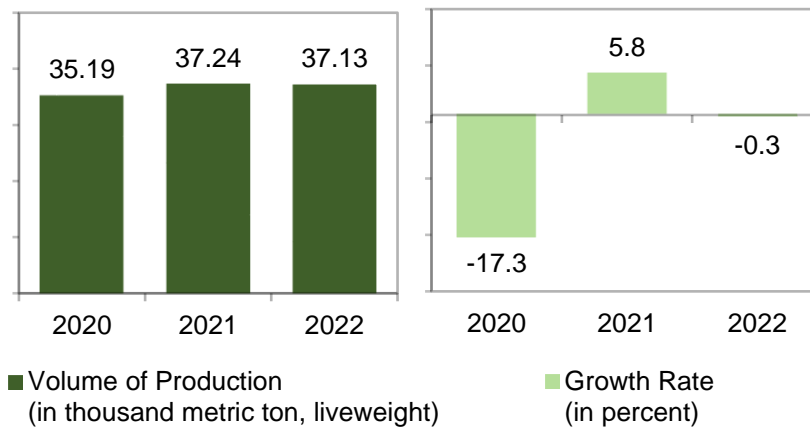


SPECIAL RELEASE

CARABAO SITUATION REPORT October to December 2022

Date of Release: 21 February 2023
 Reference No. 2023-SSO-019

Figure 1. Volume and Annual Growth Rate
 of Carabao Production, Philippines
 October to December 2020-2022^P



^P- preliminary

Source: Philippine Statistics Authority, Backyard Livestock and Poultry Survey (BLPS), and Commercial Livestock and Poultry Survey (CLPS)

Total carabao production from October to December 2022 was estimated at 37.13 thousand metric tons, liveweight. This indicates an annual decline of -0.3 percent relative to its same quarter of the previous year's level of 37.24 thousand metric tons, liveweight.

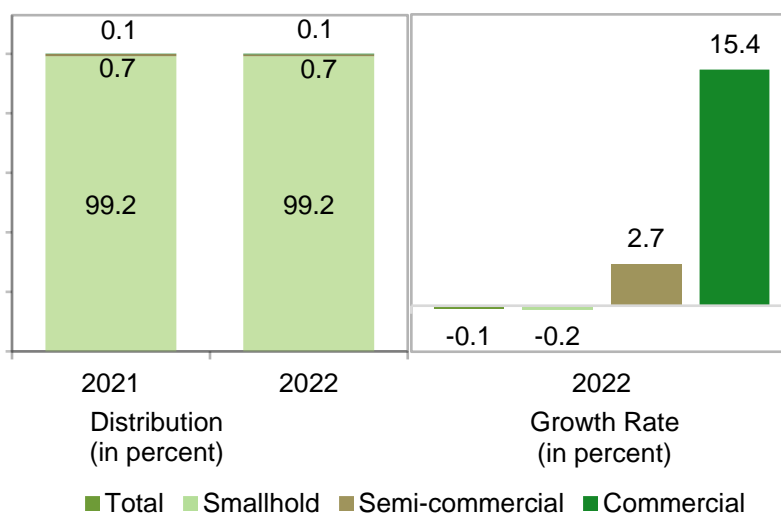
The top five regions with the highest volume of carabao production at liveweight during the period were the following:

- Eastern Visayas, 4.36 thousand metric tons;
- Western Visayas, 4.22 thousand metric tons;
- CALABARZON, 3.65 thousand metric tons;
- Bangsamoro Autonomous Region in Muslim Mindanao, 3.28 thousand metric tons; and
- Davao Region, 3.24 thousand metric tons.

These regions accounted for 50.4 percent share to the country’s total carabao production.

In comparison to their output in the same quarter of 2021, eight regions reported reductions in production during the quarter. In terms of level, Ilocos Region posted the highest decline of 0.30 thousand metric tons, from 2.55 thousand metric tons in the same quarter of the previous year to 2.25 thousand metric tons this fourth quarter of 2022. (Table 1)

Figure 2. Distribution and Annual Growth Rate of Carabao Inventory by Classification¹, Philippines
As of 31 December 2021-2022^P



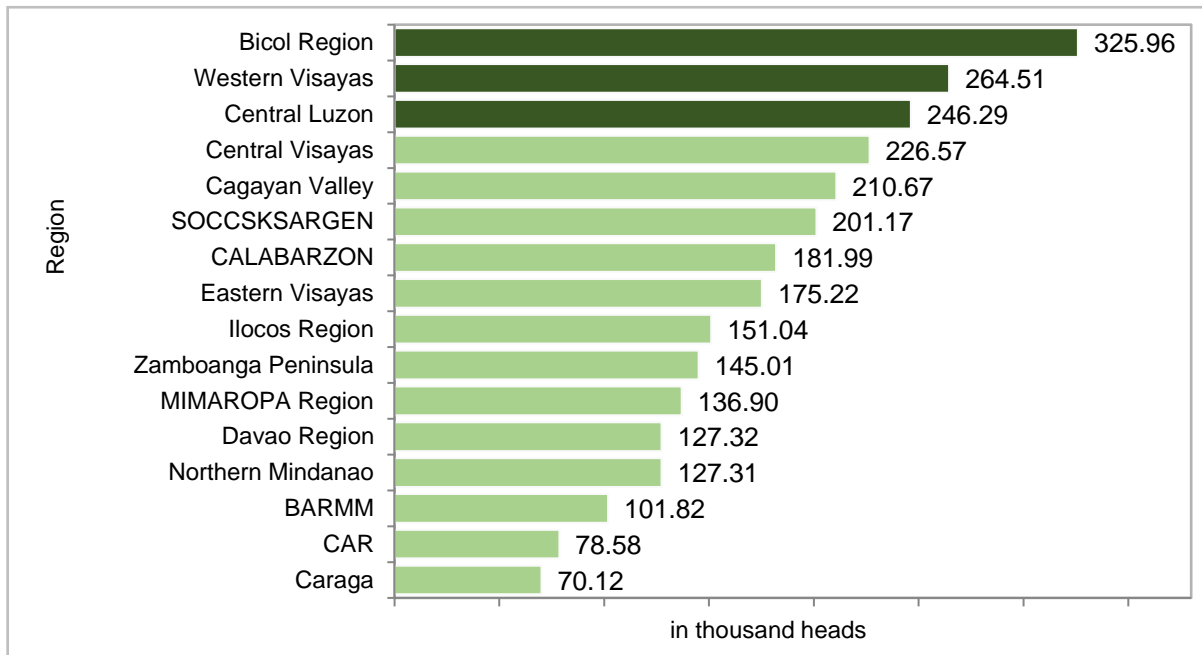
¹- Based on new classification of animals per PSA Board Resolution No. 04, series of 2022 dated 13 May 2022 (Refer to the Technical Notes Section V for the new classification)

^P- preliminary

Source: Philippine Statistics Authority, BLPS, and CLPS

As of 31 December 2022, the total carabao inventory contracted to 2,770.46 thousand heads, from 2,774.47 thousand heads stocks in the same period of the previous year. Decrease in carabao stocks were noted in smallhold farms at -0.2 percent. However, stocks in semi-commercial and commercial farms both increased by 2.7 percent and 15.4 percent, respectively. (Figure 2 and Table 2)

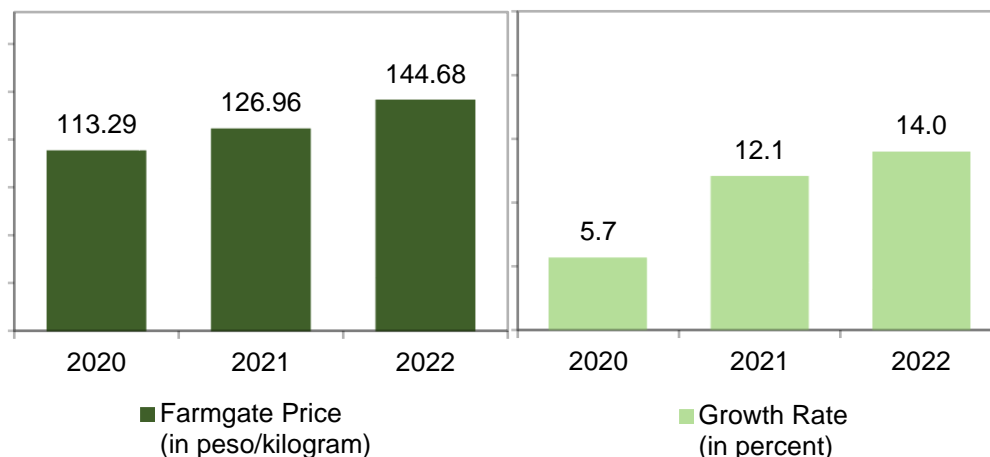
Figure 3. Distribution of Carabao Inventory by Region
As of 31 December 2022^P



^P- preliminary
Source: Philippine Statistics Authority, BLPS, and CLPS

Bicol Region recorded the highest carabao population of 325.96 thousand heads. This was followed by Western Visayas and Central Luzon with corresponding inventories of 264.51 thousand heads and 246.29 thousand heads. These three regions shared 30.2 percent to the country's total carabao population. (Figure 3 and Table 2)

Figure 4. Average Farmgate Price and Annual Growth Rate of Farmgate Price of Carabao for Slaughter, Philippines
October to December 2020-2022^P



^P- preliminary
Source: Philippine Statistics Authority, 2020-2021 Farm Price Survey, and 2022 BLPS

The average farmgate price of carabao for slaughter was quoted at PhP 144.68 per kilogram, liveweight for this quarter. This was 14.0 percent higher than the previous year's same period average farmgate price of PhP 126.96 per kilogram, liveweight. (Figure 4 and Table 3)

During the reference quarter, the highest farmgate price was observed in November at PhP 157.54 per kilogram, liveweight, while the lowest was quoted in October at PhP 134.71 per kilogram, liveweight. (Table 3)



DIVINA GRACIA L. DEL PRADO, Ph.D.

(Assistant National Statistician)

Officer-in-Charge, Deputy National Statistician

Sectoral Statistics Office



RCL/MTF

STATISTICAL TABLES

Table 1. Volume of Carabao Production by Region, Philippines
October-December 2020-2022^P

Region	Production (in metric tons, liveweight)			Annual Growth Rate (in percent)		Percent Share
	2020	2021	2022 ^P	2021	2022 ^P	2022 ^P
Philippines	35,186	37,238	37,133	5.8	-0.3	100.0
CAR	941	667	661	-29.1	-0.9	1.8
I - Ilocos Region	2,240	2,547	2,249	13.7	-11.7	6.1
II - Cagayan Valley	2,717	2,580	2,442	-5.0	-5.3	6.6
III - Central Luzon	1,170	1,092	978	-6.7	-10.4	2.6
IVA - CALABARZON	3,319	3,617	3,645	9.0	0.8	9.8
MIMAROPA Region	582	1,213	1,280	108.4	5.5	3.4
V - Bicol Region	2,084	2,195	2,209	5.3	0.6	5.9
VI - Western Visayas	3,717	4,446	4,224	19.6	-5.0	11.4
VII - Central Visayas	1,128	1,785	1,939	58.2	8.6	5.2
VIII - Eastern Visayas	3,867	4,013	4,363	3.8	8.7	11.7
IX - Zamboanga Peninsula	1,228	1,948	1,812	58.6	-7.0	4.9
X - Northern Mindanao	2,925	2,567	2,495	-12.2	-2.8	6.7
XI - Davao Region	2,305	3,241	3,243	40.6	0.1	8.7
XII - SOCCSKSARGEN	2,559	1,866	1,951	-27.1	4.6	5.3
XIII - Caraga	700	362	357	-48.3	-1.4	1.0
BARMM	3,703	3,100	3,284	-16.3	5.9	8.8

^P - preliminary

Note: Details may not add up to total due to rounding. Growth rate and percent share may yield different results when computed manually due to rounding.

Source: Philippine Statistics Authority, Backyard Livestock and Poultry Survey, and Commercial Livestock and Poultry Survey

Table 2. Carabao Inventory by Classification and Region, Philippines
As of 31 December 2021-2022^P

Region/Classification	Inventory (in number of heads)		Annual Growth Rate (in percent)	Percent Share
	2021 ^r	2022 ^P	2022 ^P	2022 ^P
Total				
Philippines	2,774,471	2,770,458	-0.1	100.0
CAR	77,218	78,579	1.8	2.8
I - Ilocos Region	166,251	151,036	-9.2	5.5
II - Cagayan Valley	215,188	210,670	-2.1	7.6
III - Central Luzon	237,813	246,285	3.6	8.9
IVA - CALABARZON	180,394	181,991	0.9	6.6
MIMAROPA Region	118,412	136,895	15.6	4.9
V - Bicol Region	324,073	325,959	0.6	11.8
VI - Western Visayas	274,496	264,514	-3.6	9.5
VII - Central Visayas	212,529	226,568	6.6	8.2
VIII - Eastern Visayas	190,658	175,217	-8.1	6.3
IX - Zamboanga Peninsula	144,418	145,010	0.4	5.2
X - Northern Mindanao	125,399	127,309	1.5	4.6
XI - Davao Region	129,507	127,318	-1.7	4.6
XII - SOCCSKSARGEN	201,695	201,166	-0.3	7.3
XIII - Caraga	70,692	70,120	-0.8	2.5
BARMM	105,728	101,821	-3.7	3.7
Smallhold				
Philippines	2,752,070	2,747,334	-0.2	100.0
CAR	77,218	78,579	1.8	2.9
I - Ilocos Region	166,063	150,609	-9.3	5.5
II - Cagayan Valley	213,414	208,372	-2.4	7.6
III - Central Luzon	230,062	237,662	3.3	8.7
IVA - CALABARZON	175,660	178,632	1.7	6.5
MIMAROPA Region	113,037	130,986	15.9	4.8
V - Bicol Region	323,900	325,784	0.6	11.9
VI - Western Visayas	274,400	264,423	-3.6	9.6
VII - Central Visayas	212,389	226,411	6.6	8.2
VIII - Eastern Visayas	190,465	175,030	-8.1	6.4
IX - Zamboanga Peninsula	144,148	145,010	0.6	5.3
X - Northern Mindanao	123,786	125,710	1.6	4.6
XI - Davao Region	129,507	127,318	-1.7	4.6
XII - SOCCSKSARGEN	201,695	201,166	-0.3	7.3
XIII - Caraga	70,598	69,821	-1.1	2.5
BARMM	105,728	101,821	-3.7	3.7

Continued

Table 2. -- Concluded

Region/Classification	Inventory (in number of heads)		Annual Growth Rate (in percent)	Percent Share
	2021 ^r	2022 ^P	2022 ^P	2022 ^P
<u>Semi-commercial</u>				
Philippines	19,004	19,517	2.7	100.0
CAR	..	..	..	0.0
I - Ilocos Region	188	427	127.1	2.2
II - Cagayan Valley	1,498	1,735	15.8	8.9
III - Central Luzon	6,458	7,120	10.3	36.5
IVA - CALABARZON	4,734	3,359	-29.0	17.2
MIMAROPA Region	5,375	5,909	9.9	30.3
V - Bicol Region	173	175	1.2	0.9
VI - Western Visayas	96	91	-5.2	0.5
VII - Central Visayas	140	157	12.1	0.8
VIII - Eastern Visayas	193	187	-3.1	1.0
IX - Zamboanga Peninsula	..	..	..	0.0
X - Northern Mindanao	55	58	5.5	0.3
XI - Davao Region	..	..	..	0.0
XII - SOCCSKSARGEN	..	..	..	0.0
XIII - Caraga	94	299	218.1	1.5
BARMM	..	..	..	0.0
<u>Commercial</u>				
Philippines	3,127	3,607	15.4	100.0
CAR	..	..	..	0.0
I - Ilocos Region	..	..	..	0.0
II - Cagayan Valley	276	563	104.0	15.6
III - Central Luzon	1,293	1,503	16.2	41.7
IVA - CALABARZON	..	..	..	0.0
MIMAROPA Region	..	..	..	0.0
V - Bicol Region	..	..	..	0.0
VI - Western Visayas	..	..	..	0.0
VII - Central Visayas	..	..	..	0.0
VIII - Eastern Visayas	..	..	..	0.0
IX - Zamboanga Peninsula	..	..	..	0.0
X - Northern Mindanao	1,558	1,541	-1.1	42.7
XI - Davao Region	..	..	..	0.0
XII - SOCCSKSARGEN	..	..	..	0.0
XIII - Caraga	..	..	..	0.0
BARMM	..	..	..	0.0

^P – preliminary

^r – revised

.. – data not applicable

Note: Growth rate and percent share may yield different results when computed manually due to rounding.

Source: Philippine Statistics Authority, Backyard Livestock and Poultry Survey, and Commercial Livestock and Poultry Survey

Table 3. Monthly Average Farmgate Price of Carabao for Slaughter
Philippines: October-December 2020-2022^P

Month	Average Farmgate Price (PhP per kilogram, liveweight)			Annual Growth Rate (in percent)	
	2020	2021	2022 ^P	2021	2022 ^P
Average	113.29	126.96	144.68	12.1	14.0
October	111.56	127.84	134.71	14.6	5.4
November	112.82	125.65	157.54	11.4	25.4
December	115.49	127.38	141.80	10.3	11.3

^P - preliminary

Note: Growth rate may yield different results when computed manually due to rounding.

Source: Philippine Statistics Authority, 2020-2021 Farm Price Survey, and 2022 Backyard Livestock and Poultry Survey

TECHNICAL NOTES

I. Introduction

The Carabao Situation Report presents the industry situation in terms of volume of production, inventory by classification, and monthly average farmgate prices. It serves as a ready reference for the various clients and stakeholders of the Philippine Statistics Authority (PSA) in the agriculture sector.

The data for this report were collected by PSA through the two surveys, namely, Backyard Livestock and Poultry Survey (BLPS) and the Commercial Livestock and Poultry Survey (CLPS).

The BLPS aims to generate estimates on the supply and disposition of livestock and poultry commodities at the household level. In Q4 2022, the number of sample households covered was 21,501 from the 1,145 sample barangays nationwide. On the other hand, the CLPS seeks to generate estimates on the supply and disposition of livestock and poultry commodities from the sample establishments. There were 61 sample establishments covered in 2022.

Both surveys are conducted quarterly in all provinces including National Capital Region. Moreover, the commodities covered in the surveys include: cattle, carabao, swine, goat, chicken, duck, and other animals raised/tended by households and establishments.

II. Data Collection

A. Backyard Livestock and Poultry Survey

1. Data collection procedure

The field data collection for fourth quarter 2022 was conducted from 01 to 07 December 2022. The data collection was undertaken by hired Statistical Researchers (SRs) and is done through face-to-face interview with qualified respondents of the sample households. Prior to data collection, training of selected staff from Field Offices, including SRs, was conducted to ensure uniform understanding of concepts and proper implementation of survey procedures. Field and manual editing of the accomplished questionnaires was done to ensure completeness, consistency, and reasonableness of the information gathered.

2. Survey Questionnaire

The BLPS Questionnaire is a thirteen-page form composed of 16 blocks that aims to gather information on the basic characteristics and operations of the household.

The data items included in the survey are as follows:

- a. Type of Operation/Purpose
- b. Inventory

- c. Number of breeders that gave birth
- d. Number of born live
- e. Number of acquired animals
- f. Slaughtered in the household
- g. Sold live for slaughter and for other purposes
- h. Disposition by areas of destination
- i. Average liveweight
- j. Average farmgate price
- k. Number of deaths/losses and cause/reason

B. Commercial Livestock and Poultry Survey

1. Data collection procedure

The schedule of field data collection was during the last ten (10) days of November 2022. The data collection was undertaken by hired Statistical Researchers (SRs) and is done through a face-to-face interview with qualified respondents of the farm/establishment. Prior to data collection, training of Field Office personnel, including SRs, was conducted to ensure that the procedures and concepts of the survey are understood and properly implemented. Field and manual editing of the accomplished questionnaires was done to ensure completeness, consistency, and reasonableness of the information gathered.

2. Survey Questionnaire

The CLPS Carabao Survey Questionnaire is a two-page questionnaire that aims to gather necessary information on supply and disposition of carabao commercial farms/establishment.

The data items included in the survey are as follows:

- a. Type of Operation/Purpose
- b. Inventory
- c. Number of breeders that gave birth
- d. Number of born live
- e. Number of acquired animals
- f. Slaughtered in the farm/establishment
- g. Sold live for slaughter and for other purposes
- h. Disposition by areas of destination
- i. Average liveweight
- j. Average farmgate price
- k. Number of deaths/losses and cause/reason

III. Sampling Design

A. Backyard Livestock and Poultry Survey

1. Sampling Frame

The BLPS sampling frame is based on the results of the 2017 Listing of Farm Household (LFH) and 2012 Census of Agriculture and Fisheries (CAF). For

barangays not covered in the 2017 LFH, the list of households was taken from the 2012 CAF. The sampling frame is updated quarterly based on the status of the sampled households using the structured Frame Maintenance Form (FMF) submitted by the PSOs every quarter.

2. Sample Selection Procedure

The BLPS uses two-stage sampling design. The first stage is the selection of barangays using probability proportional to size where the measure of size is the total animal inventory. The number of sample barangays is based on a target coefficient of variation of five (5) percent. The sample barangays are the same for all quarters of 2022.

The second stage is the selection of sample households that are engaged in livestock and poultry raising in the sampled barangays using systematic sampling.

The number of sample households per selected barangay is 20 but this could be less if the selected barangay has less than 20 households. The sample households per quarter are independent.

3. Estimation Procedure

a. Sampling Weights

a.1. Base Weight

The base weight is computed as follows:

$$w_{1i} = \begin{cases} \frac{\sum_{i=1}^A X_i - X_{certain}}{a' X_i} & , \text{if non - certainty brgy} \\ 1 & , \text{if certainty brgy} \end{cases}$$

$$w_{2ij} = \begin{cases} \frac{N_i}{n_i} & , \text{if household has at most 3 operators} \\ \frac{N_i}{n_i} \times \frac{M_{ij}}{m_{ij}} & , \text{if household has greater than 3 operators} \end{cases}$$

$$w_{ij} = w_{1i} \times w_{2ij}$$

Where:

w_{ij} = base weight of household j in barangay i

w_{1i} = 1st stage weight

w_{2ij} = 2nd stage weight

A = total number of barangays in the domain

a = barangay sample size in the domain

a' = non-certainty barangay sample size in the domain; equal to a if there are no certainty barangays

$X_{certain}$ = total animal inventory of all certainty barangays

X_i = size measure of barangay i

N_i = total number of households in barangay i
 n_i = number of sample households in barangay i
 M_{ij} = total number of operators in household j in barangay i
 m_{ij} = number of sample operators in household j in barangay i
 i = subscript for barangay
 j = subscript for household

a.2. Adjustment Factor

The adjustment factor formula is given as follows:

$$A_p = \frac{\sum_{i=1}^a \sum_{j=1}^{n_i} w_{ij} X_{1ij}}{\sum_{i=1}^a \sum_{j=1}^{n_i} w_{ij} X_{2ij}}$$

Where:

A_p = adjustment factor for domain p
 X_{1ij} = eligible status of household j in barangay i (1 if eligible, 0 otherwise)
 X_{2ij} = responding status of household j in barangay i (1 if eligible, 0 otherwise)

Eligible households are the following:

- Interview completed;
- Refused to be interviewed without replacement;
- Temporarily away/Not at home without replacement; and
- HH temporarily not accessible without replacement.

Ineligible households are the following:

- Resides outside the barangay;
- Unknown in the locality; and
- Deceased (No other livestock and poultry operator in the household).

a.3. Final Weights

The final weights formula is given as follows:

$$w'_{ij} = w_{ij} \times A_p$$

Where:

w'_{ij} = final weights for domain p
 w_{ij} = base weight of household j in barangay i
 A_p = adjustment factor for domain p

b. Estimation of Total

b.1. Estimation of Provincial Total

Estimation of domain total is done per animal type and the formula is given as follows:

$$\hat{Y}_{qp} = \sum_{i=1}^a \sum_{j=1}^{n_i} w'_{ij} y_{ij}$$

Where:

\hat{Y}_{qp} = estimated total for domain p at quarter q

y_{ij} = survey data (inventory, production, etc.) for household j in barangay i

b.2. Estimation of Regional and National Total

The regional estimates are obtained by aggregating the estimates of the provinces within the region, while the national estimate is derived by adding all the regional estimates.

B. Commercial Livestock and Poultry Survey

1. Sampling Frame

The CLPS frame is based on the results of the 2021 Updating of the List of Establishments (ULE). It is updated quarterly based on the results of visit of the sample establishments using the Frame Maintenance Form (FMF).

2. Sample Selection Procedure

The CLPS uses a stratified sampling design with the maximum farm/housing capacity as stratification variable. Stratum boundaries are obtained using Dalenius-Hodges method. Sample size is determined using Neyman procedure with a target coefficient of variation of five percent (5%). A minimum of five (5) samples are taken when the population for the stratum is greater than or equal to five (5). For stratum with population less than five (5), all farms will be enumerated. The number of strata per province ranges from two (2) to four (4) depending on the homogeneity of the stratification variable.

Complete Enumeration (CE) is applied for provinces with less than 25 commercial farms/establishments, otherwise, stratified sampling design is used.

3. Estimation Procedure

a. Sampling weights

a.1. Base Weight

The base weight for CLPS is computed by animal type and province. The formula for base weights is given as follows:

$$w_h = w_{hi} = \left(\frac{N_h}{n_h} \right)$$

w_{hi} = weight of commercial farm/establishment i in stratum h

N_h = total number of establishments in stratum h

n_h = number of sample establishments in stratum h

a.2. Adjustment Factor

The adjustment factor is given as follows:

$$A_h = \frac{\sum_{i=1}^{n_h} w_{hi} X_{1hi}}{\sum_{i=1}^{n_h} w_{hi} X_{2hi}}$$

A_h = adjustment factor at stratum h
 w_{hi} = base weight of establishment i at stratum h
 n_h = number of sample establishments in stratum h
 X_{1hi} = eligible status of sample establishment i at stratum h
 (1 if eligible, 0 otherwise)
 X_{2hi} = responding status of sample establishment i at stratum h
 (1 if responding, 0 otherwise)

X_{1hi} (Eligible) = $\begin{cases} 1, & \text{if result of final visit is 1, 5, 6 and 7} \\ 0, & \text{otherwise} \end{cases}$
 X_{2hi} (Responding) = $\begin{cases} 1, & \text{if result of final visit is 1} \\ 0, & \text{otherwise} \end{cases}$

Eligible establishments are the following:

- Operational
- Refusal
- Cannot be contacted/Not accessible/Temporarily away

Ineligible establishments are the following:

- Temporarily Stopped Operation
- Permanently Closed/Stopped Operation
- Shifted farm operation
- Cannot be located
- Not yet in Operation
- Duplicate
- Out-of-scope - Recreation
- Out-of-scope - Change Sector
- Out-of-scope – Main Office/Ancillary Unit

a.3. Final Weights

The final weight formula is given as follows:

$$w'_{hi} = w_{hi} \times A_h$$

w'_{hi} = final weight of establishment i at stratum h
 w_{hi} = base weight of establishment i at stratum h
 A_h = Adjustment factor

b. Estimation

b.1. Estimation by Stratum

Each stratum yields an independent estimate. The formula to be used is given as follows:

$$\hat{Y}_h = \sum_{i=1}^{n_h} w'_{hi} y_{hi}$$

Where:

\hat{Y}_h = estimated total for stratum h of the province
 w'_{hi} = final weight of establishments i at stratum h

n_h = no. of sample establishments in stratum h
 y_{hi} = survey data (inventory, production, etc.) for establishment i in stratum h

b.2. Estimation of Provincial Total

The total estimate for the province is obtained by simply aggregating all the expanded stratum estimates in the province. Hence, the statement of the total for the pth province is given by:

$$\hat{Y} = \sum_{h=1}^L \hat{Y}_h$$

Where:

\hat{Y} = estimated total for the province
 \hat{Y}_h = estimated total for stratum h of the province
 L = total number of strata

b.3. Estimation of Regional and National Total

The regional estimates are obtained by aggregating the estimates of the provinces within the region, while the national estimate is derived by adding all the regional estimates.

IV. Concepts and Definitions of Terms

Farmgate price refers to the price received by raisers for their produce at the location of farm. Thus, the marketing costs, such as the transport and other marketing costs (if any) incurred in selling the produce, are not included in the farmgate prices.

Inventory refers to the actual number of carabao present in the farm as of a specific reference date.

Volume of production refers to the number of tended/raised animals disposed for slaughter including animals shipped-out for slaughter (in “head/bird” and in “liveweight equivalent”).

V. Farm Classification

The following are the new farm classifications and definitions based on the approved PSA Board Resolution No. 04, series of 2022:

Farm Classification	Definition*
Smallhold	Tending not more than five (5) caracows
Semi-commercial	Tending six (6) to 50 heads of caracows
Commercial	Tending 51 caracows and above

*Based on Animal Unit index.

The data on inventory of carabao by farm type (i.e. backyard and commercial) can still be accessed in the OpenSTAT website of PSA with the link:

https://openstat.psa.gov.ph/PXWeb/pxweb/en/DB/DB_2E_LP/0022E4FINL0.px/?rxid=bdf9d8da-96f1-4100-ae09-18cb3eae313.

VI. Dissemination of Results and Revision

The PSA disseminates the Carabao Situation Report quarterly and is uploaded in the PSA Website.

The livestock and poultry statistics follows the revision policy as stipulated in the PSA Board Resolution No. 1, Series of 2017-119 approving the revision of quarterly estimates on agricultural production, prices, and related statistics to be limited to the immediately preceding quarter and for the past three years with quarterly breakdown to be done only during May of the current year.

VII. Citation

This presents how the Technical Notes will be cited by users in their research works. It contains the following information:

1. Philippine Statistics Authority
2. Date of Publication/Release of the Technical Note
3. Title of the Technical Notes
4. Link to the Technical Notes

VIII. Contact Information

Marisol T. Fallarme
Chief Statistical Specialist
Livestock and Poultry Statistics Division
Economic Sector Statistics Service
Sectoral Statistics Office
Philippine Statistics Authority
Email Address: m.fallarme@psa.gov.ph

For data request, you may contact the:

Knowledge Management and Communications Division

Telephone: (632) 8462-6600 loc. 839

Email Address: info@psa.gov.ph