



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

Strengthening and Enhancing Competitiveness of CBED through Sustainable Value Chains

Flordeliza A. Lantican, PhD

SEARCA Value Chain Analysis Project Team Leader

Presented during the **International Conference on Carabao-Based Enterprise Development**
PCC National Headquarters and Gene Pool, Science City of Munoz, Nueva Ecija, Philippines
26-27 October 2017



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

INDUSTRY SITUATION

- 2015: Philippine water buffalo (carabao) population (2.87M heads), sixth in Asia
- No. of carabao in the milkline (4,983 heads)-39% of dairy industry
- Ownership: Individual farmers (24%), cooperative (8%), government/institutional farms (6%) and commercial raisers (1%)
- National carabao milk production (6.30M liters), grew annually at 4.4%. Reasons; rising population of crossbred buffalo with average milk yield of 4.5L /head/day
- National carabao slaughtered in 2015: 219,000 heads at annual growth rate of 0.5% (2011-2015)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

PCC's CARABAO-BASED ENTERPRISE DEVELOPMENT(CBED) PROGRAM

- Creates more income generating opportunities for the smallholder buffalo raisers
- Convenes and strengthens partnership and resource sharing of various stakeholders in support to the development of village-based enterprises. Strategic government partners (LGUs, DA-RFOs, DTI, DOST)
- Massive and continuous genetic improvement of existing buffalo population through AI, bull loan and animal infusion to establish significant number of buffaloes as a resource base for milk and meat
- Established Milka Krem in 2012, an infrastructure support to dairy buffalo farmers and an avenue for absorbing surplus milk that could not be sold through their organized group (8,638L or 26% in 2014)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

PCC's CARABAO-BASED ENTERPRISE DEVELOPMENT(CBED) PROGRAM

- 2015: more than 200 dairy cooperatives/associations nationwide composed of more than 10,000 carabao owners and smallholder farmers have engaged in carabao-based enterprises
- Milk production: Luzon (Regions 1,2,3 and 4A) in 2014 reached 1,051,015L, increased by 11% from 2013 level and surplus of 176,130L. Demand for carabao's milk is estimated at 1,404,152L in 2015-2017, a deficit of 353,137L if production remains the same
- Milk production: Visayas and Mindanao (Regions 6,7,8,10 and 13) in 2015 reached 354,279L. Demand for carabao's milk was 259,539L with surplus of 94,740L. Estimated demand in 2017-2019 (326,567L)
- NEFEDCCO in 2014 supplied 20% of their marketable raw milk to Milka Krem, 76% to dairy processors and the rest, processed into dairy products and traded locally



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

PCC's CARABAO-BASED ENTERPRISE DEVELOPMENT(CBED) PROGRAM

- Milka Krem has introduced dairy products commercially to the market (high-end retailers, ice cream makers and institutional buyers); major demand centers in Luzon-Metro Manila, Baguio City, and Tagaytay City)
- PCC trained dairy coops/associations on dairy production and processing technologies/practices, provided processing equipment to partner dairy coops under CBED in Region 3-NIZ
- Coordinated with donors like KOIKA and 2KR from Japan Government in identifying recipients of the dairy processing facilities and some equipment (e.g., GTDRMPC)
- LGU-Batangas and LGU-Magdalenena provided financial support in the construction of the dairy processing plant and some equipment to RODRA and MADRA
- DTI provided milking machines to dairy coops/associations and DOST provided other processing equipment and technical assistance



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DEFINITION OF TERMS

- Value chain categorizes the value-adding activities involved starting from the input provision, production, postharvest/processing, and marketing. An industry value chain is a physical representation of the various processes that are involved in producing goods (and services), starting with raw materials and ending with the delivered product.
- Value chain analysis is a comprehensive diagnostic tool that is used to determine how to create or add value to a commodity or service and identify which upgrading strategies should be adopted to develop sustainable value chains.



Department of Agriculture

PHILIPPINE CARABAO CENTER

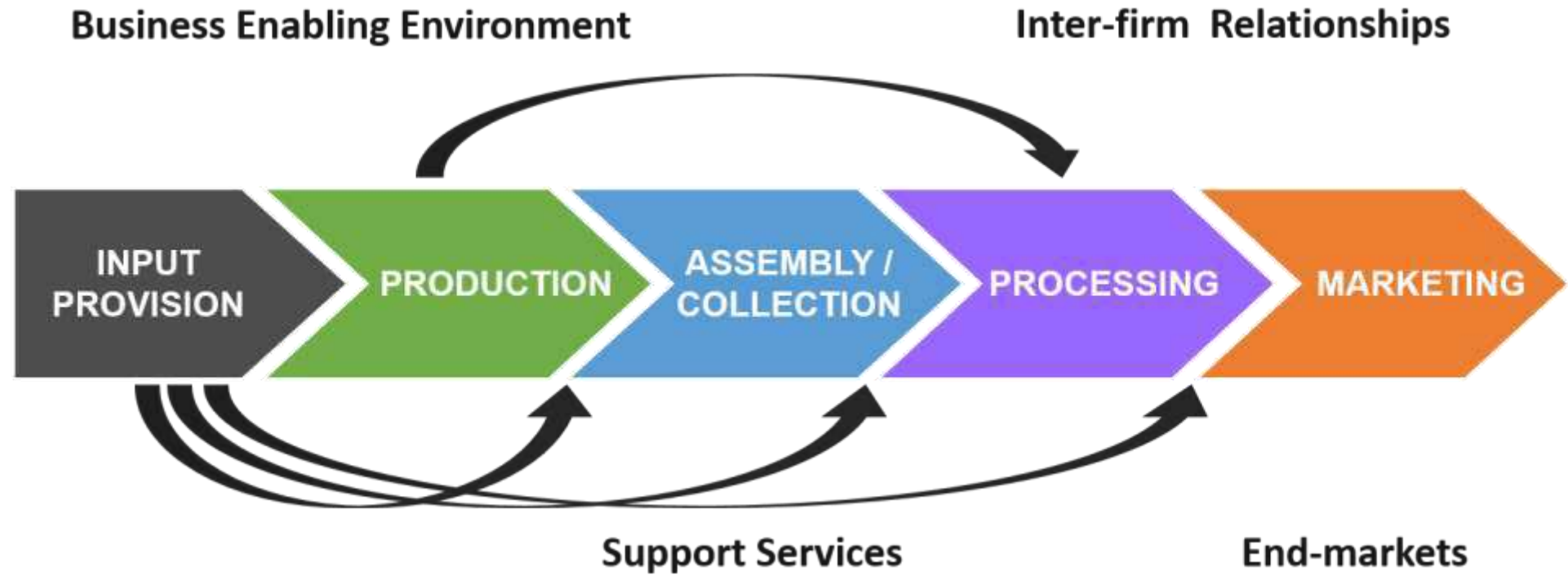
CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

VALUE CHAIN FRAMEWORK





Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

FOUR ELEMENTS OF THE VC FRAMEWORK

- 1. End-markets-** market trends, price structure of the final products and raw materials, and key suppliers and major markets and their linkages in the local and regional value chains
- 2. Inter-firm relationships-** type of coordination or cooperation between and among players/actors in the value chain.
- 3. Business enabling environment-** policies and regulations affecting the business growth and competitiveness (e.g., registration and certification of dairy buffalo products)
- 4. Support services-** include financial services (credit from LBP, DBP, private banks) and non-financial services (training and seminars, RDE, technology transfer, logistics, advisory services from government/private institutions)

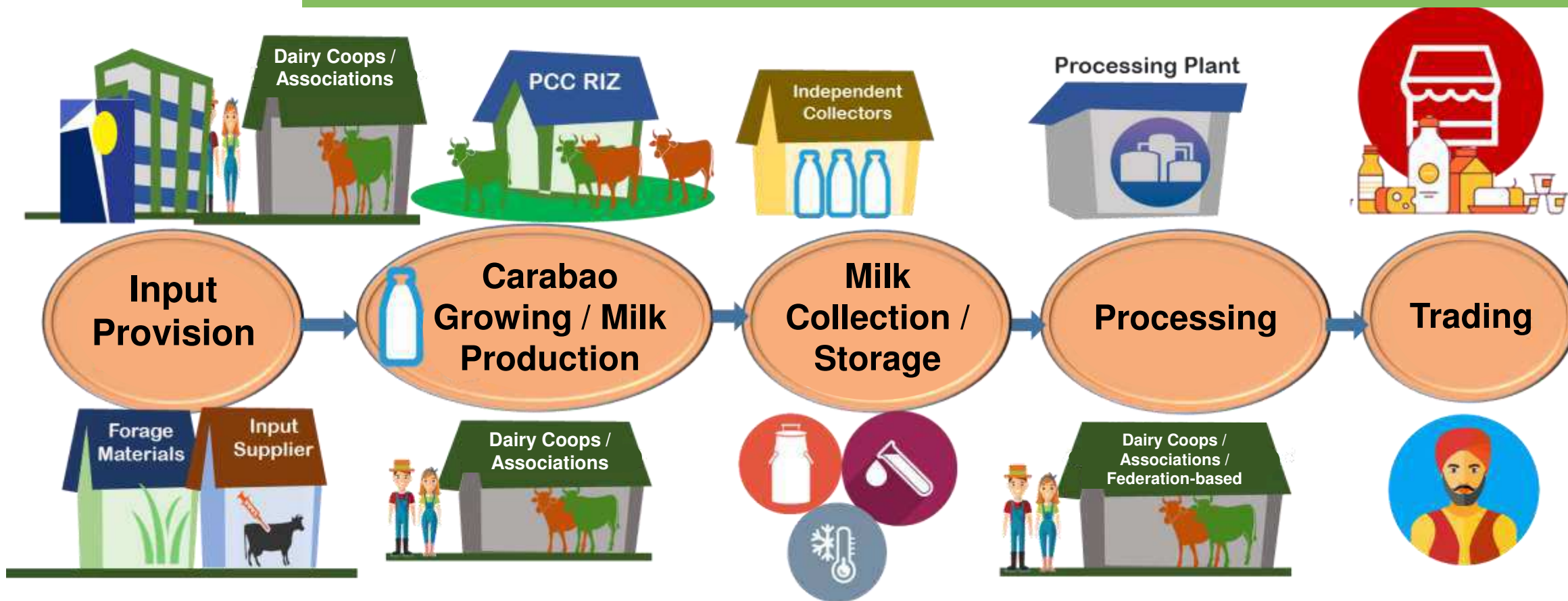
DAIRY BUFFALO VALUE CHAIN PLAYERS (7)

- Input providers
- Dairy farmers
- Milk collectors
- Dairy processors
- Wholesaler-retailers
- Retailers
- Consumers

BUFFALO MEAT VALUE CHAIN PLAYERS (8)

- Input providers –dairy coops/associations, PCC, forage material suppliers, input supply stores, AI technicians (PCC, LGU, PVO & VBAIT)
- Farmers–sell live animals for meat (coop/assoc. members & independent)
- Agents- commission fee (PhP 300-500/head of carabao)
- Livestock traders-assemble, transport and trade live animals within and outside the region
- Meat dealers – procure live carabaos, bring to abattoirs for slaughtering and then sell meat in different cuts to retailers and consumers
- Processor-produce *tapa*, hotdogs/sausages, corned beef, ground beef
- Retailers and consumers (institutional buyers and households)

DAIRY BUFFALO VALUE CHAIN FUNCTIONS / SEGMENTS





Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

BUFFALO MEAT VALUE CHAIN FUNCTIONS / SEGMENTS

- Provision of inputs- forage (napier, etc.), water and feeds, delouser, dewormer, and vaccines against animal diseases
- Carabao growing- feeding, cleaning of pens, bathing, delousing, deworming, vaccination, and vitamin injection
- Live carabao trading- feeding, transport to auction (*oksyon*) markets, buying and selling of live carabao
- Slaughtering- preparation and cleaning(slaughterhouse facilities & equipment)
- Processing-cleaning, slicing, grinding, marinating, frying, packaging, and labelling
- Trading/marketing for fresh meat-transporting, chilling buying and selling
- Trading/marketing for processed meat-buying, selling and refrigeration



PRACTICES (BY SEGMENT IN DAIRY BUFFALO VC)

- **Input provision/production: Luzon:** farmers feed dairy buffalo twice a day (60%); practice a combination of pasture/free range and cut and carry system (86%); provide proper housing (61% in Region 2 and 98% in Region 3-NIZ) and practice vitamin injection/supplementation once a year (21%); **Visayas and Mindanao:** with housing (30%), feeding twice a day (65%), combination in pasture/cut-and carry (81%)
- **Milking: Luzon:** dairy farmers practice manual milking (98%) and only a few (2%) use milking machine, milking once a day (93%)-limited market for second milking. Same pattern in Visayas and Mindanao
- **Milk collection and handling:** milk collection is done at the farmers' field/ house or at a designated collection points between 7:00-9:00 am; some members of dairy coops/associations use stainless steel milk cans to maintain the quality (30%) and the majority (70%) use plastic bottles. Types of milk collectors: independent and cooperative-based



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

PRACTICES (BY SEGMENT IN DAIRY BUFFALO VC)

- **Milk processing:** **Luzon**-four types of processors-independent, coop/assoc.-based, federation-based, and institution-based; **Visayas and Mindanao:** 3 types, no Federation-based
- **Luzon:** 29 dairy processing plants - 24 kitchen type, 2 modern and 1 semi-modern types; **Visayas and Mindanao:** 20 dairy processing plants - 3 semi-modern and 17 kitchen types of processing plants
- **Marketing:** dairy coop/assoc.-based processors employ milk collectors to pick up raw milk from the source and deliver it to the dairy processing plant; independent processors require delivery of raw milk by suppliers
- Pricing is based on quality of milk (Class A, B and C) using lactometer; payments for raw milk is on credit (1-4 weeks term) for members of dairy coops/assoc. Except in Region 3-RIZ; independent processors pay in cash upon delivery.



Department of Agriculture
PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O
SEARCHA

HIGHLY DEMANDED CARABAO'S MILK AND MEAT PRODUCTS





Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DIMENSIONS OF A SUSTAINABLE VALUE CHAIN (NEVEN 2014)

1. Economic sustainability (competitiveness, commercial viability, growth)

- Value added (additional profit, jobs and increase in food supply for the benefit of VC stakeholders; reduced physical losses, improved equipment, and increased production volumes)
- Need adequate budget for the CBED program
- Knowledgeable and well-trained implementers of CBED program



COST AND RETURNS ANALYSIS OF BUFFALO MILK PRODUCTION PER FARM

Item	Region									
	1		2		3-NIZ		3-RIZ		4A	
	Amount PhP/farm	%	Amount PhP/farm	%	Amount PhP/farm	%	Amount PhP/farm	%	Amount PhP/farm	%
Returns										
Total cash income (A)	63,337	33	60,892	28	297,436	65	151,065	44	146,700	53
Total non-cash income (B)	130,805	67	156,503	72	163,181	35	193,016	56	129,957	47
Total Income (C=A+B)	194,142	100	217,395	100	460,617	100	344,081	100	276,657	100
Costs										
Total cash costs (D)	30,679	34	29,854	34	102,936	58	35,469	36	39,659	42
Total non-cash costs (E)	58,774	66	57,002	66	73,804	42	63,477	64	54,254	58
Total Costs (F=D+E)	89,453	100	86,856	100	176,740	100	98,946	100	93,913	100
Net Income (G=C-F)	104,689		130,539		283,877		245,135		182,744	
Net Cash Income (H=A-D)	32,658		31,038		194,500		115,596		107,041	

- Carabao dairying is a profitable business as raw milk producers in Regions 1 to 4A generate positive net income and net cash income



AVERAGE RELATIVE FINANCIAL POSITION OF VC PLAYERS FOR SELECTED DAIRY PRODUCTS FROM BUFFALOES IN LUZON, PHILIPPINES

Player	Product	% Added Unit Cost	% Profit	% to Price
Farmer	Raw milk	35	47	42
Milk collector	Raw milk	12	11	12
Processor	Fresh milk	43	35	38
Wholesaler-retailer	Fresh milk	10	7	8
Total		100	100	100
Farmer	Raw milk	11	24	17
Milk collector	Raw milk	3	5	4
Processor	Choco milk	77	63	70
Wholesaler-retailer	Choco milk	9	9	9
Total		100	100	100
Farmer	Raw milk	16	27	22
Milk collector	Raw milk	6	7	7
Processor	Pastillas	64	50	57
Wholesaler-retailer	Pastillas	14	16	15
Total		100	100	100



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DIMENSIONS OF A SUSTAINABLE VALUE CHAIN (NEVEN 2014)

2. Social sustainability (inclusiveness, equitability, social institutions/organizations)

- Large number of smallholder carabao farmers and processors also benefit from the upgrading strategy
PCC (2015) : >200 dairy cooperatives/associations nationwide; > 10,000 carabao owners and smallholder farmers have engaged in carabao-based enterprises
- Women are given equal opportunity to be actively involved in CBED activities where much value is added
- Production and dairying- men work more man-days and receive higher wage rate than women. Women's' activities: cleaning of pens, bathing, feeding, delousing, deworming, milking, and cleaning after milk



TIME SPENT IN PRODUCTION AND DAIRY ACTIVITIES, WAGE RATE, AND INCOME OF MEN AND WOMEN IN LUZON, PHILIPPINES (LANTICAN ET AL. 2017)

Region	Man-days/Year		Wage Rate/Day (PHP)		Annual Income (PHP/Year)	
	Men	Women	Men	Women	Men	Women
1	193	156	229	237	44,197	36,972
2	267	154	187	175	49,929	26,950
3-NIZ	273	185	185	177	50,505	32,745
3-RIZ	255	163	222	217	56,610	35,371
4A	192	151	185	157	32,520	23,707
Average			202	193	46,752	31,149



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DIMENSIONS OF A SUSTAINABLE VALUE CHAIN

- Raw milk collection –women's activities: cleaning of milk containers, recording and monitoring of payment; women have equal wage rate (PhP 130-148/day) with men but lesser man-days/year (135-144) than men (144-180)
- Processing – women's activities: receiving of milk, quality control and laboratory tests, processing, and packaging

Luzon: women similar man-days/year (232-295) with men in processing dairy products except Region 3-NIZ (304 vs. 301 man-days/year). Higher wage rate in Regions 3-NIZ (PhP328 vs PhP279/day) and 4A (PhP437 vs. PhP388/day) due to additional tasks of administration and supervision. Regions 1 and 2, men have higher wage rate/day than women



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DIMENSIONS OF A SUSTAINABLE VALUE CHAIN

- Trading/Marketing: selling dairy and meat products, recording of sales and costs, and cleaning of the storage area
 - Luzon: Women receive lower wage rate than men in two regions:
 - Region 1(PhP 143 vs. PhP238/day)
 - Region 2(PhP 144 vs. PhP184/day)
- Same wage rate in Region 3-RIZ (PhP350/day)
- Higher wage rate in two regions:
 - Region 3-NIZ (PhP 328 vs PhP 279/day) and
 - Region 4A (PhP 300 vs. PhP250/day)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

DIMENSIONS OF A SUSTAINABLE VALUE CHAIN (NEVEN 2014)

- 3. Environmental sustainability(create additional value without permanently depleting natural resources)**
 - Proper disposal of wastes in processing of carabao-based dairy products
 - Use animal manure in producing compost as organic fertilizers for forage grass growing and organic vegetable production
- 4. Strategic partnerships between the government agencies and the private sector (Federation, farmers' coops/ associations, PCC, DTI, DOST, LGUs, NGOs and buyers)**



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

COMPETITIVENESS VISION

Within the next five years, the carabao industry should focus on enhancing its capacity and capability to increase **healthy and productive native and crossbred buffalo population**, produce **quality and safe carabao-based milk and meat products** responsive to the growing domestic demand, increase **market awareness on nutritional benefits** of milk and meat and establish **strong market linkages** among concerned VC players.



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

UPGRADING STRATEGIES FOR STRENGTHENING AND ENHANCING COMPETITIVENESS OF CBED

- Implementation of proper forage development, conservation and management – setting up of nurseries, development of silage production, and provision of chopper, cutter and baling machine for grass and legumes (LGUs, PCC and Coops/Assoc.) – sustainable supply of forage grass and legumes
- Enhancing the productive and reproductive efficiency of carabao for milk, meat and draft– increasing the number of multiplier farms and family modules, adoption of novel reproduction technology (fixed time AI or embryo transfer, and procurement of sexing machine to increase likelihood of female calf drop)- PCC, DA-RFU, DA-BAI and private sector. Breeding the native carabaos using selected native carabao semen from GIP for milk, meat and draft
- Strengthening the partnership between the farmer and AI service providers - education of farmers and AIT on the social and economic responsibilities, gradual withdrawal of providing free AI services (LGU subsidy), facilitation by PCC for immediate membership of VBAIT to UNAIP of LDD (DA-BAI)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

UPGRADING STRATEGIES FOR STRENGTHENING AND ENHANCING COMPETITIVENESS OF CBED

- Capacity building of concerned value chain players including women on input provision, carabao raising, dairying, processing, and marketing of carabao-based products. Enhancing technical skills of women would lead to higher pay
- Enhancing logistics, infrastructure, and processing and marketing support facilities and equipment – FMRs, milking machine, transport vehicles for milk collection, laboratory milk testing facilities and equipment (e.g., lactometer or mini milk-o-scan), stainless milk cooling and storage tanks, processing facilities and equipment: homogenizers, pasteurizers, ice cream machines, etc.
 - Buffalo meat: renovation of existing livestock *oksyon* markets (LGUs, DA-BAI and international agencies/organization (e.g. JICA) and upgrading of LGU-managed slaughterhouses and equipment (LGUs, DA, NMIS)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

UPGRADING STRATEGIES FOR STRENGTHENING AND ENHANCING COMPETITIVENESS OF CBED

- Engaging in product development- new or improved carabao's milk and meat products, extend the shelf-life and improve packaging and labeling of dairy and meat products (PCC, SUCs, DOST and DTI in partnership with the private sector (Federation, coops/associations and processors)
- Strengthen existing dairy farmers' cooperatives/associations that are still weak but committed (CDA's accredited training service providers, NGOs, LGUs and PCC) and clustering of carabao raisers selling animals for meat (LGUs, NGOs and PCC)
- Development of price scheme that is tied up with established standards for quality milk (e.g., % fat content, presence of water and adulterants, handling, temperature)- PCC, DA, DTI, and LGUs should organize a workshop and invite carabao farmers, dairy processors and institutional buyers



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

UPGRADING STRATEGIES FOR STRENGTHENING AND ENHANCING COMPETITIVENESS OF CBED

- Establishment of dairy market centers (dairy hub) in strategic areas to tap more potential buyers and promote quality and safe dairy products
- Access to timely and reliable market information: carabao population, milk and meat production, prices, demand in terms of quantity and quality, specific markets including directory of buyers
- Intensified market promotion, education and information campaign to further increase the demand for quality and safe dairy and meat products (Federation, Coops/Assoc., DTI, DA-PCC)
- Securing registration and certification of dairy and meat products by the Food and Drug Administration (FDA) –Federation, farmers' coops/associations, PCC, FDA, DTI, DOST)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

UPGRADING STRATEGIES FOR STRENGTHENING AND ENHANCING COMPETITIVENESS OF CBED

- Packaging and implementing a financing program with guarantee facility and agri-insurance that is accessible and suited to the needs of the dairy and meat farmers and farmers' coop/assoc.-based processors –PCC, ACPC and LBP
- Sustaining the conduct of priority research areas under the PCC's R4D in support to the carabao-based enterprises (in collaboration with government agencies /research institutions and reputable SUCs in consultation with the private sector)



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

MUTUALLY BENEFICIAL PARTNERSHIPS AND COLLABORATION IN RELEVANT R&D AND INITIATIVES IN CBED WITH ASEAN

- Conduct collaborative research studies between PCC-SUCs and select ASEAN universities and research institutions

Linking with SEARCA's University Consortium (i.e., Kasetsart University in Thailand, University of Putra Malaysia, Institute of Pertania and Gadjamadah University in Indonesia, and University of the Philippine Los Baños in undertaking collaborative research projects on buffalo-based enterprises

SEARCA also offers Research Fellow Program wherein research funding is provided by the fellows' affiliated government agencies/ institution while SEARCA provides hosting of research fellows and linkages with experts/collaborators

- Expert exchange program - application of biotechnology in increasing reproductive pregnancy success rate, carabao-based product quality and safety, new processing technologies, technologies that would extend the shelf-life



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

MUTUALLY BENEFICIAL PARTNERSHIPS AND COLLABORATION IN RELEVANT R&D AND INITIATIVES IN CBED WITH ASEAN

- Outreach extension program -involves capacity building of young professionals working on livestock (including buffalo) research and extension. The Nagoya University in Japan implements this type of program.
- Continue holding international conferences and regional round table discussions or workshops in ASEAN on buffalo-based enterprises to achieve knowledge sharing on recent production and postproduction technologies including processing and market trends, and dissemination of research outputs related to buffalo-based enterprises.



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

Note:

- **ASEAN Economic Integration:** Big market for quality and safe buffalo-based milk and meat products with more than 600 million population
- Growing number of foreign and local tourists would also support the establishment of agri-tourism that will highlight best practices in carabao farming, dairying & feedlot fattening.

REFERENCES

- Lantican, F.A., Ma. C.M. Molina, J.E. Lapitan, J.C. Padrid, E. C. Sunaz, Ma. Angelica R. Canizares, JA.G. Lantican and L.A.M. Carandang. 2017. Dairy Buffalo Value Chain Analysis in Luzon, Philippines. ISBN: 978-971-560-181-8. A monograph published by SEARCA and PCC.
- Lantican, F.A., Ma. C.M. Molina, J.E. Lapitan, J.C. Padrid, E. C. Sunaz, Ma. Angelica R. Canizares, JA.G. Lantican and L.A.M. Carandang. 2017. Buffalo Meat Value Chain Analysis in Luzon, Philippines. ISBN: 978-971-560-181-8. A forthcoming monograph to be published by SEARCA and PCC.
- Lantican, F.A., J. E. Lapitan, D.E. Evangelista, Ma. C.M. Molina, J.C. Padrid, E. C. Sunaz, Ma. Angelica R. Canizares, J.A.G. Lantican and L.A.M. Carandang. 2017. Value Chain Analysis of Carabao and Carabao-based Products in Visayas and Mindanao. Philippines. Final report submitted by SEARCA to PCC.
- Neven, D. 2014. Developing Sustainable Food Value Chains: Guiding Principles. FAO, Rome.



Department of Agriculture

PHILIPPINE CARABAO CENTER

CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001



S E A M E O

SEARCA

THANK YOU!

For more information, please do not hesitate to contact:

Dr. Flordeliza A. Lantican

E-mail Addresses: flantican@yahoo.com or
flantican23@gmail.com