

ANNUAL REPORT 2010

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PCC OPERATING FRAMEWORK

Mandate

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

Per DA Administrative Order No. 9, series of 2009, PCC likewise is the lead Institution in Livestock Biotechnology research and development.

Vision

To become a premier institution promoting profitable and sustainable carabao-based enterprises designed to improve the income and nutrition of rural farming communities.

Mission

Improve the general well-being of rural farming communities through carabao genetic improvement, technology development and dissemination, and establishment of carabao-based enterprises, thus ensuring higher income and better nutrition.

Powers and Functions

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

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

EXECUTIVE SUMMARY

The year 2010 marked the end of a decade but for the Philippine Carabao Center (PCC), it signaled a beginning of even more challenging and meaningful tasks ahead. The significant accomplishments of the Agency during the year are reflected in three major areas namely Genetic Improvement Program (GIP), Enterprise Development Program, and Research and Development.

Genetic Improvement Program

The Agency has continued the pedigree and milk production performance testing of purebred riverine buffalos at the National Gene Pool and the regional centers utilizing GIP-centralized electronic herd recording system. Nine institutional herds were enrolled in the Alpha Computer or PCC's central database. Using the test-day milk yields from the enrolled herds, estimated breeding values (EBVs) of both original (imported) stocks and island-born buffalos were subsequently established and compared for further analysis. The quality of milk from these herds was also closely monitored through somatic cell count.

Meanwhile, conservation and performance testing of swamp buffalos (native carabaos) were continuously carried out at the facilities of PCC-CSU in Piat, Cagayan and at a satellite station in Isabela State University in Echague, Isabela. Likewise, the performance of swamp buffalos at the PCC-USF in Ubay, Bohol was also considered for future across-

herd evaluation.

The selection protocols for genetic improvement were also complemented by practical application of reproductive biotechnologies, which include cryobanking of semen, artificial insemination, ovum pick-up, in vitro embryo production, and embryo transfer.

Artificial insemination (AI), applied mainly in the villages for purpose of upgrading the genetics of the native carabaos, was further expanded through the continuous training and engagement of more village-based AI technicians. Natural mating, via the Agency's Bull Loan Program, was likewise strengthened in support of the genetic upgrading efforts. Improved performance parameters were recorded in terms of number of animals inseminated and monitored, number of breeding services of bulls monitored, and number of crossbred calves produced from previous AI and natural mating services.

Enterprise Development

In support of the Dairy Fast Track Program of the Department of Agriculture, the PCC has imported purebred dairy buffalos from Brazil, as funded by Japan under the KR-2 (Kennedy Round 2) Agreement. The animals were subsequently quarantined then distributed via the Modified "Paiwi" Scheme and on a staggered basis to various partner-cooperatives (existing and newly organized) in Nueva Ecija. The

province was prioritized for distribution as it serves as the National Impact Zone for carabao-based enterprise development. Continuous assistance was provided in the NIZ by way of extension services, social, organizational, and technical trainings, field coaching, postproduction support, and market linkages. In partnership with various secondary stakeholders, a dairy development plan for the NIZ was also formalized in a series of discussions and workshops.

To firm up the postproduction and marketing support for the NIZ and nearby provinces, a centralized milk processing plant was established adjacent to the PCC National Headquarters. It aims to collect, process, and market the milk that is produced in Central and (possibly) Northern Luzon. The facility will be inaugurated on March 25, 2011.

Premium efforts were likewise carried out at the Regional Impact Zones (RIZs) by the PCC's network of centers. Foremost of such activities involved an inventory of water buffalos in their respective areas, to clearly establish the breeding base in the RIZ. The ultimate purpose of which is to put on the ground a model for enterprise development utilizing the crossbred buffalos. This is on top of the existing purebred-based dairy enterprises in the RIZs, which are limited in numbers. Such modeling initiative has become more evident in San Agustin, Isabela, as a team of development workers and field technicians was organized and mobilized by PCC in mid 2010 for the purpose. The said endeavor has received favorable support from the local government of San Agustin and even funding assistance from the provincial government of Isabela.

Cognizant of the need to establish a long-term plan not only for the development of the

carabao subsector and/or enterprises but for the whole ruminant industry as well, the Agency has also spearheaded the crafting of the Ruminant Animal Industry Road Map (2010-2034), in close consultation with various government agencies and private stakeholders.

Research and Development (R&D)

The R&D activities in 2010 focused on basic researches in the fields of reproductive biotechnology and physiology, animal health, animal nutrition, breeding and genetics, meat products and waste management. Operations or problem-driven research centered on reducing calf mortality, increasing calf production, increasing milk production, improving forage and pasture, increasing AI efficiency, and socio-economics. Animal nutrition and postproduction technologies were also successfully demonstrated in Science and Technology (S&T)-based farms in Nueva Ecija. Information and technologies derived from these research initiatives were formally evaluated during the Agency's R&D In-House Review and subsequently packaged for communication to farmers and other clientele in the forms of printed, broadcast, and audio-visual media.

All these accomplishments were facilitated through the Agency's effective and efficient management of its physical, material, human, social, and financial resources. In particular, these include continuous adherence to international quality standards, capability-building of its personnel, improvement of its infrastructure and facilities, strategic linkages with local and international institutions, and sound budgeting.

GENETIC IMPROVEMENT PROGRAM (GIP)

Selecting the Best of the Best Riverine Buffalos

As of December 2010, eleven (11) institutional herds at the PCC regional centers hosted by CSU, MMSU, DMMMSU, UPLB, USF, VSU, WVSU, LCSF, MLPC, USM and CMU, and one herd at the National Gene Pool are implementing the GIP-centralized electronic herd recording system. Nine herds (including the National Gene Pool) are enrolled in the Alpha computer (PCC's central database). Pedigree and milk production performance records of animals from these nine herds are uploaded onto the Alpha to be used for genetic evaluation.

There are currently 5,970 animals enrolled in the Alpha with 25,514 milk test day records. Aside from the National Gene Pool, largest contributors of records come from PCCs at CMU, USM, and MLPC. Herds that are already implementing the electronic herd recording system but not yet enrolled in the Alpha are from PCCs at USF, VSU, LCSF and WVSU. These herds will be enrolled eventually once optimum herd size and sire linkage have been established.

Comparison is made between original stock and island-born cows according to average first lactation estimated breeding value (EBV) per herd (Table 1). As expected, the National Gene Pool herd (original stock)

Table 1 Average EBVs of original stock and island-born buffalo cows

Center/Herd	1 st Lactation		2 nd Lactation		3 rd Lactation	
	Island-Born	Original Stock	Island-Born	Original Stock	Island-Born	Original Stock
CMU	-24.48	-37.23	-37.0	-18.7	-30.3	-59.3
CSU	44.25	-37.08	27.8	-19.3	32.9	-60.7
DMMMSU	-57.00	-70.27	-42.0	-59.7	-83.0	-99.2
MLPC	-13.70	-46.67	-12.6	-31.0	-19.8	-72.1
MMSU	-1.45	-57.16	1.3	-41.9	-2.0	-82.9
NGP	79.80	-54.30	66.6	-40.2	91.7	-77.7
UPLB	69.73	-12.89	68.1	9.8	85.4	-30.3
USM	-4.48	-56.70	-6.6	-44.6	-8.6	-80.7
Overall average	42.48	-53.22	32.9	-38.4	47.4	-77.0

has the highest average followed by PCC at UPLB and PCC at CSU, both of which maintain island-born cows. There is a very big difference in values between the two groups of animals, indicating that continuous selection based on milk production performance is on the right track to improve the genetics of our local dairy buffaloes.

Analysis on Somatic Cell Count (SCC) using Fossomatic Minor[®] was also started in February 2010 using milk samples from participating herds of PCC regional centers and cooperatives. With the exception of milk from the herds at PCC at MMSU and Pulong Buli Multipurpose Cooperative, the mean SCCs of milk from all participating herds were within the standard, which is currently set at 200,000 cells/ml (Table 2). A bulk milk tank standard is yet to be set.



Conserving and Improving the Indigenous Genetic Resource

Cognizant of its inherent qualities and potential use in the future, some 150 native carabaos are maintained in a gene pool at PCC at CSU while 50 are maintained in a satellite station at Isabela State University (ISU), Echague, Isabela. There is a renewed effort to put in order the system of pedigree and performance testing

of the native carabaos in ISU with the recent resignation of its farm supervisor who is now working abroad. The GIP team from PCC-OED has presented and explained to the ISU officials the overall directions of its Carabao Stud Farm and its Dairy Buffalo Farm.

Meanwhile, there is a continuing effort to link the swamp buffalo herd at PCC-USF such that an across-herd evaluation can be made in the near future.

Table 2. Somatic cell counts of milk samples from participating herds

Center/Herd	No. of Lactating Cows	Mean SCC (x1,000 cells/ml)	Standard Deviation
CMU	35	57.85	94.3
CSU	22	186.46	196.8
MLPC	33	94.58	88.9
MMSU	28	894.7	1,102.4
National Gene Pool	97	154.83	221.8
UPLB	41	79.05	65.9
USM	8	67.19	34.7
USF	22	73.44	68.5
VSU	11	124.08	181.0
Pulong Buli MPC	52	309.43	305.6

Cryobanking of Semen and Distribution

The semen bank based at PCC-OED received a total of 79,279 doses of frozen semen from the semen processing laboratories of PCC at CLSU and PCC at UPLB. Of this total, 42,338 doses were distributed to various clientele (Table 3). The depot at the PCC National Gene Pool has also distributed an equivalent of 1,026 dewars of liquid nitrogen to its clientele for the conduct of research and artificial insemination (AI) activities.

Table 3. Distribution of semen and liquid nitrogen to various clientele

Clientele	Doses of Frozen Semen	Dewars of Liquid Nitrogen
PCC Animal Health Laboratory	-	2
PCC Biotech Laboratory	140	40
Bureau of Freshwater Aquaculture Center	-	2.99
DA-RFU I, La Union	149	-
DVF Cooperative	30	2.25
LGU Nueva Viscaya	-	1
PCC Molecular Genetics Laboratory	16	-
PCC National Gene Pool	756	2
Nueva Viscaya State University	-	1
PCC at DMMMSU	2,956	81
PCC at LCSF	2,124	1
PCC at MLPC	2,319	3
PCC at MMSU	3,154	108
PCC at MSU	1,465	2
PCC at UPLB	2,488	-
PCC at USF	4,951	4
PCC at USM	3,123	2
PCC at VSU	3,523	3.1
PCC at WVSU	3,217	3
PCC at CMU	2,093	1
PCC at CSU	8,440	124
PCC at CLSU	-	386
PhilRice	-	5.07
PVO-Nueva Ecija	1,394	-
PVO-Nueva Viscaya	-	1
PCC Semen Bank	-	251
TOTAL	42,338	1,026.41

Upgrading and Utilizing Superior Genetics

In support of the agency's Carabao Upgrading Program (CUP), superior genetics of buffalos were made available to the farmer-clientele through the conduct of AI and natural mating (via the agency's Bull Loan Program) services of water buffalos in various localities across the country.

In 2010, a total of 21,884 AI services, which is approximately 22% higher than the output in 2009,



were conducted in the villages. Of this total, 53% was performed by village-based AI technicians (VBAITs), 31% by LGU technicians, and 16% by PCC technicians. As a result of previous year's AI services, some 3,400 crossbred calves on the ground were also monitored in 2010, which is 60% higher than those monitored in 2009.

Natural mating services for native and crossbred buffalos utilizing top quality breeding bulls were also done in the villages. In 2010 alone, 82 breeding bulls were loaned out for this purpose bringing the total to 662. Based on 2,789 natural services from previous years, which were monitored in 2010, a total of 1,617 calves on the ground were recorded, up by 51% from those monitored in 2009.

Applying Reproductive Biotechnologies

Aside from AI, the research team of PCC utilizes ovum pick-up (OPU) by transvaginal method as a tool for genetic improvement. Outstanding dairy buffalos are used as egg (ovum or primary oocyte) donors, which are being collected twice a week. Thus, OPU allows repeated collection of oocytes from genetically superior animal. OPU-derived oocytes are matured and fertilized in vitro. Embryos produced are then transferred to surrogate animals for development to term

in-vivo. Embryo transfer (ET) is carried out both at the institutional and field levels.

In 2010, one pregnant animal was produced out of OPU performed at the institutional herd, while four pregnant animals were reported out of ET in the villages.

Cascading GIP Protocols across the PCC Network

The seventh GIP coordinators' meeting was held on July 24-25, 2010 at the PCC National Headquarters and Gene Pool. It was participated in by the GIP, AI, Bull Loan, and Carabao-Based Enterprise Development (CBED) Program coordinators including their respective center directors. Five major concerns were tackled during the meeting, namely: (1) Progress of the regional centers in establishing the database for AI, Bull Loan, CBED and GIP; (2) Standardization and/or revision of format (paper-based and electronic) of data submitted monthly by the various coordinators to the PCC National Headquarters. Additional information in the database will be incorporated depending on their needs; (3) Training of encoders and center's coordinators regarding the use of paper and electronic formats (Advance MS Excel software) for easy data management and data retrieval; (4) Review of GIP and discussion about the role of each center in the overall plan; and (5) Introduction about SCC

as an effective monitor for udder health; initial SCCs of various herds submitting monthly milk samples were likewise presented.

A list of ranked animals of individual cows was also given to each center. In those centers with no breeding value of animals, the dams' milk production records were used as basis for selection.

Other matters discussed and agreed upon by the participants include the following:

1. Participating coordinators in the regional centers shall write "GIP Milestone" for consolidation by the National GIP Unit. The PCC will also adopt an SCC

standard of 200,000 cells/ml based on the initial SCC results gathered from the milk samples of participating centers.

2. The regional centers will be performing California Mastitis Test (CMT) on the day that the milk samples are collected for testing. The results will be recorded in the "Remarks" column of the milk record form.
3. The "left" and "right" front and rear teats shall be according to the anatomical left and right side of the animal (the left side of the animal being the side where the rumen is).

Recognizing the Best Performing Dairy Buffalo, Farmer, and Cooperative

The PCC continued its annual search for the best dairy buffalo cow (junior and senior cow subcategories), dairy cooperative and dairy buffalo farmer (smallhold and family module subcategories). These awards were given during the 17th anniversary celebration of PCC at the Science City of Muñoz, Nueva Ecija on March 26, 2010. Participating entries came from the herds and/or coverage areas of PCCs at DMMMSU, UPLB, VSU, CMU and USM and cooperatives in the National Impact Zone (NIZ) of Nueva Ecija.

The award for best senior cow went to owner Mr. Gregorio Cueco of Gabas, Baybay, Leyte, whose buffalo displayed an exemplary dairy character and body conformation aside from its production of 2,815 liters of milk during its 4th lactation. The PCC at UPLB got the best junior cow, the only crossbred entered in the competition. Other awards are the "Best Dairy Cooperative" received by Simula ng Panibagong Bukas Producer's Cooperative, which is chaired by Mr. Fernando Pablo, and the "Best Dairy Buffalo Farmer", which went to Mr. Pablo Nazar of Kilusang Bayan sa Pagpapaunlad ng Talavera.



Best Senior Cow

Owner: **Mr. Gregorio Cueco** • Address: Gabas, Baybay, Leyte • Cow ID Number: 2LS98205
Approximate Age: 12 years old • Origin: Bulgaria

Calving Date	Total Milk Production (kg)	Number of Days in Lactation	Average Daily Milk Production (kg)
September 28, 2003	1,817.30	304	5.98
December 3, 2004	2,127.75	280	7.60
December 27, 2005	2,410.05	279	8.64
March 24, 2007	2,485.05	289	8.60
June 2, 2008	2,815.25	327	8.61
October 3, 2009	1,597.50	113 (ongoing)	14.14



Best Junior Cow

ID Number: 5UP05005 • Date of birth: March 17, 2005 • Place of Birth: PCC-UPLB Institutional Farm (Island born)
Age of the animal: 4.5 years old • Sire: 609 CLSU • Dam: 5UP606/1265 • Breed: Crossbred (75% Murrah)
Peak lactation: 8.6 kg at 55 days in milk • Body Condition Score: 4.0

Calving Date	Total Milk Production (kg)	Number of Days in Lactation	Average Daily Milk Production (kg)
August 30, 2009	678.50	93	7.30

ENTERPRISE DEVELOPMENT

Strengthening Initiatives at the National Impact Zone (NIZ)

Distribution of New Stocks, Female-Breeder Inventory, and Participating Farmers and Cooperatives

As the NIZ for buffalo enterprise development, the province of Nueva Ecija was prioritized for a series of baseline surveys, social preparation and technical

trainings for the subsequent distribution of a new batch of purebred dairy buffalos from Brazil, which arrived in January 2010. The latter is part of the dairy fast track program of the national government and is funded by the government of Japan under the KR-2 (2nd Kennedy Round) Agreement.

Of the 800 head Brazilian buffalos that were allocated for Nueva Ecija, 734 were already delivered to 20 (14 existing and six newly organized) partner-cooperatives in 2010 (Table 4).

Table 4. Brazilian buffalos distributed to partner-cooperatives (as of December 31, 2010)

Name of Cooperative*	Address	No. of Buffalos Received
Existing		
1. Bagong Mabuhay PMPC	Mabuhay, Talavera	19
2. Simula ng Panibagong Bukas PMPC	Porais, San Jose City	71
3. Angat Buhay DPC	Calabalabaan, Science City of Muñoz	91
4. Eastern PMPC	Sibut, San Jose City	46
5. Pulong Buli PMPC	Pulong Buli, Sto. Domingo	70
6. Bibiclat DPC	Bibiclat, Aliaga	30
7. San Rafael Dairy Carabao MPC	San Rafael, Guimba	40
8. Lakas Magsasaka PMPC	Caballero, Guimba	36
9. United Farmers Producers Cooperative	San Antonio, Science City of Muñoz	25
10. Cinense DPC	Cinense, Talugtug	37
11. San Vicente Dairy PMPC	San Vicente, Llanera	54
12. Casile DPC	Casile, Llanera	37
13. Rizal Credit & Allied Services	Poblacion, Rizal	24
14. Catalanacan PMPC	Catalanacan, Science City of Muñoz	31

Newly Organized		
15. Agpapa Irrigators PMPC	Paco Roman, Rizal	21
16. Makabagong Kooperatiba ng Bantug	Bantug, Talavera	13
17. Samahan ng Sta. Monica Para sa Likas Kayang Pag-unlad	Sta. Monica, Aliaga	23
18. Pao Producers Cooperative	San Antonio Weste, Lupao	21
19. Bagong Pag-asa sa Bagong Talavera	Minabuyok, Talavera	20
20. Kapitbahayan PMPC	Mabini, Llanera	25
TOTAL		734

*DPC=Dairy Producers Cooperative; PMPC = Primary Multipurpose Cooperative

With these recent developments, the NIZ Program now covers 12 municipalities and three cities in Nueva Ecija involving the participation of 32 primary cooperatives and 850 farmer-cooperators. The latter are managing a total of 1,839 purebred female breeding buffalos (Table 5) including 161 purebred mature bulls.

Calf Production

In 2010, a total of 257 calves (143 males and 114 females) were produced in the NIZ through artificial insemination (n=86) and natural mating (n=171) services, bringing the total calf production since 1999 to 3,545 (Table 6). Owing to improved management

practices by the farmer-cooperators and support by the PCC field technicians and village-based veterinary aides, calf mortality rate was reduced significantly from 8.59% in 2009 to 3.89% in 2010.

Milk Production, Income Generation, and Job Creation

Annual milk production in the NIZ has steadily increased from 2000 to 2007 then slowly declined from thereon (Table 7). The latter observation relates to the decreasing inventory of dairy buffalos in the province due to the culling of old female buffalos that are no longer productive.

Table 5. Number of primary cooperatives, farmer-cooperators and female breeding buffalos in the NIZ as of December 31, 2010

Town/City	No. of Primary Cooperatives	No. of Farmer-Cooperators	No. of Female Breeding Buffalos
Guimba	3	75	184
San Jose	3	96	221
Muñoz	4	149	364
Santo Domingo	1	43	199
Quezon	1	15	63
Talugtug	1	34	107
Cuyapo	0	3	4
Talavera	5	86	185
Llanera	4	103	214
Carranglan	0	11	15
Aliaga	4	60	80
General Tinio	1	18	24
Cabanatuan	1	27	33
Rizal	3	109	125
Lupao	1	21	21
TOTAL	32	850	1,839

Table 6. Calf production in the NIZ (1999 to 2010)

Year	Number of Calves Produced		
	Male	Female	Total
1999	21	48	69
2000	26	33	59
2001	111	142	253
2002	178	176	354
2003	185	205	390
2004	232	208	440
2005	245	224	469
2006	203	203	406
2007	188	188	376
2008	115	136	251
2009	118	103	221
2010	143	114	257
TOTAL	1,765	1,780	3,545

Since its formation in 2002, the Nueva Ecija Federation of Dairy Carabao Cooperatives (NEFEDCCO), through its elected Board of Directors and officials, has served as the marketing arm for the milk produced by the dairy buffalos of participating farmer-cooperators in the NIZ. Milk is collected regularly by the NEFEDCCO's refrigerated van at strategic points in the villages for transport to its processing plant in Talavera. Milk is sold either as raw (fresh) or processed (in the form of pasteurized milk, soft cheese, and pastillas or milk candies). Most of the revenues come from the sale of fresh milk to private processors in Bulacan, Metro Manila, Batangas, and Cagayan.

In 2010 alone, the cooperatives and individual farmers of NEFEDCCO earned cumulative incomes of PHP0.387 M and PHP6.20 M, respectively from the sale of 193,710 kg of milk (Table 7).

Table 7. Milk production, value and income in the NIZ

Year	Milk Production (kg)	Price (PHP)	Total Value (PHP)	Cooperatives' Income (@PHP2/kg)	Farmers' Income (PHP)
2000	873.00	32	27,936	1,746	26,190
2001	17,530.00	32	560,960	35,060	525,900
2002	117,578.00	32	3,762,496	235,156	3,527,340
2003	249,296.00	32	7,977,472	498,592	7,478,880
2004	322,930.50	32	10,333,776	645,861	9,687,915
2005	344,276.00	32	11,016,832	688,552	10,328,280
2006	318,820.00	32	10,202,240	637,640	9,564,600
2007	720,794.71	32	23,065,431	1,441,589	21,623,841
2008	303,944.22	32	9,726,215	607,888	9,118,327
2009	202,881.60	34	6,897,974	405,763	6,492,211
2010	193,710.30	34	6,586,150	387,421	6,198,729
TOTAL	2,792,634.33		90,157,482	5,585,269	84,572,213

Table 8. Type and Number of Jobs Created and Corresponding Salaries or Personal Income in the NIZ, CY 2010

Type of Job	No. of Persons	Salary/Income
1. Dairy Farmers/Families	850	PHP42,000-PHP72,000 per lactation (gross)
2. Bull Caretakers	71	PHP500 per successful pregnancy (or an average of PHP13,500/year per bull)
3. Drivers/Delivery Persons of NEFEDCCO	3	PHP3,000 /month
4. Milk Collectors	16	PHP3,000/month
5. Milk Processors	30	PHP3,000-PHP3,500.00/month
6. Village-based Vet Aides	15	PHP500-PHP1,500/month (depending on the number of client)
7. Village-based AI Technician	15	PHP3,000-PHP10,000/month (depending on the number of client)
8. Bookkeepers	16	PHP3,000-PHP5,000/month
TOTAL	1,016	

The dairy buffalo modules in the NIZ have generated a total of 1,016 jobs, a major portion of which relates to the dairying operations of the individual farmer-cooperators while the rest involves breeding, extension, and other support services by various individuals (Table 8).

Organizational Development

With the assistance of a development consultant from the Central Luzon State University (CLSU), the PCC-NIZ Coordinating Unit has spearheaded the conduct of a series of trainings on organizational development and management for the NIZ cooperatives (see relevant information in Table 18). Likewise, on-site field coaching and regular consultation meetings were made by the Unit to assist the NIZ cooperatives in addressing organizational issues affecting their dairy buffalo project. The Unit also facilitated an organizational assessment of NEFEDCCO, which aimed at assisting the federation in analyzing its present situation for further planning or improvement.

Improving the Health Condition of Animals in the NIZ

The PCC-NIZ Coordinating Unit's mobile veterinarians with the assistance of village-based vet

aides were able to provide a total of 4,776 animal health services to farmer-clienteles in the NIZ (Table 9). Their efforts have helped keep the morbidity and mortality incidences to a minimum.

Table 9. Animal health services in the NIZ, CY 2010

Services Rendered	No. of Services
1. Vaccination	820
2. Deworming	1,172
3. Vitamin Administration	1,292
4. Pregnancy Diagnosis	817
5. Treatment	168
6. Blood Collection	507
TOTAL	4,776

Partnerships and Linkages

Through the joint efforts of the PCC's Planning and Special Projects Division (PSPD) and the NIZ Coordinating Unit, a meeting for provincewide Secondary Level Stakeholder Forum was conducted on May 17, 2010, which was followed by a workshop in Baguio City on August 1-3, 2010. Both activities sought to institutionalize or sustain the convergence of secondary stakeholders in the NIZ Program.

The said activities were participated in by various government agencies such as the provincial officers of the Department of Trade and Industry (DTI) and Department of Agrarian Reform (DAR), Cabanatuan Chamber of Commerce, and Municipal Agriculturists and Municipal Cooperative Development Officers of the Local Government Units of Llanera, Guimba, Sto. Domingo, Science City of Muñoz, San Jose City, and Rizal.

Each municipality prepared its respective development plans in support of the dairy sub-sector project. The individual plans were then consolidated into one Dairy Development Plan in support of the NIZ Program in Nueva Ecija.

Each agency had also committed their continuous support to the NIZ Program through signing of a Memorandum of Agreement.

Linkages were also made with private groups or nongovernment organizations (NGOs). Notably, the Alalay sa Kaunlaran sa Gitnang Luzon Incorporated (ASKI) of Aliaga, Nueva Ecija provided financial assistance and other support to the Samahan ng Sta. Monica Para sa Likas Kayang Pag-Unlad, one of the newly organized cooperatives in the NIZ. Initial discussions were also made with the Social Action for Rural-Urban Development Inc. of Gabaldon, Nueva Ecija as a prospective recipient of a dairy buffalo institutional module and with the Inner Wheel-Science City of Muñoz Chapter, Betbien Montessori of San Jose City, and Misereor Village of General Natividad, Nueva Ecija as potential market outlet for milk.

Other Relevant Projects and Activities

In 2010, the NIZ Coordinating Unit has represented the PCC in the planning, coordination, and implementation of other activities related to enterprise development and technology utilization. These included the following:

- “Gatas ng Kalabaw Festival” in Nueva Ecija – This is an annual festival in the province, which features the buffalo’s milk and the many products that can be derived from it. In 2010, the celebration was hosted by the town of Llanera.



- Small and Medium Enterprise Development Council (SMEDC) – On December 21, 2010, the council approved the proposal submitted by the PCC as regards adopting the NIZ Program as one of its assisted enterprises in Nueva Ecija.
- Science and Technology (S&T)-Based Farm Projects – In coordination with and funding assistance from the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), two S&T-based farms (one in Calabalabaan and one in Talavera) were completed in 2010. Technologies that were successfully demonstrated and/or adopted by the said farms include the use of milk replacer, milking machine, and “flushing”.
- Farmer’s Forum – This was conducted during the visit of Sen. Francis Pangilinan (Senate Committee Chair on Food and Agriculture) to the PCC National Headquarters on November 5, 2010. Some 350 dairy farmers in Nueva Ecija participated in the said forum where pressing issues related to the local dairy industry such as tariffs on imported milk products, access to farmer-friendly credit system, and support to milk feeding program were tackled.

Revitalizing Efforts at the Regional Impact Zone (RIZ)

The long-term breeding plan in the impact zones, NIZ included, is to cross the female native carabaos with purebred riverine bulls then continuously backcross the subsequent female crossbreds with purebred riverine breed to ultimately produce “close-to-purebred” dairy buffalos. As more and more female crossbred buffalos are produced in the process, the breeding base and dairy animals for enterprise activities shall be established.

To “short-cut” the process, the regional centers of PCC also adopted the approach that was initially applied in Nueva Ecija, i.e. distribute purebred female buffalos in selected impact areas to demonstrate immediately that village level dairying is feasible. In effect, the RIZ is a “smaller” version of the NIZ, as it only covers certain municipalities (not a whole province) for the purpose. Likewise, some regional centers have already initiated efforts towards crossbred buffalo-based enterprise development in their respective RIZs.

Establishing the Inventory of Carabaos in the RIZ

Recognizing the need to clearly establish the potential breeding base of carabaos in the impact zones, the PCC regional centers conducted a census of native, crossbred, and purebred buffalos in their respective areas. As of December 2010, a total of 37,552 water buffalos were counted, of which, 21,196 (or 56%) are females.

Strengthening Partnerships with Various Organizations or Entities

The PCC regional centers have continuously provided support to various partner-entities or organizations in the RIZ through provision of breeding stocks, capability-building, organizational development, animal breeding and animal health services, technical assistance, and market linkages (Table 10).

Preliminary discussions were also made with Green Earth Heritage Foundation of Bulacan and Kapampangan Development Foundation of Pampanga as recipients

Table 10. Number of partner-cooperatives, government institutions, and NGOs in the RIZ being supported by the PCC regional centers, CY 2010

Island/Regional Center-In Charge	Partner Organizations/Entities			
	Cooperative	Farm Household	Government Institution	Nongovernment Organization
Luzon				
PCC at CSU	9	-	2	-
PCC at CLSU	8	2	5	-
PCC at UPLB	5	22	-	-
PCC at MMSU	2	-	-	-
PCC at DMMMSU	5	-	-	1
Visayas				
PCC at VSU	1	-	-	-
PCC at LCSF	5	-	3	-
PCC at USF	6	-	-	-
PCC at WVSU	1	3	6	-
Mindanao				
PCC at USM	1	10	4	-
PCC at MLPC	-	1	3	-
PCC at CMU	-	5	10	-
TOTAL	43	43	33	1

of a dairy buffalo institutional module and with the Department of Education Baliuag North District, Bulacan as potential marketing arm and direct users of products produced by the San Roque Dairy Farmers Association.

Female Breeding Buffalos, Volume and Value of Milk Production

As of 2010, there are 1,224 female breeding buffalos (1,089 purebred and 135 crossbred) in the care and management of various partner-stakeholders within the RIZ (Table 11). A total of 213,727 kg of milk was produced from this dairy buffalo population with total milk sales amounting to PHP14.248 M (Tables 12 and 13). Note that the price of raw buffalo's milk varies from place to place, ranging from PHP34 to PHP45 per kg.



Table 11. Number of female breeding buffalos in the RIZ, CY 2010

Island/Regional Center-In Charge	Number of Female Breeding Buffalos				
	Cooperative	Farm Household	Government Institution	NGO	TOTAL
Luzon					
PCC at CSU	181	-	-	-	181
PCC at CLSU	245	59	37	-	341
PCC at UPLB	66	30	-	-	96
PCC at MMSU	46	-	-	-	46
PCC at DMMMSU	139	-	-	15	154
Visayas					
PCC at VSU	14	-	-	-	14
PCC at LCSF	16	-	8	-	24
PCC at USF	110	-	-	-	110
PCC at WVSU	11	4	21	-	36
Mindanao					
PCC at USM	23	13	24	-	60
PCC at MLPC	-	24	19	-	43
PCC at CMU	-	32	87	-	119
TOTAL	851	162	196	15	1,224

Table 12. Volume of milk production in the RIZ, CY 2010

Island/Regional Center-In Charge	Milk Production (kg)				
	Cooperative	Farm Household	Government Institution	NGO	TOTAL
Luzon					
PCC at CSU	50,212	-	10,650	-	60,862
PCC at UPLB	89,330	9,618	-	-	98,948
PCC at MMSU	3,001	-	-	-	3,001
PCC at DMMMSU	25,126	-	-	583	25,709
Visayas					
PCC at VSU	7,035	-	-	-	7,035
PCC at LCSF	1,953	-	1,015	-	2,968
PCC at USF	11,022	-	-	-	11,022
PCC at WVSU	-	573	1,807	-	2,380
Mindanao					
PCC at USM	1,072	-	353	-	1,425
PCC at CMU	-	377	-	-	377
TOTAL	188,751	10,568	13,825	583	213,727

Table 13. Milk sales in the RIZ, CY 2010

Island/Regional Center-In Charge	Milk Sales (PHP)				
	Cooperative	Farm Household	Government Institution	NGO	TOTAL
Luzon					
PCC at CSU	1,754,979	-	728,048	-	2,483,027
PCC at UPLB	9,437,247	410,818	-	-	9,848,065
PCC at MMSU	78,291	-	-	-	78,291
PCC at DMMMSU	888,866	-	-	29,043	917,909
Visayas					
PCC at VSU	198,938	-	-	-	198,938
PCC at LCSF	71,719	-	50,292	-	122,011
PCC at USF	380,790	-	-	-	380,790
PCC at WVSU	-	24,031	90,099	-	114,130
Mindanao					
PCC at USM	57,281	-	42,874	-	100,155
PCC at CMU	-	4,500	-	-	4,500
TOTAL	12,868,111	439,349	911,313	29,043	14,247,816

Establishment of Enterprise Models Based on Crossbred Buffalos

a. San Agustin, Isabela

While there are two existing dairy cooperatives in San Agustin, Isabela (i.e. San Agustin Carabao Owners Dairy Cooperative and San Agustin Women's Dairy Processing Association), their production, processing and marketing operations were met with much difficulties owing to a gamut of factors. Thus, in August 2010, the PCC-OED, PCC at CSU, and the LGU of San Agustin formally entered into an agreement to have a fresh start for San Agustin's dairy endeavors. The project collaboration, called "Transforming San Agustin as a Dairy Community Utilizing Crossbred Buffaloes", aims to put in place the basic social and technical infrastructures crucial in staging the transformation of San Agustin into an enterprise model for crossbred buffaloes.

Twelve priority barangays were identified based on their inventory of breedable female (native and crossbred) carabaos (Table 14). Subsequently, 12 dairy associations were organized in these barangays. Market linkages were then established with private milk processors in Cagayan and Isabela.

Table 14. Inventory of breedable female carabaos in 12 priority barangays in San Agustin, Isabela, as of September 2010

Barangay	Native	Crossbred	TOTAL
1. Masaya Sur	91	39	130
2. Santos	52	20	72
3. Palacian	101	24	125
4. Sinaoangan Sur	15	47	62
5. Sinaoangan Norte	23	22	45
6. Salay	51	18	69
7. Dabubu Grande	68	24	92
8. Virgoneza	23	27	50
9. Quimalabasa Norte	62	37	99
10. San Antonio	61	21	82
11. Sto. Niño	84	17	101
12. Mapalad	76	21	97
TOTAL	707	317	1,024



Likewise, a more aggressive estrus synchronization and AI program was pursued, reaching around 30% of the breedable carabaos in the municipality. The strong support from LGU-San Agustin facilitated the implementation of the project. Its initial success has encouraged the Provincial Government of Isabela to contribute PHP 5M for the establishment of six milk barns in the 12 priority barangays.

b. Pampanga and Tarlac

With the initial success of the project in San Agustin, Isabela, similar initiatives were pursued in the provinces of Pampanga and Tarlac.

In Pampanga, a proposal was already packaged for the purpose. Collaborators include the PCC-OED, PCC at CLSU, Provincial Government of Pampanga through its Provincial Veterinary Office and Office of the Provincial Agriculturist, Municipal Agricultural Offices (LGU-Magalang, LGU-Mabalacat, and LGU-Arayat), Pampanga Agricultural College, and Bucluran Memalen Capampangan. A dialogue was conducted on September 20, 2010 with Governor Lilia Pineda for funding of the said proposal.

Meanwhile, initial discussions were made to engage the Tarlac Provincial Government to spearhead the packaging of its own proposal. A series of further consultative dialogues and meetings shall be pursued.

RESEARCH & DEVELOPMENT

Engaging in Knowledge Production and Problem-Driven Research

In 2010, 15 research studies were completed, which include the four S&T based-farm project-collaboration with PCARRD, while 46 are continuously being conducted (Tables 15a and 15b). The researches were categorized according to disciplines (for basic research) and thematic areas (for operations research).

Table 15a. List of Completed Researches for CY 2010

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
A. Basic Research		
Reproductive Biotechnology	Cryopreservation of In Vitro-Matured Buffalo (<i>Bubalus bubalis</i>) Oocytes by Slow Freezing and Vitrification	E.P. Atabay, E.C. Atabay, S. Hamano, D.H. Duran, F.P. Aquino, R.V. de Vera and L.C. Cruz
	Cryopreservation of Buffalo Ear Skin Cells and Its Potential Utilization in Enhancing the Propagation of Genetically Superior Water Buffaloes	E.P. Atabay, E.C. Atabay and L.C. Cruz
	Chemical and Electrical Activation of Swamp Buffalo (<i>Bubalus bubalis</i>) Oocytes for the Production of Parthenogenetic Embryos In Vitro	E.C. Atabay, E.P. Atabay, F.V. Mamuad and L.C. Cruz
	Production of Nuclear Transfer Buffalo Embryos Using Oocytes from Ovaries Stored at Low Temperatures	E.C. Atabay, E.P. Atabay, F.V. Mamuad and L. C. Cruz
	The Effects of Holding Water Buffalo and Bovine Ovaries at Various Temperatures During Transport and Storage On In Vitro Embryo Production	E.P. Atabay, E.C. Atabay, R.V. de Vera, F.P. Aquino, and L.C. Cruz

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
Reproductive Biotechnology	Effect of Medium Supplement and Storage Temperature on Motility and Longevity of Frozen-Thawed Buffalo Spermatozoa	D.H. Duran, H. Vililia and R.A. Manzano
	Propagation of Superior Goats for Dispersal through Reproductive Biotechniques: Superovulatory Response to Exogenous FSH Administration and Embryo Recovery in Boer, Saanen and Anglo-Nubian Breed of Goats	N. Marzan, E. Flores, E. Atabay, F. Aquino and L.C. Cruz
Animal Health	Comparative Virulence of Trypanosoma evansi Isolates in Luzon, Visayas and Mindanao Water Buffaloes	J.C. M. Verdillo, J.V. Lazaro, and C.N. Mingala
	Prevalence and Risk Factors of Zoonotic Protozoa among Smallholder Farms in Aurora Province	C.Y. J. Domingo, R.C. Paragusion, N.S. Abes, I. I. Acayan, R. Ador-Dionisio, A. Bulasan, C. Francisco, G. Magtanao, R. Manlapig, R. Medrano, and S.R. Quiamco
	Optimization of Loop-Mediated Isothermal Amplification Method (LAMP) in Diagnosing Trypanosoma evansi	C.Y.J. Domingo, N.S. Abes, C.A. Gutierrez, G.J. Domingo and R.D.C. Carurucan
Reproductive Physiology	Cryoviability of Buffalo Sperm in Tris Extender Following Supplementation with Different Amino Acids	R.T. Morcoso, F.V.Mamuad, E.V. Venturina, E.C. Atabay, M.M. Cabling, R.V. Javier and S.C. Ramos
Science and Technology Based-Farm Projects		
<ul style="list-style-type: none"> Science and Technology Based-Farm to Produce Quality Buffalo Milk through the Use of Communal Milk Cooling Tank (D.L. Aquino, W.T. Del Rosario, M. Delizo and L. Verona) Science and Technology Based-Farm to Increase Milk Production through the Use of Portable Milking Machine (D.L. Aquino, W.T. Del Rosario, M. Delizo and L. Verona) Science and Technology Based-Farm to Improve Calf Production and Management Using Milk Replacer (D.L. Aquino, W.T. Del Rosario, M. Delizo and L. Verona) Science and Technology Based-farm to improve Milk Production of Buffaloes through Flushing (D.L. Aquino, W.T. Del Rosario, M. Delizo and L. Verona) 		
B. Operations Research		
Increasing AI Efficiency	Increasing Efficiency of Artificial Insemination Program in Nueva Ecija	F.V. Mamuad, H.V. Venturina, E.C. Atabay, R.S. Hibionada, E.C. Encarnacion, M.M. Roguel Jr., V.L. Mamuad, R.T. Morcoso and C.M. Adriano
Socio-Economics	Assessment of the Performance of Bull Loaned to Various Farmers in Region 2	R.A. Salas, R.R Piñera and F.T. Rellin

Table 15b. List of On-going Researches for CY 2010

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
A. Basic Research		
Reproductive Biotechnology	Cryopreservation of Buffalo Embryos by Conventional Controlled-Rate Freezing: Comparison on the Effect of Glycerol and Ethylene Glycol-Based Protocols on Post-Warming In Vitro and In Vivo Development	E.P. Atabay, E.C. Atabay, S. Hamano, F.P. Aquino, R.V. de Vera and L.C. Cruz
	Optimizing Chemically-defined Culture System for Production of Buffalo and Bovine Embryos In Vitro: a. Optimizing Culture Condition for the In Vitro Development of IVF and Nuclear Transfer-Derived Buffalo Embryos: The Effect of Gas Environment, Culture Medium and Embryo Density During Culture	E.C. Atabay, E.P. Atabay, D.H. Duran, R.V. de Vera, F.V. Mamuad and L.C. Cruz
	Cryostorage of Vitrified Immature Bovine And/Or Bubaline Oocytes Using the Cryoloop Device	L.C. Ocampo , F.P. Aquino, E.P. Atabay, P.B. Pedro, M.B. Ocampo and L.C. Cruz
	Vitrification of Buffalo Oocytes by Minimum Drop Size Technique	M.B.Ocampo, F.P. Aquino, E.P. Atabay, P.B. Pedro, L.C. Ocampo and L.C. Cruz
	In Vitro Fertilization by Intracytoplasmic Sperm Injection (ICSI) in Buffaloes	P.B. Pedro, P.G. Duran, E.P. Atabay, E.C. Atabay, L.C. Ocampo and L.C. Cruz
	Viability of Goat Embryos Maintained in Portable Incubator During Transit for Embryo Transfer	F.P. Aquino, E P. Atabay, EB. Flores, N. V. Marzan and L.C. Cruz
	Enhancing Cryoviability of In Vivo-Derived Goat Embryos by Optimizing Embryonic Stage and In Vitro Culture of Morula to Blastocyst Before Freezing	E.P. Atabay, F.P. Aquino, E.C. Atabay, E.B. Flores, N V. Marzan and L.C. Cruz
	Ultra Rapid Vitrification of In Vitro-Matured Buffalo Oocytes by Minimum Volume Cooling Methods	E.P. Atabay, E.C. Atabay, F.P. Aquino, R.V. de Vera and L.C. Cruz
	Developmental Competence and Midkine Expression of Philippine Water Buffalo (<i>Bubalus bubalis</i>) Oocytes in Media Supplemented with Retinoic Acid during In Vitro Maturation	L.A. Cajuday and D.H. Duran
	Synchronizing Ovulation Using OVSYCH-CIDAR-Based Protocol for Fixed-Time Embryo Transfer (FTET) in Water Buffaloes	P.G. Duran, E.P. Atabay, P.B. Pedro, D.H. Duran, E.C. Atabay, F.P. Aquino, E.B. Flores and L.C. Cruz

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
Breeding and Genetics	Use of DNA "Fingerprinting" and Other Molecular Markers in Genetic Resource Conservation and Improvement of Water Buffaloes: a. Parentage Verification of Riverine and Swamp Buffaloes Using Microsatellite Markers b. Identification of Sets of Markers in Dairy Buffaloes Associated with QTL for Milk and Milk Component Traits	E.B. Flores, J.R.V. Herrera, L.A.M. Del Barrio and L.C. Cruz E.B. Flores, J.R.V. Herrera, L.C. Cruz
	Characterization of the Swamp and Riverine Buffalo Genome: a. Microsatellite Genotyping of the Philippine Swamp and Riverine Buffaloes b. Single Nucleotide Polymorphism (SNP) Detection in Buffaloes Associated with Milk and Milk Component Traits	E.B. Flores, J.R.V. Herrera, L.A. M. Del Barrio and L.C. Cruz E.B. Flores, J.R.V. Herrera, A.S. Villanueva and L.C. Cruz
	PCC Breeding Program for Philippine Dairy Buffaloes: Genetic Evaluation and Breeding Value Estimation in Philippine Dairy Buffaloes for Milk Yield Traits Using Milk Test Day Records	E.B. Flores and J.F. Maramba
	RT-PCR Breeding and RT-Lamp Detection Kits for Rapid Screening of FMD Virus Infection	R.C. Paraguison, E.B.Flores and L.C. Cruz
	Cloning of the 2B Region from Foot-and-mouth Disease Viral Genome as Potential Positive Control for FMD Detection	J.A.C. Sanchez and R.C. Paraguison
	Development of Molecular Markers as Potential Use in Breeding Program of Local Livestock Species in the Philippines: Screening for Genetic Disease-associated DNA Polymorphism in Water Buffaloes	R.C. Paraguison, R.G.Cacho, E.B. Flores, J.R.V. Herrera and L.C. Cruz
	Improving the Breeding Performance of Bulgarian Murrah and Crossbred Buffaloes Raised at the PCC-UPLB Institutional Farm	A.N. del Barrio, J.C. Canaria, P.O. Abrigo, J.R.V. Herrera and R.M. Lapitan

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
Animal Health	Strengthening the Philippine Animal Health Biotechnology Towards Effective Preventive and Control Management of <i>Trypanosoma evansi</i> Infection (Surra)	
	a. Comparative Effect of Trypanocidal Drugs in <i>Trypanosoma evansi</i> Isolated from Water Buffaloes (<i>Bubalus bubalis</i>) using Murine Model	B.B. Macaraeg, C.N. Mingala, and J.V. Lazaro
	b. In Vitro Drug Response of Three <i>Trypanosoma evansi</i> Isolated from Water Buffaloes (<i>Bubalus bubalis</i>)	L. Belotindos, C.N. Mingala, and J.V. Lazaro
	Retrospective Study on the Prevalence of Sub-Clinical Mastitis and its Association with Selected Risk Factors in PCC-Genepool:	
	a. Prevalence of Subclinical Mastitis and Associated Risk Factor in the PCC Genepool	J.M. Beltran, R.Salvador, C.N. Mingala and N.S. Abes
	b. Retrospective Study on the Use of Antibiotic in the Treatment of Subclinical Mastitis in Water Buffaloes in PCC- Genepool	N.M. Villanada, C.N. Mingala, N.S. Abes, and N.P. Medina
Bovine Vaccine Trial of <i>Schistosoma japonicum</i> paramyosin	M.A. SL. Jiz and C. N. Mingala	
Establishment of Milk Quality Standard for Dairy Buffaloes	N.S. Abes	
Animal Nutrition	Development of Buffalo Feeding Regimes from Enhanced Sweet Sorghum Biomass of Bio-ethanol Production	P.C. Florendo, N.P. Garcia, M.P. Abella, M. Roguel and F.V. Mamuad
	Comparative Performance of Nursing Buffalo Calves Fed with Pure Milk, Cattle Milk and Milk Replacer	D.L. Aquino, P.G. Duran, M.V. Del Rosario and N.V. Marzan
Meat Products	Carcass Yield and Meat Quality of Crossbred Buffalo Meat Slaughtered at 24 Months of Age	R.M. Lapitan, A.N. del Barrio, J.R.V. Herrera and T.L. Canaria
Waste Management	Organic Fertilizer Production through Vermiculture (PCC-CMU)	M.R. Renacia, L.P. Hamot, A.G. Racho and L.C. Paraguas
	Herbage Production of Napier Grass (<i>Pennisetum purpureum</i>) Fertilized with or without Organic Fertilizer (Vermicultured)	M.R. Renacia, L.P. Hamot and L.C. Paraguas

DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
B. Operations Research		
Reducing Calf Mortality/ Increasing Calf Production	Reducing Calf Mortality at PCC-MMSU through Improved Health and Management Schemes	C.P. Dabalos, F.T. Malicad, R. Sair, J. Donato and A. Padulip
	Growth Performance of Swamp Buffalo on Grazing Management Condition with Supplementation	F. Rellin, M. Wandagan, and R. Piñera
	Feeding Milk Replacer to Calves at PCC-UPLB	B.R. Arenda, P.O. Abrigo, J.R.V. Herrera, J.C. Canaria and A.N. del Barrio
Increasing Milk Production	Effects of the Inclusion of Tyrolac in the Diet of Lactating Buffaloes from 20-80 Days of Lactation	R. Piñera, F.T. Rellin and A. Morales
	Studies on Increasing Milk Production of Dairy Buffaloes based on Actual Dairy Farm Operations and Existing Feed Resources.	P.C. Florendo, F.V. Mamuad, N. Lorenzo, R. Santiago, S. Lorenzo, H. Venturina, V. Mamuad, F. Venturina, M. Abella and L.C. Cruz
	Milk Production Performance of Bulgarian Murrah and Crossbred Buffaloes Raised at the PCC-UPLB Institutional Farm	J.R.V. Herrera, R.M. Lapitan, A.N. del Barrio, J.C. Canaria and P.O. Abrigo
	Milk Production Performance Evaluation of BMB Milking Herd of PCC at CMU	L.C. Paraguas, A.G. Racho, M.E. Renacia and V.L. Canatoy
Improving Forage and pasture	Performance of Grass Legume Pasture Fed to Dairy Buffaloes under Cooperative Management System	M.B. Wandagan, R.B. Carag, L. Agumboy
	Improvement and Management of Marginal Grassland Areas of the PCC at CLSU Ranch	N.P. Garcia, J.E.F. Malamug, and L.T. Alfonso
	Introduction and Management of Arachis pintoi in Combination with Stylo in Native Grass Based Pasture Under Hilly Land Condition	C.B. Salces, G.P. Bajenting, O. Godinez and K. Ciroy
	The Influence of Vermicast on the Growth, Yield and Nutrient Composition of Selected Forages (Ruzi grass and forage peanut)	E.U. Corpuz, Jr., B.J. C. Basilio and D. E. Corpuz



DISCIPLINE/THEMATIC AREA	TITLE	RESEARCHER
Socio-Economics	An Assessment of the Economic Viability of 5 -Dairy Buffalo Module in Dasmariñas, Cavite	J.C. Canaria, J.C. Malijan, R.M. Lapitan and A.N. del Barrio
	Profitability Assessment of PCC-USF Institutional Dairy Processing and Marketing Center	C.B. Salces, G. Abay-abay and C. Maturan
	Assessment of Performances of the Buffalo Bulls Under the Bull Loan Program in Central Visayas	B.A. Hingpit, J.A. Bigcas and A.A. Anoos
	Development of a Sustainable Village-Based Artificial Insemination System: The VBAIT Approach	G.M.R. Recta, W.A. Gudoy, L.G. Battad, A.S. Sarabia and M.M. Alimbuyuguen
Increasing AI Efficiency	Development of Animal Health and Management Protocol of Grazing Buffaloes at PCC-USF	G.P. Bajenting, O. Godinez, K.S. Ciroy and C.B. Salces

Keeping Abreast with R&D Trends

A series of technical seminars was facilitated by the PCC's R&D Unit to continuously create awareness among PCC staff members and other interested researchers and students on the latest trends, theories, methodologies, and innovations related to livestock R&D and extension (Table 16). All seminars were held at the PCC National Headquarters in Nueva Ecija except for the Forum on Application of Molecular Techniques, which was held in Quezon City.

Table 16. Topics and resource persons of technical seminars, CY 2010

Date (2010)	Title	Speaker	Organization
January 25	Forum on Application of Molecular Techniques for Screening Genetic Defects and Characterization of Livestock Germplasm for Cryobanking		
	a. Economically Important Genetic Defects in Livestock	Dr. Ester B. Flores	Genetic Improvement Program Unit-Philippine Carabao Center National Headquarters
	b. Genomic Selection and Screening of Genetic Defects Applied to Livestock	Dr. Hsiu-Luan Anna Chang	National Pingtung University of Science and Technology, Taiwan
	c. Cryobanking and Risk Management of Livestock Animal Genetic Resources	Dr. Ming Che-Wu	Taiwan Animal Germplasm Center, Taiwan
February 26	Blurring Cultural Boundary Between Scientists and Farmers in the Philippines through a Mediated Bilateral Model	Dr. Eric P. Palacpac	Knowledge Resource Management Division-Philippine Carabao Center National Headquarters
March 23	Intracytoplasmic Sperm Injection (ICSI): Recent Developments and Prospects in Livestock Production	Dr. Michiko Nakai	National Institute of Agrobiological Sciences, Tsukuba, Ibaraki, Japan
April 9	Development of <i>Fasciola spp.</i> Vaccine	Dr. Peter Smooker	Laboratory of Biotechnology and Environmental Biology, RMIT University, Victoria, Australia
May 18	Protective Immunity and Vaccine Development for Schistosomiasis japonica	Dr. Mario Antonio L. Jiz II	Institute of Immunology, Research Institute for Tropical Medicine, Alabang, Muntinlupa City

July 28	Application of Molecular Methods for Identifying and Quantifying Microbial Population and Functions in Environmental Engineering and Rumen Studies	Dr. Francis L. De Los Reyes	North Carolina State University, Raleigh, USA
August 5	Characterization of a New Mycobacterial Species Belonging to Mycobacterium tuberculosis Complex Isolated from Monkeys in Bangladesh	Dr. Chie Nakajima	Research Center for Zoonosis Control, Hokkaido University, Japan
August 26	Rumen Manipulation and Production of Fermented Total Mixed Ration (TMR) for Feeding of Ruminants	Dr. Daniel L. Aquino	Animal Nutrition Unit-Philippine Carabao Center National Headquarters
September 8	Mechanism of Leukemogenesis Induced by Bovine Leukemia Virus	Dr. Yoko Aida	Viral Infectious Diseases Unit, RIKEN, Japan
October 13	Current Status of Korean Dairy Industry and Selection of Proven Dairy Bull	Dr. ByoungHo Park	Research Scientist of the National Institute of Animal Science (NIAS), Rural Development Administration, Korea

Reviewing Current R&D Efforts and Future Directions

The annual PCC's In-House R&D Review was held on May 26-28, 2010, wherein 11 completed and 17 on-going researches were presented to a panel of evaluators composed of Dr. Synan S. Baguio (LRD-PCARRD), Dr. Jose Arceo N. Bautista (IAS-UPLB), Dr. Danilo S. Vargas (CLSU), and Dr. Eric P. Palacpac (KRMD-PCC).

The awards for Best Presenter and Best Paper for Completed Research (Non-Operations Category) were given to Dr. Clarissa Yvonne Domingo (College of Veterinary Medicine-CLSU) for her work on the

"Prevalence and Risk Factors of Zoonotic Protozoa among Smallholder Farms in Aurora Province. The Best Paper for Completed Research (Operations Category) was awarded to Dr. Felomino V. Mamuad of PCC-CLSU for his paper entitled "Increasing Efficiency of Artificial Insemination Program in Nueva Ecija".

A research management forum was also held on the third day with Dr. Baguio as resource speaker, as facilitated by Dr. Claro Mingala (PCC's R&D Coordinator) and Dr. Palacpac. The forum highlighted the components of a strategic R&D planning. Likewise, it revisited issues, concerns and strategies related to aligning the research activities of PCC regional centers to the overall R&D agenda of the agency.

Publishing R&D Outputs

As a way of preserving and sharing the results of their R&D initiatives to a wider audience, a total of 16 abstracts and seven full paper-articles by the PCC researchers were published in local and international journals and conference proceedings (Table 17).

Table 17. List of published research abstracts and articles, CY 2010

A. CONFERENCE PROCEEDINGS		
Title of Research Abstract	Author	Title of Proceedings
The Effects of Holding Water Buffalo and Bovine Ovaries at Various Temperatures During Transport and Storage On In Vitro Embryo Production	Eufrocina P. Atabay, Edwin C. Atabay, Rodante V. de Vera, Flocerfida P. Aquino and Libertado C. Cruz	7th Annual Conference of the Asian Reproductive Biotechnology Society, Kuala Lumpur, Malaysia, November 8-12, 2010, p. 102
Production of Nuclear Transfer Buffalo Embryos Using Oocytes from Ovaries Stored at Low Temperatures	Edwin C. Atabay, Eufrocina P. Atabay, Rodante V. de Vera, Flocerfida P. Aquino, Felomino V. Mamuad and Libertado C. Cruz	47th PSAS Scientific Seminar and Annual Convention, Davao Ciy, October 20-22, 2010; p. 14 7th Annual Conference of the Asian Reproductive Biotechnology Society held last Nov. 8-12, 2010 at Kuala Lumpur Malaysia, p. 14
Interaction Effect of Methylexanthines and Temperature on Motility and Longevity of Frozen-Thawed Buffalo Spermatozoa	Danilda H. Duran, Peregrino G. Duran, Eufrocina P. Atabay and Libertado C. Cruz	7th Annual Conference of the Asian Reproductive Biotechnology Society held last Nov. 8-12, 2010 at Kuala Lumpur Malaysia, p. 98
Science & Technology Based-Farm Project on Improving the Productivity of Dairy Buffaloes thru Flushing and Use of Milk Replacer	Daniel L. Aquino	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; pp. 38-39
High and Low Feeding Levels on Dairy Crossbred Buffalo (PC x M) Calves' Growth and First Lactation Milk Production	Cynthia Remedios V. de Guia, Enrico P. Supangco, Veneranda A. Magpantay, Daniel L. Aquino, Arnel N. Del Barrio & Ma. Eden S. Piadozo	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 31

Title of Research Abstract	Author	Title of Proceedings
Chemical Composition, Nutrient Digestibility and Total Digestible Nutrient (TDN) of Sesbania cannabina Silage in Goats	Makoto Kondo, Rosalina M. Lapitan, Arnel N. del Barrio, Edgar A. Orden & Tsutomu Fujihara	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 51
Analysis of the Market and Local Demand for Buffalo Milk in General Trias, Cavite	C.R.V. de Guia, E.P. Supangco, V.A. Magpantay, A.N. del barrio, M.E. S. Piadozo	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 39
A Village-Based Dairy Buffalo Enterprise Model: General Trias, Cavite	Arnel N. del Barrio, Rosalina M. Lapitan, Jose C. Canaria, Anna Reylene J. Montes, Nerissa P. Marquez & Annabelle S. Sarabia	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 6
Ruminant Animal Industry Road Map	Franklin T. Rellin	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 57
Recent Developments in Livestock Biotechnology	Eufrocina P. Atabay	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; pp. 54-55
Ultra Rapid Vitrification of Germinal Stage Bovine Oocytes by the Cryoloop Method.	Lerma C. Ocampo, Flocerfida P. Aquino, Marlon B. Ocampo, Moises. Barcelo Fimbres, Eufrocina P. Atabay and George E. Seidel Jr.	47th PSAS Scientific Seminar and Annual Convention, October 20-22, 2010; p. 49
Effect of Medium Supplement and Storage Temperature on Motility and Longevity of Frozen-Thawed Buffalo Spermatozoa	Danilda H. Duran, Perry Neslynn H. Duran, Harlene M. Vigilia & Royanna Ambrey B. Manzano, Eufrocina P. Atabay & Libertado C. Cruz	47th PSAS Scientific Seminar and Annual Convention; October 20-22, 2010; p. 10
Building Community of Interest in Carabao-based Enterprise Development	Liza G. Battad	5th Symposium on Asian Agricultural Technology, Maejo University, Chang Mai, Thailand
The Exciting World of In Vitro Production of Embryos	Danilda H. Duran	2nd Annual Convention of the Philippine Society for Developmental Biology, p. 10
Ultrastructure of Immature Water Buffalo Oocytes of Different Quality and Morphology	Danilda H. Duran	2nd Annual Convention of the Philippine Society for Developmental Biology, p. 28
External Parametric Indicators of In Vitro Developmentally Competent Water Buffalo Oocytes	Danilda H. Duran	Trans. Nat. Ac. Sci. Tech. Philippines 2010: 32 (1):33

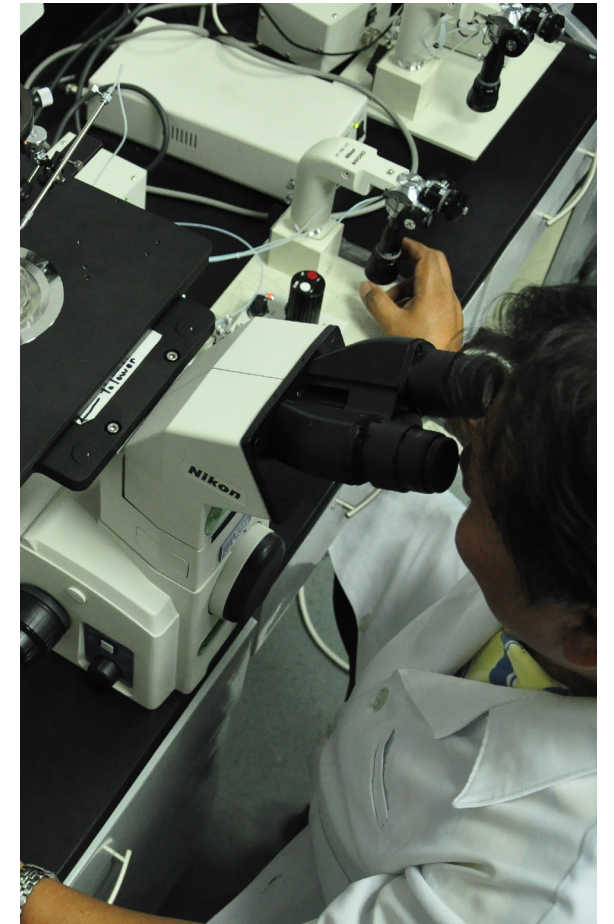
B. REFEREED JOURNAL		
Title of Published Research	Author	Journal Title
Genetic Analysis and Development of Species-Specific PCR Assays Based on ITS-1 Region of rRNA in Bovine Eimeria Parasites	Fumiya Kawahara, Guohong Zhang, Claro N. Mingala, Yu Tamura, Masateru Koiwa, Misao Onuma & Tetsuo Nunoya	Veterinary Parasitology 2010: 174 (1-2); 49-57
Incidence and Risk Factors of Cryptosporidium spp. Infection in Water Buffaloes Confined in a Communal Management System in the Philippines	Marvin A. Villanueva, Clarissa Yvonne J. Domingo, Nancy S. Abes and Claro N. Mingala	The Internet Journal of Veterinary Medicine 2010; Volume 8. Number 1
The Effects of Holding Water Buffalo and Bovine Ovaries at Various Temperatures During Transport and Storage On In Vitro Embryo Production	Eufrocina P. Atabay, Edwin C. Atabay, Rodante V. de Vera, Flocerfida P. Aquino and Libertado C. Cruz	Phil. Journal of Veterinary and Animal Science, 2010: 36 (1), 81-93
Spurring Dairy Buffalo Development in the Philippines through Cooperatives, Negotiations and Networks	Eric P. Palacpac	Journal of Rural Cooperation, Volume 38 Issue 1
Incidence of Chromosomal Abnormalities in early stage Buffalo Embryos derived from In Vitro Fertilization	Midoru Yoshizawa, Carlos Manuel Ulloa, Danilda H. Duran, Eufrocina P. Atabay, Peregrino G. Duran, Libertado C. Cruz, Yukio Kanai and Yoshiyuki Takahashi	Journal of Mammalian Ova Research Vol. 27, 157-160, 2010
Characterization of CTLA-4, PD-1 and PDL-1 of Swamp and Riverine Type Water Buffaloes	Claro N. Mingala, Saturo Konnai, Ryoyo Ikebuchi & Kazuhiko Ohashi	Comparative Immunology, Microbiology and Infectious Diseases 2010; doi:10.1016/j.cimid.2010.02.002
Possible Use of RNA Isolate From Inactivated Vaccine for External Positive Control in Reverse Transcription-based Detection of Foot-and-mouth Disease Virus in Bull Semen	Rubigilda C. Paraguison, Ester B. Flores and Libertado C. Cruz	Biochemical and Biophysical Research Communications 392 (2010) 557-560 doi: 10.1016/j.bbrc.2010.01.065

Showing Proofs of Excellence in R&D

Five papers/posters were given recognition during the 47th Philippine Society of Animal Science (PSAS) Scientific Seminar and Annual Convention held on October 20-22, 2010 in Davao City. These are the following:

- Production of Nuclear Transfer Buffalo Embryos Using Oocytes From Ovaries Stored at Low Temperature (E.C. Atabay, E.P. Atabay, R.V. de Vera, F.P. Aquino, F.V. Mamuad and L.C. Cruz); 1st Place in Animal Biotechnology Category
- Ultra Rapid Vitrification of Germinal Vesicle Stage Bovine oocytes by the Cryoloop Method (L.C. Ocampo, F.P. Aquino, M.B. Ocampo, M.B. Fimbres, E.P. Atabay and G.E. Seidel Jr.); 1st Place, Scientific Poster
- High and Low Feeding Levels on Dairy Crossbred Buffalo (PCxM) Calves' Growth and First Lactation Milk Production (C.R.V. de Guia, E.P. Supangco, V.A. Magpantay, A.N. del Barrio, and M.E. S. Piadozo); 1st Place in Production and Processing Category
- Analysis of the Market and Local Demand for Buffalo Milk in General Trias, Cavite (C.R.V. de Guia, E.P. Supangco, V.A. Magpantay, A.N. del Barrio, M.E. S. Piadozo); 1st Place in Socio-Economics Category
- Chemical Composition, Nutrient Digestibility and Total Digestible Nutrient (TDN) of Sesbania cannabina Silage in Goats (M. Kondo, R.M. Lapitan, A.N. del Barrio, E.A. Orden, and T. Fujihara); 2nd Place, Scientific Poster

Meanwhile, a research paper entitled "Increasing Efficiency of Artificial Insemination (AI) Program in Nueva Ecija" (F.V. Mamuad, H.V. Venturina, E.C. Atabay, R.S. Hibionada, E.C. Encarnacion, M.M. Roguel Jr., V.L. Mamuad, R.T. Morcoso and C.M. Adraino) also won 2nd place in Development Category during the 21st CLARRDEC Regional Symposium on R&D Highlights on August 13, 2010. Likewise, Dr. Rubigilda C. Paraguison, won 3rd Place as Best Technology Presenter for her "Potential Rapid Detection Kits for FMD Virus" in the



Agricultural Biotechnologies: A Technology Presentation Contest held on November 22-28, 2010 during the National Biotechnology Week Celebration.

During the 77th Philippine Veterinary Medical Association Annual Convention and Scientific Conference held on February 17-19, 2010 in Naga City, Dr. Claro N. Mingala, Head of PCC's Animal Health Unit, was also awarded the "PVMA Outstanding Veterinarian in Government Service".

Moreover, the PCC's Executive Director, Dr. Libertado C. Cruz was selected as a recipient of 2010 Gregorio Y. Zara Award for Applied Research by the Philippine Association for the Advancement of Science, Inc. (PhiliaAS). The awarding ceremony was held during the association's 59th Annual Convention Opening Ceremonies on September 9, 2010 at University of the Philippines Diliman.

Building-up the Capabilities of Farmers and Technicians

An important component of R&D involves enhancing the human capital (knowledge and skills) of farmers and technicians in the National and Regional Impact Zones through the conduct of appropriate seminars and trainings. In 2010, there were 160 batches of various capability-building activities involving more than 6,000 participants (Table 18).

Disseminating Client-Focused Information Materials

For the year in review, PCC, through its Applied Communication Section (ACS) under its Knowledge Resource Management Division (KRMD), focused on the sustained and timely release of information, education and communication (IEC) materials especially packaged

for the specific needs of its various stakeholders. These IECs are complemented by regular linkage with the traditional mainstream media outfits such as the television, radio and newspaper. These efforts are further reinforced using the strength of the digital media as an economic, easy and fast means of information dissemination.

The accomplishments of the ACS particularly focused on the goal of PCC in translating its research and development efforts into needs- and location-based information materials that are packaged for the easy understanding of its primary stakeholders. Using these popularized information materials, results of PCC's scientific research are seen touching the ground where the most needed information is anticipated.

Publications and Productions

A book, "Appreciating the Carabao", was launched during the program in celebration of PCC's 17th anniversary. This book, compiled and written by development journalist Dr. Anselmo Roque was meant



Table 18. Trainings and seminars for farmers and technicians, CY 2010.

Topic	No. of Batch	No. of Participants
Orientation Seminar on Carabao Upgrading/Development Program	65	3,832
Course on Dairy Buffalo Production, Management, Milk Collection, Processing and Marketing	44	804
Orientation Seminar on Carabao Enterprise Development	10	220
Social Preparation Training for Entrustment of Dairy Buffalo	7	303
Basic Course on Artificial Insemination and Pregnancy Diagnosis in Large Ruminants	6	97
Cooperative Policies, Systems, and Procedures*	4	136
Cooperative Developmental Planning Workshop*	3	98
Cooperative Financial Management*	2	97
Cooperative Parliamentary Procedure*	2	41
Values Orientation	2	107
Orientation Seminar on the Bull Loan Program	1	13
Basic Course on Bull Management	1	12
Miscellaneous	13	286
TOTAL	160	6,046

*Conducted in the NIZ only

to provide basic information about the carabao and the current developments for its improvement. The launching was joined by then Agriculture Undersecretary Salvador Salacup. Copies of the book were given to some important guests during the event.

A new IEC material, the R&D Highlights, was produced in September 2010. This is an annual publication of PCC which publishes in popularized form the Agency's completed researches presented in its annual R&D review. It aims to reach out to a wider scope of readers both in the science and non-science profession as well as the interested public. Copies of this material were given to practitioners and students in livestock R&D-related fields as well as to the PCC regional centers.

As a regular print material of PCC intended for the general public, four issues of the PCC Newsletter were produced in 2010 in theme-based feature stories. For the first quarter, the issue was devoted to the efforts of PCC as the national lead agency for livestock R&D harnessing the potential of reproductive biotechnology. The second quarter delved on the outputs of PCC leading the improvement of the genetic potential of the carabao as a

source of milk. The 2010 outstanding dairy farmers and cooperative were featured in the stories. The third quarter issue focused on the efforts of the Agency in herding its trained village-based AI technicians (VBATs) toward privatized capacities along with their compelling stories of success. The Newsletter's fourth issue was a boost to the growing number of private entrepreneurs who are successfully netting income from selling carabao-based products. This issue captured the interesting talent of the Filipino entrepreneur toward innovating on classics and captivating the customer's selective palate.

The second issue of the farmers' IEC material, the PCC Balita, was released in 2010. The issue published the current undertakings of PCC and success stories shared by dairy farmers and cooperatives. Copies were sent to PCC's 13 centers nationwide for distribution.

Eight extension cum promotional posters were produced in 2010. These were on the testimonies of champion farmers and cooperatives of PCC. These were displayed at the DA central office lobby. Other posters were the "Wow, Gatas ng Kalabaw", "Humataw sa Kalabaw" and a poster showcasing PCC's technologies in mitigating climate change.

The ACS has also proposed the establishment of a Knowledge and Information Service (KIS) kiosk in all PCC centers. This facility, showcasing PCC's IEC materials, will provide the general public and stakeholders awareness about the agency's programs, services, and accomplishments, and about livestock-based products and how any interested enterprising individual can earn from them. Ultimately, the goal of establishing KIS system in all PCC networks is to promote PCC and encourage greater support and participation among its stakeholders. The KIS system is scheduled for launching during PCC's 18th anniversary celebration in March 2011.

Press Releases

For 2010, PCC has gained media mileage in various outfits such as in the newspaper, TV, radio and digital media. Press releases were regularly sent to local and national media entities. The PCC was featured in the Philippine Daily Inquirer, The Philippine STAR, Malaya, Agriculture Magazine of the Manila Bulletin and Aggie Trends, the official newsletter of the DA.

PCC has also gained media exposure in TV and radio such as in the TV programs of ABS-CBN, GMA

7, UNTV, Living Asia Channel, and the radio programs Maunlad na Agrikultura (DZAS 702) and Usapang Magsasaka (Radyo Natin-Guimba).

In the internet, press releases and various topics about the PCC program and success stories of its farmers were regularly uploaded. The PCC press releases were wired to and published in several media entities online such as the Official Gazette of the President of the Philippines, gmanews.tv, philstar.com, malaya.com, mb.com, pia.gov.ph, balita.ph, and positivenewsmedia.net, among others.

Exhibits

Aside from the use of the traditional and digital media, PCC also keeps its public abreast of its program and projects through active participation in relevant exhibits.

The PCC sponsored and co-organized several trade fairs that showcased the enterprise in livestock, specifically dairying and carabao production. Such were the Dairy Congress and Expo 2010 in Cebu, Gatas ng Kalabaw Festival, International Seminar on the Utilization of Native Animals in Building Rural Enterprise in Warm Climate Zones and the National Biotechnology Week.

Advertorials

Reinforcing the promotion of PCC programs was done through regular placement of PCC advertorials in souvenir programs of various fora. For 2010, PCC has placed advertorials in ENEDA, Philippine Agricultural Journalists, JOCV-PASA, Dairy Congress and Expo 2010, Agrilink/Foodlink/Aqualink, CLSU-Urirat, Tanduyong Community Newspaper, LaMB Magazine, and in the Wag-Wag anniversary souvenir program, among others.

Attending to the Agency's Visitors

The Visitors' Bureau, manned by the ACS staff members, accommodated a total of 3,557 scheduled and walk-in visitors. The visitors' are mostly farmers, students, government employees and local government officials, and professionals. During the visits, visitors were first accorded with orientation and briefing on the PCC program through showing of a 15-minute audio-visual presentation, lecture about a specific subject matter (as requested), and a tour to the National Gene Pool and milking parlor.

A customers' satisfaction survey was conducted for groups attending a rolling tour. This survey aims to improve the capability of the Visitors' Bureau in rendering quality service for the visitors of the Agency. In 2010, a total of 204 respondents were requested to respond to the survey, almost 40 percent were farmers. Results showed an overall rating of 4.71 or "very satisfactory" for the persons in charge of accommodating the visitors including the visitors' assistance officer and the security guards. In the Agency's Quality Management System, the target rating for customer satisfaction is only set at 4.25 percent.

Establishing Electronic and Scientific Library Systems

With assistance from the National Computer Center (NCC), the agency through its Library has developed

a web-based electronic source of information on selected quality researches on water buffalo called the "International Buffalo Knowledge Resource Services" or IBKRS. It consolidates, organizes, and disseminates all available international refereed, peer-reviewed, and published journal articles on buffalo, as selected from the best publishers' websites. As of December 2010, the database includes 4,045 article abstracts and 1,800 full-text articles, as gathered from about 140 journal titles and categorized into specific fields disciplines such as breeding and genomics, reproduction, health and nutrition, dairy technologies, and socio-economics. Upon its scheduled launching in March 2011, the website can already be accessed through <http://www.ibkrs.net>.

Courtesy of the DOST/STII, a free library software called SCINET ILMs was also installed and customized for the PCC's Library. The software has four interlinked library functional modules namely: Acquisition, Cataloging, Circulation, and Report Generation/Statistics. The Library is still transferring its back-up database of about 3,000 library catalog records to the new library system. Upon completion of data migration from the back-up database, the Library Online Public Access Catalog (OPAC) will become available and accessible to all PCC users as well as the general public via the internet. Borrowers can check on the availability of a particular book or reference material and likewise make an online reservation.

Providing Quality Laboratory Services

Twenty-six clients were served by the agency's Animal Health Unit in 2010, 12 of these were from PCC while 14 were farmer-cooperators. A total of 240 samples were subjected to laboratory tests as follow: Serology (n=171), Microbiology (n=18) and Parasitology (n=51).

Likewise, veterinary biologicals such as 5,025 doses of Hemosep vaccine, 1,578 vials of Trypanocidal drugs, 54 carpules of Bovine TB, and 12 bottles of California Mastitis Test (CMT) reagents were distributed



Monica Verallo of Unang Hirit (GMA 7's morning show) explains the process in making mozzarella at the PCC Dairy Plant.

to the PCC National Gene Pool and various PCC regional centers for their animal health program.

Employing Information and Communication Technologies

Through the agency's Information and Communication Technologies Section (ICTS), the Local Area Network (LAN) wiring of data outlets and fiber backbone was enhanced to strengthen file and data transfer of the agency as well as limiting internet connection downtime. A Wireless Fidelity (WiFi) in the vicinity of the PCC National Headquarters was also installed. Three new servers were also acquired to accommodate the database of PCC Library Web, Mail and Databank.

Regular maintenance and upgrading of all (70) computer units were ensured making all workstations up-to-date and high-end. Consistently following a support system to ensure a virus-free LAN, the agency likewise renewed its license for Symantec Endpoint Protection Anti-Virus. This ensures protection to all units

joined in the LAN from any fortuitous computer bug infection.

Geographic Information System (GIS)-based maps were likewise generated particularly zooming in on variables such as Carabao Population and Density, AI technicians, Bulls Distributed, and Dairy Cooperatives in the provincial and municipal level. Data gathering and Global Positioning System (GPS) were conducted in cooperation with various operating units resulting in the generation of 86 GIS maps for 2010.

In collaboration with the National Computer Council (NCC), three Management Information System (MIS) softwares were also developed and installed in appropriate PCC-OED units namely Records, Human Resources, and Property. A separate system was developed for Document Tracking. Appropriate users trainings for these softwares were also conducted. The said systems are still undergoing refinements for full application in early 2011.

The ICTS likewise enhances and maintains existing Information System of the Electronic National Government Accounting System (e-NGAS) from MSSQL 2003 to MSSQL 2005 versions.

INSTITUTIONAL DEVELOPMENT

Conforming to Upgraded Standards under the Quality Management System (ISO 9001)

Year 2010 saw the agency's conformity to the upgraded standard of ISO 9001. Through the surveillance audit conducted by SGS on January 21 and 22, 2010, the PCC's certification to the ISO 9001:2000 was upgraded to ISO 9001:2008 after proving that it has satisfactorily maintained its quality management system and has coped with the requirements for upgrading.

The upgrade was based on the agency's achievement of set quality objectives and results of customer satisfaction surveys conducted for the different services e.g. distribution of frozen semen, laboratory, technical, and information services, etc; and products e.g. frozen semen, female dairy buffaloes, etc. Consolidated over-all customer satisfaction for both services and products in 2009, which was the basis of 2010 assessment, was 4.50 showing another leap from a rating of 4.38 in 2008.

To sustain further implementation of this system, the PCC's Internal Management Audit Section (IMAS) has formulated an internal audit program for 2010 which was subsequently approved and implemented.

Management Review meetings were likewise conducted to thresh out issues related to QMS implementation and maintenance.

A comprehensive internal audit was also conducted to monitor continuing compliance to Quality Management System (QMS) and process requirements in all areas of the PCC National headquarters and Gene Pool.

Meanwhile, the IMAS has complied with the requirements of Philippine Drug Enforcement Agency (PDEA) for the issuance of P-6 license officially allowing the agency to use Precursors and Essential Chemicals (PECs) in its laboratories. The permit with a validity of one year was issued on January 22, 2010. It will be renewed annually subject to the agency's compliance to PDEA's semi-annual reporting requirements.

Cascading the QMS to the PCC Regional Centers

Sessions were conducted during the planning workshops held for centers in Visayas and Mindanao in February and March to promote the implementation and integration of Quality Management Systems (ISO 9001 principles) in their operations. The principle of adopting P-D-C-A (Plan-Do-Check-Act) cycle in the center's operations was emphasized, giving more focus on the review, root cause analysis, validation, and keeping records on the effectiveness of actions taken.

Meanwhile, full documentation workshop on QMS was conducted at PCC at MMSU, in preparation for its



certification to ISO 9001:2008. Likewise, an extensive internal quality audit (IQA) of the center's documented QMS was made to confirm the earlier audit conducted by its IQA team and assess their readiness for certification. The activity culminated with a Management Review meeting.

Inching Closer to Environmental Management System (EMS 14001) and Occupational Health and Safety Management System (OHSAS 18001) Certification

Two designated Pollution Control Officers (PCO) of the PCC National Headquarters got their official accreditation from the Environmental Management Bureau-Department of Environment and Natural Resources (EMB-DENR).

Likewise, following the submission of the agency's Environmental Performance Report and Management Plan (EPRMP), an inspection of facilities and premises at the PCC National Headquarters and Gene Pool was conducted by the EMB-DENR-Region 3, which subsequently resulted in the granting of an Environmental Compliance Certificate (ECC) to the agency.

Continuous monitoring of EPRMP is done via the PCC's conduct and submission of Self-Monitoring Report (SMR) to EMB on a quarterly basis subject to the former's compliance to Clean Air Act; Clean Water Act; Solid Waste Management Act; Hazardous and Nuclear Wastes Act; and other laws governing pollution control and prevention.

Permits to operate gen sets and to discharge waste water and hazardous wastes generator ID were also acquired from EMB-DENR-Region 3 through compliance to various government requirements.

In compliance with the requirements of RA 9003 (Solid Waste Management Act), a waste segregation, classification and collection system was initiated and partly implemented at the PCC National Headquarters and Gene Pool. A simple material recovery facility (MRF) was established within the compound. The facility



holds the segregated wastes before it is finally disposed to Capas Sanitary Landfill through an agreement with Metro Clark Waste Management.

A simple water treatment facility (series of ponds) for effluents at the gene pool including milk processing plant was also put in place to ensure that waste water released to the creek is within the defined 'Effluent Standard'. Furthermore, application for permit from the National Water Resources Council regarding deep well construction (in our case, late application) per Article 10 of PD1067, Water Code of the Philippines is also in progress. Requirements for this have been completed.

Ambient Air Quality testing within the compound and immediate neighborhood was likewise undertaken to ensure that potential environmental impact coming from PCC's operations are properly addressed to prevent and/or control pollution.

Moreover, the PCC has registered with the Department of Labor and Employment (DOLE) as required by the National Labor Code and Occupational Safety and Health Standards. Following PCC's registration was a conduct of Work Environment Measurement (WEM) by the Occupational Safety and

Health Center (OSHC), an attached agency of DOLE that assesses possible hazards in the workplace and designs appropriate controls to address the risks found.

Conduct of various activities involving all staff at the PCC National Headquarters and Gene Pool were started in conformance with basic laws. The activities include:

- Fire Safety Awareness & Prevention Seminar and Drill
- Earthquake Preparedness Seminar and Drill
- Safety Awareness Training
- Safe Handling of all Chemicals and Reagents as Environmental Support (in collaboration with Animal Health Unit)
- Proper Waste Segregation and Disposal
- Fire Brigade Members' Orientation

Various teams or committees were also organized as core groups that will spearhead implementation of various programs pertaining to EMS and OHSAS.

These are Emergency Preparedness and Response Team, Fire Brigade, First Aid Team, and Health and Safety Committee. Members of these committees have attended awareness sessions pertaining to their responsibilities. The First Aid Team in particular has completed the Basic Life Support and First Aid Training conducted by the Philippine National Red Cross (PNRC) in Cabanatuan. The team members are now licensed to administer first aid treatment to victims in cases of emergency within and outside PCC (within the province of Nueva Ecija).

Appropriate documents were produced in relation to the abovementioned activities. These include the following:

- Guidelines on Health, Safety, Pollution Control and Resource Conservation
- Emergency Preparedness and Response Guideline
- Fire Brigade Members' Duties and Responsibilities
- General Waste Management Guideline



- Operational Control Procedure on Communication for EMS and OHSAS
- Procedure on Hazards Identification, Risks Assessment and Determination of Controls (HIRAC)
- Procedure on Identification of Applicable Regulatory Requirements, Evaluation of its Applicability on EMS and OHSAS

To ensure that medical emergencies among PCC employees are attended, the unit facilitated PCC's pact with CLSU regarding access to the latter's medical services and facilities. The agreement was formalized in April.

Collaboration with the Local Fire Department was also initiated through the conduct of Fire Safety Inspection at the facilities of PCC National Headquarters which was followed by seminars on fire safety awareness and prevention, earthquake preparedness and drills for both disasters. This resulted in the issuance of Fire Safety Inspection Certificate (FSIC) to PCC.

Meanwhile, safety inspection in the premises was also conducted by the Science City of Muñoz Engineer's Office to ensure that unsafe conditions, should there be any, are properly addressed.

In the absence of a concrete health program for PCC, the services of the Muñoz Diagnostic Center was also tapped to establish benchmark health profile of PCC staff, which will serve as basis for the crafting of the agency's annual health program. Physical examination of each employee was undertaken along with the interpretation of results through one-on-one consultation with a physician whose expertise is Internal Medicine. Upon establishment of a PCC staff health profile, a series of lectures was conducted by the physician to create awareness among employees on how to maintain a healthy lifestyle.

Setting the Road Map for the Ruminant Subsector

A series of brainstorming and planning activities for the crafting of a long-term program for the development

of the ruminant subsector was initiated by the PCC in early 2010. The said activities were participated in by the Livestock Development Council (LDC), the National Dairy Authority, the DA-Executive Committee and Regional Field Units, the Bureau of Animal Industry, and the National Meat Inspection Service (NMIS). Consistent with the development concept of public-private partnership, the PCC and LDC also spearheaded a series of consultation with key private stakeholders in Luzon, Visayas, and Mindanao, as represented by the Dairy Confederation of the Philippines (DairyCon), the Federation of Cattle Raiser Associations of the Philippines (FCRAP), the Large Animal Raisers of Mindanao, the Federation of Goat and Sheep Producers Association of the Philippines (FGASPAPI), the United Small Ruminant Raisers Association (USRRA), the Philippine Association of Meat Processors, Inc. (PAMPI), the Meat Importers and Traders Association (MITA), and their local counterparts.

The consultations were facilitated by the Mandala Agricultural Development Corporation (MADECOR), which also packaged the final document entitled "Ruminant Animal Industry Road Map 2010-2034".

The Road Map aims to (1) invigorate the rural economy by promoting enterprise development along the value chain; (2) develop high-value animal-derived products for local and export markets; and (3) improve nutrition and promote healthy lifestyle. Currently, the Road Map is being used as a major reference material for (further) planning and/or implementation activities by the PCC, the DA, and other livestock agencies.

Developing Meaningful Infrastructure

The year saw the construction of a building called the "Central Milk Collecting and Processing Facility", which is adjacent to the main gate of the PCC National Headquarters. As the name implies, it will serve as a centralized collecting and processing point for all the milk that is produced in Nueva Ecija (i.e. from PCC and partner cooperatives) and nearby provinces. Likewise, it will house a one-stop shop that will showcase all

buffalo-derived products produced by PCC, the farmer-cooperatives and other private entrepreneurs across the country.

An auditorium with a seating capacity of 500 people was also constructed and is targeted for initial use in 2011.

Meanwhile, construction of administration buildings has started in PCC-CSU (at its new site in Tuguegarao, Cagayan) and in PCC-LCSF (La Carlota City) with targeted completion in mid 2011. Groundbreaking activities for the construction of Korea International Cooperation Agency (KOICA)-funded semen processing facilities of PCC-CLSU in Digdig, Carranglan also commenced in late 2010. The KOICA also extended

support to the establishment of a centralized collection and processing facility for the PCC at UPLB-assisted cooperative in General Trias, Cavite.

Establishing and Sustaining Linkages and Collaborations

In line with building its social network for collaborative purposes, the agency has maintained and created (new) linkages or partnerships with local and international research, government, and academic institutions (Table 19). Collaboration is in the forms of R&D (basic and applied research) and technical cooperation.



Table 19. List of partner-institutions, CY 2010

Partner Institution/Program	Title/Research Areas	Nature of Collaboration
Laboratory of Infectious Disease, Faculty of Veterinary Medicine, Hokkaido University, Japan	Water Buffalo Immunology, Viral and Hemoparasitic Infections	R&D
Hokkaido University Research Center for Zoonosis Control, Japan	Public Health Microbiology, Emerging and Re-emerging Diseases, Zoonoses and Other Related Animal Health Issues	R&D & Technical Cooperation
Korea International Cooperation Agency	Enhancing Dairy Buffalo Enterprises Development Thru Improvement of Village-Level Milk Production, Collection & Processing System	Technical Cooperation thru Korean Overseas Volunteer Development
Korea International Cooperation Agency	Enhancing Livestock Sector in the Philippines	R&D
Manila Economic and Cultural Office-Taiwan Economic and Cultural Office	Strengthening Philippine Livestock Biotech & Research Capability	Technical Cooperation
Philippine Council for Agriculture, Forestry and Natural Resources Research and Development-Department of Science and Technology (PCARRD-DOST)	Characterization of the Swamp and Riverine Buffalo Genome	R&D
	S&T Based Farm to Improve Production of Buffalo Milk through Flushing	R&D
	S & T Based Farm to Increase Milk production through the Use of Portable Milking Machine to Produce Quality Buffalo Milk through the use of Communal Milk Cooling Facilities	R&D
	S&T Based Farm Project to Improve Calf Production & Management Using Milk Replacer	R&D
Central Luzon State University-College of Veterinary Science and Medicine	Optimization of LAMP Method for the Detection of Trypanosoma evansi	R&D
Molecular Protozoology Laboratory, Natural Sciences Research Institute, University of the Philippines Diliman	Molecular Epidemiology of Trypanosoma evansi Isolates in Luzon, Visayas and Mindanao	R&D
Bureau of Agricultural Research	Promotion and Commercialization of Carabao-Based Dairy Products towards Village-Based Enterprise Development	R&D
	Propagation of Genetically Superior Water Buffalos through Embryo In-Vitro Production & Embryo Transfer Techniques	R&D

Partner Institution/Program	Title/Research Areas	Nature of Collaboration
Department of Agriculture Biotech Program	Use of DNA "Fingerprinting" and other Molecular Markers in Genetic Resource Conservation and Implementation of Water Buffalos	R&D
	Cloning by Somatic Cell Nuclear Transfer as a Tool for Genetic Improvement in Water Buffalos	R&D
	Propagation of Superior Goats for Dispersal through Reproductive Biotechniques	R&D
	Modified Paiwi Dairy Carabao Module Program for Laguna	R&D
	United Nations Development Fund for Women in Laguna	Development
Department of Agriculture-Ginintuang Masaganang Ani Livestock Program (DA-GMA-LP)	Sustainable System of Propagation for Superior Genetics Dairy	Development
	Buffalos for Smallhold Farmers Dairy Fast Track Development Program	Development
Public Law (PL) 480	Strengthening the Livestock Biotech Center	R&D
Kennedy Round (KR) 2	Enhancing Rural Employment Through Promotion of Village-Based Dairy Enterprises	Development
GMA-Livestock Fund	Dairy Fast Track Development Program	Development
PCC-Japan Society for the Promotion of Science-PCARRD-DOST	Tamaraw Nuclear Transfer and Inventory in the Philippines	R&D
Phil-India, DA-PCC-INDIA	Bilateral Phil-India Cooperation on Dairy Development	Technical Cooperation
Department of Budget and Management	Expanding the Service Reach of the AI Program for the Acceleration of Dairy Herd Build-up	Development
CLSU Small Ruminant Center	Animal Health	R&D
Research Institute for Tropical Medicine	On-going research entitled "Bovine Vaccine Trial of Schistosoma japonicum Paramyosin"	R&D
National Agribusiness Corporation (NABCOR)	DA Biotechnology Research Fellowship Project entitled "RT-PCR and RT-LAMP Detection Kits for Rapid Screening of FMD Virus"	R&D

Partner Institution/Program	Title/Research Areas	Nature of Collaboration
School of Biotechnology Embryo Technology and Stem Cell Research, Suranaree University of Technology, Nakhon Ratchasima, Thailand	Reproductive Biotechnology in Buffalo	R&D
Korea National Open University, South Korea	Establishment of Feed Biotechnology Using Anaerobic Microbial Culture Technique	R&D

Managing the Agency's Resources

Human Resources

The formal designation of PCC in 2008 as a lead institution in the conduct of livestock biotechnology along with the continuing expansion of its regular operations necessitated additional workforce. However, the national

government can only allocate limited number of regular plantilla positions. Thus, over the years, the agency has resorted to "contracted jobs" to support or complement its regular staff members in pursuing its mandate and functions. In 2010, the agency's total workforce is 444, composed of 233 regular (plantilla) staff members, 208 on job contract, and three on detailed appointment from other government agencies (Table 20).

Table 20. Distribution of PCC Personnel, CY 2010

Particulars	Plantilla Position			Contracted Staff	Detailed Staff*	Total
	Technical Staff	Support & Administrative Staff	Total			
Office of the Executive Director	22	28	50	65	1	116
PCC at CLSU	30	2	32	30	1	63
PCC at UPLB	24	2	26	14		40
PCC at CSU	13	1	14	7		21
PCC at MMSU	8	1	9	6		15
PCC at DMMMSU	7	1	8	2		10
PCC at USF	13	1	14	17		31
PCC at VSU	8	2	10	11	1	22
PCC at WVSU	8	1	9	8		17
PCC at LCSF	11	1	12	9		21
PCC at CMU	11	4	15	2		17
PCC at USM	10	1	11	15		26
PCC at MSU	10	1	11	6		17
PCC at MLPC	11	1	12	16		28
TOTAL	186	47	233	208	3	444

*From other government agencies

Capability Enhancement

Consistent with the agency's Human Resource Development Program, its staff members have actively participated in various trainings, conferences, and seminars held locally and abroad (Table 21).

Table 21. Conferences, seminars and trainings participated in by PCC personnel, CY 2010

Date (2010)	Title	Venue	No. of participating staff members
INTERNATIONAL			
November 7-13	7th Annual Conference of the Asian Reproductive Biotechnology	Kuala Lumpur, Malaysia	3
October 26-28	International Conference on Agricultural Extension (AGREX' 10)	Putrajaya, Malaysia	1
September 26-October 31	Training on Dairy Processing Technology and Plant Operations	Thailand	3
August 22-September 5	Training on Oocyte Cryopreservation and Intracytoplasmic Sperm Injection	Stem Cell Research Center, Suranaree University of Technology, Rhakon, Ratchasima, Thailand	3
August 29-30	5th Symposium on Asian Agricultural Technology, Maejo University, Chang Mai, Thailand	Maejo University, Chiang Mai, Thailand	1
August 25-28	16th Asian Agricultural Symposium KMITL, Bangkok, Thailand	KMITL, Bangkok, Thailand	1
July 19-23	International Seminar-Workshop on the Utilization of Native Animals in Building Rural Enterprises in Warm Climate Zones	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	10
June 24-30	Protocol Development Workshop - TDR/WHO	Nairobi, Kenya	1
May 26	Transcriptomic Approach in Rumen Anaerobic Fungal Studies.	Suncheon National University, Korea	1
April 13	Development of Various Feed Additives to Regulate Methanogenesis in the Rumen.	Korea National Open University, Korea	1
March 24	2010 Continuing Education Series	De La Salle University, Manila	1
March 23	International Seminar on Advanced Research Techniques in Animal Nutrition, Physiology and Nutrigenetics.	National Institute of Animal Science, RDA, Sownon, Korea	1

Date (2010)	Title	Venue	No. of participating staff members
March 8-20	Training Course on Molecular Technology for Animal Genetics, Conservation, Utilization and Management	Taiwan Animal Germplasm Center Livestock Research Institute, Council of Agriculture, Farm Road, Hsinhua, Tainan, Taiwan	3
January 12-July 12	Post-doc training on Rumen Manipulation and Development of Fermented Total Mix Ration	Korea National Open University, Seoul, Korea	1
January 25	Forum on Application of Molecular Techniques for Screening Genetic Defects and Characterization of Livestock Germplasm for Cryobanking	Crowne Plaza Galleria Manila, Ortigas, Quezon City	23
NATIONAL			
December 12-15	Adobe CS5 Illustrator	Don Chino Roces, Makati City	1
December 6-10	COURAGE National Congress	Baguio City	1
December 4-5	Philippine Society of Biochemistry and Molecular Biology Post Convention Training and Workshop on Quantitative PCR	UP Manila, College of Medicine	5
December 1-4	Government Procurement & Its Generic Procurement Manual	Bayview Park Hotel, Roxas Blvd., Manila	2
November 22	6th National Biotechnology Week	Mall of Asia, Pasay City	13
November 17-20	GACPA Seminar on Ethics and Accountability and Internal Revenue Regulation	Cebu City	8
November 12	Merck Inc. Seminar on Permits and Licenses: Regulatory Requirements of Chemical Substances Importation and Usage	Diamond Hotel, Manila	1
October 20-22	47th PSAS National Convention and Scientific Seminar	Davao City	12
October 14-15	21st National Occupational Safety and Health Congress	Diliman, Quezon City	
October 12-13	DA-BIOTEC Program Review and Planning Workshop	Lubao, Pampanga	2

Date (2010)	Title	Venue	No. of participating staff members
October 11-15	IT Auditing, Information Security Management and IT Governance	NCC, UP-Diliman, Quezon City	2
October 7-8	DA-BAR National Research Symposium	Bureau of Agricultural Research, Quezon City	8
October 5	National R&D Delphi Assembly	PICC, Pasay City	1
August 26-27	Philippine Government Electronic Program System Training	Baguio City	1
August 21	2nd Annual Convention of the Philippine Society of Developmental Biology	Auditorium, UP Diliman, Quezon City	1
August 17	Biotech 101	Philippine Rice Research Institute, Science City of Muñoz, Nueva Ecija	1
August 11-13	GAHP Inspector Training	Davao City	2
August 9-18	Training Course on Statistics for Project Monitoring and Evaluation	Statistical Research and Training Center, Diliman, Quezon City	1
July 19	National Science and Technology Week	Manila Hotel	1
July 14-15	32nd Annual Scientific Meeting of the National Academy of Science and Technology	Manila Hotel	1
June 7-8	Adobe Photoshop CS4 Basics	2247 Chino Roces Avenue, Makati City	1
May 30 -August 1	Visual Basic for Application (VBA)–MS Excel	INFORMATICS Computer Institute, Philippines, North EDSA, Quezon City	2
May 24-28	Advanced Geographic Information System (GIS) Training Working	Dacha, Tagaytay Hotel, Tagaytay	1
May 13-14	GIS Training/Workshop	BAI, Quezon City	2
May 12-14	Seminar on Managing IT Services in Government-ITIL Framework	UP Diliman, Quezon City	1
May 12-14	Strategic Planning and Management: Bootcamp Series	EDSA, Quezon City	2
May 12-14	Basic Quantum Geographic Information System	NDA, BAI Compound, Quezon City	1
April 29-30	2nd National and Scientific Conference of the Philippine College of Ruminant Practitioners, Inc.	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	4

Date (2010)	Title	Venue	No. of participating staff members
April 26	5th Total Laboratory Show Sponsored by Dakila Trading	EDSA Shangrila Hotel, Mandaluyong City	1
April 16-18	Dairy Congress 2010	Cebu City	1
April 15	Dairy Confederation Seminar in Cebu	Cebu City	1
April 13-16	Laws and Rules on Government Expenditures	Commonwealth Avenue, Quezon City	2
April 7-8	Operations Management	EDSA, Quezon City	2
March 18-20	23rd JOCV-PASA Annual Seminar	VSU, Leyte	1
March 18-19	Managing the Marketing Function	EDSA, Quezon City	2
March 17-19	32 nd GACPA Annual National Convention	Subic, Zambales	1
March 15-16	Eight Rs of Effective Human Resource Management	EDSA, Quezon City	2
March 10-13	Training on Philippine Bidding Documents	Bayview Park, Roxas Boulevard, Pasay City	1
March 10-12	Seminar on Managing IT Services in Government- ITIL Framework	UP Diliman, Quezon City	2
March 10	77th NRCP General Membership Assembly	Manila Hotel	1
March 8-17	Training Course on Database Management Using MS Access	Statistical Research and Training Center, Diliman, Quezon City	1
March 6	Philippine Society of Parasitology, Inc. Scientific Seminar	UP-Manila	1
February 17-19	77th PVMA National Convention and Scientific Seminar	Naga City	4
REGIONAL			
December 9-10	1st Regional Techno-Gabay Summit	RET-Central Luzon State University, Science City of Muñoz, Nueva Ecija	1
August 14	3rd Nueva Ecija Veterinary Medical Association (NEVMA) Continuing Professional Education Seminar	Philippine Carabao Center, Science City of Muñoz, Nueva Ecija	1
August 13	21st CLARRDEC Regional Symposium on Research and Development Highlights	BASC, San Ildefonso, Bulacan	1
August 12	Forum for Cooperatives	Pampanga	1

Date (2010)	Title	Venue	No. of participating staff members
August 1-3	NIZ Secondary Stakeholders' Seminar/ Workshop	Baguio City	2
May 20-22	2010 PSAS Outreach Program and Lecture Series at Cagayan State University	Cagayan State University, Piat, Cagayan	2
AGENCY-WIDE			
November 26	Performance Management System Seminar: Training Workshop	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	5
November 23-25	Fossomatic Minor User Training	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	1
November 11-13	MSC50 User and Calibration Training	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	1
November 5	Farmers' Forum for NIZ	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	10
October 9	Current Status of Korean Dairy Industry and Selection of Proven Dairy Bull	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	21
September 8	User's Training on MIS Software Packages Developed by NCC	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	34
August 26	Application of Biotechnology for Improving Rumen Functions and Feed Production in Ruminants	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	21
August 16-17	ISO Calibration Training; Liquid-in-glass Thermometer Calibration Performance Testing of Temperature Controlled Enclosures	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	7
August 9-10	ISO Calibration Training; Calibration of Mass	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	7
August 2-3	ISO Calibration Training; Calibration of Volumetric Wares	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	7
August 5	Seminar on Characterization of a New Mycobacterium spp. belonging to Mycobacterium tuberculosis Complex Isolated from Monkeys in Bangladesh	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	20
July 28	Applications of Molecular Methods For Identifying and Quantifying Microbial Populations and Functions in Environmental Engineering and Rumen Studies	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	20

Date (2010)	Title	Venue	No. of participating staff members
July 23-24	Seminar on Effective Records Management Program	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	22
May 28	22nd CLSU In-house Review of Completed and On-going Researches	RET-Central Luzon State University, Science City of Muñoz, Nueva Ecija	1
May 26-28	R&D In-House Review and Research Management Forum	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	75
May 23-25	7 Habits for Managers Workshop	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	8
May 19	PCC Local Area Network and Computer Trouble Shooting: A Refresher Course	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	50
April 21	Merck's Safety in the Laboratory Seminar	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	15
April 19-21	Training on Advance Excel	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	13
April 16	Safety Awareness Training conducted by Safety House, Inc.	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	4
April 9	Development of Fasciola spp. Vaccine	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	22
March 14-26	In- House Training on Intracytoplasmic Injection (ICSI) as a Method of Enhancing In Vitro Embryo Production in Water Buffaloes for Embryo Transfer	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	7
March 23	Intracytoplasmic Sperm Injection: Recent Developments and Prospects in Livestock Production	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	25
March 6-7	Goat production and Entrepreneurship Training	Small Ruminant Center, CLSU	1
February 26	Blurring Cultural Boundaries Between Scientists and Farmers	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	32
February 25	Fulbright Scholarship Seminar	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	15
February 15-17	Integrated Management System- Internal Auditor Course	PCC National Headquarters, Science City of Muñoz, Nueva Ecija	19

Budget and Finances

- The PCC's budgetary thrusts and expenditure components for FY 2010 relate to the implementation of the "Dairy Fast-Track" program. Specifically, expenditures are channeled to Carabao-Based Enterprise Development and Intensification of the National Carabao Upgrading Programs. Specific activities are as follows:
- Dispersal of dairy buffaloes; provision of sustained technical assistance to farmer's cooperative members through training on the various aspects of carabao production, breeding and nutrition
- Institutionalization of milk collection system with organized processing, packaging and marketing system
- Nationwide herd performance recording, central data banking and retrieval system, and genetic evaluation system
- Expansion of AI services by private village-based AI technicians,
- Intensification of the "Unified" National Artificial Insemination (AI) Program with BAI, DA-RFU's, Provincial and Municipal Governments through

provisions of technicians' trainings and frozen semen from superior purebred Murrah Bull

- Wider and active implementation of the Bull Loan Program in various barangays where carabao population is high and AI is not possible
- R & D efforts focused on operational problem areas approach, with emphasis on more effective technology dissemination.
- Strengthening of technical competencies related to biotechnology and genetics

Sources of Funds

The agency's main sources of funds to support its operation are provided by the national government through the General Appropriation Act (GAA). Table 22 presents the details of fund allotment, utilization and balances for FY 2010 operation.

Other funds came from research projects from various government agencies and institutions. Fund utilization is mainly focused on the approved budgetary thrusts for FY 2010. Project funds expenditures are channeled mainly to the maintenance and operating requirements of the project.

Table 22. PCC's Sources and Utilization of Funds as of December 31, 2010 (Figures in PHP million)

Sources/Particulars	Allotment/ Appropriation	Utilization		Fund Balance
		Amount	%	
2010 GAA	659.72	544.57	86%	115.15
Personal Services	69.09	69.00	100	0.09
MOOE	154.03	104.09	78	49.94
Capital Outlay	436.60	371.48	88	65.12
2009 GAA Continuing Appro.	163.09	163.09	100	0
MOOE	69.48	69.48	100	0
Capital Outlay	93.61	93.61	100	0
Trust/Project Funds*	555.15	292.51	53	262.65
PL 480	236.20	36.20	15	200.00
KR2	171.24	166.99	98	4.26
Various Projects	68.28	48.70	71	19.58
Revolving fund	48.83	26.07	53	22.76
Agri-Pinoy Fund	30.60	14.55	48	16.05
Total	1,377.96	1,000.17	73%	377.80

*cumulative balances

Financial Condition

The PCC's total asset as of December 31, 2010 is PHP1,636.79 million comprising mainly of the agency Property, Plant and Equipment (PPE) and Other Assets (Table 23). The significant change in PPE and Other assets represents the booking of the 2,000 imported animals, procured vehicle and various PPE items. These are programmed expenditures in support of the dairy fast-track program, being the main budgetary thrust of FY 2010.

Total liabilities posted PHP304.33 million and total equity reached PHP1,332.46 million. A significant decrease in total liabilities is mainly attributed to the decrease in trust liabilities brought about by full implementation of the special project funds during the year. Trust liabilities represent the inter-agency fund transfer from the Department of Agriculture for the Agri-Pinoy Fund, Public Law (PL) 480, Kennedy Round 2 (KR-2) and other trust accounts from various research agencies for special project implementation.

Table 23. Statement of Financial Condition as of December 31, 2010 (figures in PHP million unless specified)

Particulars	FY 2010	FY 2009	% Change
Assets	1,636.79	1,576.42	4
Current Assets	442.79	836.44	(47)
Property, Plant & Equipment	663.67	530.82	25
Other Assets	561.33	209.16	168
Liabilities	304.33	502.33	(39)
Government Equity	1,332.46	1,074.09	24
Total Liabilities and Government Equity	1,636.79	1,576.42	4

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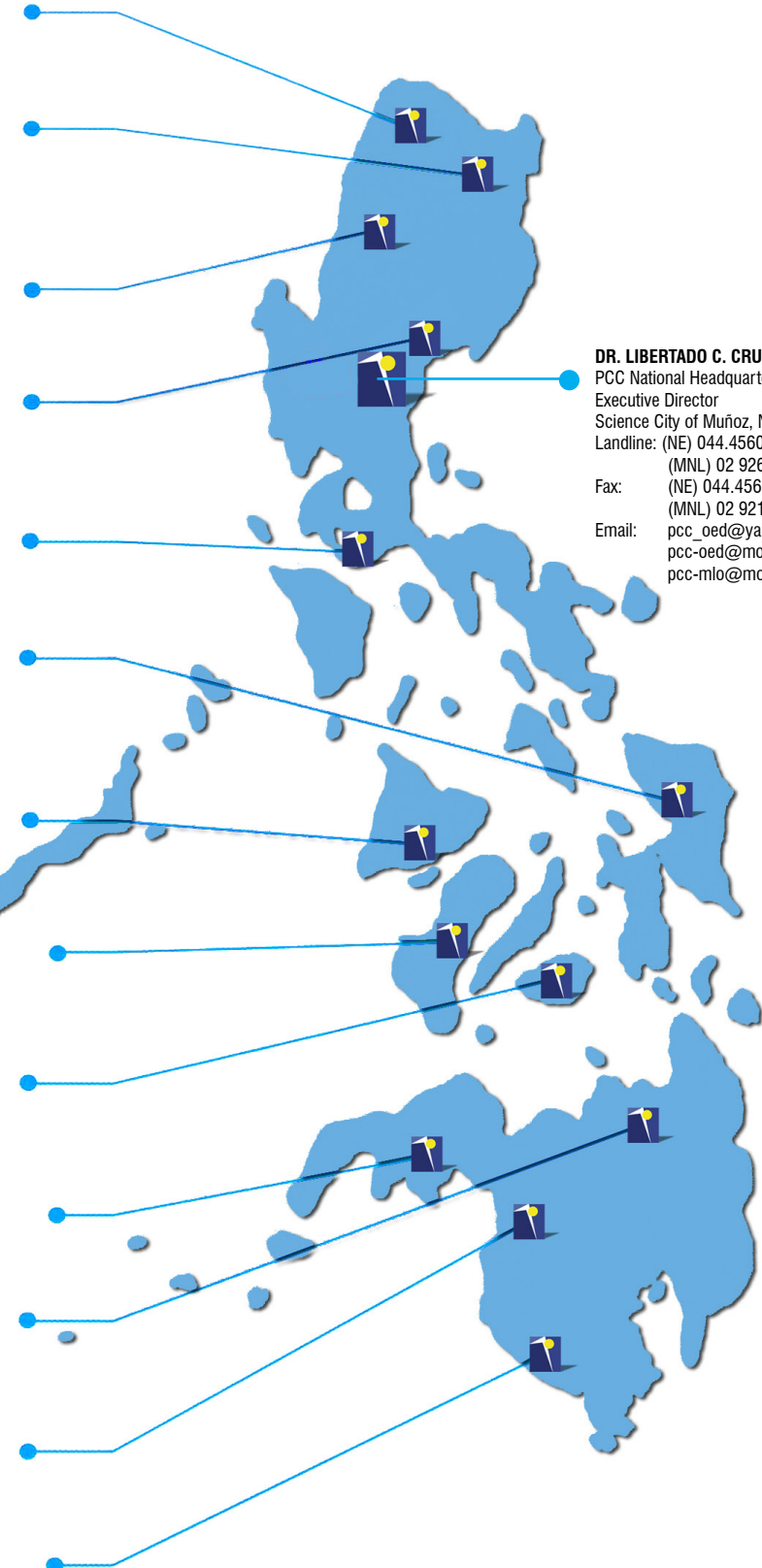
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