Carabao-Based Enterprise Development: The Philippine Experience

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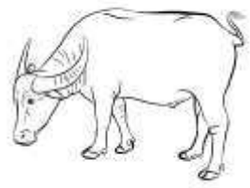


OUTLINE

Background

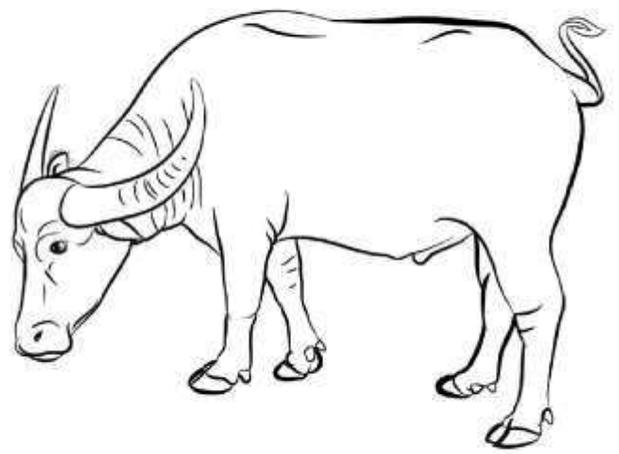
Carabaos in the Philippine Setting

Changing Swamp buffalo population
Economic Contributions of water buffaloes

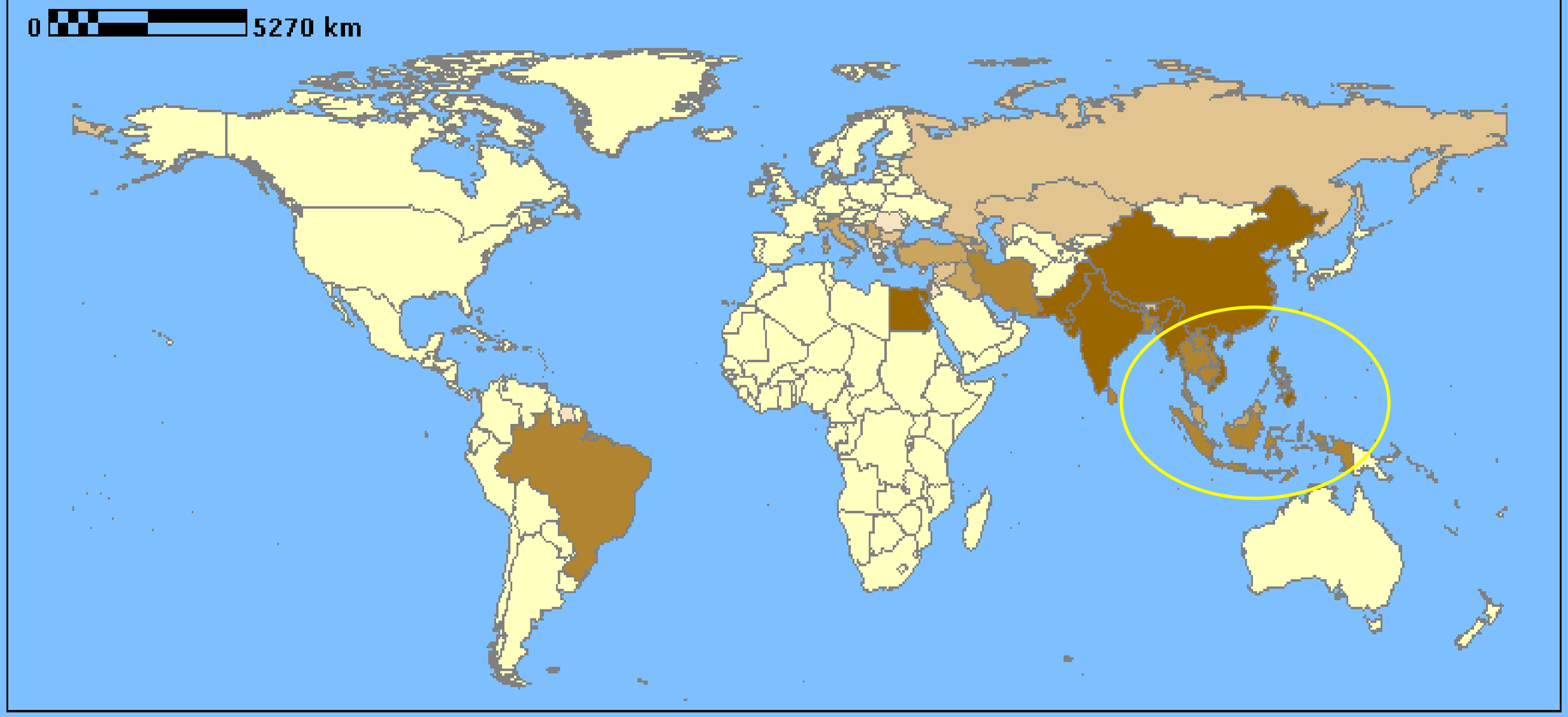
Carabao-Based Enterprise Development

“ Putting the basics”
“ Kick-start the Market”
“Expanding the Market”

Concluding statement



ATLAS OF WORLD BUFFALO POPULATION

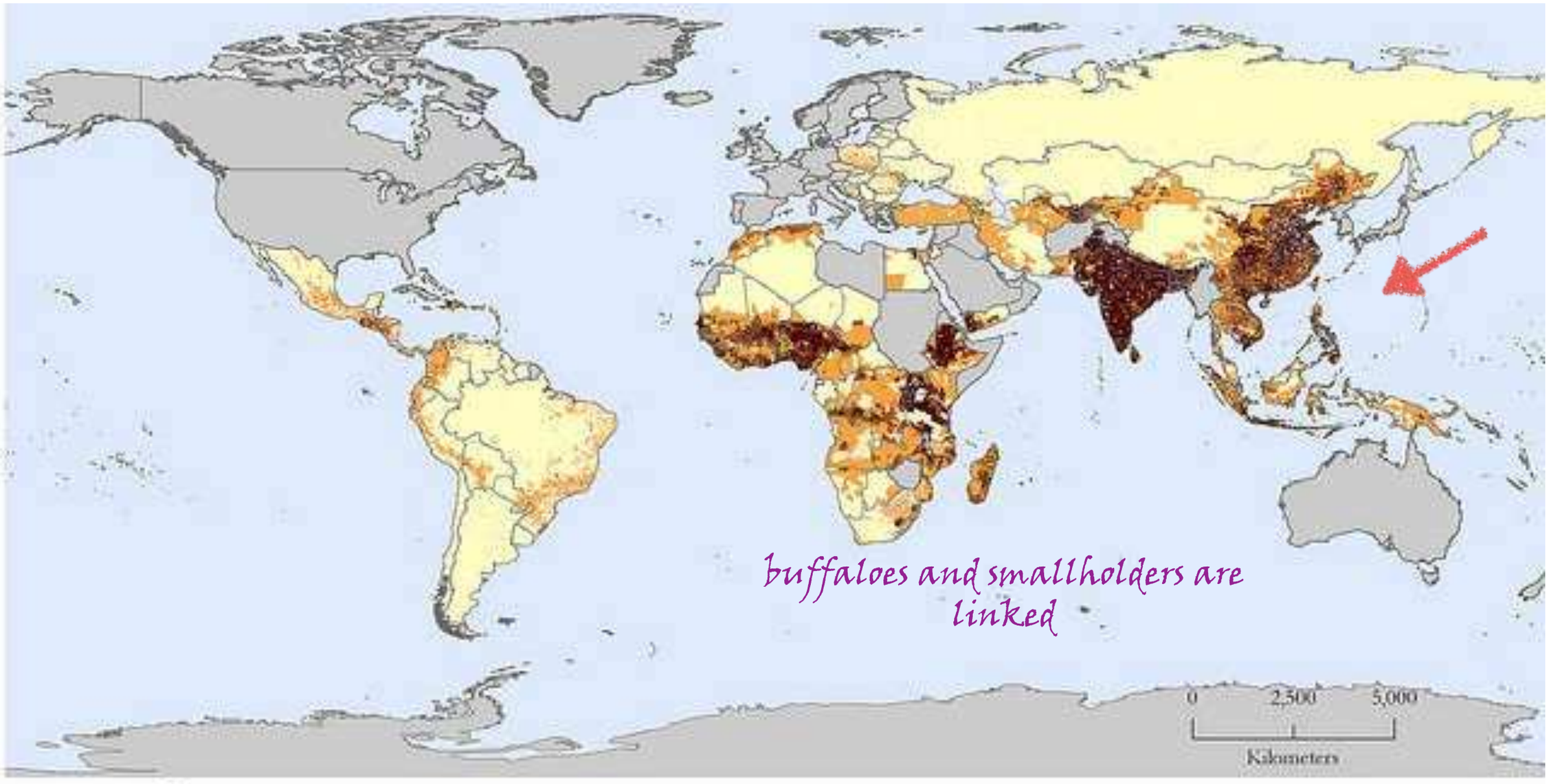


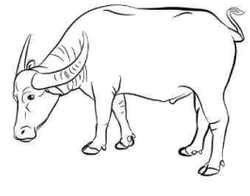
Water Buffaloes – world population

2,504,000	more
447,000	2,504,00
18,000	447,000
2,000	18,000
Less	2,000
Not Available	

world pop. = 199.7 M (FAO, 2015)
pop in Asia = 97%
swamp type= SEA

Distribution of poor livestock keepers

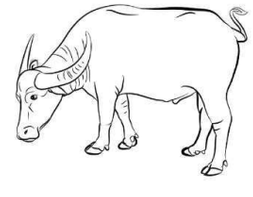




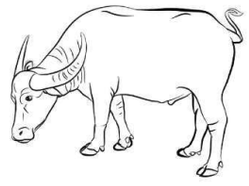
swamp buffaloes and rice farming are linked

0 200 400 600 800 1000 1200 1400 1600

Average regional rice output (kg/ha)



Farm mechanisation displaces the draft carabaos



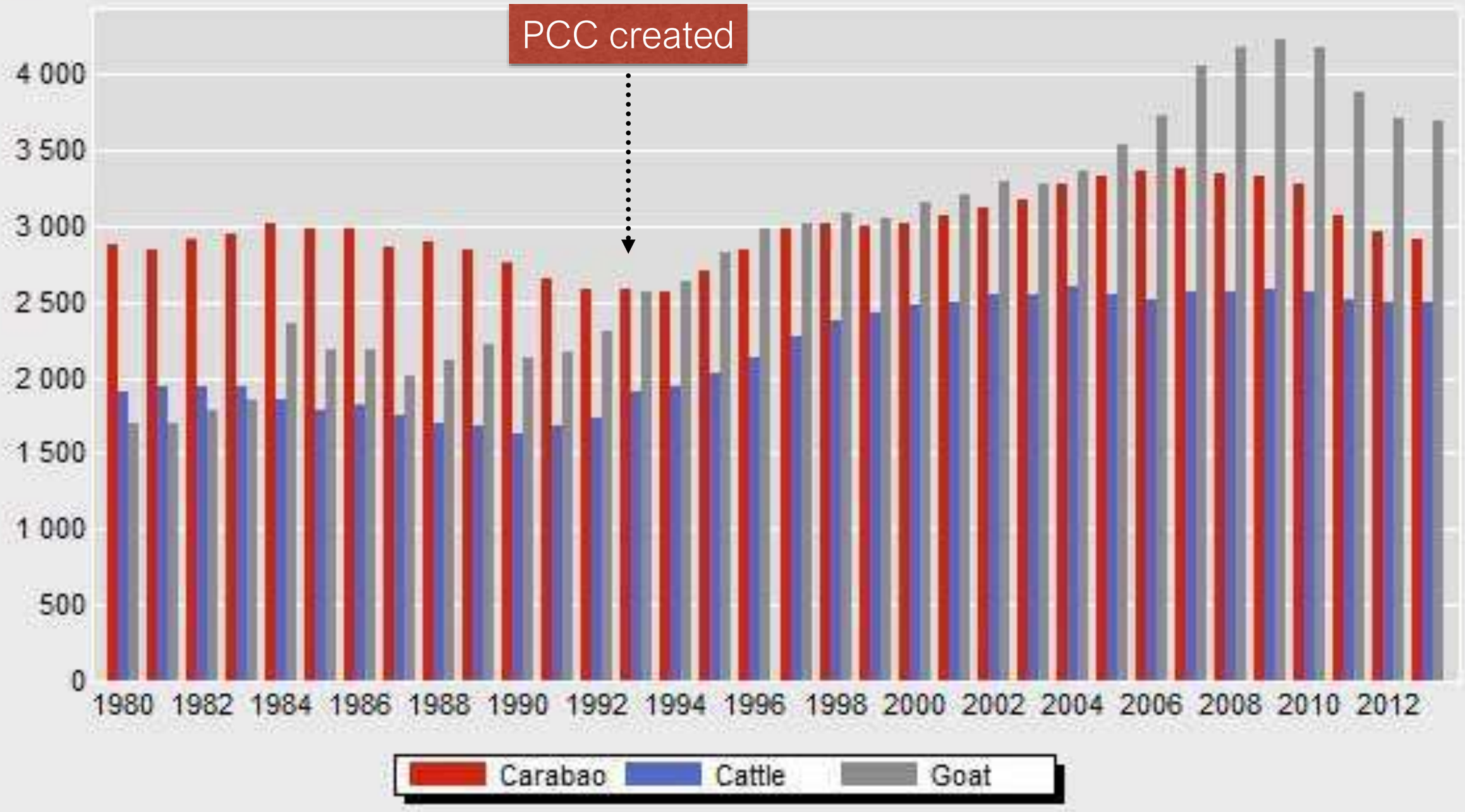
Even the labor-intensive farm income-generating activities such as rice planting and harvesting are displaced by farm machineries

Selected SEA Countries with declining swamp buffalo population (million), 1960-2013

Country	Year					
	1960	1970	1980	1990	2000	2013
Indonesia	2.8	2.8	2.4	3.3	2.4	1.4
Malaysia	0.3	0.3	0.2	0.2	0.1	0.1
Philippines	3.4	4.4	2.8	2.7	3.0	2.9
Thailand	4.9	5.7	5.6	5.0	1.7	1.2

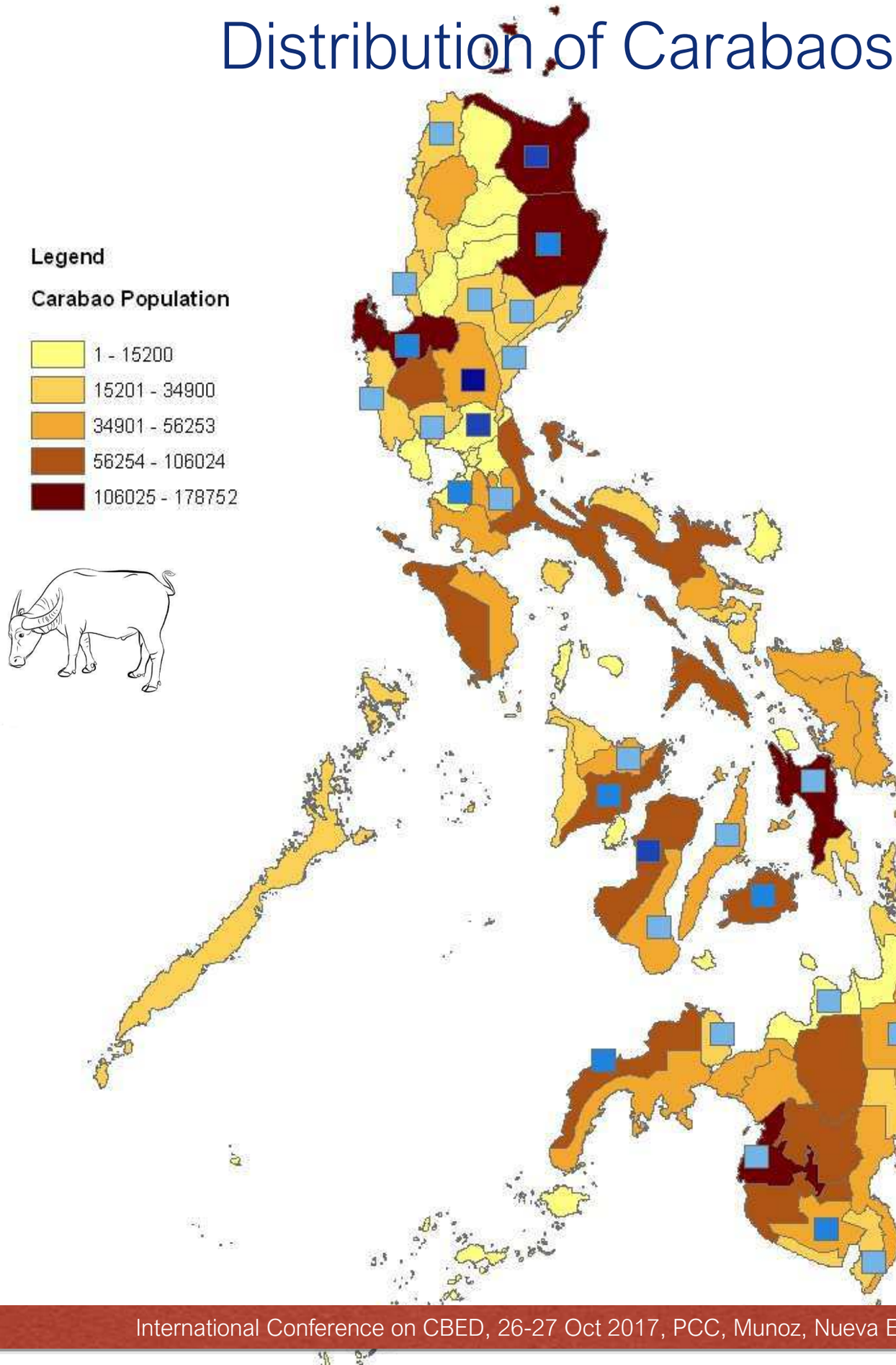
Source: FAO, 2015

Livestock and Poultry: Inventory by Animal Type and Year. (thousand heads)



Bureau of Agricultural Statistics

Distribution of Carabaos in the Philippines

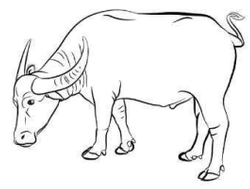


Domestic Meat and Milk Production from Cattle and Buffalo, Philippines, 2016

SOURCE	MEAT, ‘000 ton	%	MILK, ‘000 ton	%
Carabao	144.68	34.85	14.20	52.30
Cattle	270.42	65.15	12.91	47.70
TOTAL	**415.10**	**100.00**	**27.15**	**100.00**

Carabao is the symbol of Philippine Agriculture

Office of the Secretary
Department of Agriculture



Philippine Agriculture is essentially **crop dominant**, carabao is but an input, just as is seed and fertiliser;

income is essentially from crops;

income is also seasonal

Policy/policy reforms related to carabao-based enterprise

major policy/policy reforms related to carabao-based enterprise worth the review

1

Policy Reforms

Slaughter Ban

aims to prevent slaughter of carabaos to make work animals available for agriculture; legal to slaughter female carabaos after 11 years old and male carabaos after 7 years old; abolition of the slaughter ban in 1985 permitted raising of buffalo for meat purposes

2

Policy Reforms

Open Domestic Market to Indian Buffalo meat

aims to reduce extraction rate from domestic carabao population; if not implemented the domestic carabao population will be extinct in a period of ten years

BUFFALO POPULATION, SLAUGHTER AND MEAT IMPORTATION, PHILIPPINES, 1997-2016

YEAR	POPULATION,hd	Slaughtered, M hd	% of population	BUFFALO MEAT IMPORTATION	
				VOLUME, kg	Live animal Equivalent, hd
1997	2,987,780	228,614	7.58	30,733,625	173,636
2000	3,024,400	267,060	8.83	36,395,226	205,622
2005	3,326,830	265,345	7.97	62,418,781	352,648
2010	3,270,410	218,208	6.67	43,146,025	243,762
2015	2,855,000	219,062	7.67	44,388,540	250,782
2016	2,877,000			30,903,126	
Average		**243,644**	**7.84**	**49,002,132**	**283,684**
Total		**4,654,334**			**4,937,969**

the volume of import is more than the domestic slaughter volume!

3

Policy Reforms

Infusion of dairy buffalo genetics

aims to introduce dairy buffalo genetics as early as 1917-1957; resumed in bigger number after the establishment of the PCC in 1993; the breed include Murrah, Nili Ravi, Bulgarian Murrah, Brazillian Murrah and the Italian Mediterranean buffalo

Infusion of Live Riverine Buffaloes to Philippines

Year	Source	Breed	No. (hd)		
			male	female	total
1917	India	Murrah			57
1918	India	Nili-Rav			85
1947	India	Murrah	7	43	50
1947	India	Murrah	1	21	22
1950-56	India	Murrah	108	554	662
1994	USA	Am-Murrah	70	154	224
1995-99	Bulgaria	Bul-Murrah	216	2926	3142
2010	Brazil	Murrah	11	2027	2038
2013	Italy	Italian Mediterranean		1025	1025

Recorded transport of riverine frozen semen to the Philippines

Year	Origin	Breed	# Straw/dose
1981	Pakistan	Nili-Rav	1000
1983	Pakistan	Nili-Rav	1000
1987	Pakistan	Nili-Rav	1000
1982	India	Murrah	1000
1984	India	Murrah	1000
1985	India	Murrah	1000
1995	Bulgaria	Bulgarian Murah	13,000
2013	Italy	Italian Mediterranean	5000

4

Policy Reforms

Creation of Carabao research Commodity

DOST-PCARRD created a separate research team on Carabao Commodity; this allowed in-depth research on crossing swamp buffalo with thee riverine breed assisted by UNDP/FAO (1982-1992)

3 times more milk
2 times growth rate
Double farmers' income

5

Policy Reforms

Establishment of the Philippine Carabao Center

Created by R.A. 7307:

"Philippine Carabao Act of 1992"

"why will government support the development of carabao, a symbol of backward agriculture in the era of modernization?"

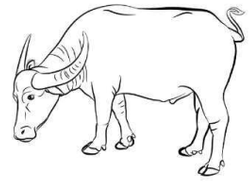
Question at the Phil Congress 1993, initial budget deliberation of PCC

"when can we develop a machine that feeds on grass to produce milk or feed on rice straw and rice bran to produce meat?"

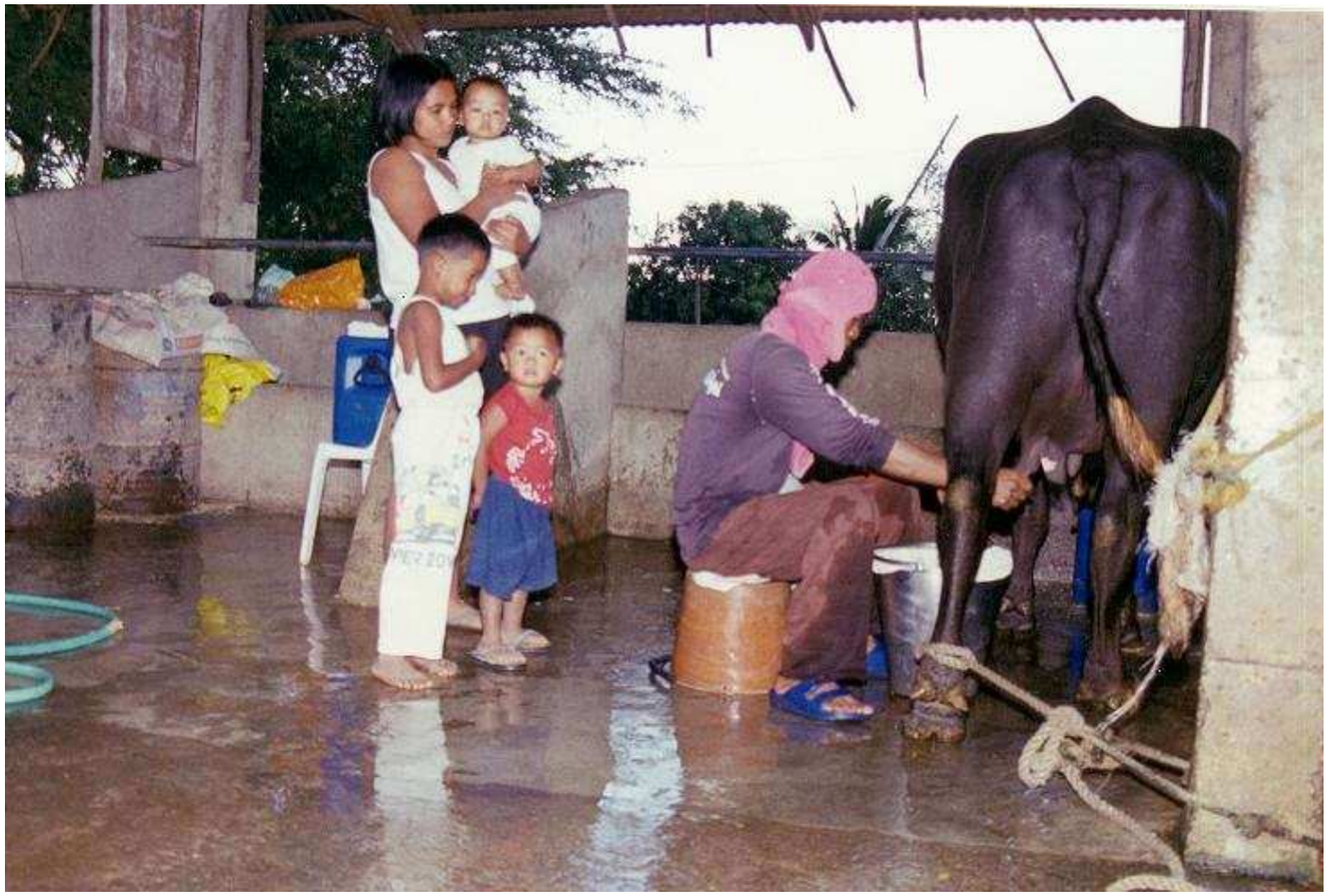
PCC National Headquarters and Gene Pool

Regional Centers:
Luzon = 5
Visayas = 4
Mindanao = 4

Regional Centers carry out field extension activities in concert with the Local Govermenr Units (LGUs)



Carabao Development program is more than the carabao, it is about human, income and general well being of smallholders



Carabao Development Program (CDP)

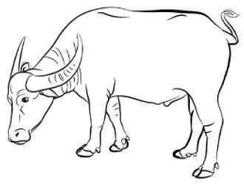
↓

Carabao-Based Enterprise Development (CBED)

↓

Matrix of the Carabao Sector Value Chain

	PRE-FARMGATE	IN-FARM		POST-FARM GATE	
		Production	Product	Post production/Processing	Market and marketing
Input					
	Policies (regulation/tariff/taxes)	Feeds	Transport	Transport	Transport
	Credit system	Labor	Collection	Processing Facilities	Advertising/ Info
	Environment	Vet Products/MOOE	Technologies	Technologies	Technologies
	Socio-Economic Systems	Technologies	Storage	Storage	Distribution
	Human Resources	Semen/Bull	Fund/Money	Fund/Money	Storage
	R, D and E	Fund/Money	R, D and E	R, D and E	Fund/money
		R, D and E			R, D and E
Players					
	Banks/Funding Istitutions	Animal Raisers	Traders	Butcher	Whosellers
	Regulatory agencies	Feed Suppliers/Input providers	Milk collector	Trader	Retailers
	Universities/Training Centers	Veterinarian	Testing Lab	Processors (for meat and milk)	Tranporters
	Research Centers/ Agencies	AI Techinician	Extensionist	Storage Person	Storage Person
	Policy Makers(Legislators, LGUs)	Extensionist	Scientists/Reseachers	Scientists/Reseachers	Consumers
	Development Agencies	Scientists/Reseachers			Scientists/Reseachers
END TARGET OF PLAYERS	**COMPETITIVENESS, PROFITABILITY, SUSTAINABILITY**	**COMPETITIVENESS, PROFITABILITY, SUSTAINABILITY**	**COMPETITIVENESS, PROFITABILITY, SUSTAINABILITY**	**COMPETITIVENESS, PROFITABILITY, SUSTAINABILITY**	**COMPETITIVENESS, PROFITABILITY, SUSTAINABILITY**



Theory of Value Chain Enhancement

Objectives | **Activities**

Improving Productivity
- Training and Education
- Access to Technologies
- Group Mobilization

+

Increasing Access to Inputs
- Feed, Medicine
- AI, Savings

+

Increasing Access to Market
- Collectors and Collection Systems
- Market Linkages, Value Addition

+

Enhancing Rules of Exchange
- Digital Fat Testing Meters
- Lactometers

+

Improving the Policy Environment
- Working with Government, IFC and Other Stakeholders

Tangible Outcomes
- Increased Revenues
- Reduced Costs
- Access to Capital and Resources

Intangible Outcomes
- Trust
- Risk and Uncertainty
- Knowledge and Skills
- Transparency

Incomes
Efficiency

Empowerment
Capabilities

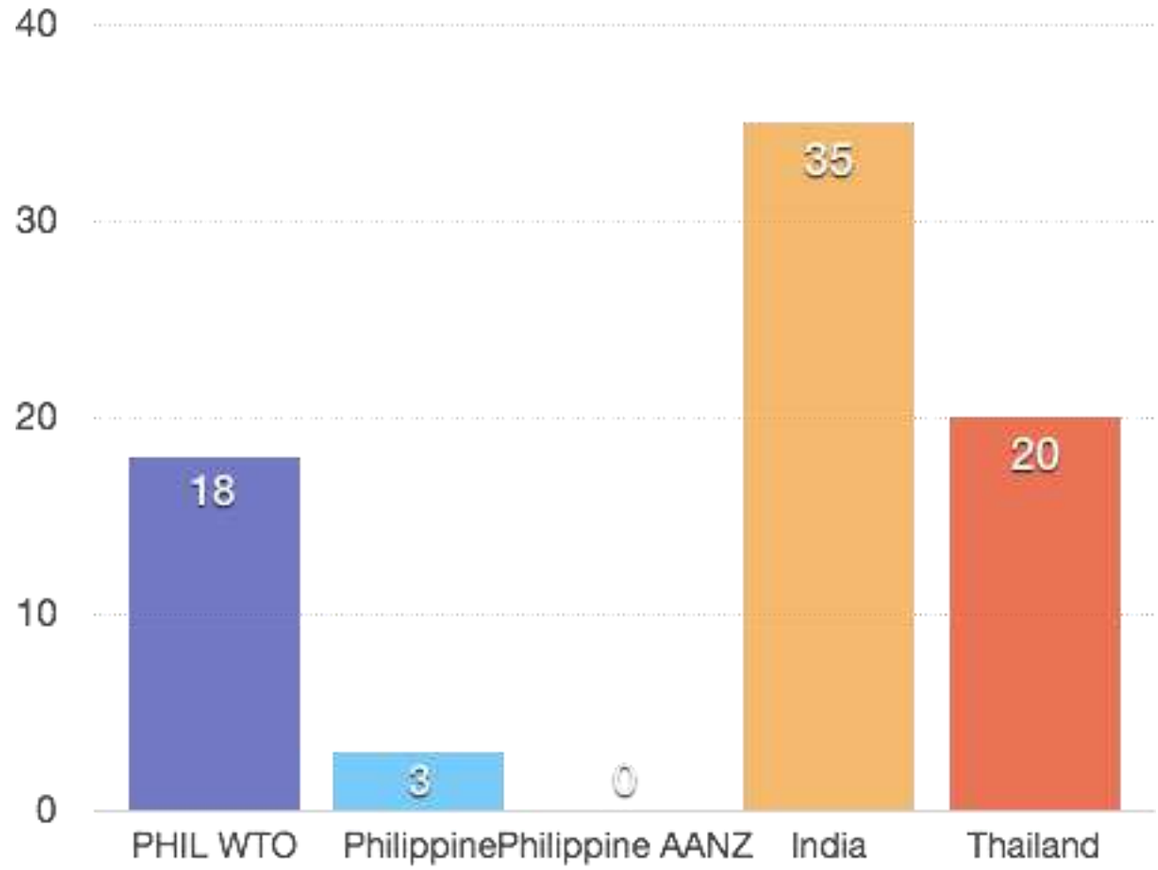
Poverty Alleviation

Priorities: Focus on the Poor | Gender Equity | Economic Sustainability | Natural Environment

enterprise environ 1

TARIFF ON IMPORTED MILK

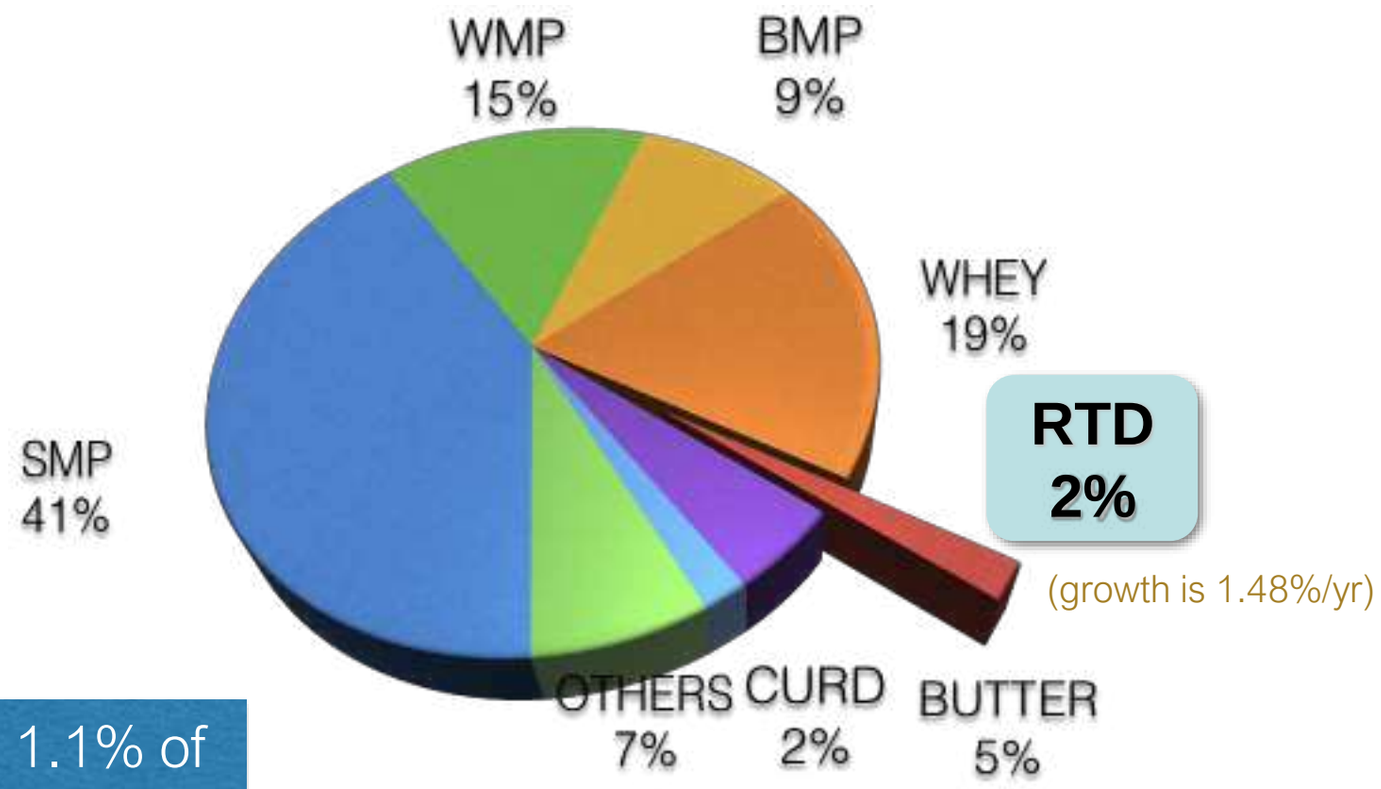
COUNTRY	TARIFF (%)
PHIL WTO	18
Philippine	3
Philippine AANZ	0
India	35
Thailand	20
Japan	21
China	20



Domestic Milk and Dairy Products Market

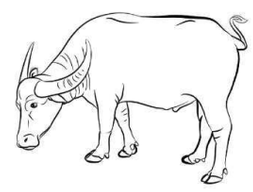
Philippines, 2016

- Volume of total import in LME = 1.79 B liters
  (growth is +1.63%/yr)
- Import is 84% Powdered Milk
  (growth is - 3.6%/yr)
- Average Annual Import =US$450.00
- Value of local Industry = P75B



Domestic Production is 1.1% of total supply; growth is 4.85%/yr

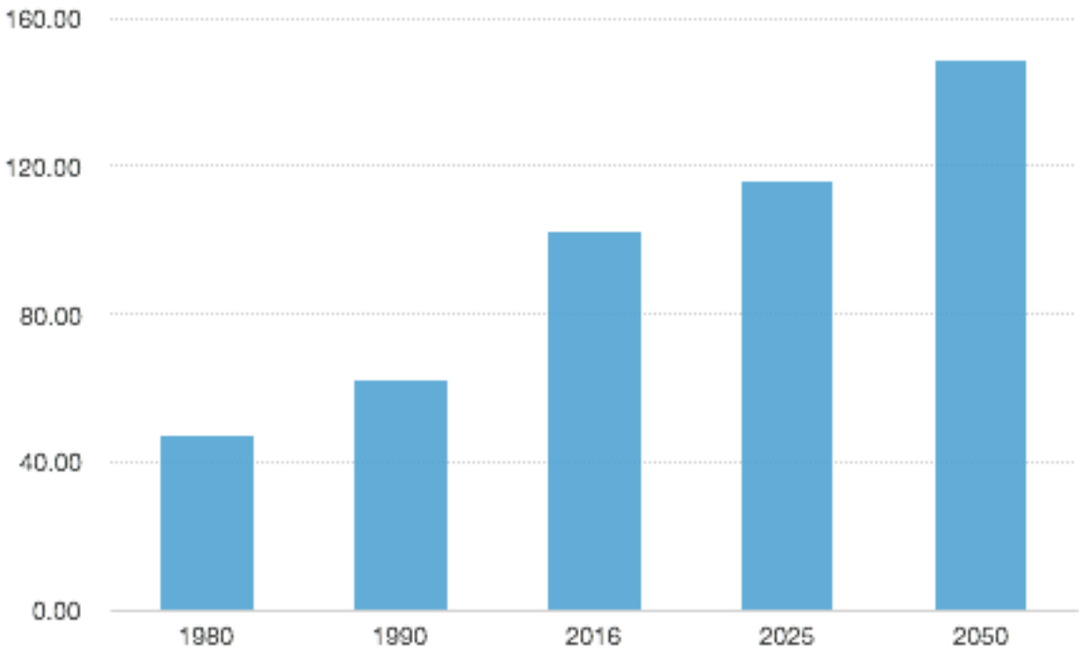
Competitive area is only 16% of total supply (P 3.6Billion)

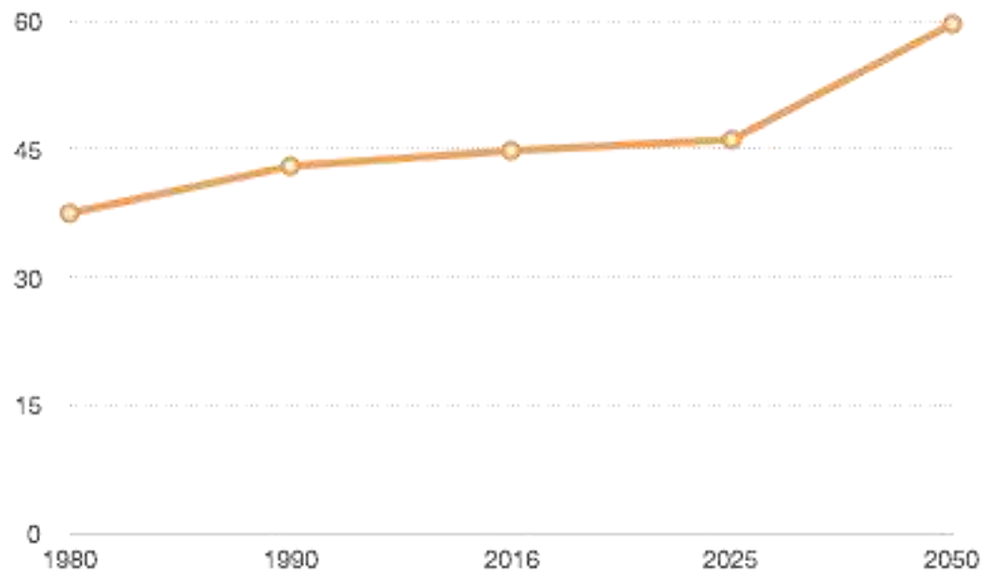


Self sufficiency (%), milk consumption (kg ME/caput)
Selected Countries, 2013

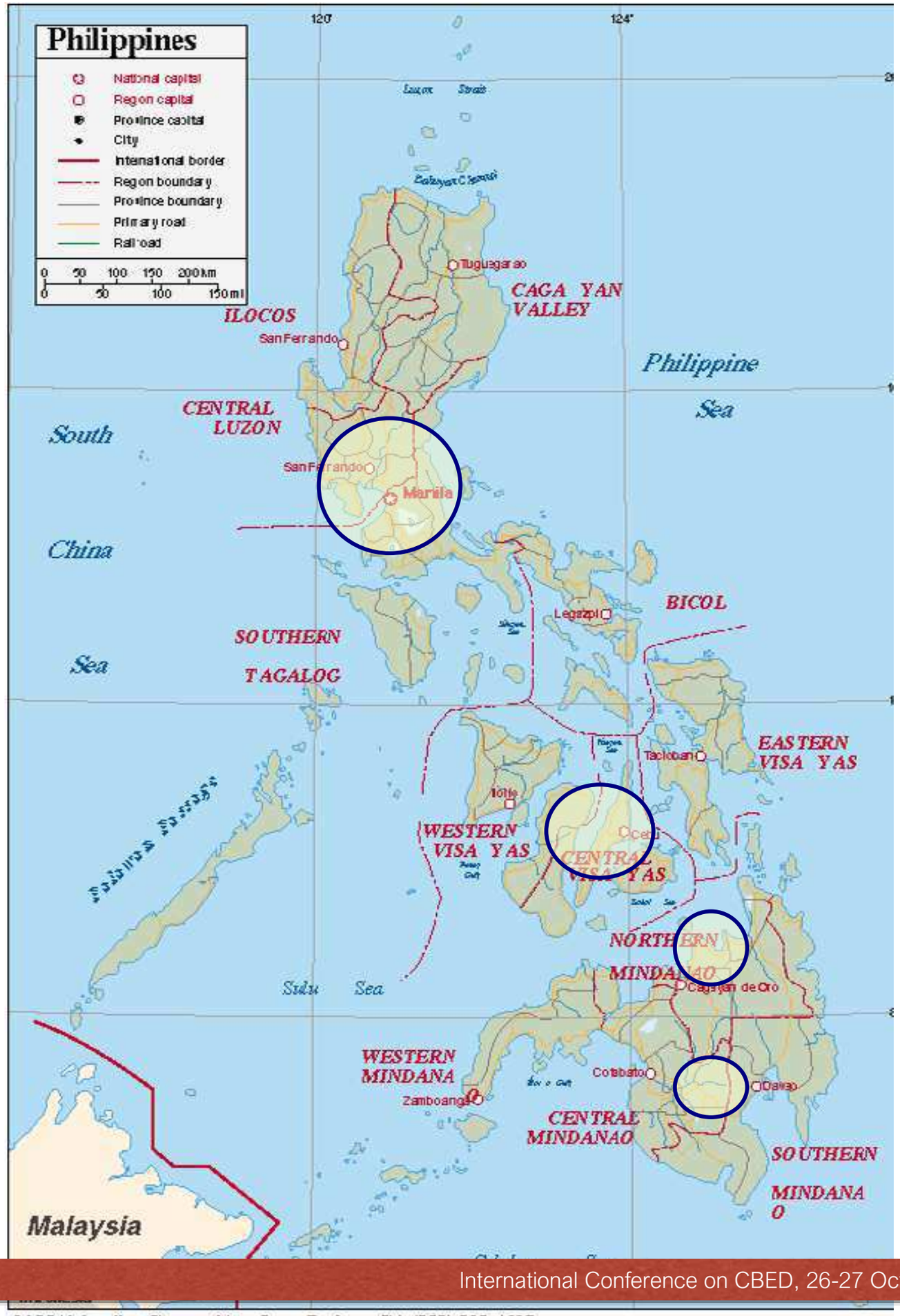
COUNTRY	SELF SUFFICIENCY, %	MILK CONSUMPTION (KG ME/CAPUT)
Australia	127	328
New Zealand	855	593
China	81	31
India	101	123
Indonesia	49	13
Japan	77	77
Korea	60	68
Malaysia	8	28
Philippines	1	13
Taiwan	31	50
Thailand	69	24
Vietnam	33	15

enterprise environ 4



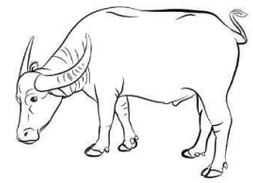


YEAR	HUMAN POPULATION (MILLION)	URBAN POPULATION (MILLION)
1980	47.30	37.5
1990	61.90	43.0
2016	102.20	44.8
2025	116.10	46.1
2050	148.20	59.6



✓ **Establish four DAIRY/BEEF ZONES linked with the urban markets**

- Metro Manila grid
- Cebu grid
- Cagayan de Oro grid
- Davao grid



Institutionalization of Carabao Development

Establishing ground for Genetic Improvement

Gene Pools
Indigenous breeds
Riverine breeds

Reproductive Biotech Labs
ET, IVM/IVF, OPU, ICSI, SCNT

Genetic Evaluation System
BIUP, MAS

Cryobanking of AnGR
Semen, Oocytes, Embryo, Cells/Tissue, DNA

Superior Germplasm Utilization
AI, Bull Loan

Support to Business Process

Research

Extension services

Cooperatives

Credit system

Collection Centers

Marketing assistance

Backcrossing to the 4th Generation

Swamp (S) 100 % x Murrah (M) 100%

F_1 SM (50:50)

SM x M (25 : 75)

SMM x M (12.5 : 87.5)

SMMM x M (6.25 : 93.75)

Providing the basics

public actions to allow poor livestock producers to have secure and adequate access to basic production inputs;

a) genetics (live animals and frozen semen)
b) technology
c) risk coping mechanism

GENETIC IMPROVEMENT

- ✓ **Establish Gene Pool of Murrah (Dairy)**
- ✓ **Establish gene pool of Indigenous Water Buffalo**
- ✓ **Establish gene bank (semen, embryos, somatic cells)**

GENETIC IMPROVEMENT (Utilization)

✓ **Massive AI in cooperation with**

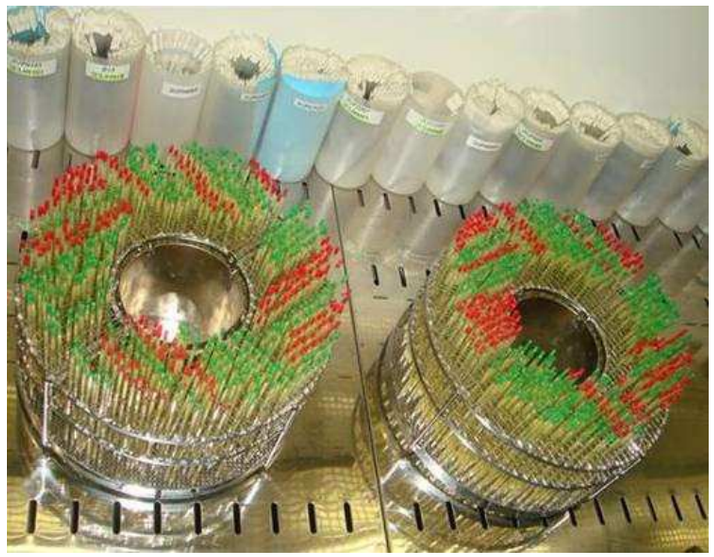
- **LGUs**
- **Village-based private technician**

(with PCC conducting training of AI tech, processing/distribution of high genetic semen, technical assistance)

✓ **Massive bull loan (dairy breed bulls) in cooperation with LGUs, FAs & coops**

Enhancing dairy/meat based enterprises

REPRODUCTIVE BIOTECHNIQUES

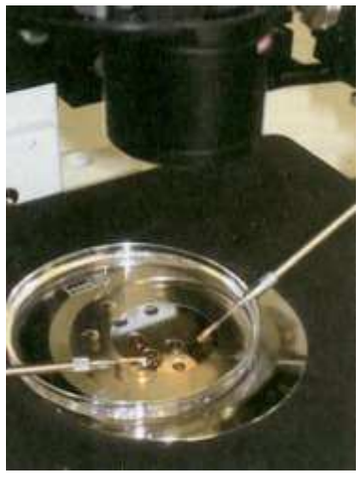


1. Artificial Insemination

a). Cryopreservation of semen
(allow expanded usage of superior males and for indefinite period)

b). Estrus synchronization
(enable breeding many females at pre-determined time)

c). Sperm sexing – (predetermined sex)



2. Embryo Technologies

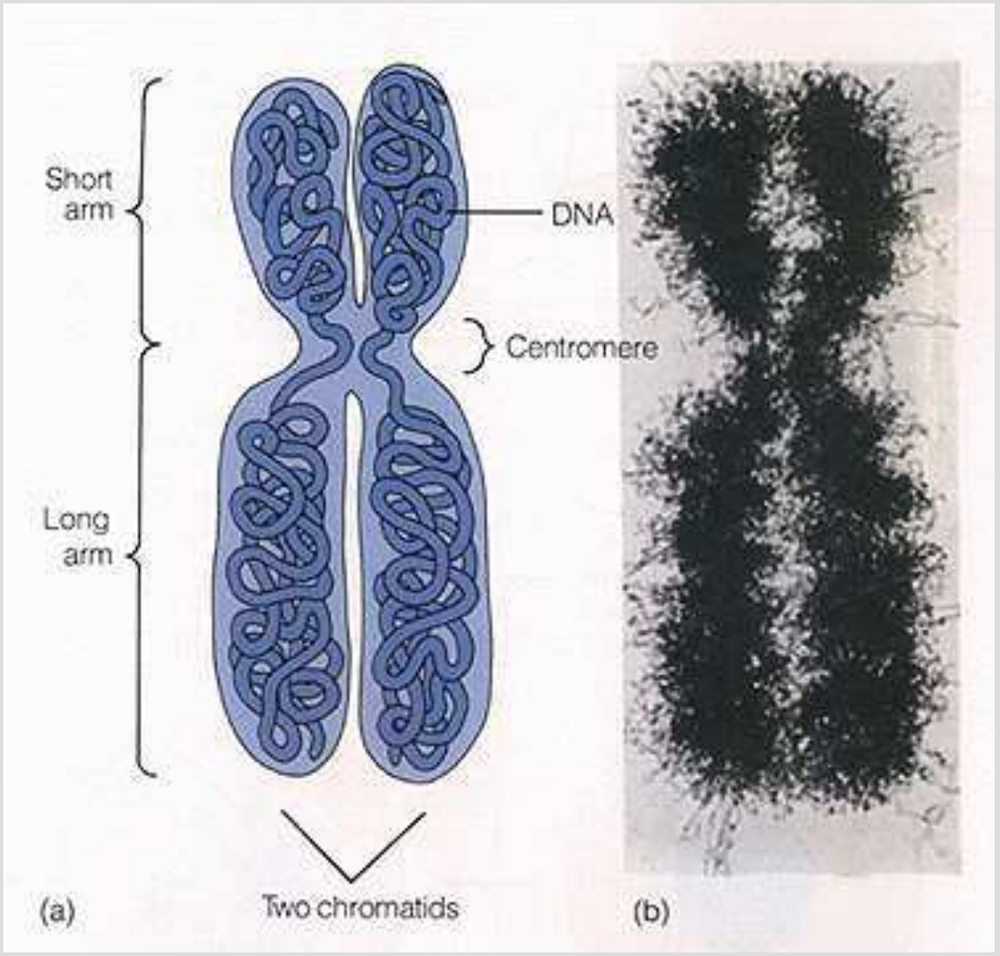
a). Superovulation and Embryo Transfer (goat & cattle) for faster multiplication of superior stocks

b). Cryopreservation of oocytes, IVM/IVF & OPU (dairy cattle & dairy buffalo)

For production of purebred stocks (oocytes from US Holstein Freisein and oocytes of Buffaloes from India

3. AnGR Cryobanking (genetic diversity & conservation)

DNA-Based Technologies



DNA Marker Assisted Selection significantly shorter the time to select best animals

DNA-based diagnostics for FMD, mastitis, etc. (to reduce risks of diseases

For Imported Genetics

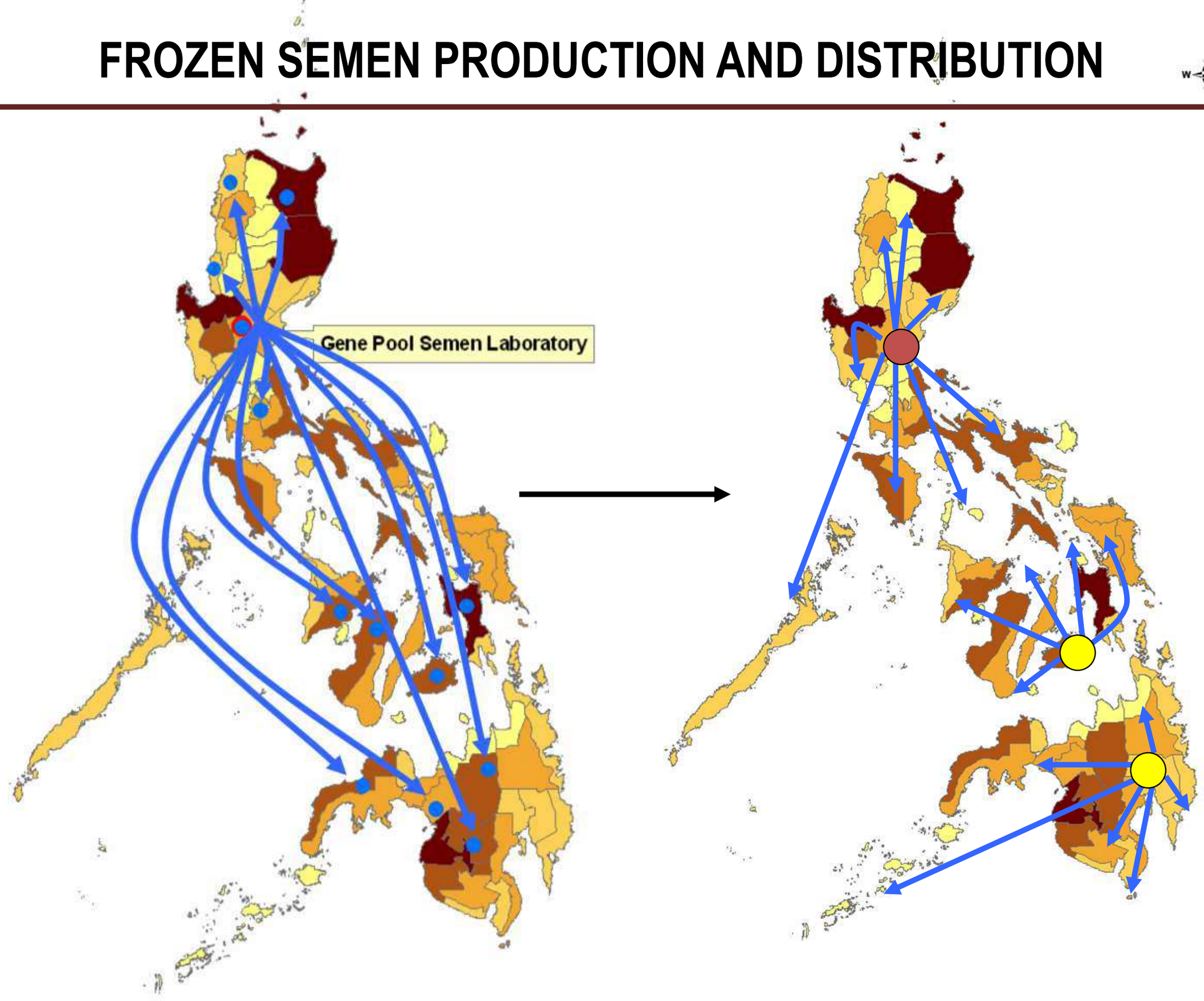
DNA-based screening for genetic defects

BLAD in cattle (poor reproduction)
PPS for swine (poor quality pork)
SCRAPIE for goat (high mortality)

For Export of Product

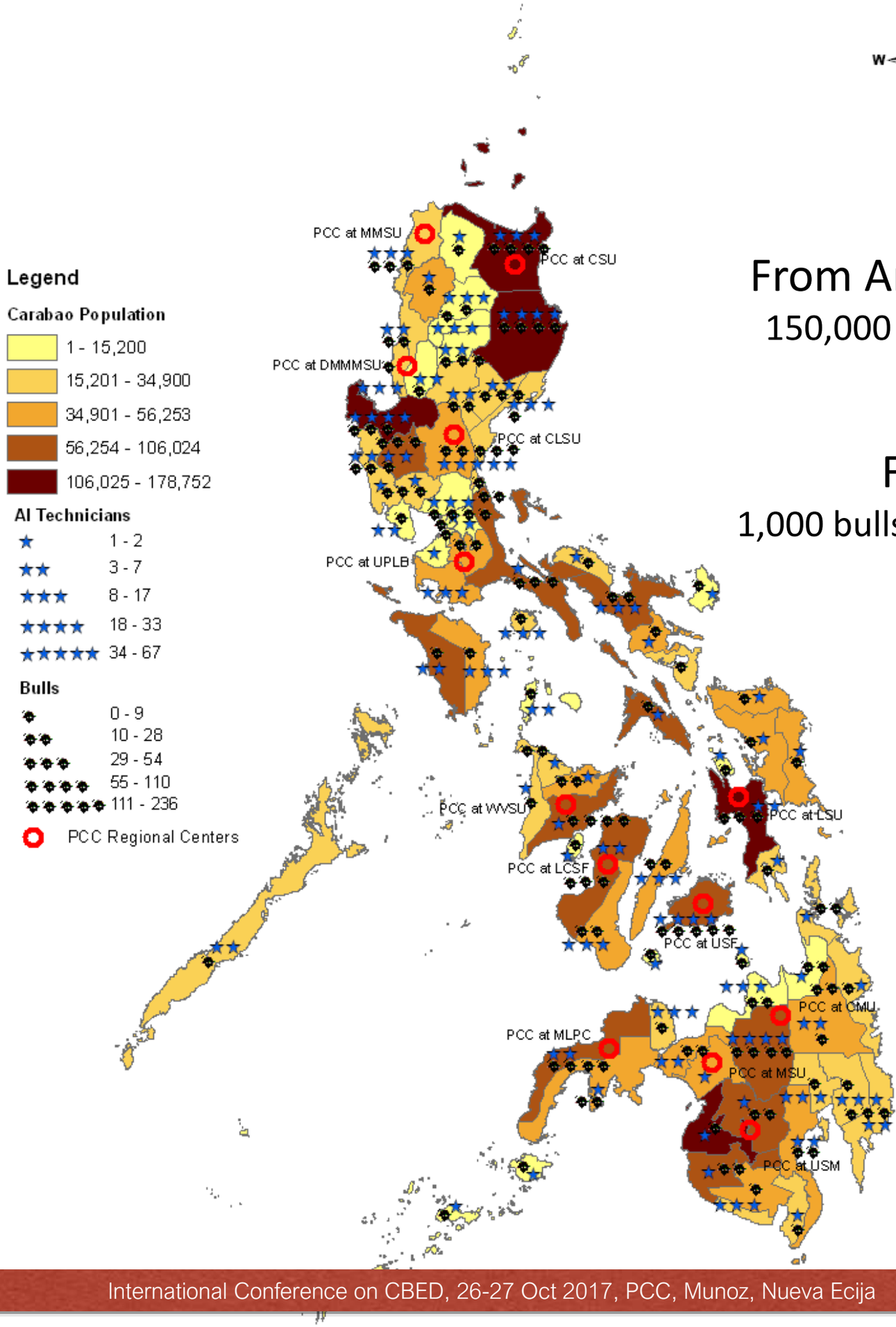
DNA-based traceability

FROZEN SEMEN PRODUCTION AND DISTRIBUTION



2.9 M Total Carabao Population

AI techs target is 2000



From Artificial Insemination

150,000 to 350,000 services/year

From Bull Loan

1,000 bulls on loan and new 250 bulls every year

Kick-start the Market

public actions to allow poor livestock producers to exploit market opportunities;

a) training on milking, milk handling
b) training on processing
c) credit on milk collection equipment
d) support to milk collection centres
e) support to value adding (milka krem)

beyond technologies

CREATING ENTERPRISES for SMALL HOLDERS

DAIRY VALUE CHAIN

FARMERS

- Declining water resources
- Higher incidences of diseases and pests
- Reduction in availability of water and feed inputs resulting in reduction in production and quality of milk
- Inadequate knowledge of farmers about climate risks
- Heat stress for the exotic cow breeds
- Impact of climate change on land use
- New irrigation schemes/ Water harvesting
- Tactical disease control
- Encourage farmers to form cooperatives
- Introduce improved cow breeds that are resilient to climate change
- Biogas
- Introduce feeds which are easy to digest and produce less methane

DAIRY COOPERATIVES

- Process milk at the farms
- Deterioration in milk quality as a result of rising temperatures
- Provide support to cooperatives

TRADERS (RURAL)

- Breakdown in road infrastructure resulting in delays in transporting milk from farms
- Floods
- Inconsistent supply of milk due to erratic climatic conditions- markets can't function properly

Periodic risk assessment of changing climate risks

COLLECTION POINTS

- High intensity rainfall could render roads impassable, preventing timely delivery of fresh milk
- Add collection points in new locations

WHOLESALERS

- Poor quality milk and milk products due to low productivity
- Sell/purchase milk by grade to encourage quality production
- Rising emissions from wholesalers
- Road infrastructure deterioration due to extreme events
- Improved infrastructure development

PROCESSING

- Increasing use of energy to cool milk due to higher temperatures
- Increased cost of cooling
- Green processing - making use of renewable energy

DISTRIBUTION

- Increasing incidents of floods pose a risk to infrastructure
- Sectoral linkage with Ministry of Works to design climate-smart infrastructure

REGIONAL EXPORTS

- Climate impacts on neighbouring countries resulting in a change in demand and/or prices

RETAIL

- Low sales because of reduced production
- Less attention to quality standards due to declining quality and quantity of milk being produced
- Enforce regulations on quality control

CENTRES

VENDORS

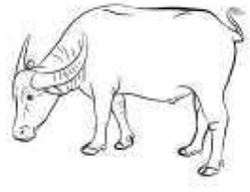
CONSUMERS

- Poor nutrition due to increasing cost/ declining availability of milk and milk products
- Promote alternative nutrient sources

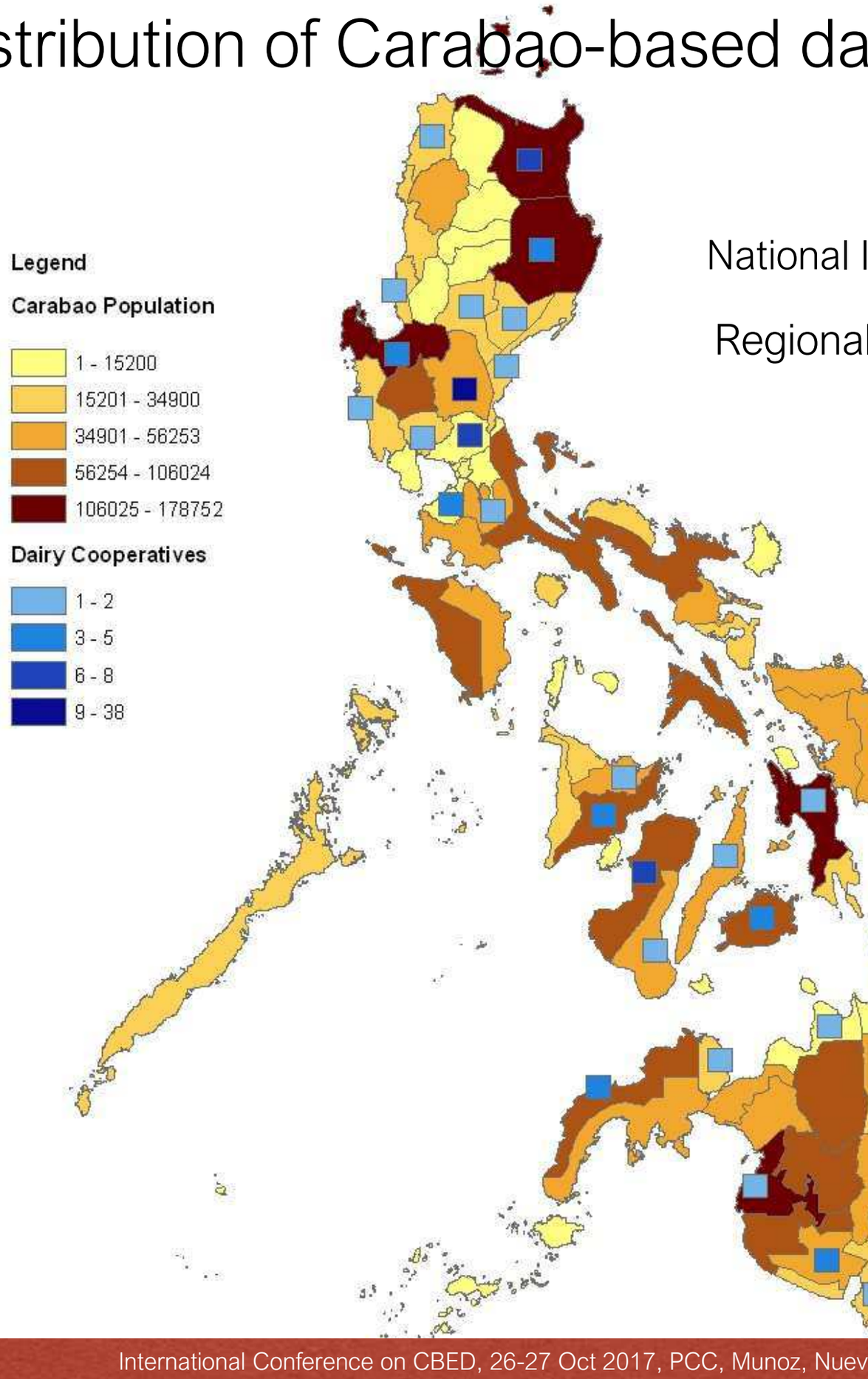
KEY:

- Climate change risks
- Climate change opportunities

CDKN Climate & Development Knowledge Network

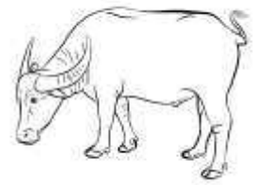


Distribution of Carabao-based dairy coops



National Impact Zone = 74 coops

Regional Impact zone = 190 coops



Milk producers
and
milk collectors
and
processors

variety of buffalo derived products


NOW OPEN!
Dairy Delicatessen
Dairy BOX

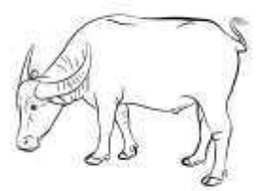

Dairy BOX


DVF
DAIRY FARM
The Healthy Tradition
DVF
DAIRY FARM
Pasteurized
Gatasing
KALABAW
carabao's milk

variety of products , packaging and brands

Milka Krem was established to link the smallholder producers to commercial market that demand quality and safety, good packaging, sustainability of supply, among others

the scheme is to pay smallholder producers added price on top of the farm gate price right away (derived from the value adding activities)



buffalo meat -derived processed products

a new entrepreneur with focus on feed base supply, contracting smallholder farmers to plant corn for silage for dairy buffaloes

Summary of International collaborations related to transformation of swamp buffaloes from draft to milk and meat in the Philippines.

Theme	Institution/Entity	Date	Area of Collaboration
Genetics	Govt of India	1917 to 1956	Live Animals, Murrah (854 hd at various years)
		1982 to 1985	Frozen Semen, Murrah (3000 doses)
	Govt of Pakistan	1981 to 1987	Frozen Semen of Nili Ravi (3000 doses)
	FAO-UNDP	1982 to 1992	Research on Crossbreeding between swamp x riverime
	FAO	1994	Risk assessment on importation of live animals from India
	Govt of Bulgaria	1995 to 1999	Live Animal Importation, Bulgarian Murrah (3142 hd various years)
	Govt of Brazil	2010	Live Animal Importation, Murrah Breed (2038 hd)
	Govt of Italy	2013	Live Animal Imporation. (1200 hd, Mediterranean breed; 4000 straw of frozen semen)

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Theme	Institution/Entity	Date	Area of Collaboration
System Development and Utilization of Genetics	Japanese Govt thru JICA	2000 to 2005	Genetic Improvement, AI improvement, Semen Processing
	Australian Govt thru ACIAR	1999 to 2004	Genetic Improvement focused on Animal ID, recording system and data analysis
	Korean Govt thru KOICA	2010 to 2012	Cryobanking of AnGR, DNA based biotechnology, Semen Processing
	US Govt thru its PL480 Program	2010 to 2013	Research and Development, Biotechnology Laboratories, Human Resource Development
	Taiwan Livestock Research Institute	2008 to date	DNA-based technologies, Screening of Genetic Defects, Cryobanking
	USDA	2012	Human Resource Development focused on Cryobanking of AnGR
	International Buffalo Genome Consortium	2011 to date	DNA-based MAS, Buffalo Genome
Enterprise Development	Japanese Govt thru it 2KR fund	2010 to 2013	Dairy Product Processing, Establishment of Milk Collection Scheme for smallholders
	Korean Govt thru KOICA and KAPE	2010 to date	Product Development, Product Standard, Product Traceability

Expanding the Market

long-term public actions that encourage and support the sustainable production of high quality and competitive products in a crowded market:

a) continuing research on animal production tech
b) research on improving feed base
c) continuing genetic improvement program
d) addressing quality standards
e) strengthening producers cooperatives
f) certification and grading
g) environmental protection
h)strengthening institutions

Approach: Solution-driven R4D to achieve impact

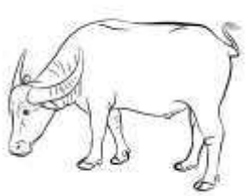
#1: Addressing the whole value chain

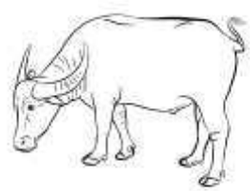
#2: Working directly to design and support intervention at scale

#3: In partnership with development actors

R4D integrated to transform the whole value chain

competitiveness profitability sustainability





Funding Agencies

unfinished homework

Basic to the carabao-based enterprise development (milk and meat) is creating the **critical production base,** appearing to be the current major limitation. The challenge to achieve this is considerable considering the slow rate of reproduction and the time needed to genetically upgrade the existing population to achieve acceptable level of productivity.

Bold Government support is needed to entice private partners to invest in herd-build up and enterprise development. Dedicated livestock credit window with relatively low interest rate and a national milk feeding program are essential push and pull factors.

The Philippine Carabao Center should seize the opportunity to take the lead in **increasing its internal and partners' (essentially the LGUs) capacities** in developing human resources attuned to the requirements of the enterprise, both in research and in extension

Serious efforts should be channelled to increasing per capita consumption among young through the school milk feeding program. This is the future market of domestic fresh milk. This is benefitting the dairy sector by way of expanding the market and at the same time creating a better and healthy generation

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Take Home Message

➢There are enough compelling reasons on the need to harness the huge existing swamp buffalo population to address socio-economic concerns of rural farming communities in most of South East Asia

➢There are enough scientific data and sufficient field experience to indicate that crossing and backcrossing swamp buffaloes with riverine breeds is feasible

➢For **wide-scale** and **sustainable** crossbreeding and backcrossing, it is essential to set-up needed institutional mechanism; **Legislation** of national Policy

➢Research and Development to improve productivity, and Support to enterprise development aimed at improving market access by smallholders is critical for sustained growth and development

➢International collaborations in the areas of germplasm and technology sharings will hasten the envisaged development


THANK YOU!