SMART FEEDING PRACTICES OF BUFFALOES FOR IMPROVING CARABEEF AND MILK PRODUCTION IN THE PHILIPPINES

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Status of Phil. Agriculture
Carabao industry scenario
Carabao development program
Requisites in carabao farming
Smart feeding practices to increase carabeef and milk of carabaos
Conclusion
THE PHILIPPINES

- An archipelago of 7,107 islands
- Total area = 297,170 km²
- Total population is 102.3M
- Annual growth rate of 1.45%
"It is my moral obligation to provide available and affordable food for my people."

- Rodrigo Duterte
FOOD SECURITY AND SUFFICIENCY

- The Philippines ranks 74th globally as regards the level of food security index,

- The food affordability which is defined as the quantity of stuff consumed as a share of household expenditure accounts to 44.2%.

- The food availability (sufficiency) and quality or safety had category scores of 53.4 and 54; respectively,

Source: (Dupont, 2016 in Food Security Index).
Agriculture sector gained 5.28% in January-March 2017 with a gross earning of P407.6B (8.79% higher than 2016).

The crop sub-sector gained 8.28%, contributes 53.66% of total agricultural production valued at 233.5B (10.45% higher than 2016).
Livestock production increase by 3.22%, gross value of P65.4 B (16.85% of the total agri-output)

a. Hog - up by 5.47%, gross value P60.0 B

b. Poultry - up by 1.88%, gross value of 52.9 B

c. Fishery - up by 0.73%, gross value of P55.7B

Source: PSA, 2017
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carabao, hd</td>
<td>2,847,111</td>
<td>2,854,838</td>
<td>2,877,111</td>
<td>0.26</td>
<td>0.78</td>
</tr>
<tr>
<td>Cattle, hd</td>
<td>2,512,184</td>
<td>2,534,243</td>
<td>2,553,383</td>
<td>0.88</td>
<td>0.75</td>
</tr>
<tr>
<td>Dairy Animals, hd</td>
<td>40,322</td>
<td>41,781</td>
<td>44,432</td>
<td>3.62</td>
<td>6.34</td>
</tr>
<tr>
<td>Cattle, hd</td>
<td>21,605</td>
<td>22,498</td>
<td>24,512</td>
<td>4.13</td>
<td>8.95</td>
</tr>
<tr>
<td>Buffalo, hd</td>
<td>16,829</td>
<td>17,299</td>
<td>17,802</td>
<td>2.79</td>
<td>2.91</td>
</tr>
<tr>
<td>Goat, hd</td>
<td>1,888</td>
<td>1,984</td>
<td>2,118</td>
<td>5.08</td>
<td>2.75</td>
</tr>
<tr>
<td>Goat, hd</td>
<td>3,695,627</td>
<td>3,674,186</td>
<td>3,663,170</td>
<td>-0.58</td>
<td>-0.30</td>
</tr>
<tr>
<td>Poultry, hd</td>
<td>167.67</td>
<td>176.47</td>
<td>178.77</td>
<td>5.25</td>
<td>1.30</td>
</tr>
<tr>
<td>Swine, hd</td>
<td>11,801,656</td>
<td>11,999,722</td>
<td>12,477,711</td>
<td>1.68</td>
<td>2.98</td>
</tr>
</tbody>
</table>
BIENNIAL LIVESTOCK AND POULTRY INVENTORY FROM 1980 TO 2012

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

- Carabao
- Cattle
- Goat

Bureau of Agricultural Statistics
BUFFALOES AS PRODUCER OF FOOD, FEED AND FUEL

RUMEN MANIPULATION TO MITIGATE GHG EMISSION

MILK  MEAT  PROBIOTICS  BIOGAS  ETHANOL  FERTILIZER
PURPOSE OF RAISING CARABAOS

Dairy Farming
- **Cow** producing 8-10 kg milk/d or 2,400-3,000 kg in 300 days

Cow-calf operation
- **Calving** every 1 ½ yrs. or 13-14mo. **calving interval**

Fattening
- **ADG** of ≥1kg/d
- **Fattening period-** 4-6 mo.
I. GENETIC IMPROVEMENT
* GENE POOL
  Riverine Buffalo    Swamp Buffalo
* CROSSBREEDING (UPGRADING)
    Artificial Insemination
    Bull Loan

II. CARABAO-BASED ENTERPRISE DEVELOPMENT
- Cooperative Development/ Organized Farmers group
  - Credit
  - Dairy Hub – Collection, Processing, Market Assistance, Ancillary enterprises

III. RESEARCH 4 DEVELOPMENT
WHO IMPLEMENT THE CARABAO DEVELOPMENT PROGRAM?

- The Philippine Carabao Center (PCC) was created by virtue of RA 7307 in 1992 and became operational in 1993.
- Lead agency in carabao R for D in livestock biotechnology researches.
- Goal is better nutrition, higher income and improved general well-being of rural farming families, thru the conservation, propagation and promotion of carabao for milk and meat, draft power and hide.”
The Philippines has 2.89 M carabaos with a growth rate of 0.47% annually. The volume of production is 70.37 thousand metric tons with gross value of Php113,270 M.

The volume of production is reduced by 1.65% and a farm gate price of P74.10/ kg LW, up by 4.34% vs. 2015.
CARABAO AS PRODUCER OF MILK

2016 Dairy animal population - 44,432 hd.

Cattle- 24,512 hd
Carabao-17,802 hd
Goat – 2,118 hd

2016 Milk Production = 20.39M li.

Cattle- 12,928.5 M
Carabao- 7,121.8 M
Goat – 335.8 M

2015 Milk Import = 1,793.29 MT.

Value of Import = US$ 876.02
**Status of the Dairy Industry**

- Milk demand: 1,760.01 MT
- Milk import: 1,740 MT
- Local milk production: 20.01 MT
- Sufficiency: 1.4%

**Exporter of milk/dairy products**

- New Zealand: 27.8%
- USA: 30.1%
- Australia: 6.7%
- Others: 35.5%

**Value (P 40.3 B)**

$876.2 M

**84% of imported in powdered milk**

**2016**

- Skim Milk Powder: 41%
- Whole Milk Powder: 15%
- Butter Milk Powder: 9%
- WHEY: 19%
- BUTTER: 5%
- CURD: 2%
- OTHERS: 7%
- RTD: 2%
SUPPLY AND DEMAND FOR MILK

Demand and production of milk and dairy products

- Demand = 1,760 MT annually
- Local production = 20 MT. from 18,611 cows on line
- Deficiency (import) = 1740MT
- Value of milk import = US$ 876.2 M or P40.30 B.
- Current per capita milk consumption = 19 li/yr
- Required per capita consumption = 30 li/yr

Animal requirement to meet 100% sufficiency for milk

- 67,539 hd dairy cattle producing 2000 kg/lactation, (63.6%)
- 62,736 hd buffaloes producing 1,200 kg/lactation, (35.7%)
- 8,120 hd of goat producing 500 kg, annually, (1.6%)

Needed Solutions

- Stock infusion (importation)
- Increase breeding efficiency/proper calf rearing
- Proper Nutrition/ Biosafety
## PROBLEMS ON SEASONALITY OF FORAGE SUPPLY

<table>
<thead>
<tr>
<th>Season</th>
<th>Availability</th>
<th>Effects on animal</th>
</tr>
</thead>
</table>
| Summer (Dec-May) | Limited & poor quality grasses | » Reduce ADG 60-100g/d  
» Reduce Milk production  
» Reproductive problem |
| Rainy (June-Nov) | Abundant grasses but not fully utilize | » ADG of 150-300 g/d  
» Milk yield of 4 kg/d |
### REQUISITES TO ENHANCE CARABEEF AND MILK PRODUCTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Farm land m. ha.</th>
<th>Est. DM yield t/ha/yr</th>
<th>Carrying capacity, a.u./ha/yr</th>
<th>No. of animals ‘000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native pasture</td>
<td>1.5</td>
<td>3.65</td>
<td>0.4</td>
<td>600</td>
</tr>
<tr>
<td>Rice land</td>
<td>3.2</td>
<td>5.48</td>
<td>0.6</td>
<td>1,920</td>
</tr>
<tr>
<td>Corn land</td>
<td>2.3</td>
<td>18.25</td>
<td>2.0</td>
<td>4,600</td>
</tr>
<tr>
<td>Sugar cane land</td>
<td>0.3</td>
<td>4.56</td>
<td>0.5</td>
<td>132</td>
</tr>
<tr>
<td>Coconut land</td>
<td>3.4</td>
<td>3.65</td>
<td>0.4</td>
<td>1,360</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>8,612</strong></td>
</tr>
</tbody>
</table>
CURRENT FEEDING PRACTICES OF CARABAOS

- Farmers practice mix feeding systems
  a. Grazing/tethering = 22%
  b. Grazing/ Cut and carry = 60%
  c. Complete confinement/ (cut and carry only) = 18%
SMART FEEDING PRACTICES

AN APPROPRIATE FEEDING IS A MUST!!!

TO IMPROVE CARABEEF AND MILK PRODUCTION OF CARABAOS
AIM:
- Sustainable year-round supply of quality forages
- Develop complete nutrients diet
- Increase growth, reproduction and milk yield
- Reduce incidence of Fascioliosis
- Increase income
ENRICHMENT OF FARM BY-PRODUCTS

UREA TREATED RICE STRAW
# Preparation and Feeding of UTRS

<table>
<thead>
<tr>
<th>Item</th>
<th>Target</th>
<th>Actual</th>
</tr>
</thead>
</table>
| Dairy buffalo cooperatives assisted           | 100    | 1. Kapitbahayan sa Mabini Dairy Coop  
                                            |        | 2. Casile Dairy Producers Coop  
                                            |        | 3. Punla Multi-purpose Dairy Coop  
                                            |        | 4. Bosque Primary Multi-purpose Coop  
| No. of dairy farmers assisted                 | 300    | ➢ 90 dairy farmers (by the project)  
                                            |        | ➢ 26 dairy farmers (new adopters) |
| UTRS Produced                                 | At least 2,000 tons | ➢ 2,203.5 tons (by 3 cooperatives) |
| Number of farmers trained/Actual Demo on UTRS| 300    | ➢ 369 farmers from Northern Luzon trained on UTRS production |
BENEFITS OF FEEDING UTRS IN CARABAOS

Nutrient Composition
- Increase protein content from 4.4% to 7-9%
- Increase potential digestibility for 47% to 55-57%
- Improve feed intake by 12%

UTRS for meat production
- Improved ADG from 250 g to 428 g for crossbred buffaloes
- Benefits of 17% US$ 400/ hd in 6 months feeding

UTRS for milk production
- Improved milk production from 777li to 924li in 210 days lactation (18% increase)
- Increase income from US$ 425 to $ 555 (33.18% increase)
TECH-COM FOR FORAGE CORN SILAGE
<table>
<thead>
<tr>
<th>Market</th>
<th>Type of Animals</th>
<th>Approximate number of animals</th>
<th>Total weight of corn silage marketed (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCC institutional herds in Nueva Ecija and Laguna</td>
<td>Buffaloes</td>
<td>2,600</td>
<td>1,268,688</td>
</tr>
<tr>
<td>Dairy cattle farmers in Nueva Ecija</td>
<td>Buffaloes</td>
<td>35</td>
<td>49,230</td>
</tr>
<tr>
<td>Commercial dairy cattle farms in Quezon, Batangas, Pangasinan, and Nueva Ecija</td>
<td>Cattle</td>
<td>1,600</td>
<td>1,048,943</td>
</tr>
<tr>
<td>Farms in Nueva Ecija and Tarlac</td>
<td>Goat</td>
<td>1,030</td>
<td>34,516</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>2,401,377</strong></td>
</tr>
</tbody>
</table>
EFFECTS OF FLUSHING WITH CONCENTRATE SUPPLEMENTATION IN CARABAOS

**Animal Description**
- Bulgarian buffaloes
- 3rd calving
- BCS between 2.5-3

**flushing management**
- Supplementary concentrates --- 2 kg
- Given 1 mo. before calving up to 2 mo after calving (90 days flushing period)
- Forage offered ad libitum

**Breeding management**
- AI by VBAIT
- Natural mating
- PD

**Health management**
- Deworming
- Vaccination
EFFECTS OF FLUSHING ON MILK PRODUCTION AND CALVING INTERVAL IN CARABAOS

Milk Production

Calving interval

Legend:
- Without Flushing
- With Flushing

Benefit of flushing:
- W/ flushing = US$ 667
- W/o flushing = US$ 178
AUGMENTED FEEDING TO INCREASE MILK PRODUCTION

OBJECTIVES

- To manage the peak and lactation persistency
- Assess nutrient utilization and digestibility
- Evaluate post-partum reproduction
- Determine benefit derived

**Animals used**

- 25 hd Brazilian buffaloes
- Primiparous-pregnant buffaloes

**Dietary treatments**

1. Control diet
2. Augmented Feeding (AF)
3. AF + By-passed Amino Acid (BPAA)
4. AF + Slow released NPN (SRNPN)
5. AF + BPAA + SRNPN
HOW AUGMENTED FEEDING WAS INTRODUCED TO CARABAOS?

Feeds and feeding management

» Complete confinement
» Roughages: Corn silage & rice straw
» Supplementary concentrates
  ✓ Control diet = 4kg/hd/day for maintenance and lactation

✓ Augmented feeding (AF) = 4kg/hd/day + 0.5kg concentrate for every 1 kg increase in milk production
## PERFORMANCE OF CARABAOS THROUGH AUGMENTED FEEDING

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No augmented feeding</td>
</tr>
<tr>
<td>Peak-milk, kg/d</td>
<td>8.4</td>
</tr>
<tr>
<td>Average peak-day</td>
<td>78</td>
</tr>
<tr>
<td>Adjusted 305d milk yield, kg</td>
<td>1120.9</td>
</tr>
<tr>
<td>% Lactation Persistency</td>
<td>93.6</td>
</tr>
</tbody>
</table>

### BENEFIT OF AUGMENTED FEEDING

Php = 11,223 vs Php 25,881  
US$ = 226/cow vs. US$523/cow
EFFECTS OF FEED ENHANCERS TO CARABAOS

- Influence of by-passed amino acids
  - Increase peak of milk production; 12.5 vs. 8.4 kg/d
  - Increase milk fat; 9.72% vs. 7.04%
  - Increase milk protein; 5.00% vs. 4.33%
  - Increase total milk solids; 19.98% vs. 16.15%

- Effects of feeding by-passed fat to dairy buffaloes
  - Increase peak of milk production
  - Overcome the problem of negative energy balance during the early stage of lactation
  - Decreases metabolic disorders (ketosis, acidosis and milk fever)
FEEDING TOTAL MIX RATION for CARABAOS

Total Mixed Ration

- A well balance ration offered to the carabaos
- It contains roughages, concentrates, vitamins and minerals
- Offers less risk of acidosis and helps avoid low pH problems in the rumen,
- Better digestion of nutrients
- Increase in milk production and better milk composition.
CONCLUSION

- Carabaos are potential sources of carabeef and milk in the Philippines contributing 76% of the carabeef supply and 35% of the annual domestic milk production.

- Enhancing carabeef and milk from carabaos:
  - Establishment of tropical feed libraries and feeding standards,
  - Capacitating carabao farmers thru the farmer livestock school (FLS)
  - Adoption of S & T-based farm or smart feeding interventions by the livestock farmers
  - Provision of logistical supports to carabao farmers
Scenario during Rainy Season

Philippine is the typhoon path of Asia.

- In 2015 .....14 typhoons hit the country,
  ..... 5-7 typhoons were destructive.
  ..... 116 lives lost
  ..... damages in agriculture was P18.2 billion
  ..... damages to livestock accounts P2.8 billion.

Figure 3. Rainfall pattern in the Philippines in 2015
Scenario during Dry season


Temperature ranges from 32 to 42°C

Highest Temperature Index of 53.05 °C

Damaged to Agriculture
Php 4.77 or US$ 1.04 B
The Philippines ranks 6th in the region as regards world total GhG emission with a share of 0.31%. GhG emission was below 200 Mt CO₂ with annual increase of 3.25% for the past 20 yrs.

Global and Philippine GhG Emissions, Mt CO₂ 1990-2010

Source: European Commission JRC/PBL, EDGAR.
Philippines
climateactiontracker.org/countries/philippines.html

History:
• 2015

Rating
ANNUAL METHANE EMISSION FROM LIVESTOCK PRODUCTION

Figure 1. Annual Methane Emission from Enteric fermentation and Manure management

EF—Enteric fermentation  MM ---Manure management

0.78% Annual increase in GhG emission

EF  MM  TOTAL

2014  2015  2016

ANNUAL METHANE EMISSION FROM LIVESTOCK PRODUCTION
CARABAOS AS EMITTERS OF GhG

Carabaos emit GhG: Carbon dioxide… Methane …..55Gg/ yr. Nitrous oxide…

Methanogenesis