FOETAL WASTAGE IN ABATTOIRS AND ITS IMPLICATIONS: SITUATION REPORT FROM OGUN STATE, NIGERIA.

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ABSTRACT

This study examined the magnitude and implications of foetal wastage resulting from the slaughtering of pregnant cows in Lafenwa - Abeokuta and Ijebu-Igbo abattoirs in Ogun State between 1984 and 1989. Results show that one foetus is wasted for every 8 cattle slaughtered in the abattoirs. This has the grave effects of reducing over time the herd size and revenue of owners, the access of most Nigerians to a nutritive source of dietary protein and therefore the ability to attain the internationally recommended protein intake level per caput per day.

Key words: Slaughter, pregnant cows, foetal wastage/recovery.

INTRODUCTION

There is a disturbing and noticeable shortage of animal protein in the diet of the average Nigerian. This arises from the short fall in the supply of meat in the country to meet the demand of the ever increasing population. For instance, the projected supply of beef for 1990 was 214,000 MT as against a projected demand of 544,130MT representing a short fall of about 330,130MT (Oyenuga, 1982). Further, according to him, beef accounts for more than 50 percent of Nigeria's total meat supply. The growing demand for beef and the accompanying attractive prices, however, have led to the common and unhealthy practice of slaughtering young breeding and pregnant cows in abattoirs (Craig, 1982). Matthew *et al* (1982) reported that from a total of 1,948,047 cattle slaughtered in four zones (Kaduna, Jos, Enugu and Ibadan) in Nigeria from 1975-1980, about 31,797 (1.6 percent) were pregnant cows.

In an attempt to curb this practice, soon after the creation of Ogun State in 1976, the Veterinary Division of the Ministry of Agriculture and Natural Resources was charged with the sole responsibility of preventing the slaughtering of pregnant and immature animals in the various slaughter houses in the state. This programme however, came to a halt in 1984 due to lack of fund. This study was therefore carried out to evaluate the magnitude and significance of foetal wastage caused by slaughtering of pregnant cows since then; as well as underscore the likely implications of the persistence of such a practice, in the state in particular and Nigeria in general.

MATERIALS AND METHODS

The two largest abattoirs in Ogun State were selected for this study. They were Lafenwa - Abeokuta and Ijebu-Igbo abattoirs located in Egba and Ijebu divisions respectively. Details recorded were the number of bulls and cows slaughtered per month, number of foetuses recovered per month under the different age groups estimated from their lengths. Records for Lafenwa-Abeokuta covered 1984-1989 and those of Ijebu-Igbo 1987-1989.

These time series data were analysed using both descriptive and quantitative analyses. The descriptive analysis which comprised ratio, percentage and correlation analyses was used to explain some of the important variables that determine foetal wastage in the abattoirs. The magnitude and type/form of association between foetal wastage and the likely causal factors was determined. We also examined

the trend in foetal recovery by age across seasons - dry and wet.

The quantitative analysis including both the regression analysis and the analysis of variance (ANOVA) carried out entails fitting of simple regression lines to the limited data to determine the linear relationships between foetal wastage per annum on one hand and the number of cows/bulls/cattle slaughtered per annum on the other hand. Some other factors expected to have impacts on foetal wastage in a given year are number of cows/cattle slaughtered in the given year and in the preceeding year, period of the year, sex and type of breed, owner's liquidity position, herd size, disease outbreak in the herd, level of precision in diagnosis among others.

The simple linear regression model used in this study is specified as

$$Y_t = b_0 + b_1X_t + U_t \dots \dots \dots (1)$$

Where

Y_t is the level of foetal wastage/recovery in year t .

X_t is the number of cows/bulls/cattle slaughtered in year t .

b_0 and b_1 are the regression parameters; b_0 is the constant term and b_1 is the marginal propensity to waste or recover foetus.

U_t is the random error term.

On *a priori* grounds, the number of cows and cattle slaughtered are expected to have positive effects on foetal wastage/recovery; while a negative impact is expected for the number of bulls slaughtered. Overall, the marginal propensity to recover or waste foetus and the foetal recovery elasticity are expected to be lowest for the number of cows slaughtered and highest for the number of bulls slaughtered. That is, a positive and relatively inelastic relationship is expected for the former while a negative and relatively elastic relationship is expected for the latter.

As a second part to the quantitative analysis, an intergrated ANOVA table for equations (1), (2) and (3) is presented and the F-tests

conducted therefrom. The result for this and other analyses will be discussed where appropriate in the remaining sections of this paper.

RESULTS AND DISCUSSION

The total slaughter figure for the two abattoirs between 1984 and 1989 was 122, 178 cattle from which 9,630 foetuses were recovered (Table 1). The estimated number of pregnant cows slaughtered, given the assumption that one cow gives birth to one calf per partum, was 9,630 out of a total 67, 573 cows slaughtered (9.87 percent). Besides, the highest proportion of pregnant cows (about 20 percent) was slaughtered in 1985, while the highest proportions of all foetuses recovered from all cows and thereofre cattle slaughtered were recovered in 1984 and 1986, respectively. The period 1984 - 1986 however marked the period of high level of foetal wastage. This is most probably due to the halt in further implementation of the State programme focused on prevention of the slaughtering of pregnant cows in abattoirs, around this period.

A simple ratio analysis of the available data for the two abattoirs revealed that an average of 1 foetus is wasted/recovered for every 10 cattle slaughtered between 1984 and 1989 at Lafenwa-Abeokuta while the corresponding ratio for Ijebu-Igbo between 1987 and 1989 is about 1 to 20. Further evidence however showed that the rate of wastage reduced in the later years - between 1987 and 1989. The results of the correlation analysis also indicated a low and moderate but positive correlations between foetal wastage and the number of cows (0.38) and cattle (0.51) slaughtered respectively.

Evaluation of the level of foetal recovery across four seasons, namely the early and late dry and wet seasons (Table 2), showed that most foetuses (37 percent) were recovered in the third trimester especially in the late rains (40 percent). The only exception to this was

TABLE 1: SLAUGHTER RECORD AND FOETUSES RECOVERED FROM PREGNANT COWS

Year	No. of Cattle Slaughtered	No. of Bulls Slaughtered	No. of Cows Slaughtered	No. of Foetuses Recovered	Proportion of Pregnant Cows Slaughtered
1984	16393 (9.58) ^a	9922 (60.55) ^b	6471 (39.47) ^c	1570 (24.26) ^d	16.30
1985	21054 (8.94)	9847 (46.77)	11207 (53.23)	1883 (16.80)	19.55
1986	12086 (10.91)	4906 (40.59)	7180 (59.41)	1328 (18.50)	13.79
1987	22445 (7.40)	8700 (38.76)	13745 (61.24)	1662 (12.09)	17.26
1988	25595 (5.94)	10635 (41.47)	15010 (58.23)	1521 (10.31)	15.79
1989	24605 (6.77)	10645 (43.26)	13960 (56.74)	1666 (11.93)	17.30
Total	122178 (7.88)	54655 (44.73)	67573 (55.31)	9630 (9.87)	100.00

Note: ^aProportion of foetuses recovered from cattle slaughtered per year in percentages.

^bProportion of bulls slaughtered per year in percentages.

^cProportion of cows slaughtered per year in percentages.

^dProportion of foetuses recovered from cows slaughtered per year in percentages.

^ePercentage values computed based on the assumption that one cow delivered on calf per partum.

Source: Veterinary Division, Ministry of Agriculture and Natural Resources, Abeokuta and Ijebu-Igbo.

TABLE 2: NUMBER AND AGE OF FOETUSES RECOVERED AT DIFFERENT SEASONS.

Period	Age of Foetuses			Total
	No. within 1-3 months	No. Within 4-6 months	No. Within 7-9 months	
Early Dry Season (Oct. - Dec.)	646 (25.95) ^a	853 (36.29)	894 (37.76)	2403
Late Dry Season (Jan. - Mar.)	701 (28.56)	862 (36.22)	841 (35.22)	2404
Early Rainy Season (Apr. - Jun.)	762 (31.76)	792 (33.21)	830 (35.03)	2439
Late Rainy Season (Jul. - Sept.)	655 (25.94)	823 (33.80)	961 (40.26)	2439
Total	2360 (28.04)	2936 (34.88)	3122 (37.09)	9630

Note: ^aProportion of foetuses recovered from cattle slaughtered in a period t in percentages.

Source: Veterinary Division, Ministry of Agriculture and Natural Resources, Abeokuta and Ijebu-Igbo.

in the late dry season where the highest proportion (36 percent) was between 4 - 6 months of age. The highest proportion of foetuses between 1 - 3 months age bracket recovered however occurred during the early rains - between April and June. Overall, a higher proportion of all foetuses recovered was in the dry season between October and March, a period noted for high scarcity of green pastures particularly in the northern parts of the country.

In order to examine more rigorously the relationships which the numbers of cows/bulls/cattle have with foetal recovery, simple regression lines were fitted to the time series data. The simple regression results showing the relations are

$$(1) F_{wt} = 1391.143 + 0.019C_{st} \quad r^2 = 0.143 : \\ e_1 = 0.133 \\ (0.95)$$

$$(2) F_{wt} = 1132.781 + 0.052B_{st} \quad r^2 = 0.377 : \\ e_2 = 0.295 \\ (1.555)$$

$$(3) F_{wt} = 1235.615 + 0.018CT_{st} \quad r^2 = 0.257 : \\ e_3 = 0.228 \\ (1.187)$$

Where

F_{wt} is the level of foetal wastage/recovery in year t.

C_{st} is the total number of cows slaughtered in year t.

B_{st} is the total number of bulls slaughtered in year t.

CT_{st} is the total number of cattle slaughtered in year t .

r^2 is the coefficient of determination.

e is the foetal recovery elasticity.

The test of fitness of the regression line to the data showed that the level of fit was generally poor ranging from 0.14 for equation (1) to 0.38 for equation (3). Given this poor fit, it was less surprising that the independent variables failed to significantly explain, at the 10 percent level, the variations in the dependent variable. This observation could not, however, be unconnected with the low degrees of freedom encountered due to data limitations. Overall, the tendency observed is to recover 2 foetuses for every additional 100 cows or cattle slaughtered.

The coefficient of foetal recovery elasticity (e) measures the percentage change in foetal recovery which is associated with a given percentage change in any given independent variable, all other factors affecting foetal recovery or wastage assumed to remain constant. From the elasticity values estimated for the respective equation above, it is observed that the foetal recovery elasticities of slaughtering cows, bulls, and cattle are nearer zero than unity. Thus, implying rigidity or relative insensitivity of foetal wastage to changes in the levels of cows, bulls, and cattle slaughtered. This observation also underscored, in line with *a priori* expectation, the fact that foetal wastage with respect to the number of cows or cattle slaughtered, is more of a routinous exercise in Lafenwa-Abeokuta and Ijebu-Igbo abattoirs.

To check the overall significance of the results from the regression analysis as well as confirm the accuracy of our computations, an ANOVA was performed with the study data. Results are presented in Table 3. Again, all the estimated regression functions were not significant at the 10 percent level. Besides, the level of accuracy attained in the study is verified with the relationship; $t^2 = F$. A random check confirmed the high level of precision in our estimation study.

IMPLICATIONS OF STUDY FINDINGS AND SUGGESTIONS FOR FURTHER RESEARCH

The results of this study showed that 1 foetus was wasted out of every 8 cattle slaughtered between 1984 and 1989. If allowed to continue, this has the implication of reducing the population of cows and therefore the herd size in Ogun State in particular and Nigeria as a whole. This will in turn reduce the access of an average Nigerian to proteins of animal sources (such as beef and milk) even though his normal daily protein requirement is not presently being met. For instance, in 1986, the FAO/WHO recommended level of protein intake per caput per day was 68gm while per caput consumption in Nigeria was only 46gm per day - more than 30 percent short of the required level (FMANR, 1986). Albeit, the situation would have worsened by now given the current high level of economic hardship in the country.

As regards the monetary implications of foetal wastage, assuming that the rearing cost of a calf to slaughter age is 2,000, and the market price at slaughter is 3,000, about 1.61 million will be lost every year due to the slaughtering of pregnant cows in the State. This amounts to a huge sum (about 9.63 million) over a period of 6 years. Besides, a comparison of the estimated annual monetary loss in the State with a similar estimate (about 1.59 million per annum) obtained by Mathew *et al* (1982) for Kaduna, Plateau, Anambra and Oyo States confirmed that the figure for Ogun State is relatively on the high side. Thus further underscoring the relatively high level of foetal wastage in Ogun State. At the macro level, Craig, (1982) estimated that about 935,580 cattle are slaughtered annually in Nigeria. Given this figure, about 75 million will be lost annually by the nation assuming a foetal loss about 8 percent per annum.

Another important adverse consequence of high foetal wastage is the loss of daily milk and therefore income which the cattle owners may derive from the sales of fresh milk from

TABLE 3: INTEGRATED ANOVA TABLE.

Source of Variation	Source of Squares	Degrees of Freedom	Mean Squares	F
1. Number of Cows Slaughtered:				
Regression	24,227.225	1	24,227.225	
Error	145,036.775	4	36,259.194	0.668
2. Number of Bulls Slaughtered:				
Regression	63,761.112	1	63,761.112	
Error	105,502.888	4	26,375.722	2.147
3. Number of Cattle Slaughtered:				
Regression	43,561.872	1	43,561.872	
Error	125,702.128	4	31,425.532	1.386
Total	169.264	5		$F_{0.10} = 4.54$ With $v_1 = 1$ $v_2 = 4$

Source: Authors' calculations, based on data obtained from the Veterinary Division, M.A.N.R., Abeokuta and Ijebu-Igbo.

nursing cows to the general public. The magnitude of this effect is further underscored by our observation that the highest proportion of the foetal wastage was in the third trimester - at advanced stage of pregnancy - when milk formation would have started in pregnant cows. Sellers of pregnant cows will definitely receive more money per head of cattle, since the robustness of the pregnant cows will make them to command higher prices than non-pregnant ones if undetected. Such dubious sales will however result into great loss to buyers since remaining carcass after the removal of foetus will be less as compared to when the cow is not pregnant.

Moreover, beef from such pregnant cows, when slaughtered, usually weighs less and

doesn't command expected attraction (high price) from final consumers given its characteristic flabby nature and watery appearance. Further, the skin of such cows may not be good for tanning since it does not provide tough leather. Its use will therefore result in a loss, instead of a gain, to the tanning industry when used as a basic raw material.

The above notwithstanding, there is still a need especially when more data become available to: one, exhaustively quantify the major determinants of foetal wastage in abattoirs, and two, examine in great details the economic implications of foetal wastage using a simple benefit-cost framework that takes into consideration the probable potential gains (for

owners and the country as a whole) in terms of reduction in monetary loss, emotional and health problem of foetal wastage, alleviation of poverty, and increase in herd size. These benefits could be set against the fiscal costs incurred (that is public expenditures) in the operation of the preventive programme, the economic costs including the opportunity cost of administering the programme, and lastly, the welfare losses especially if the tax used to finance such preventive programme is borne largely by the people. But the potential welfare loss of most serious concern is that such prevention programme will entrap individuals into actions against their short-term interest.

CONCLUSION AND RECOMMENDATIONS

Though there was no significant positive association between foetal wastage and the number of cows slaughtered in the study area, it suffice from available evidence in this study to conclude that if the *status quo* remains, increasing number of foetuses will be wasted in abattoirs due to the indiscriminate slaughtering of cows and the accompanying lack of necessary and timely assistance of veterinary experts in proper diagnosis of the state of cows meant for slaughtering. This will have far-reaching implications in terms of reducing the maximum attainable revenue and therefore income in the livestock sub-sector, further lowering the protein intake of Nigerians and the ability of the country to attain the FAO/WHO recommended intake level per caput per day.

In the light of the above, the following recommendations are proffered:

- (1) Adequate funds should be provided by the State government to rejuvenate and invigorate the abattoir pregnancy diagnosis programme in the State;
- (2) Government should make a legislation making it an offence to slaughter pregnant animals; and
- (3) Cattle owners should be educated on the implications of slaughtering pregnant cows.

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