAO FEEDLOT FATTENING is a profitable business venture for farmers, study says

KHRIZIE EVERT M. PADRE



There's more to carabaos than just a source of draft power. They offer big potential for the meat industry as an increase in the slaughtering rate of carabaos for meat or carabeef is an indicator of its growing market demand.

As this unfolds, a production system for this animal is seen as a very profitable venture. The system is called carabao feedlot fattening.

It is an intensive carabao raising practice, which is one of the fastest ways to increase carabeef production.

In feedlot fattening, the animals are kept in a confined area to minimize their movements and help develop their tissues. They are usually fed and fattened with locally available quality feeds. The practice is more beneficial in areas where there are abundant farm by-products such as corn stover, fresh corn stalks, sugarcane tops, cover crops, pineapple pulp, rice straws, banana leaves and trunks.

The system requires the needed feedlot facilities and simple animal management.

Crossbred for meat production

The Philippine Carabao Center (PCC) initiated the crossbreeding program of the native carabaos in the spirit of the Philippine Carabao Act of 1992, which is aimed at increasing production of milk and meat.

Crossbreeding involves impregnating female native carabaos with frozen-thawed semen collected from superior sires thru artificial insemination. The first offspring of crossbreeding is a crossbred with 50% purebred blood and 50% native blood. The purebred bloodline of the crossbred increases as it undergoes backcrossing.

The crossbred for one has the potential for better milk production. It also has larger body size and, therefore, when slaughtered provides more meat than that of the native type.

According to researchers, male crossbred carabaos have more potential in the meat processing enterprise owing to its higher dressing percentage.

Studies have shown that carabao's meat, particularly from the crossbreds, when raised and properly fed the same way as that for cattle, is comparable to beef in terms of

its physiochemical, nutritional and palatability characteristics.

In a comparative study conducted by the PCC at UPLB on the meat characteristics of cattle and carabao, it was noted that "crossbred carabao can grow as fast as cattle and can be raised economically under an intensive production system at 90 days fattening period."

"With feedlot fattening, two to three production cycles a year are possible", said Dr. Rosalina L. Lapitan, then Supervising Science Research Specialist of the PCC at UPLB.

The center started its institutional feedlot fattening in 2007. The male crossbred buffaloes and animals that are no longer productive were used for fattening.

"The animals were fed with high energy feeds consisting of legumes, grasses and concentrates. We saw to it that the animals reach an average daily gain of 0.5 kilogram to ensure the desired market weight of 400 kilograms at 18 to 20 months of age," Dr. Lapitan said.

Since the production cycle is relatively shorter, a quick return of investment can be attained, she added.

She said the animal management in feedlot fattening system is very simple. "If you are into backyard fattening, the animal management involves only feeding the fattener with available farm by-products within the community or available concentrates," she added.

The PCC at UPLB used the carabeef produced to make gourmet sausages labeled as "Carabest Premium Carabeef Sausages". Among these are cervelat, salametti, Italian sausage, beerwurst, bratwurst, schublig, kielbasa, mortadella, kabanosy, summer sausage, batutay and Hungarian sausage. The latter is the best-selling item.

The PCC commissioned the Animal Products Development Center (APDC) of the Bureau of Animal Industry (BAI) in Marulas, Valenzuela City to process these products.

Commercial feedlot operation

The PCC at UPLB is currently pursuing a one-year joint project titled "Fattening and Finishing of Riverine Buffaloes under a commercial feedlot operation" with Mr. Martin Gomez, a private farm owner from Canlubang, Laguna as a cooperater.

The joint undertaking aimed to demonstrate the viability of feedlot fattening of purebred riverine buffaloes. Specifically, the project implementers aimed to compare the growth performance of cattle and riverine buffaloes under commercial feedlot operation; to determine the slaughter, carcass and lean-fat bone yield of cattle and buffaloes; to evaluate the sensory traits, chemical composition and processing characteristics of meat from cattle and buffaloes under intensive system of operation, and determine the economic viability of raising male riverine buffaloes for feedlot fattening.

Under the agreement, PCC provides the test buffaloes for fattening; conducts the laboratory tests to determine the meat quality and sensory evaluation from the meat produced by the test buffaloes; and provides assistance in data gathering.

The test buffaloes are male riverine buffaloes not suitable for breeding purposes.

Gomez, on the other hand, provides transport or trucking service for the hauling of animals from PCC site to the feedlot, establishes the feedlot facilities and provides feed resources and animal management.

The net proceeds from the project, which will come from the sale per kilogram of the body weight less the cost of feeds and other inputs will be shared between the two parties. These inputs include the purchase cost of the buffaloes for fattening per kilogram of the body weight based on the prevailing market price. The data gathered and results of the laboratory testing will be made available to both parties. 

Multiplying opportunities in carabaos thru **MULTIPLIER DAIRY FARMS**

KHRIZIE EVERT M. PADRE

Sustaining the growth of the local dairy industry, particularly carabao dairying, and for other purposes, like meeting the demands for carabeef, has been the main preoccupation of the Philippine Carabao Center (PCC).

As it continues to encourage Filipino farmers to venture into carabao raising and its companion drive for carabao-based enterprises, it partners, among others, with private entrepreneurs who have the capacity and willingness to pursue the goals of the agency.

One such partnership is manifested in the "dairy buffalo multiplier farm" project. The project is now on the road for expansion.

In the town of Javier, Leyte, 73 kilometers south of Tacloban City, the country's first dairy buffalo multiplier farm (DBMF) established on a four-hectare land area in Sitio Mapula, Zone II. Michael Javier, who entered into an agreement with PCC operates the farm.

PCC acting executive director Arnel N. Del Barrio, together with the PCC at Visayas State University (PCC at VSU) staff, officially turned-over 50 Italian Murrah heifers in a ceremony held last November 8. It was officially launched as the first DBMF project in the country.

Del Barrio explained that the multiplier farm is another strategy aimed at increasing the population of dairy buffalos and breeder base, improve the animal productivity that will help ensure availability of milk, and to serve as a demonstration farm for farmer-partners and stakeholders for better appreciation of buffalo-based enterprise through dairying.

He added that the Department of Agriculture supports the implementation of the DBMF operation scheme as it believes that this project can contribute substantially in the sustainable growth of the dairy industry and can create more livelihood opportunities.

The DBMF undertakes breeding, milk production and processing and establishing sustainable dairy enterprise. It contract

is awarded to qualified farmer-trustees to have an access to good quality animals and technical support for carabao production, breeding and marketing activities.

Under the program, PCC entrusts a number of imported or island-born purebred heifer animals depending on the capability of DBMF partner. The animals are to be paid within an eight-year period.

The first payment, in the form of heifers, commences within or at least at the end of the 4th year of the contract and the last payment is within or at the end of 8th year of the contract. The heifer should be at least 14 months of age weighing not less than 220 kilograms in body weight and has an average body size for its age.

Javier town Mayor Leonardo Javier Jr. said that this project in his municipality will provide economic benefits for his constituents.

A fourth class municipality with 28 barangays, most of the households in the town are engaged in corn, abaca and coconut planting.

"What does this multiplier farm means to the town? It means, we will have milk so we will have income. We will have organic fertilizers from their manure. We will benefit a lot," he said in his message during the turn-over ceremony.

Under the program, PCC will entrust a number of imported or island-born purebred heifer animals depending on the capability of DBMF partner, payable within an eight-year period.

The condition of payment of animals is that the offspring should be at least 14 months of age weighing not less than 220 kilograms in body weight and has an average body size for its age. The First payment of one heifer will commence within or at least the end of 4th year of the contract and the last payment is within or at the end of 8th

year of the contract.

Dairy farm management

It was not smooth sailing at the start.

The Javier DBMF had to work double time to provide the required housing facilities for the animals. For two weeks, the construction works went on full swing and the 12 personnel underwent an intensive hands-on training to familiarize themselves to the actual management of the dairy animals.

The 50 Italian Murrah heifers arrived on the farm on October 31, 2014.

The animals were fed with fresh napier four times a day. The workers also engaged silage-making to ensure the availability of the feed for the animals.

According to Dario Divino, Javier DBMF supervisor, the challenged they confronted was how to prevent the animals from getting attacked by diseases.

"We monitored the animals 24-hours a day. We divided the 12 management staff into two groups. The day shift is in-charge of feeding and health monitoring of the animals while the night shift conducts heat detection of the animals," said Divino.

On the the part of PCC at VSU, its center director Julius Abela made sure that close health monitoring is ensured and that technical assistance to the farm is always at hand. The center's staff also assisted in the planting and growing of Napier grass in the forage areas.

Currently, 30 animals have already been given artificially insemination services and are already subject for pregnancy diagnosis. The animals are expected to conceive in August if the AI proves successful.

The farm also practices the use of coco peat as the animal's bedding and as a means to lessen the foul smell in the dairy farm as well as helping the pens to be clean and dry.

The coco peat primarily consists of the coir fibre pith or coir dust which is obtained by processing coconut husk and removing the long fibers. It can hold large quantities of water, just like a sponge.

"Twice a day after cleaning the area, we scatter the coco peats on the pens," Divino said. "The animal wastes that we collect every day are into organic fertilizer which we apply to our forage area," he added.

According to Divino, the management is undertaking the necessary preparations for the construction of the farm's milking parlor and processing plant to prepare for the future much anticipated activities of the farm

The management of the Javier DBMF will also adopt the PCC "paiwi system" to the community for its re-dispersal scheme.

"The farm's role is to multiply the animal

stocks and eventually distribute the shared calves produced to every qualified farmer in our areas. We will help the farmers to become our business partner. Milks collected from the animals that we entrusted to them will be collected or delivered to us," Divino further said.

The farm targets to market the processed products to Andok's outlet. The Andok's outlet is a family business owned by the Javier's.

The farm aims to raise its herd up to 100 head in the years to come.

Other adopters

Two DBMF proponent-operators were added to the list of qualified beneficiary of the program. Both in Tarlac, the new DBMFs are operated by the Alfredo Belen Farm and RG Agustin Dairy Farm.

Mr. Alfredo Belen, owner of the Belen Farm in Magao, Concepcion, Tarlac, was entrusted with 40 heads of Italian Murrah heifers on last December 2. To date, 10 calves were already produced and seven of the breedable buffaloes were confirmed pregnant.

The turnover of the multiplier dairy module to RG Agustin Multiplier Farm in Tambungan, Camiling, Tarlac was done during the inauguration ceremony of the Livestock Innovations and Biotechnology (LIB) Complex last March 20. The 25-head Italian Murrah heifers were awarded to Mr. Rommel Agustin, owner of RG Agustin Dairy Farm.

These three DBMFs are now eyed as the forerunners of more multiplier farms of dairy buffaloes in the country. 



"The multiplier farm is another strategy aimed at increasing the population of dairy buffalos and breeder base, improve the animal productivity that will help ensure availability of milk, and to serve as a demonstration farm for farmer-partners and stakeholders for better appreciation of buffalo-based enterprise through dairying."

- Dr. Arnel N. Del Barrio, PCC Acting Executive Director



Integrated Farming System



“Palayamanan”, a term which came from two words: palayan (rice farm) and yamanan (gold mine), or literally, making the rice farm a gold mine, is a project that revolves around the concept of intensive and integrated farming in which every inch of space on the farm is utilized for production of various crops and livestock.

CARABAO-RAISING is added feature to PhilRice's 'Palayamanan Plus'

CHRISSALYN L. MARCELO

The Philippine Carabao Center (PCC) is boosting the features of "Palayamanan Plus Nuestra" project of the Philippine Rice Research Institute (PhilRice).

Raising of dairy carabaos is now added as another source of income for farmers adopting the project.

"Palayamanan", a term which came from two words: palayan (rice farm) and yamanan (gold mine), or literally, making the rice farm a gold mine, is a project that revolves around the concept of intensive and integrated farming in which every inch of space on the farm is utilized for production of various crops and livestock.

"The 'Nuestra' on the other hand is a model that will serve as service provider for technologies, capacity enhancement activities, custom services, enterprise development, financing and market access to the smallholder farmers," according to Rizal G. Corales, program leader.

He added that "Nuestra" stands for Nucleus Estate Strategy and that it is now being fully developed in an area within the PhilRice station in the Science City of Muñoz in Nueva Ecija.

Under Palayamanan, PhilRice will integrate farming system to increase production inputs and increase farmers' income.

"In Palayamanan, diversification, intensification and integration (DII) strategies will be used," Corales said. "It is expected to increase production outputs and therefore the income of the farmers", he added.

Diversification, he explained, means diversifying farm inputs to diversify production and income. It includes other crops and commodities such as corn, peanuts and livestock particularly goat, and now carabao raising, among others, he added.

On the other hand, intensification, he explained means increasing the cropping intensity over space and over time.

"It means maximizing the use of land to plant additional crops, forages or roughages

in between harvest season where most of farmers' land are underutilized," he added.

Corales continued his explanation by saying that "integration means all the component crops or commodities that will be established on the farm should complement each other such that it will be both beneficial to the farmer and to the environment."

He added that the project would not be possible without collaborating with other government agencies and private entities. He said that they were currently coordinating with various government agencies and private entities that could help them in the project.

One such government agency is the PCC, he said.

"Last October 2014, we coordinated and made collaborations with the PCC. Through a memorandum of agreement (MOA), signed by PCC acting executive director Dr. Arnel N. Del Barrio and then PhilRice executive director Dr. Eufemio Rasco, both parties agreed to help each other in the project. PCC is in-charge of providing the livestock (dairy buffalo) component and relevant support for the envisaged Palayamanan Plus Nuestra project," Corales said.

Under the MOA, Corales mentioned that PCC is to allocate five to ten head of dairy buffaloes as added component to the project.

"Though our project is still under experimentation, we initially implemented it in Bulacan, Pampanga and Aurora. This year, we are planning to open and implement it in Nueva Ecija, Pampanga, Pangasinan and Isabela," Corales said.

He said they are still asking assistance from PCC on where to locate the project that will enlist dairy carabao farmers in Nueva Ecija. He said that Dr. Del Barrio suggested to them to implement the project close to PCC's established dairy buffalo farmers

since most of those individuals are already capable of managing buffaloes and are already knowledgeable and skillful in carrying out the job..

Dr. Del Barrio said his agency is 100 percent in providing assistance and collaboration to contribute to the success of the project.

He explained that carabao raising can contribute income through the animal's milk, meat and manure.

As an example, he said: "If a particular farmer would be given five dairy carabaos and three of them will lactate at the same time, he will be harvesting at least 15 liters of milk every day in a 305-day lactation period. This means that the farmer will be earning at least P225,000 as additional income from his farm".

"The selling of male calves and the vermicast (a product that can be produced from carabao manure) that will be produced are additional sources of income for the raising of the carabaos alone," he added.

Corales said that this "Palayamanan plus Nuestra" project is leading to be a national program because of the possible impact that it can create in the future. He added that aside from the main objective of increasing the farmers' income, the project can also help spin-off agribusiness in a particular community; increase production inputs; bring positive impact in the environment; and will give farmers sufficient and nutritious food.

"At the moment, we're also collaborating with other agencies and private entities such as the Philippine Center for Postharvest Development and Mechanization (PhilMech), National Irrigation Administration (NIA), Agricultural Training Institute (ATI), National Dairy Authority (NDA) among others, aside from the PCC. We believe that these collaborations are our key in attaining success to this project", Corales said. 



Looking for a healthier food?

try NUTRI RICE MILK

CHRISSALYN L. MARCELO



If you are conscious about your health and the food you eat, then consider going to the dairy outlet of the Philippine Carabao Center at Central Luzon State University (PCC at CLSU) in the Science City of Muñoz, Nueva Ecija and look for the product called Nutri Rice Milk.

Nutri Rice milk is a healthy beverage whose main ingredients are germinated brown rice (GBR) and carabao's milk.

It was developed through a research study titled "Development and Evaluation of Functional Beverage with Germinated Brown Rice as Base Ingredient" last year. The study was conducted by Rodel Bulatao, Jody Chaves, and Dr. Marissa Romero from the Rice Chemistry and Food Science Division of the Philippine Rice Research Institute (PhilRice) in Maligaya Science City of Muñoz, Nueva Ecija.

Dr. Romero, one of the researchers, said the study proved that using germinated brown rice as base ingredient, the product becomes healthier because of the presence of gamma amino butyric acid (GABA). "GABA", which is about 10 times the level found in white rice, improves the brain and cardiovascular functions and can slow down the effects of aging. It also contains fiber, which is good in managing constipation and in fighting colon cancer plus other nutrients," Romero said.

She added that the product was developed through the conduct of a sensory evaluation test. The use of GBR of various rice varieties in beverage (using cow's milk

initially) was tried and among other samples, she said, the germinated black rice, which is a pigmented brown rice variety, obtained the highest scores for aroma, flavor, sweetness, and overall acceptability for the consumers.

Romero added that GBR, which is also called "togeng bigas", is also produced in a very simple manner. She explained that to do so, they need to soak the raw brown rice in water for 12 hours, drain it, and then wrap it in cheesecloth for 24 hours. She added that the resulting GBR is cooked and can then be used as alternative to white rice or as an ingredient in other food products.

Bulatao, her co-researcher, on the other hand, said that the beverage, which is called Nutri Rice Milk, was also developed to further promote the brown rice to the public. Mina P. Abella, officer-in-charge of the dairy outlet at PCC at CLSU, said the PhilRice collaborated with PCC for the production of the beverage.

PhilRice provided them the GBR and conducted processing studies that included carabao's milk and other ingredients until the right mixture and taste were perfected.

Bulatao said "We know that brown rice is nutritionally superior to white or milled rice.

Yet, issues like long cooking time and rough texture discourage the public to consume it. And so we thought of germinating it to help address these concerns. We also thought of coming out with various products using it."

Researchers said the product is a good source of protein, fiber, iron, and calcium. They added that it can last up to 10 days at refrigerated temperature.

It is now commercially available in the outlets of the PCC at CLSU and PhilRice.

Through a Memorandum of Agreement signed by PCC at CLSU and PhilRice last July 8, the promotion and selling of the Nutri Rice Milk to the public was allowed.

Abella said the product comes in 200mL and 1000mL bottles priced at Php145 and Php40, respectively.

"We are selling this product in some other places through some of our distributors," Abella said.

The PCC at CLSU dairy outlet also offers other healthy and delectable dairy products such as fresh milk, choco milk, lacto juice, yogurt, white cheese, mozzarella cheese, ricotta cheese, leche flan, pastillas de leche, ube halaya and others that are all made from nutritious and healthy carabao's milk. 

Carabao rises...*(cont. from p16)*

crosses (50:50) have relatively greater capacity to grow and produce milk than the native carabao,

- * at 24 months, the crossbred weighed 216.46 kilograms or 28 percent higher than the weight of the native carabao,

- * in terms of draftability, there is no difference in performance between the native carabaos and Murrah grades, suggesting that the introduction of Murrah blood to improve the milk production does not have detrimental effect on the ability of the animal to perform work,

- * some crossbred calves were observed to weigh 34 kg at birth, the female, 26.65 kg. The male native carabao calves were 23.54 kg at birth, the female, 23.42 kg, and

- * some matured crossbreds weighed 700 kg with the females having potentials

of 10 to 12 liters of milk production per day.

But that was not all that the center spawned in so far as addressing the carabao's improvement was concerned. A bill for the institutionalization of the carabao improvement program was filed in Congress authored principally by then Sen. Joseph Estrada. Subsequently, the "Philippine Carabao Act of 1992" (RA 7307) was passed which, among others, authorized the establishment of the Philippine Carabao Center (PCC) to "conserve, propagate, and promote the carabao as source of draft power, meat, and hide for the benefit of smallhold farmers."

On March 27, 1993 the PCC was officially created. The agency, which is attached to the Department of Agriculture, from then on embarked on a program of upgrading the farmers' native carabaos thru the oldest known biotechnology,

artificial insemination (AI), and thru bull loan program and modern reproductive biotechnologies.

"Your country has developed a unique water buffalo, a three-in-one carabao... It produces more milk, it's heavier and meatier, and it still retains its draft ability," Dr. Surendra Ranjhan, a former consultant of the Food and Agriculture Organization (FAO) and chief technical adviser of the United Nations Development Program (UNDP), said in an interview when he visited PCC last year.

The economic life of the farmers raising dairy carabaos have improved a lot, Ranjhan added.

"They not only vastly improved their houses, bought farm machines and motorcycles, but were able to send their children to college," he said. 

Farmer's Livestock School... *(cont. from p19)*

the technologies or topics considered are Raising Healthy and Productive Dairy Buffalo; Building Enterprise for Buffalo Dairying; Training on the FLS-Dairy Buffalo Production (FLS-DBP) Course Curriculum; Establishment of Model Farms; Training on the use of FLS-DBP Facilitators Guide Book and Selection of Pilot Classes.

Phase II involves the implementation of FLS pilot classes, conduct of regular sessions, field days, exchange visits and graduation of the selected farmer participants.

Phase III is about the FLS post-graduation activities which includes follow-up session for FLS, establishment of FLS networks, and setting-up of regional core team training.

Phase IV involves conduct of research on the adoption of technologies or innovation prior to and after the FLS-DBP, and

Phase V is impact assessment to be conducted after two years of implementing the pilot classes of the farmer-trainees in Nueva Ecija and Ilocos Norte.

Communicators of innovations

"We did not stick to purely FLS. We incorporated the engagement of a mobile team of communicators of innovations that

will be piloted only in Nueva Ecija to make sure that the farmer-participants of FLS will really apply what they learned from the school. Progressive farmers will do coaching and monitoring of the participants," Dr. Palacpac emphasized.

The mobile team aims to capacitate a team of communicators of technologies or innovations on buffalo dairying; mobilize it in the conduct of communication campaign on the said technologies or innovations; measure the rate of technology uptake of dairy buffalo farmers following their engagement with the mobile team of communicators; and determine issues encountered in the process and suggest appropriate recommendations.

It employs methods and strategies for implementation such as communicators of innovations (COI); skills enhancement training; communicators of innovations mobilization; utilization of the FLS-DBP model farms as a community-based knowledge, information, and outreach service (KIOS); incentive systems; adoption of technologies or innovation studies; and regular monitoring and evaluation of progressive farmers and analysis of relevant issues.

"The essence of this study is that they will do on-farm and house to house visits for each cooperative in Nueva Ecija. Then, they will report to PCC. So, instead of PCC

doing the monitoring, they, the progressive farmers and COI teams, will do it because they know well how to communicate with their fellow-farmers. They have incentives in performing their tasks," Dr. Palacpac said.

Farms of the COI will serve as community-based KIOS to showcase or demonstrate to the local farmer-residents and visitors the innovative practices in dairy buffalo production.

Dr. Palacpac added that they will measure the adoption of technology of the farmer-cooperatives prior to and after the engagement of COI teams.

Application of technology

In May, the next schedule of session on FLS of the module developers will be held at the PCC Gene Pool in which they will undergo hands-on demonstration on proper milking, body scoring, and others.

"We, module developers, will undergo immersion in dairy buffalo farming to prove that the technologies we are showcasing are doable. We will demonstrate what we wrote in the module. We will apply it among ourselves first before the farmers can adopt the technology," Dr. Palacpac concluded. 

LIVESTOCK INNOVATIONS AND BIOTECHNOLOGY COMPLEX

This edifice symbolizes the steadfast commitment of the Philippine Carabao Center in advancing sciences through biotechnology and innovative solutions toward an inclusive development, competitiveness and sustainability of the livestock industry.

