International Journal of Biological, Life and Agricultural Sciences
ISSN: 2415-6612
Vol:7, No:2, 2013

Relative Contribution of Livestock Species to Meat Supply in Bauchi Metropolis, Bauchi, Nigeria

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***Abstract*—**Primary and secondary data from the Bauchi abattoir were utilized to determine the relative contributions of different livestock species to meat supply in Bauchi Metropolis. Daily livestock slaughter figures for five months (June – October 2011) indicated that more goats (64.0) were slaughtered than either sheep (47.3) or cattle (41.30) each day ($P<0.001$) and fewer ($P<0.05$) animals (45.65) were slaughtered daily in June than either in August (57.07) or October (55.95). Five year (2006 – 2010) monthly slaughter records indicated that both species and year had significant ($P<0.001$) effects on number of animals slaughtered. More goats (2727.8) were slaughtered than either sheep (731.09) or cattle (520.06) each month and more animals were slaughtered in 2006 (1847.72/month) than in 2008, 2009 and 2010 (997.67, 1029.13 and 1273.75/month respectively). In terms of total carcass output, cattle accounted for 61-80% of the meat supply obtained from ruminant animals slaughtered at the Bauchi abattoir.

***Keywords*—**Carcass Output, Livestock Slaughter Figures, Meat Supply, Ruminant Animals.

I. Introduction

IN Nigeria and many developing countries of the world, there is an acute shortage of animal protein supply among the populace. Animal protein is one of the most important components of human meals and its consumption varies from country to country. The average per capita annual intake of meat stands at 87kg in developed countries while in the developing countries it is 31.6kg. In many of the developing countries, the meat consumption is less than 10kg [1], [2]. It is recommended that a minimum protein intake per caput per day of 70grams should be provided to Nigerians with protein of animal origin contributing up to 35grams or 50% of the total.

Nigeria's livestock population is estimated at 16million cattle, 35.5million sheep and 56.5million goats [3], while the human population is 170.1million and is growing at a fast rate [4]. The meat obtained is mostly derived from cattle, sheep and goats [3]. Livestock production plays an important role in the economy of the country. The growth in livestock production has been insufficient to maintain the current demand for meat and other animal products [5]. There are various Government policies aimed at achieving self-sufficiency in animal protein.

The objective of the study was to determine the contributions of different livestock species (cattle, sheep and goats) to meat supply in Bauchi Metropolis by estimating the total number of animals slaughtered at the Bauchi abattoir both on a daily basis and over a period of five years.

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II. Methodology

A. Location

The study was carried out at the Bauchi abattoir, Bauchi, Nigeria. The town is located on latitude $10^0$17' north and longitude $9^0$49' east at an altitude of 690.2 metres above sea level. Rainfall is about 1091mm annually. The hottest month is April with about 33^0C – 37^0C while the coldest months are December and January with temperatures of 10^0C – 15^0C [6].

The climatic conditions of Bauchi exhibit two marked seasons which are rainy season and dry season. During the rainy reason, there are abundance of pastures and green grasses for animals to graze. The dry season lasts for a period of about 7 months (October to April). The months of October to December are the period of harvest and there are a lot of animal feeds in form of crop residues.

B. Source of Data

Primary and secondary data, both collected from the Bauchi abattoir, were used for the study. A large number of domestic ruminants (cattle, sheep and goats) are slaughtered daily at the Bauchi abattoir. The primary data for the study were taken daily at the Bauchi abattoir over a period of five months (June to October 2011). Most of these animals were brought by butchers as early as around 6:00am, but few others were brought by other people to be slaughtered there. The animals were mostly purchased from the surrounding village markets and small-holders and farmers. These animals were mostly managed under traditional/free range system; where animals are allowed to fend for themselves, with little or no supplementary feeding during the cropping season. In some cases, medical care is practically non-existent or provided at rudimentary level.

Secondary data were collected from the abattoir covering the period 2006 – 2010. Each year was divided into four

seasons as follows: dry (or RANI) season (January, February and March), spring (or BAZARA) season (April, May and June), rainy (or DAMINA) season (July, August and September), and harvest (or KAKA) season (October, November and December).

C. Data Analysis

The data generated from the study were subjected to univariate analysis of variance using SPSS 17.0 using models stated below. Where differences between treatments exist, means separation was achieved using either Duncan's multiple range or least significant difference [7].

D. Primary Data

The model for primary data made use of **"**Number of animals slaughtered by species, sex and month".

The design for primary data was "species, month, sex, month * sex, month * species and species * sex".

The model for primary data had the following degrees of freedom:

Source	df
Total	858
Model	22
Species	2
Sex	1
Month	4
Month * Sex	4
Month * Species	8
Species * Sex	2
Error	836

E. Secondary Data

The model for the secondary data made use of **"**Number of animals slaughtered by species, year, sex and season".

The design for secondary data was "species, sex, year, season sex * season, species * season, year * season, species * sex, sex * year and species * year".

The model for secondary data had the following degrees of freedom:

Source	df
Total	348
Model	46
Species	2
Sex	1
Year	4
Season	3
Species * Season	6
Year * Season	12
Species * Sex	2
Sex * Year	4
Species * Year	8
Error	302

F. Total Carcass Output

The total carcass output was computed by multiplying the number of animals slaughtered by the species standard weight given by [3]. That is 130kg, 11kg and 12.7kg for carcasses of cattle, sheep and goats respectively.

III. Results

A. Primary Data

The influences of species, month and sex on the number of animals slaughtered from the primary data are shown in Tables I, II and III respectively.

The results revealed that higher (P<0.001) number of goats (64.0) was slaughtered as compared to the other two species (41.3 for cattle and 47.27 for sheep) at the Bauchi abattoir.

TABLE I
ANIMAL SLAUGHTER FIGURES AT THE BAUCHI ABATTOIR (PRIMARY DATA)

Species	**N**	**Animal/ Day**
Cattle	254	41.30 [b]
Sheep	302	47.27 [b]
Goats	302	64.0 [a]

[a,b]Means with different superscripts differ significantly (P<0.001). N = Number of Sample SD = Standard Deviation

TABLE II
NUMBER OF ANIMALS SLAUGHTER AT THE BAUCHI ABATTOIR (PRIMARY DATA)

Month	N	Animals /day
June	179	45.65 [b]
July	162	48.14 [ab]
Aug	170	57.07 [a]
Sept	181	50.51 [ab]
Oct	166	55.95 [a]

[a,b]Means with different superscripts differ significantly (P<0.05). N = Number of Sample SD = Standard Deviation

TABLE III
SEX OF ANIMALS SLAUGHTER AT THE BAUCHI ABATTOIR (PRIMARY DATA)

Species	**N**	**Animal/ Day**
Sex	N	Mean
Male	174	1268.33
Female	174	1384.31

N = Number of Sample SD=Standard Deviation

August had the highest number of slaughtered animals at the Bauchi abattoir, while June had the lowest number.

There were no significant differences between the treatments.

There were interaction effects of sex * month, species * month and species * sex (P< 0.001) as shown in Appendix I.

B. Secondary Data

The influence of species, year and sex on the number of animals slaughtered, from the secondary data are shown in Tables IV, V and VI respectively while that of season is shown in Fig. 1.

TABLE IV
ANIMAL SLAUGHTER FIGURES AT THE BAUCHI ABATTOIR (SECONDARY DATA)

Species	N	Animals/ month
Cattle	116	520.06 [b]
Sheep	116	731.09 [b]
Goat	116	2227.8 [a]

[a,b]Means with different superscripts differ significantly (P<0.001). N = Number of Sample SD= Standard Deviation

More animals were slaughtered in 2006 than in 2009, 2008 and 2010.

TABLE VI
SEX OF ANIMAL SLAUGHTER AT THE BAUCHI ABATTOIR (SECONDARY DATA)

Sex	N	Number
Male	174	1268.33
Female	174	1384.31
Sex	N	Number

N = Number of Sample SD=Standard Deviation

TABLE V
YEARLY ANIMALS SLAUGHTER FIGURE AT THE BAUCHI ABATTOIR (SECONDARY DATA)

Year	N	Mean
2006	72	1847.72 [a]
2007	72	1474.57 [ab]
2008	72	1029.13 [c]
2009	72	997.67 [c]
2010	60	1273.75 [bc]

[a,b,c]Mean with different superscript differ significantly

There were no significant differences between the sexes.

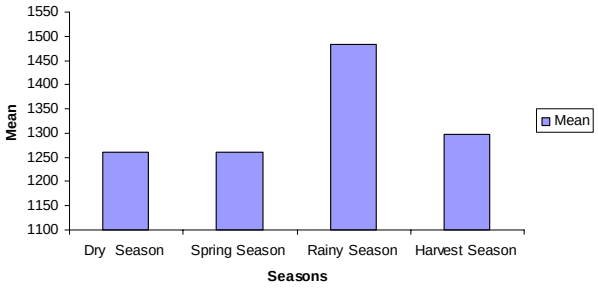

Fig. 1 Mean Seasonal Animals Slaughtered at the Bauchi Abattoir (Secondary Data)

There were species/year and species/sex interaction effects (p<0.001) as shown in Appendix II.

TABLE VI I
CARCASS OUTPUT AT THE BAUCHI ABBATOIR (PRIMARY DATA)

Species	Mean	Carcass Weight/day (kg)
Cattle	41.3	45369
Sheep	47.27	519.97
Goat	64.03	812.8

C. Total Carcass Output

The computed total carcass output for each of the three species of animals from the primary and secondary data are shown in Tables VII and VIII respectively.

TABLE VI I
CARCASS OUTPUT AT THE BAUCHI ABBATOIR (PRIMARY DATA)

Species	Mean	Carcass Weight/ month (kg)	Percentage (%)
Cattle	520.0	67,600	61.3
Sheep	731.09	8041.99	7.3
Goat	2727.80	34643.06	31.4

Cattle accounted for 80% of carcass output produced each day from the primary data.

From the secondary data, cattle accounted for about 61.3% of carcass output produced monthly at the Bauchi abattoir.

IV. DISCUSSION

A. Animal Slaughter Figures

The contribution of the various livestock species to meat supply in the study area indicated that more goats were slaughtered than cattle and sheep. Livestock species of different sexes were used in the domestic meat supply in the state. The analysis of the primary data indicated that goats had higher contribution in terms of numerical number of slaughtered figures (64.0) as compared to sheep (47.3) and cattle (41.3). More animals were slaughtered in August (57.07) and October (55.9) than in June (45.65). Sex did not influence the number of animals slaughtered. Analysis of the secondary data indicated that both species and year had significant effects on number of animals slaughtered. More animals were slaughtered in 2006 (1847.72/month) than in 2008, 2009 and 2010 (997.67, 1129.13 and 1273.75/month respectively). Similarly, more animals were slaughtered in 2007 than in 2008 and 2009. Season and sex did not influence the number of animals slaughtered. Thus, in terms of daily and monthly slaughtered figures, more goats were slaughtered at the Bauchi abattoir than either cattle or sheep.

The variation in the number of slaughter figure of these species in favor of goats might have been due to smaller-body size of these animals as compared to cattle which require more space in terms of their housing requirements [8]. The feeding habits of goats put them at advantage over other ruminant animals, as they can tolerate and adapt to wide range of climatic conditions especially during period of feed scarcity. Goats are also easier to manage. These animals are liquid asset compared to sheep and cattle because of their low price in the market. Cattle and sheep require huge sum of money for their upkeep or management and this might have been the reason

why the butchers preferred to go for goats as they are low income earners. Most of the butchers operate their business of meat processing and handling at small-scale level and locally [8]. This probably accounted for the large number of goats slaughtered at the Bauchi abattoir.

Total Carcass Output

In terms of carcass output, cattle accounted for 80% of the carcass weight produced from the primary data. This was followed by goats (12.12%) and sheep (7.76%). For the secondary data, cattle accounted for 61.3% of carcass output produced monthly at Bauchi abattoir. This was followed by goats (31.4%) and sheep (7.3%). The importance of ruminant animals in Nigeria and ways of improving animal agriculture in the country had been discussed by [5], [9] and [10]. The contributions of different livestock species as sources of meat in Bauchi have been discussed by [11].

V. Appendixes

Appendix I

Primary Data Tests of between-Subjects Effects
Dependant Variable: Number of Animals Slaughtered

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	1.169E9	46	2.540E7	19.937	.000
Species	3.349E8	2	1.674E8	131.409	.000
Sex	1201806.391	1	1201806.391	.943	.332
Year	3.526E7	4	8815033.738	6.918	.000
Season	3015573.747	3	1005191.249	.789	.501
Sex x season	1333987.905	3	444662.635	.349	.790
Species x season	2422307.800	6	403717.967	.317	.928
Year x season	1.655E7	12	1378944.121	1.082	.375
Species x sex	2.991E7	2	1.495E7	11.737	.000
Sex x year	5707194.200	4	1426798.550	1.120	.347
Species x year	1.164E8	8	1.455E7	11.423	.000
Error	3.848E8	302	1274143.336		
Total	1.553E9	348			

a. R Squared = .633 (Adjusted R Squared = .623)

Appendix II

Secondary Data Tests of between-Subjects Effects Dependant Variable: Number of Animals Slaughtered

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	2.529E6	22	114972.871	65.423	.000
SPP	77417.610	2	38708.805	22.026	.000
SEX	2075.098	1	2075.098	1.181	.278
MONTH	16196.459	4	4049.115	2.304	.057
SEX *x* MONTH	12972.342	4	3243.086	1.845	.118
SPP *x* MONTH	124905.159	8	15613.145	8.884	.000
SPP *x* SEX	28375.076	2	14187.538	8.073	.000
Error	1469172.846	836	1757.384		
Total	399856.000	858			

a. R Squared = .752 (Adjusted R Squared = .715)

Acknowledgment

The authors are grateful to the Director, Bauchi State Veterinary Services for allowing us use facilities and data at the Bauchi Abattoir.

References

[1] Number [1] M. M. Abubakar, M. M Bube, T. A.Adegbola, and E. O. Oyawoye. “Assessment of Four Meat Products (Kilishi, Tsire, Dambu and Balangu) in Bauchi Metropolis”. ACT – Biotechnology Research Communications, vol. 1 (1) pp. 40-48, 2011.

[2] M. M. Abubakar, M. M Bube, T. A.Adegbola, and E. O. Oyawoye.. Processing and Evaluation of Dambu, Tsire and Balangu from non-ruminant animals. ACT – Biotechnology Research Communications, vol. 1 (1) pp. 49 – 55, 2011.

[3] FAO. “FAOSTAT”. Food and Agriculture Organization of the United Nations. Rome Italy, August 2012.

[4] PRB. “World Population Data Sheet”. Population Reference Bureau. 1875 Connecticut Avenue, Washington DC, 2012.

[5] Ladan, I. “Animal Agriculture in Nigeria”. In: Animal Agriculture in West Africa. Proceedings of the Joint Silver Anniversary Conference of the Nigerian Society for Animal Production (NSAP) and West African Society for Animal Production (WASAP) Inaugural Conference, 21-26 March,1998, Abeokuta, Nigeria, Edited by O. A. Osinowo. Pp. 80-93, 2008.

[6] Butswat, I. S. R. “Study on Seasonal Variation in the Reproduction States of Sheep and Goats in Bauchi”. Ph.D Thesis, Abubakar Tafawa Balewa University, Bauchi, 1994.

[7] Steel, R. G. D. and Torrie, J. E. Principles and Procedures of Statistics, Biometrical Approach. McGraw Hill Book Co., Inc. New York, 1980.

[8] Ahemen, T. & Zahraddeen, D. “Species Contribution as a Source of Meat and their Foetal Wastage in Taraba State, Nigeria”. Archives of Applied Science Research, vol. 2 (5) pp. 85 – 91, 2010.

[9] Amogu, U. “Required Policy Environment for Sustainable (Long Term Growth and Development of the) Livestock Industry in Nigeria”. In: Animal Agriculture in West Africa. Proceedings of the Joint Silver Anniversary Conference of the Nigerian Society for Animal Production (NSAP) and West African Society for Animal Production (WASAP) Inaugural Conference, 21-26 March,1998, Abeokuta, Nigeria, Edited by O. A. Osinowo. Pp. 113-126, 2008.

[10] David-West, K. B. “Review of Livestock Development in Nigeria in the 20th Century”. In: Animal Agriculture in West Africa. Proceedings of the Joint Silver Anniversary Conference of the Nigerian Society for Animal Production (NSAP) and West African Society for Animal Production (WASAP) Inaugural Conference, 21-26 March,1998, Abeokuta, Nigeria, Edited by O. A. Osinowo. Pp. 94-112, 2008.

[11] Butswat, I. S. R. and Bello M. “Contribution of Different Livestock Species as Sources of Meat in Bauchi”, Nigerian Journal of Animal Production, vol. 29 (2) pp. 207 – 216, 2002.