

Bubalus



Quarterly Newsletter of the Philippine Carabao Center

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FEATURES

Carabao dairying: Now a booming industry in PH landscape

By Anselmo Roque

Current developments in livestock concerns, particularly about an animal which in recent years was called the symbol of backwardness, all but point to a very exhilarating scenario.

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PCC celebrates 25 years of continuous 'great sharing'

By Charlene Corpuz

Bearing the theme "Great to Share and Celebrate", the Philippine Carabao Center (PCC) has set the stage for the month-long celebration of its silver anniversary starting March 1, with its two-day grand affair on March 26-27.

Each section and division of PCC's national headquarters and

genepool, including its regional centers, will host weekly activities in support of the hashtags – #GreatToShare, #GreatToInnovate, #GreatToInspire, and, of course, #GreatToShareAndCelebrate.

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Editor's Word



On behalf of the editorial staff, I am glad to introduce this maiden issue of *Bubalus*, a quarterly publication of PCC that replaces and expands the old “Roundup” Newsletter. As the name implies, *Bubalus* is taken from a generic name of bovines where the carabaos or water buffalos belong. Thus, it represents the instrument of development where the PCC’s programs and activities are anchored on.

With this new publication, we hope to share with you newsworthy, informative, timely, relevant, and engaging stories that are evidences or manifestations of the PCC’s Carabao Development Program and its major components, namely, genetic improvement, R&D, and enterprise development and how they impact on the carabao (and livestock) industry and its various stakeholders.

Among the highlights of this maiden issue are some preliminary efforts related to the production of Halal meat from carabaos, improved breeding techniques, and exemplary practices and outputs of crossbreeding, which are capped by a feature story on the soon-to-be launched Philippine Dairy Carabao breed.

More importantly, as the PCC enters its 25th year of existence, we devoted some pages to pay homage to the pillars of carabao development in the Philippines along with the milestones that defined the agency from 1993 to 2017.

We hope you enjoy reading *Bubalus* and learn many things from it!

A handwritten signature in black ink, appearing to read 'E. Palacpac', written over a thin horizontal line.

Dr. Eric P. Palacpac

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Experts from SEA talk about surra in PCC-hosted int'l confab

By Charlene Corpuz



Dr. Marc Desquesnes (French expert) demonstrates the card agglutination test in detecting *T. evansi* antibodies.

Experts from different Southeast Asian countries shared their knowledge and expertise in combatting surra during a five-day international conference and training workshop hosted by the Philippine Carabao Center (PCC) at its national headquarters and genepool in the Science City of Muñoz, Nueva Ecija.

Titled, “Trypanosomes and their vectors in animals and humans in Southeast Asia (SEA)”, the event was aimed at expanding knowledge of the participants on trypanosomes and its vectors, developing skills on biting fly trapping, and identifying various diagnostic techniques for trypanosomes including ELISA and molecular techniques.

Held last January 15-19, it was also meant to support the strengthening of the country’s veterinary services to control surra in accordance with the international standards set by the World Organization for Animal Health (OIE) and in the development of joint research projects among French and South East Asian research institutions and universities.

The activities consisted of a series of lecture-discussions, laboratory

hands-on and open workshop for the enhancement of skills and knowledge of participants of allied fields from the academe, research institutions and animal service laboratories of government and private sectors in the Philippines.

The Faculty of Veterinary Technology of Kasetsart University (FVT/KU) in Bangkok, Thailand; International Center for Cooperation in Agricultural Research for Development (CIRAD), and the Central Mindanao University under the umbrella of the BioZoonoSEA Platform and GREASE helped organize the activities undertaken during the training-workshop.

Their roles strengthened cross-sectoral and multidisciplinary exchanges about trypanosomosis survey and management among professionals from different sectors (animal health, human health, environment, and rural development).

PCC Executive Director Dr. Arnel N. Del Barrio welcomed the guests and the participants. In his remarks, he emphasized the importance of addressing and analyzing the issues related to Trypanosomes as it greatly affects the health condition

of animals, specifically buffaloes not just in the Philippines but in other countries as well.

Dr. Reuben Sharma, Dr. April Wardhana, and Prof. Sathaporn Jittapalapong discussed the situation of surra and its vectors in Malaysia, results of the survey on *Trypanosoma evansi* in Indonesia, and zoonotic parasites in Thailand, respectively.

On the other hand, the activity went interactive as Director Dr. Ronnie Domingo of the Bureau of Animal Industry (BAI) talked about the “Current status of surra and its control in the Philippines”. His presentation elaborated and complemented the topic presented by Dr. Allan Dargantes of Central Mindanao University (CMU) regarding “Situation and impact of surra on the livestock in Mindanao” and the discussion by Dr. Jose Escarlos Jr. also of CMU on the “Knowledge, Attitudes and Practices of village farmers in Mindanao for surra and its control”.

The other resource persons were Dr. Rafael Mercado of the Department of Agriculture (DA) who talked

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Facility for Halal carabeef production soon to rise in Bukidnon

By Mervalyn Tomas



A facility for the production of Halal-certified buffalo meat will soon be put up in Maramag, Bukidnon. This will be done under the supervision of the Philippine Carabao Center at Central Mindanao University (PCC@CMU).

Halal is a Qur'anic term meaning 'permitted, allowed, or lawful'. It is an Islamic value that has a direct impact on how products are produced, processed, distributed, stored, sold and consumed.

"We have already allocated a 30-hectare pasture land here at PCC@CMU for the fattening of 24 carabaos, ages 18-36 months. Also, the researchers involved in this project have already undergone trainings regarding Halal," Director Lowell Paraguas of PCC@CMU said.

He explained that they cannot start yet with the project because they are still looking for a Halal slaughter house to use because it is not available in Maramag.

He added that the Php4.5M budget has already been released for procurement of equipment needed.

"The purpose [of the facility] is

for fattening of buffaloes, using Halal feeding system, fabrication and product development, and marketing," Dir. Paraguas explained.

He said that he is confident that the Halal buffalo meat will be popular in the province because there is already a niche market in the area.

"We can also target the international market because as far as I know, we do not have Halal buffalo meat competitor yet," he stressed.

For now, PCC@CMU has already identified the 24 buffaloes to be fattened.

Paraguas explained that while they are looking for an available slaughter house, they will proceed with fattening and manufacturing of buffalo meat for local consumption. He explained that this is for the researchers to practice and be able to establish standard cuts and other processes needed to produce Halal buffalo meat.

"We still have a lot to do but we really want to develop the buffalo meat industry here in Bukidnon," he said.



Participants performing the ELISA- one of the detection methods of *Trypanosoma evansi*.

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Experts from SEA...

about "The Mindanao Unified Surra Control Approach (MUSCA) Experience"; Dr. Claro Mingala of PCC who focused on "Buffalo breeding program in the Philippines including the problem of surra and hematophagous flies", and Dr. Marc Desquesnes of CIRAD who tackled the topic "A typical human infection by animal trypanosomes in SEA".

An open confab at Day 1 was followed by a series of training workshops that focused on "Biting Insects biology and trapping", "Biting flies trapping and identification/ Trypanosome DNA-based identification", "Biting flies and Trypanosomes: identification" and "Trypanosomes: parasitological, serological and molecular diagnosis" from Day 2 to Day 5.

The topic presentations were complemented with laboratory hands-on exercises. A total of 60 participants attended the training-workshops.

Twin hits: Effective nutrition, brisk livelihood

By Ma. Theresa Sawit



One of the objectives of the milk supplementation program is to address malnutrition among schoolchildren by providing 200ml of milk and a regular hot meal for each child for 120 days.

Hitting two birds with one stone.

This was how Sen. Cynthia Villar described the joint program launched by the Philippine Carabao Center (PCC) and the Department of Social Welfare and Development (DSWD).

She was referring to the contributions of the program in addressing malnutrition among children and in providing a means for steady source of income generation among smallhold dairy farmers. It has proved effective, she said.

Statistics indicated that a working intervention indeed is needed to address the big problems confronting certain prevailing conditions particularly in the countryside. For one, the problems of hunger and malnutrition in the country are considered serious. The prevalence of underweight and stuntedness among children aged 0-5 years is at 20% and 30%, respectively (FNRI, 2013).

Meanwhile, the Philippine Statistics Authority (PSA) data showed that poverty in 2015 was around 34.3 percent among farmers.

The PCC-DSWD joint program was implemented from November 2016 to May 2017. It was both a nutrition and a livelihood intervention that targets the vulnerable sectors of the country – the farmers and children of low-income families. It was meant to help meet the protein requirement of children through the provision of 200ml of milk daily in addition to the regular hot meal for each child.

The program's pilot areas included Aliaga, Nueva Ecija; Talibon, Bohol; and the towns of Maramag, San Fernando and Damulog in Bukidnon.

In the program's rationale, it was mentioned that protein consumption is necessary for normal childhood growth and development. It said that the estimated average protein requirements of children aged 3-5 years old is 18 grams for boys and 17g for girls (FNRI, 2015). And, according to Ms. Mina Abella, PCC Supervising

Science Research Specialist, a 200ml of cow's milk or toned buffalo milk can provide 7-8g protein.

Results

Out of 10,094 children registered in the pilot Child Development Centers (CDCs), 9,860 completed the 120-day milk supplementation.

Results showed that after the program's completion, the reductions in the prevalence of severely underweight was 75% (from 186 to 46) and underweight 60% (from 897 to 354). There was also a 20% reduction in the prevalence of overweight (from 50 to 40).

In the implementation of the program, a total of 130 smallhold dairy farmers was engaged to supply the required milk. Forty-five of them were Pantawid Pamilyang Pilipino Program (4Ps) beneficiaries. On the average, each of these farmers earned Php4,553 per month for six months from the milk that they supplied. This was equivalent to

Revolutionizing breeding techniques for increased pregnancy rate in carabaos

By Mervalyn Tomas



Dr. Ramesh Tilwani (left), PCC Science Research Specialist II and Rodante De Vera (right), Lab Aide II, use an ultrasound to detect whether a dam that has undergone FTAI is pregnant. Ultrasonography is a very essential diagnostic technique in FTAI as it is used for the observation of processes in a dam's reproductive system.

The process may be tedious and needs expertise, but this protocol increases pregnancy rate in buffaloes.

The Fixed-time Artificial Insemination (FTAI), compared to the “ordinary” Artificial Insemination (AI) breeding technique commonly used in dairy buffaloes and cattle, is proving to be a more efficient way to increase pregnancy rate in animals, according to published researches.

It, however, carries some limitations that had been observed.

At the Philippine Carabao Center (PCC), a new FTAI protocol was studied by scientists and researchers and it proved to increase pregnancy rate in buffaloes by 26.41% compared to the widely-used FTAI protocol OVSYNCH. The team was led by Dr. Eufrocina Atabay, Scientist I.

Different methods, different results

AI is a technique where semen is collected from the male and then after processing is artificially

introduced into the female reproductive tract.

AI in buffalo, however, is constrained by difficulties in estrus detection in this animal. Likewise, finding the right timing to conduct it is difficult.

An alternative method to increase the number of pregnancies in buffalo through AI is by using a protocol that does not require estrus detection. This is called FTAI.

Historically, Ovysynch is the widely-used FTAI protocol. It uses the hormone GnRH and prostaglandin (PGF_{2α}), which had been initially adopted in PCC's FTAI activities in buffaloes.

The major effect of Ovysynch procedure is the tight synchrony of ovulation among animals and the conduct of AI without the need for heat detection, according to the researchers.

Ovulation synchronization is done in FTAI instead of estrus synchronization (ES). This makes

the incidence of pregnancy more certain, the researchers said.

They explained that with ovulation synchronization, there is a better probability that the ovum [egg] of the cow [female buffalo] is released from the follicle after AI is done. Therefore, there is a higher possibility that fertilization will occur. On the other hand, estrus is instigated in ES but there is no certainty of the time when ovulation will occur.

“However, this protocol's effectiveness can be influenced by many factors that can limit its widespread application and its full potential for buffalo production,” the PCC researchers said.

CIDR-Synch-hCG

A team of scientists and researchers modified the original FTAI protocol to achieve better results. They are

Dr. Eufrocina Atabay, Dr. Edwin Atabay, Excel Rio Maylem, Ramesh Tilwani, Dr. Ester Flores and Dr. Annabelle Sarabia.

They called this protocol CIDR-Synch-hCG.

Its difference from the original FTAI protocol is the insertion of Controlled Internal Drug Release and the injection of human chorionic gonadotrophin (hCG) hormone.

The result of the study comparing Ovsynch and CIDR-Synch-hCG protocol showed that the former resulted to a conception rate of 31.63%. This outcome improved when CIDR-Synch-hCG was used, which resulted in 58.04% pregnancy rate, showing a 26.41% difference.

Currently, CIDR-Synch- hCG protocol is being used in the expanded FTAI activities in the PCC Regional Centers and some multiplier farms in the country.

Enhanced FTAI

Other than FTAI, Enhanced AI is also explored by the same group of

researchers.

“It is called ‘enhanced AI’ because we enhanced the original AI protocol,” Dr. Eufrocina explained.

The team compared four AI protocols, including the original AI protocol, and one stood out to have caused the highest pregnancy rate. In this protocol, the hormone hCG is also used instead of GnRH, which was used in the other three treatments.

Triple E Strategy

The team has also identified gaps and concerns that lead to low reproductive efficiency in animals.

With this, they devised a strategy, which they called the triple E strategy. The three E’s stand for Enhancing Pregnancy Rate, Early Pregnancy Diagnosis, and Effective Breeding Program.

“Good nutrition and good health condition are important for buffaloes to have better chances of getting pregnant,” explains Dr. Edwin.

Based on the Triple E Strategic Framework, ensuring good health condition and nutrition is followed by the breeding techniques FTAI and Enhanced AI (including OPU/VEP/MOET). These are perceived to lead to enhanced pregnancy rate.

After which, early pregnancy diagnosis should be done through the use of ultrasonography, progesterone, and Pregnancy Associated Glycoprotein test.

“Ultrasonography is very essential for easier detection of pregnancy,” Dr. Eufrocina stressed.

The next stage, she said, will be the Effective Breeding Program where rebreeding is administered to non-pregnant buffaloes. The three E’s have been considered as a cyclic process, she added.

“There still are many things to do to improve our breeding program,” Dr. Edwin said.

He assured, though, that they are doing their best to develop breeding technologies and be able to help more carabao owners.

From page 1

PCC celebrates 25 years

These hashtags summarize what this agency has been constantly imparting to its clients, partners, collaborators, stakeholders and employees for the past 25 years. They were inspired by its ultimate goal of improving the breed of the carabaos in the country and shower the rural families with benefits derived from it.

The launching of the “Philippine Dairy Carabao” breed will be bannered by the introduction of the PCC mascots Kalaboy and Kalagirl. The giving of recognition to outstanding PCC employees as well as appreciation to all those

who have played big roles in its journey all through the years will be also held.

Special sharing sessions and cultural Filipino games for its employees will also highlight the celebration.

More than 500 guests will join the PCC officials and employees during the anniversary program that will also include an evening event for PCC employees. The PCC has invited important personalities, including retired PCC employees, the living pillars, as well as its partners from various



agencies.

The grandfather of PCC, former president of the Philippines, and now, City Mayor of Manila, Joseph Ejercito Estrada, will serve as the guest of honor during the anniversary program. Senate Committee Chair on Agriculture Sen. Cynthia Villar is also expected to grace the event.

In San Agustin, Isabela Excellence in carabao crossbreeding

By Ma. Cecilia Irang



Hallmarks in carabao upgrading can also bring prominence and significance to a town. Take the case of San Agustin town in Isabela province.

This town has made high marks in carabao crossbreeding that no other town can approximate it. That's why this town is often called as the "Crossbred Carabao Capital of the Philippines" by the officials and farmers in this town.

San Agustin is at the foot of the Sierra Madre Mountains and a crossroad of the provinces of Quirino, Aurora and Isabela.

Carabao is the number one ally of farmers for land cultivation up to the hauling of harvested crops and a real partner in many ways in agricultural endeavors and as such has fitted the aphorism that says "without the carabao, a farmer is only half a farmer".

Furthermore, female carabaos have added meaning for them for they produce volume milk which can readily be turned into cash or food for the nutritional needs

of their family. This is especially true for the dairy type of carabaos, like the Murrah buffaloes, Italian Mediterranean buffaloes, Brazilian buffaloes, and the crossbreds which yield higher milk quantity than that of the native or swamp buffaloes.

Crossbreeding introduced

Crossbreeding of the native-type (female) with the milk-type (male) carabaos was introduced in the spirit of the Philippine Carabao Act of 1992. The result is a crossbred carabao which, at its first generation, carries the 50% riverine blood and 50% Philippine carabao blood and zooms up to almost the purebred state after four generations of backcrossing.

According to studies, crossbred carabaos have the potentials for higher growth rate and milk production than the native carabaos. It can produce an average of 4-6 liters of milk a day or higher as their upgrading continues, while the native yielding an average of 1.5 liters daily.

San Agustin is a third class municipality with 23 barangays. Its total land area is 27,840 hectares

characterized mostly of rolling hills terrain.

The town has a big number of native carabaos which the farmers use in their farm works. Its mountainous profile, which is rich in grasses, provides assurance to the farmers of the abundance of feed and its prevailing peace and order condition guarantees that the animal can be left grazing the whole day in the open field only to be retrieved the next morning for bathing.

In 1992, San Agustin was one of the areas identified, thru a Memorandum of Agreement (MOA) between the then Philippine Carabao Research and Development Center (PCRDC) at Cagayan State University (now Philippine Carabao Center at CSU) and the Department of Science and Technology (DOST) in Region II for the conduct of the Carabao Crossbreeding Program.

In September 1993, PCC@CSU center director Franklin Rellin together with then provincial veterinarian Dr. Angelo Naui, met with all the municipal agriculturists to inform them about the newly launched Carabao Upgrading Program (CUP) and how it can be carried out for the



San Agustin, thru the collaborative efforts of the LGU, PCC and other partners and supporters, hopes to be invigorated some more in its move forward with higher marks not only in carabao upgrading but also in dairy enterprise development.

carabaos in different localities.

Julio Lamug, then municipal agriculturist of San Agustin, attended the gathering and informed and discussed with then Mayor Jesus Silorio how the CUP would impact on their town and farmers. Mayor Silorio eventually acquiesced to earmark Php25,000 for the expenses in implementing the program.

The first artificial insemination (AI) project in San Agustin was undertaken at the latter part of October 1993.

Parallel to the AI program was the PCC's bull loan program wherein imported and island-born superior quality bulls were loaned out to qualified farmer-partners for use in carabao upgrading in their respective places. San Agustin received a total of 15 bulls under the program which were given to different farmers under a MOA inked by the PCC and the respective farmers.

Later, in 1995, then Mayor Virgilio Padilla declared the CUP in San Agustin as the town's banner program.

Thru the commitment and unwavering support of the previous mayors and the current Mayor Cesar Mondala as well as the participation of adherents and believers of the program, San Agustin's CUP has grown very strong.

Population of crossbreds

San Agustin town is also known for its assiduous celebration of its "Nuang Festival". "Nuang" is an Ilocano term for carabao. This festival is a much-anticipated occasion for carabao-owners as their beloved crossbreds are at the center stage of the festival and accorded public recognition of their significant achievement in participating and sustaining a program designed for the improvement of the breed of native carabaos.

The municipality of San Agustin, in its strong drive to continue and gain more grounds in crossbreeding, has trained several Village-Based AI Technicians (VBAITs) in PCC at CSU for the upscaling of growth in number of the crossbreds in the town.

Aside from the individual AI activity of VBAITs who were trained in PCC and the technicians from the Department of Agriculture (DA), they also conducted massive AI activities twice a year in the different barangays for the sustainable success of the program. All biologics used for vaccine and deworming were provided by the LGU and Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD).

No doubt, the crossbreeding efforts in this town have already paid off as evidenced by the more than 2,068 head of crossbreds based on the inventory conducted by the research team of PCAARRD. Over and above this achievement, during the celebration of San Agustin's 13th Nuang Festival last September, three farmers were entrusted with buffalo bulls that will be used for natural mating with crossbred female carabaos to sire what could be the birth of calves, which after further

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The making of the PH Dairy Carabaos

By Mervalyn Tomas

Delighted, farmer Joel Vallejos of San Antonio, San Agustin, Isabela passes his hands on the massive body of the bull, which owns a peculiar pair of eyes, as officials of the Philippine Carabao Center (PCC) entrusted it to him.

He was told that it is a product of almost 20 years of breeding efforts and it has 93.75% riverine buffalo blood. It came all the way from the PCC at the University of the Philippines Los Baños (PCC@UPLB) in Laguna.

Two other farmers in San Agustin each received a similar bull during a ceremony that marks the beginning of a much anticipated milestone in the history of carabao breeding in the country.

A similar bull will be showcased during the 25th anniversary celebration of PCC. This bull, with all its excellent attributes developed over years of backcrossing from selected crossbreds, will be introduced to the public as the “Philippine Dairy Carabao” breed, according to Dr. Arnel del Barrio, PCC’s Executive Director.

The wonders of breeding

According to Dr. Ester Flores, National Genetic Improvement Coordinator and geneticist of PCC, the Philippine Dairy Carabao is a product of backcrossing method done by researchers at the

University of the Philippines-Los Baños under her guidance.

She added that they were able to come up with this kind of bull by continuous backcrossing.

She explained that imported purebred (riverine) buffaloes are either mated with native (swamp) buffaloes or become semen donors for artificial insemination. The resulting offspring are crossbred carabaos, bigger, meatier, and several liters more of milk yields than the native carabaos.

The native carabao can only produce an average of one to two liters of milk a day, while the purebred riverine buffalo can produce from six to eight liters of milk a day.

She added that this effort is also important for the breed’s adaptation to Philippine climate.

“The bulls entrusted to the San Agustin farmers have high percentage of riverine blood but they still have native blood. Hence, they can adapt to our country’s tropical climate compared to the imported bulls that needed proper acclimatization protocol,” she explained.

The process

When the program started years ago, the process used was inter-se mating (among or between themselves). In other words, the acclimatized F1 females are mated with F1 males of the same breed. The performance of the different filial

generations (F1, F2, etc.) are then studied, according to Flores.

She explained that the end-result of inter-se mating is a crossbred buffalo with 50% riverine blood and 50% swamp blood.

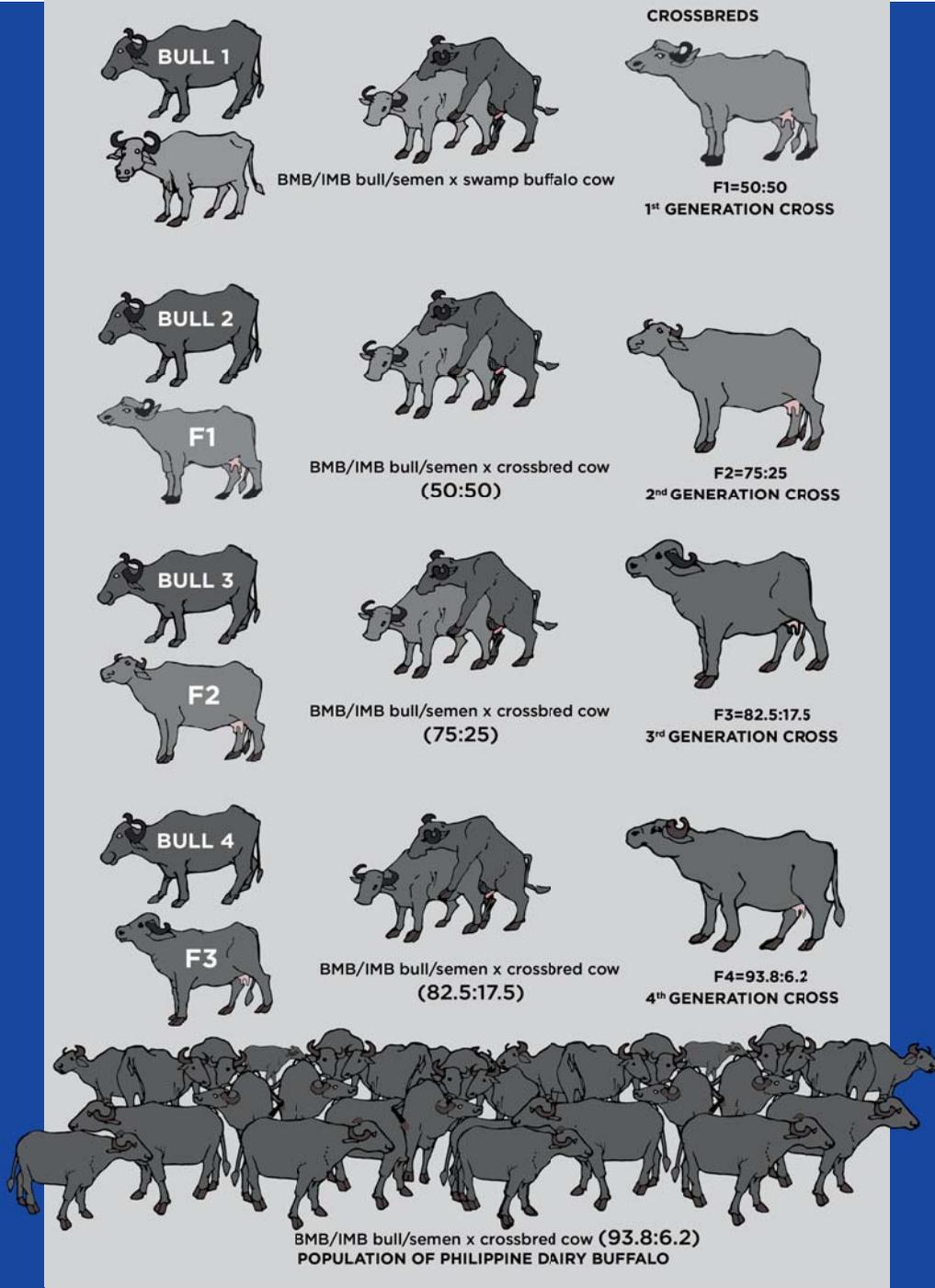
To illustrate, Flores explained that in inter-se mating, a purebred bull is mated with a native cow to produce a crossbred cow. The resulting offspring is called the first filial generation (F1) with 50% riverine blood and 50% swamp blood. To achieve the second filial generation (F2), an F1 cow is mated with an F1 bull. Their offspring will still be 50% riverine and 50% swamp. Then, to achieve the third filial generation (F3), an F2 cow is mated with an F2 bull that results in the production of offspring which again have 50% riverine and 50% swamp blood.

This still would be the case even as this process continues to the succeeding generations.

Backcrossing

In backcrossing, the F1 (50% swamp, 50% riverine) cow will be mated with a riverine bull. Their offspring (F2), will have 25% swamp blood and 75% riverine blood and when mated with a riverine bull, the F3 offspring will have 87.5% riverine blood and 12.5% swamp blood. The offspring of the F3 cow mated with a riverine bull is F4 with 93.75% riverine and 6.25% swamp blood which is almost a purebred, according to Flores.

The F4 bulls can then be used for breeding for the production of the



“These bulls [entrusted to farmers] are not just ordinary bulls but with 93.75% riverine blood. They are products of continuous backcrossing and selection of cows that are really good milk producers. Their daughters will be included in the genetic evaluation, the process that purebred cows undergo, having their own estimated breeding values,” Flores said.

Philippine dairy carabao, she added.

Flores also said that it is not advisable to use F1, F2, and F3 bulls for breeding because there is a high probability of them having offspring with lower fertility rate.

“Purebred and native buffaloes have different chromosome numbers. Native buffaloes have 48 chromosomes, while purebred buffaloes have 50 chromosomes. Therefore, their chromosomes

are not aligned. In F1, there will be fusing of chromosomes. This will again break-up for the subsequent F2, thus, the offspring will have high chances of having low fertility rate,” Flores said.

She said this is the reason why continuous backcrossing is needed.

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Joel Vallejos of San Agustin, Isabela with the 93.75% purebred riverine bull entrusted to him by PCC.



“In the process, some of the offsprings will look more native than purebred, while some will look more purebred than native,” she explained.

She elaborated that the good thing in backcrossing is that the offsprings, as far as observable characteristics are concerned, become more uniform in each generation as the process continues.

In F4, almost all offsprings will look more purebred.

Rigorous selection of cow

More than just improving the bloodline until the fourth filial generation, the cows used in breeding were also carefully selected. The PCC@UPLB researchers selected crossbred cows that have high milk production performance to be used in breeding.

“These bulls [entrusted to farmers] are not just ordinary bulls but with 93.75% riverine blood. They are products of continuous backcrossing and selection of cows that are really good milk producers. Their

daughters will be included in the genetic evaluation, the process that purebred cows undergo, having their own estimated breeding values,” Flores said.

“With all the rigorous processes done to come up with these bulls, they are ready to be used for breeding,” she added.

For the farmers

Director Franklin Rellin of PCC at Cagayan State University explains that San Agustin is home to many crossbred buffaloes which are owned by the farmers. This was the reason why, he said, this town was selected for the production of more Philippine Dairy Carabaos.

These bulls will be used to sire more carabaos of its kind through mating with crossbred cows, according to Rellin.

The farmer-recipients were trained in bull handling and are qualified for bull entrustment, according to Celso Quinet, Community Development Officer of PCC@CSU.

The two other farmer recipients, Rodel Bartolome of Salay and Reynaldo Tapaoan of Masaya Sur, like Bartolome, are noticeably happy for being chosen as the recipients of these bulls that will sire the expected Philippine-bred dairy carabao.

“We really need bulls for breeding [genetically superior] buffaloes here in San Agustin,” Vallejos said.

Bartolome shared that the bulls will help the farmers in their town as many dairy buffaloes will be sired. “The milk from dairy buffaloes will surely augment our dairy income,” he added.

Similarly, Tapaoan stated that their fellow carabao farmers are happy that they have bulls in their community.

Performance monitoring

Director Rellin stressed that the performance of the bulls will be closely monitored, including the performances of their offsprings.

“If we have enough information of

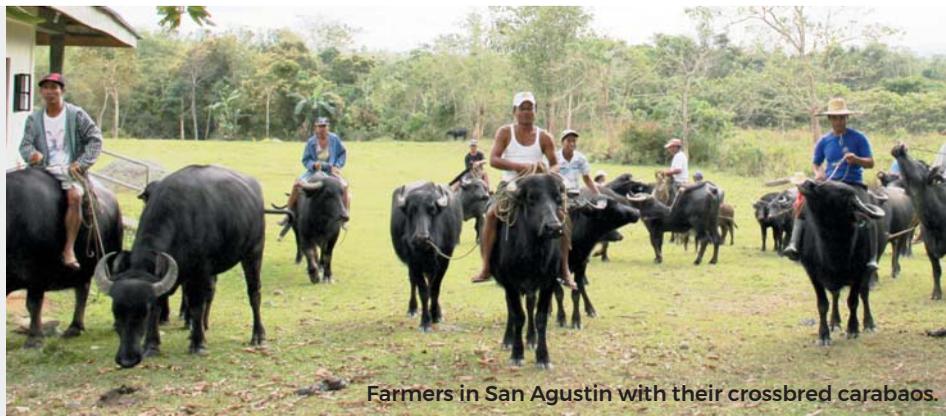
Definitely, the production of more “Philippine Dairy Carabao” is a much anticipated happening. It would bring pride to the Filipinos by joining the select few countries of the world that how successfully bred their own dairy buffalo.

the genetic potential through close monitoring, farmers in San Agustin can sell the buffaloes at a higher price. It may also serve as source of export materials and it will bring higher income for the farmers,” he said.

Definitely, the production of more “Philippine Dairy Carabao” is a much anticipated happening. It would bring pride to the Filipinos by joining the select few countries of the world that how successfully bred their own dairy buffalo.

Farmers Rodel, Joel, and Reynaldo, on their part, are with bated breath as they await the coming of more carabaos with bluish pairs of eyes.

But more than the peculiar eye color and the bigger body frame, the farmers will not rely anymore on imported bulls and cows to breed more dairy buffaloes in the country. For them, it is a boom, as they know that these type of buffaloes is synonymous with progress in their respective family and in their rural communities.



Farmers in San Agustin with their crossbred carabaos.

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Excellence in carabao crossbreeding

diligent selection and testing, from among of which can be declared as the “Philippine Dairy Carabao”. (See separate article about this on page 10).

Currently, the municipality has a total of 13 dairy associations. These associations are under the umbrella of the San Agustin Dairy Cooperative (SADACO).

SADACO’s total milk production grew higher from 2,803.25 liters in 2010 when they started milking their crossbreds to 39,283.54 liters in 2017. They process some of the milk yield into different milk products such as flavored milk drinks and pastillas and the rest for other purposes.

To sustain the CUP, the PCC experts recommended to San Agustin the implementation of strategies such as development of

The farmers of the town, at first, hesitantly embraced the program. But as they witnessed the success of the 10 farmers who became the “forerunners” of the other hundreds of crossbred carabao owners in San Agustin, a big number of farmers registered their intention to submit their female carabaos for AI a year after.

a roadmap and municipal livestock development plan, increased availment of the bull loan program, strengthening of the AI program, provision of post-production support, provision of technical training, community organizing, social preparation and marketing support, and establishment of collaboration and linkages.

San Agustin, thru the collaborative efforts of the LGU, PCC and other partners and supporters, hopes to be invigorated some more in its move forward with higher marks not only in carabao upgrading but also in dairy enterprise development.

Will someone now officially move for the declaration of San Agustin by a competent body as the “Crossbred Carabao Capital of the Philippines”?

From page 1

Carabao dairying: Now a booming industry in PH landscape

Among others, carabao (or water buffalo) dairying shines brightly today as a booming industry in the country's landscape.

Appreciate what took place recently at the Third National Carabao Conference at the Philippine Carabao Center headquarters in the Science City of Muñoz. The winners of the search for the outstanding dairy carabaos and the farmer-raisers were honored.

One buffalo of the Brazilian breed was declared winner of the “Gintong Kalabaw Cup”. Her milk yield was up to 18 liters a day or a total of 3,364.5 liters in a ten-month lactation period. She provided an income of Php149,670 to her owner, Rogelio Marquez, of Quezon, Nueva Ecija.

The other awardees were Henry Orbito of Calinog, Iloilo as “Outstanding Dairy Buffalo Farmer” (smallhold category), Victoriano Dumale of Licaong, Science City of Muñoz, “Outstanding Buffalo Farmer” (family module), Samuel Mercader of San Jose City in the semi-commercial category, and Emily Velasco of Villa Josen, San Jose City as “Modelong Juana sa Kalabawan” (model woman in carabao dairying). Patrick Pascual of Sto. Domingo, Nueva Ecija was awarded the “Modelong Kabataan sa Kalabawan” honors while the Eastern Multi-purpose Cooperative of San Jose City was bestowed the “best dairy cooperative” title.

The Eastern Multi-Purpose Cooperative has 432 dairy carabaos in the hands of 60 members and had combined milk harvest of 145,099.65 liters in 91 lactating carabaos in one year (Php7,254,982.50 at Php50 per liter). It also runs its own milk processing plant and marketing outlet.

Dumale and his family earned Php70,000 a month from their five dairy carabaos while Orbino grossed Php354,314.80 from the milk yield of his two carabaos.

Mercader, who started raising a dairy carabao in 2000, has 32 carabaos of which 14 are mature females, one a senior bull, four are heifer, and nine are calves, earned more than enough to finance the education of four daughters, two of whom had graduated from their respective collegiate courses, acquired agricultural lands, house and lot, vehicles, farm equipment, and appliances.

They became the cream of the crop, so to speak. Elsewhere in the country, several thousand more, speaks highly about their achievements in dairy carabao-raising and engaging in carabao-based industries.

Re-engineering the carabao

History says that among the fauna brought by the migrants to the country was the “swamp-type water



buffalo” which was excellent for its draft power usability. Its cousin, the riverine-type, like those in the Indian continent, is excellent for meat and milk.

In the Philippines, this animal was called “carabao”, probably from the Visayan or Cebuano word karabaw, the Malay word kerbau, and the Indonesian-Dutch word karbouw.

In a study in 2002, the carabao's contribution for draft, meat, hide, and milk, was valued at almost Php5 billion.

But the carabao suffered misfortunes. More than a century ago, it was almost wiped out due to diseases, particularly rinderpest, and poor dietary supply.

In World War II, about two million of its population was massacred as Japanese officials suspected it as being used by the Filipino guerrillas

Emily Velasco (left) and Samuel Mercader and family (right)



Stories also abounded about dirt-poor families who now own different vehicles, including expensive van, and other flourishing businesses spawned by their carabao-dairying ventures, of families who not only improved their houses, acquired appliances, motor vehicles but have supported easily the education of their children thru college.

for transporting weapons and goods in aiding American soldiers.

Their breed suffered, too.

Indeed, the carabao population in the country dwindled due to natural and man-made causes. In terms of its breed and nutritional needs, the carabao generally declined in size and weight. From an average weight of 500 kilograms, it went down to 400 kilograms.

But the due concern for the welfare of the carabao and for the benefits it can provide particularly to the farmers, became a major undertaking. Research and development efforts were mounted in 1973 then in 1981 when the “Strengthening of the Philippine Carabao Research and Development Center” project was implemented and above all, in 1992 when the “Philippine Carabao Act”

(RA 7307) was enacted to “conserve, propagate, and promote the carabao as source of draft power, meat, and hide for the benefit of smallhold farmers.”

Among others, that law provided for the establishment of PCC which has since undertaken myriads of ground-breaking programs, projects, and activities that catapulted the carabao to new heights resulting in the now new-found industry booming in the country – the carabao-based enterprises.

Beast of fortune

From its erstwhile moniker as “beast of burden”, the carabao has been labelled as the “beast of fortune”.

“Over the years, we did not see the contribution of the carabao to local dairy production. Today, its contribution is more than 34 percent

and is increasing,” said Dr. Arnel del Barrio, PCC executive director.

The milk yields were from both the imported dairy buffaloes and from the crossbreds which are in the hands of the farmers.

Documentations by the PCC showed many examples of dairy carabao cooperatives in different parts of the country which are succeeding in their endeavors, the advances made in life by individual farmers through dairying, the flourishing of carabao-based industries, the engagement of thousands of entrepreneurs in the carabao-based industry, and how agencies partnered in providing milk supplementation to undernourished school children and a sure market for the milk of dairy farmers.

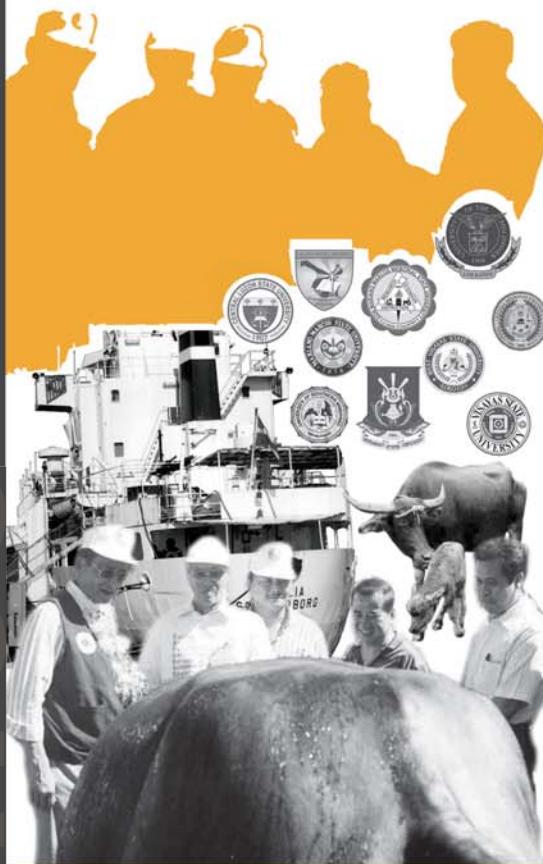
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PHILIPPINE CARABAO CENTER

Milestones

The Philippine Carabao Center's 25 years of existence as a research and development institution is a milestone that the PCC family is proud of. The agency has gone this far because of a very solid and focused direction and accompanying strategies translated and implemented by its workforce, partner-agencies and local government units, and individuals.

Design By Chrissalyn Marcelo



INSTITUTIONALIZATION OF THE CARABAO UPGRADING AND ENTERPRISE DEVELOPMENT (CBED)

These years marked the institutionalization of CBED through the second phase launching of the Carabao Development Program, which was spearheaded by President Joseph E. Estrada.

Other markers were the importation of 1,078 Bulgarian Murrah Buffaloes; groundbreaking ceremony and inauguration of PCC's research and training facilities; partnership between the Philippines (PCC and BAI) and Japan through signing of the Water Buffalo and Beef Cattle Improvement Project (WBBICIP), which aims to improve the productivity of both animal species; establishment of a satellite laboratory for reproductive biotechnologies in buffaloes in Frigorifico Allana Limited, Aurangabad, India; and transfer of Vitri-fied IVM/IVF-derived embryos produced from India to the BMB cows at the PCC's national gene pool and nearby village.

These years also marked the birth of GLORY--world's first calf from in-vitro produced-vitri-fied-warmed embryo. The calf was named after President Gloria M. Arroyo.

1993-1997

THE FORMATIVE YEARS

These are the developmental years of the Philippine Carabao Center (PCC). Its operationalization started in 1993, after the Republic Act 7307, otherwise known as the Philippine Carabao Act of 1992, was signed into a law on March 27, 1992, and after former President Fidel V. Ramos launched the National Carabao Development Program in the same year.

Originally, the center had 6 regional centers across the country until seven regional centers were added in 1994.

During these years, the center also imported 220 heads of American Murrah Buffaloes and 403 heads of Bulgarian Murrah Buffaloes. "Test-tube" calves from in vitro/fertilized matured embryos were also produced, and the national headquarters and gene pool facilities in Nueva Ecija were also constructed.

Other activities conducted were hosting of the 2nd Asian Buffalo Congress and launching of Carabao-based Dairy Enterprise Development (CBED) Program.



1998-2002





VITRIFIED IN-VITRO PRODUCED EMBRYO CALVES



2003-2007

ADHERENCE TO INTERNATIONAL QUALITY STANDARDS

These are the years when the PCC was accredited to the International Organization of Standardization (ISO) 9001:2000. The agency passed the rigorous audit conducted by SGS (Societe' Generale Surveillance) Philippines.

Other milestones of the agency during these years were the birth of twin buffalo calves from embryos fertilized in vitro; hosting of 7th World Buffalo Congress; acquisition of manufacturing license for milk and cheese from DFA; launching of the projects on "Expanding the Reach of AI Program for the Acceleration of Dairy Herd Build-Up" and "Environmental Animal Health Management"; launching of "Changing Lives... Beyond the Draft Carabao" book; heightened efforts in research activities, especially in the area of reproductive biotechnology; and the establishment of the PCC's Molecular Genetics Laboratory (MGL).

The PCC also started a technical cooperation with the Korea International Cooperation Agency (KOICA) during these years.

ASSERTION AS A LEADING LIVESTOCK R&D INSTITUTION

These are the years when the PCC started engaging in biotechnology R&D in other livestock species as a result of its additional mandate from DA.

Other milestones of the agency during these years were the expansion and strengthening of their collaborative projects with KOICA; infusion of genetic materials for dairy buffaloes; launching of International Buffalo Knowledge Resource Services (IBKRS); membership of the PCC to the International Buffalo Consortium; provision of international study program on livestock under JICA-TCTP; inauguration of Central Milk Collecting and Processing Facility; Opening of Milka Krem dairy outlet to public; conduct of third country training program for Myanmar; hosting of ARBS conference; and inauguration of new PCC facilities. It was also in 2008 when the PCC was given the "Tanglaw Award" by PCAARRD as an outstanding research institution.

2008-2012

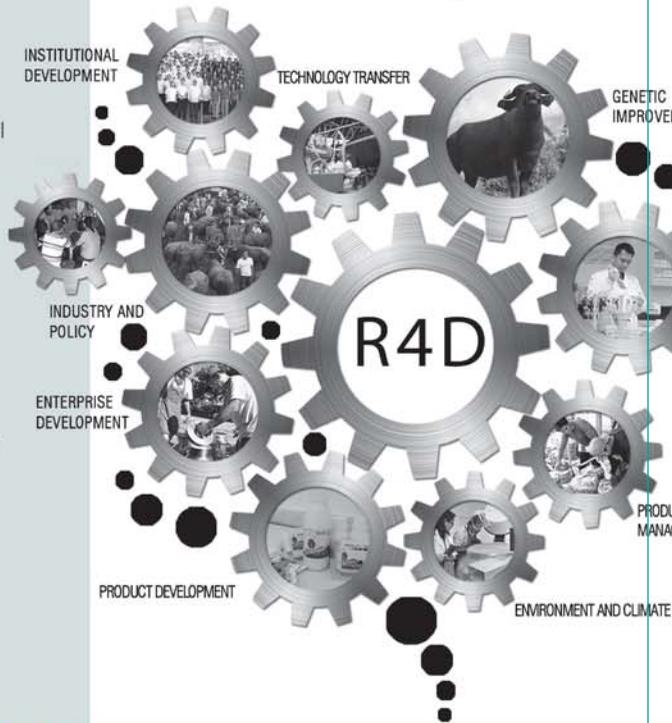
2013-2017

RATIONALIZATION AND STRATEGIC SHIFT IN PROGRAM IMPLEMENTATION

These are the years when the PCC started to rationalize and shift its focus from being an "R&D institution" to "R4D agency" in line with the change occasioned by the rationalization program of the Department of Agriculture.

Aside from refocusing its agenda in research, Dr. Arnel N. Del Barrio succeeded Dr. Libertado C. Cruz, the agency's executive director for 21 years, after he retired mandatorily from his position in 2014.

During these years, the PCC also imported Italian Mediterranean Buffaloes; established and inaugurated facilities i.e. three AI Bull Farms, Semen Laboratories and Livestock Innovations and Biotechnology Complex; launched the dairy buffalo multiplier farm module, milk supplementation program, Dairy Box, Milka Krem outlet in Laguna; hosted and conducted national carabao conference, international training on reproductive biotechnology, national knowledge sharing forum and international conference on CBED; piloted farmers livestock school, among others.



The un-deterred pioneers of PCC

The significant roles of these people behind the successful establishment and operationalization of PCC will never be forgotten.

Dr. Alfonso N.
Eusebio



The late Dr. Alfonso N. Eusebio, then an instructor in the College Department of Dairy Production and Sciences of CLSU, started the research and development on carabaos in 1955 when focus on buffalo livestock R&D was still minimal. He later became the director for research in CLSU and eventually the director of the Livestock Research Division of PCAR (Philippine Council for Agricultural Research). Under his leadership, the National Carabao Research team was created on November 21, 1975. He also allowed an intensified regional and international support to strengthen its research capabilities. He also facilitated the provision of additional funding for the construction of facilities at the CLSU ranch in Digdig, Carranglan, Nueva Ecija.

Dr. Joseph C.
Madamba



Dr. Joseph C. Madamba, a livestock expert, spearheaded the endorsement of the national carabao research program that was designed to improve the productivity of the Philippine carabao beyond its use for draft. As a result of these efforts, between 1978 and 1981, several research infrastructures were constructed [under USAID loans Phases I & II] including the bull farm at the Digdig ranch in Carranglan, Nueva Ecija.

Dr. Amado C.
Campos



Dr. Amado C. Campos, who was then the CLSU president circa 1977, allowed the conversion of the university's 1, 500-hectare cattle ranch in Carranglan, Nueva Ecija into the National Carabao Research and Development Center to provide full support to carabao research and development pursuits.



Dr. Leopoldo S. Castillo



Considered as a guru in the field of animal nutrition, Dr. Leopoldo Castillo was a well-respected scientist, professor, and advocate of livestock R&D. His remarkable accomplishments as team leader of the National Beef and Carabeef Commodity Research of PCAR (now PCAARRD), has contributed greatly to the eventual creation of PCC. His service as a national consultant on animal nutrition to the PCRDC from 1981 to 1984 has made significant contributions to the furtherance of science in feeds and feeding system.

Joseph “Erap” Ejercito Estrada



He provided the impetus for the creation of the Philippine Carabao Center by sponsoring in 1989 as Senator of the Republic of the Philippines Senate Bill 1165 “An Act Creating the Philippine Carabao Center to Propagate and Promote the Philippine Carabao and for other Purposes”, which was ratified into a law on March 27, 1992 as Republic Act 7307, the Philippine Carabao Act.

Dr. Fortunato A. Battad



His unwavering support to convince the Board of Trustees and his constituents as CLSU President has paved the way for the agency to have a 40-hectare land where the Philippine Carabao Center National Headquarters and Gene Pool facilities were built on. He concretized his commitment to the Carabao Development Program (CDP) by way of institutionalizing human resource complementation and administrative oversight as Advisory Board Member. He also championed the CDP across the country as Chairman of the PRC’s Board of Agriculture.



Leticia Ramos-Shahani



Her strong advocacy to the WHITE REVOLUTION aimed to improve the local dairy industry in the Philippines influenced the continuing development of dairy impact areas using existing ruminant dairy species. She was also a very active supporter of the agency's Carabao-based Enterprise Development Program. Through the partnership between PCC and her BUDHI Foundation, the very first 25-cow dairy buffalo module in the country was launched in Tulong, Urdaneta, Pangasinan.

“The lessons and insights in that “Tulong” experience became the guidepost in establishing several incubator dairy buffalo modules in the country.” –**Leticia R. Shahani**

Lino E. Nazareno



He steadfastly supported the operationalization of the Carabao Development Program as the then Assistant Secretary for Livestock of the Department of Agriculture.

Dr. Surendra K. Ranjhan



He was actively involved as FAO consultant and chief technical adviser in the UNDP project “Strengthening of the PCRDC”.

Dr. Patricio S. Faylon



He is sincerely committed to sectoral growth of carabao communities starting from the UNDP project in 1980 “Strengthening of the Philippine Carabao Research and Development Center (PCRDC)” as its project leader. He has demonstrated continuing and proactive support to the Carabao Development Program as former Director of PCAARRD's Livestock Research Division and then as its Executive Director by way of R&D project grants, scholarship, and police-related support as member of the Advisory Board of PCC.

“We believe in PCC and we would like to congratulate it for leading us in the carabao programs.” –**Patricio S. Faylon**

Dr. Vicente G.
Momongan



He served as the program leader of the FAO-UNDP project “Strengthening of the Philippine Carabao Research and Development Center” (PCRDC) from 1980 to 1990. He advocated the institutionalization of the effects of the PCRDC project across the country through Senate Bill “An Act Creating the Philippine Carabao Center”.

Tomas N.
Joson III



He was the provincial governor of Nueva Ecija when the province was declared as the National Impact Zone for Dairy Buffalo Enterprise.

Dr. Libertado C.
Cruz



He was appointed by then President Fidel V. Ramos as the first executive director of the agency. He served the agency for 21 years until his mandatory retirement in 2014.

His commitment to research and development in enhancing technologies that conserve, propagate, and promote the carabao as a source of draft animal power, meat, milk, and benefits to rural farmers has earned him utmost respect from both

national and international scientific communities and administrative bodies.

Under his helm, PCC has laid the foundations and directions for national animal biotechnology program focused on increasing the genetic quality of breeding animals. The center is also acknowledged for its remarkable endeavors in implementing the National Carabao Development Program which include production of good quality semen and refined artificial insemination (AI) technology.

Because of his unwavering passion and commitment, the PCC has helped improve the general well-being of rural farming communities thru carabao genetic improvement, and establishment of carabao-based enterprises.

“Can any country—even the developed ones—be able to invent a machine in the next century which, if fed with grass, will give you milk? Will there be any machine in the next century, which, if fed with rice straw, will give you meat? This is the carabao we are talking about—a symbol of backwardness to most of us, but given enough support would be a tool for progress.” –**Libertado C. Cruz**

“I made a decision, a bold decision you may call it. I told Dr. Cruz that I am allotting 40 hectares of the CLSU’s prime riceland to be the home of PCC.” –**Fortunato A. Battad**

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Carabao dairying...

Stories also abounded about dirt-poor families who now own different vehicles, including expensive van, and other flourishing businesses spawned by their carabao-dairying ventures, of families who not only improved their houses, acquired appliances, motor vehicles but have supported easily the education of their children thru college.

In the meantime, the population of the purebred and crossbred dairy buffaloes continue to increase as the PCC and its partner agencies, including the Village-based Artificial Insemination Technician (VBAIT), along with the PCC-supported multiplier farms, intensify their work.

More to come

“In terms of carabao meat, our carabao slaughter rate was formerly 11 to 12 percent but has gone up to 16 percent... The demand is increasing [and] the local carabao is contributing much to that [market],” Dr. Del Barrio said.

He said the PCC is also establishing dairy carabao hubs as a well-oiled business marketing chain.

He added that a value-chain analysis about carabao-dairying has been completed. It is a positive step in identifying problems in each of the links and applying the necessary corrective measures to

keep the chain in carabao-dairying unbroken and very strong.

Dr. del Barrio said that on top of the PCC's R&D efforts, the “mother of all milestones” of the agency is about to come.

“We now begin the count down for the birth of the Philippine Dairy Carabao breed, one that is excellent for milk, meat and draft,” he declared. “The calves have now developed in the wombs of female animals and will come out soon,” he added.

When that comes, the country will join the few countries in the world that have successfully bred their own dairy buffalo breed.



Daycare children in Aliaga, Nueva Ecija.

utilized for the purchase of milk was provided by DSWD. The PCC, on the other hand, ensured that the milk supply was delivered to CDCs on time and was consistently manufactured and packed according to a quality standard.

The municipal local government units, on the other hand, helped in the logistics and in data gathering while the dairy cooperatives or associations ensured the availability of the required volume of milk.

Indeed, the output of the program would not have been achieved without the active participation and willingness of various institutions and actors to share their time, ideas, and resources.

A program evaluation was made and put forward this message:

“The PCC-DSWD joint program proved to be a good model of development endeavor worthy to be replicated in other areas with high incidence of poverty and malnutrition”.

From page 5

Twin hits...

a 50% share to the total monthly income requirement of a family of five to be able to avail of the basic food and non-food needs.

Of equal importance, aside from its

nutritional and livelihood impact, the program also promoted partnerships among dairy cooperatives or associations, municipal local government units (LGUs), CDC workers, PCC and DSWD. The fund

March 26, 2018

#GreatToInspire

Engaging Administrative & Financial Efficiency

Dr. Antonio R. Obsioma

Former Chief, PCC Program Monitoring & Evaluation Division

Currently Vice Chancellor for Administration of UP Mindanao

Building Relationship & Human Resource Development

Dr. Zosimo M. Battad

Former PCC Deputy Executive Director Turned Academic Administrator

Currently Chancellor of the University of the East

Former President, Pampanga Agricultural College

Visioning the CDP 25 Years Forward

Dr. Libertado C. Cruz

Former PCC Executive Director Turned Carapreneur of 'Stephenhan Multiplier Farm'

#GreatToCelebrate

Dr. Fortunato A. Battad

Chair, Board of Agriculture Professional Regulation Commission

CLSU President Emeritus

Hon. Cecilia Leonila V. Chavez

BUTIL Party List Representative, Philippine House of Representatives

March 27, 2018

Anniversary Program Proper

GUESTS OF HONOR

Hon. Emmanuel F. Piñol

Secretary, Department of Agriculture

Hon. Cynthia A. Villar

Senator of the Philippines

Chair, Senate Committee on Agriculture & Food

Hon. Joseph Ejercito Estrada

Author of Senate Bill 1165 which was ratified into RA 7307 or Philippine Carabao Act of 1992

LAUNCHING OF THE PHILIPPINE DAIRY CARABAO BREED & BUFFALO BREED REGISTRY

Dr. Ester B. Flores

National Coordinator, PCC Genetic Improvement Program

PCC 'Silver' Anniversary Night

#MyGreatShareToPCC

Gala Red Carpet Tribute Assembly of VIPs and Honourees



**#Great
ToShare
AndCelebrate**