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Environmental and Public Health Issues of Animal Food Products Delivery System in Imo State, Nigeria

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Abstract:
Information on livestock movement, animal food products processing facilities, meat inspection methods, official meat inspection records and distribution and marketing systems for processed products in Imo state, Nigeria needed for policy development interventions in the sector are not fully understood. The primary data generated with the aid of personal interviews, field observations and secondary data obtained from records accumulated by the department of veterinary services Imo state from 2001 to 2004 were used to investigate the environmental and public health issues of animal food products delivery system in state. Majority of trade animals supplied to the state originated from the northern states of the country and were brought in with trucks by road. Only two veterinary control posts served the whole state thus resulting in non-inspection and taxing of a large proportion of trade animals. Official record of trade animals supplied to the state from 2001 to 2004 ranged from 45000 – 144000 for cattle, 23000 – 96000 for goats and 11000 – 72000 for sheep per annum, with supplies increasing steadily across the years. Official slaughter points in the state were principally low-grade quality slaughter premises consisting of a thin concrete slab. Meat handling was very unhygienic with carcasses dressed beside refuse heaps of over 2 years standing. Carcasses were dragged on the ground and transported in taxi boots and open trucks. Meat inspection at these points was not thorough because of stiff resistance of butchers to carcass condemnation. Official meat inspection records for the state from 2001 to 2004 revealed that overall totals of 159,000 cattle, 101,000 goats and 67,000 sheep were slaughtered. This accounted for about 56, 57 and 57% shortfall of cattle, goat and sheep respectively supplied to the state and represents the volume of un-inspected animals during the study period. Fascioliasis and tuberculosis were the most common infections encountered in cattle and recorded percentage occurrences of 16.7 and 7.5 respectively, whereas mastitis was common in goats and sheep at percentage occurrences of 5.8 and 5.0 respectively. Overall prevalence rates of 4.4, 8.0, 3.2, 3.3 and 1.5% were recorded for tuberculosis, fascioliasis, streptotricosis, mastitis and worms respectively. Animal food products delivery in Imo state needs to be improved upon in order to safeguarded the health of consumers
Key Words: Animal food products, Public health, Nigeria

Introduction:

Humans are at the top of the biological food chain. As a result, we are prone to pathogens, drugs and contaminants in the animal food product we consumed, which may include meat, fish, egg and milk. The health of food animals is of major concern to man not only because they provide us with a significant amount of nutrients especially protein, minerals and vitamins that add variety to the nutritional quality of human diets but because they also provide other needs such as income to farmers, supply of industrial raw materials, transportation, farm power and companionship among others.(1) Inadequate care of food animals reduces their productivity and exposes them to different forms of diseases agents, which may become hazardous to man and his environment.(2,3) The health and proper husbandry of livestock is therefore essential for optimization of their productivity as well as promoting good health in their human consumers.

Unpublished report by Federal Live-stock Department (FLD) (4) and stud-ies by Adubi and Aromolan (5) indicate that over 80% of food animals slaugh-tered in Nigeria originate from the northern states namely; Yobe, Sokoto, Kano, Borno, Kastina and Bauchi. These ruminant livestock populations are held in the traditional herds reared

in the savannah agro-ecological zone mostly by Fulani and Shuwa Arabs pastoralists, more as symbol of status than as meat animals.(6) The animals are transported to the south by rail or road depending on the distance, source and quantity.

Myriad of constraints inherent in the poor economy, climate, inadequate breeding and husbandry systems, limitations of feed availability and animal diseases among others have however been reported as major limiting factors to efficient livestock production in Nigeria.(5-12) Because of these constraints, animal protein intake in Nigeria still falls short of the value (70 g/head) recommended by FAO (13). Consequently, meat products are viewed as rare delicacies and there is hardly any customer discrimination against poor quality products.

A recent review of the facts about animal food products safety situation in Nigeria (3) highlighted the fact that the production, handling, sales and consumption of poor quality animal food products are serious public health problems in Nigeria traceable to the influence of the underdeveloped status of livestock producers, marketers, meat processors, quality regulating agencies staff and consumers on different segments of the country's livestock industry. The need for better understanding of the issues associated with animal food products production, handling and consumption, and quality assessment of animal food products as well as their possible impacts on human health therefore remains an important research issue in Nigeria.

According to Okoli et al (3), paramount among these research needs are perhaps generation detailed facts and statistics about the quality of animal food products in Nigeria, the consequences of unwholesome animal food products on human health and the compelling economic and socio-cultural factors for the situation. Such information will highlight the relevant policies and programs needed to address the issues as well as obstacles and challenges facing the implementation of policies directed at improving the quality of animal food products. Furthermore, the socio-cultural conditions of producers, processors, marketers, regulating agencies and consumers of animal food products, and how these fit into a program for improvement and what difference these make for the animal food industry as well as the status, roles and rewards of quality regulating agencies and their staff in the country need to be understood.

The present study was designed to examine the environmental and public health issues of animal food products delivery system in Imo state, Nigeria. Specifically the study aims to understand the current state of government regulation of livestock movement, animal food products processing facilities, meat inspection methods, official meat inspection records and distribution and marketing systems for processed products.

Materials and Methods:

Study area: This study was carried out in Imo State, which is situated in the southeastern region of Nigeria. The state is situated in the southeastern vegetational belt of the country and lies between latitude 5^0 4' and 6^0 3' N and longitude 6^0 15' and 7^0 34' E. The agro-ecological characteristics of the area have been reported.(14) The state is divided into 27 Local Government Areas (LGA), which are further grouped into three agricultural zones namely, Owerri, Orlu and Okigwe.

Data Collection: The primary and secondary data used in the study were generated from field surveys conducted between June and September 2005. The study was preceded by preliminary informal survey of the study area through which the researchers became familiarized with important locations and production in the area and explained the purpose of the study to the participants. Data was generated with

the aid of personal interviews, field observations and records preserved by relevant agencies.

Trade animals supply: Veterinary control post at Okigwe and Mgbidi, were each visited 3 times during the period to assess the on-the-ground structures for the regulation of livestock movement into the state and interview the staff manning them. These posts were the only official control posts in the state. Secondary data on animal movement was obtained from the state veterinary headquarters and comprised the monthly and annual records of the number of cattle, sheep and goats that entered the state from 2001 to 2004.

Abattoir operations: Veterinary approved slaughter points at Afo Ogbe in Ahiazu Mbaise LGA, Owerri markets and the veterinary center Egbu road Owerri were purposively selected for animal food products processing study because they handle major proportions of the animals slaughtered in the state. These slaughter points were visited every 2 weeks and interviews conducted with willing butchers and veterinary personnel. Additional secondary data were equally collected on the numbers of cattle sheep and goats slaughtered during the period from 2001 to 2004.

Meat inspection: Veterinary personnel at the official slaughter points based this on ante-mortem and post-mortem examination of the animals. Official records of major diseases encountered in the state during the period from 2001 to 2004 were also analyzed.

Meat handling, transportation and sales: Information on meat transportation and retailing were obtained with aid of interviews and observation of the activities of the stakeholders.

Meat inspection records: The official records were analyzed for their value by comparing the data derived from the control posts with those derived from slaughter and inspection activates. As described in earlier studies (14-16) official veterinary data for the state are those generated at the different local government areas and submitted to the state veterinary headquarter at the end of each month. These are pooled at the end of each month to represent the monthly veterinary report for the state.

Data analysis: data generated were analyzed using descriptive analysis such as simple average ratios and percentages. Plates were also used in representing results where necessary.

Results and Discussion:

Trade animals supply: The present study showed that majority of the livestock supplied to the state come from the northern states and were brought in lorries by road, although some sheep and goats were derived from within the state. This agrees with the findings of Adubi and Aromolam (5) and Ikeme (6) that more than 80% of animals slaughtered in Nigeria originate from the northern states of the country.

An official map of the state showed that out of 8 major roads entering the state, only 2 (Mgbidi and Okigwe) had veterinary control post. At these points, lorries conveying livestock in to the state are stopped, the animals inspected and tax collected from their owners. Additional animals could enter the state through several uncontrolled routes such as Etiti, Umunelu and Okpala. Orlu, Urulla, Egbema etc. Animals entering through these other routes are neither inspected nor tax collected from the owners. Interview of veterinary personnel at Okigwe post showed that no animal is rejected on grounds of poor quality at the post because loss to the owner and the state in terms tax is considered since suppliers pay N100.00 per cattle and N50.00 per sheep and goat.

Observations made at these posts and subsequently at the various slaughter points showed that the welfare of the trade animal was not an important factor during their transportation. **Plate I** for example showed the type of lorry usually employed in transportation of the animals.

Plate I: A truck discharging trade cattle at the Owerri slaughter point. Shown are the carcasses of animals that probably died of suffocation and exhaustion during transportation

Arrowed in the plate are 3 carcasses of cattle that died of suffocation during journey. Such carcasses when processed have been reported to end up in remote village markets as wholesome meat (3).

Table 1 showed the official annual figures of cattle, sheep and goat supplied to the state from 2001 to 2004. There was a continuous increase in the number of all categories of livestock supplied to the state with range from 2001 to 2004 standing at 45000 – 144000 for cattle, 23000 – 96000 for goats and 11000 – 72000 for sheep. Annual for the three species also stood at 89,750, 58,500 and 39,500 for cattle, goats and sheep respectively supporting the earlier reports that cattle are the most important meat animals marketed in the southern states of Nigeria.(17,18)

Table 1: Annual figures of cattle, sheep and goats supplied to Imo state from 2001 to 2004.

Year	Cattle	Goat	Sheep	Total
2001	45,000	23,000	11,000	79,000
2002	70,000	40,000	25,000	135,000
2003	100,000	75,000	50,000	225,000
2004	144,000	96,000	72,000	312,000
Total	359,000	234,000	158,000	751,000
Annual mean	89,750	58,500	39,500	178,750

These findings are of significance because trade animals originating from the northern states and harboring diseases of public health importance could easily spread them in the southern states especially under a situation of poor regulation of animal movement. The steady increase in the annual supply to the state may be reflecting increases in the population and purchasing power in the state. There is the need for creation of additional veterinary posts to ensure effective control of trade animal entering the state.

Abattoir operations: Our visits to the veterinary approved slaughter points at Afo Ogbe in Ahiazu Mbaise LGA, Owerri markets and the veterinary center Egbu road Owerri revealed that the facilities were principally low-grade quality slaughter premises consisting of thin a slab of concrete and a small pit that serves for collection of both solid and liquid wastes. These slaughter points were characterized by lack of tap running waters, proper waste disposal facilities, absence of sanitary inspectors and attendants needed for cleaning and day to day manage of the points. Animals brought to the slaughter slabs were mishandled, slaughtered processed beside heaps of waste materials such as bones and rumen digester accruing from previous operations (**Plate II**).

Plate II: Dressing of slaughtered cattle beside a long-standing heap of bones and animal rumen wastes.

These waste heaps were observed at the Egbu road veterinary center to have lasted more than 2 years at the sight. The method of slaughtering was halai at these points, while immobilization was by means of ropes and wrestling down. Sticking was usually done with the animal lying on the either the slaughter slab or on the bare ground, while carcass dressing was done on the floor (Plate II). Animals due for slaughter usually stand and watch while others are being slaughtered.

Similar observations have been made by Okoli et al (3), Ikeme (6), Ogunyemi (17), Aladi (19) and Nwokeocha (20) specifically reported that slaughter slabs handle more than half of the animals slaughtered in the Nigeria. Difficulties encountered in introducing modern techniques into the Nigerian livestock industry are usually most glaring at animal auction and slaughter points and are manifested by the continued employment of primitive methods at these points. Where modern facilities for animal slaughter and meat handling have been installed (usually at astronomical costs), they are usually abandoned due to poor patronage by local butchers and neglect by regulating government agencies.(19) Butchers are reluctant in patronizing these modern facilities because they view the mechanized and automated systems as competitors for their jobs and those of their dependants.(3)

Meat inspection: The study also revealed that the state-regulating agency was mainly interested in the revenues accruable from abattoir operations in the state and therefore approves veterinary personnel specifically for areas where revenue to government could meet up monthly salaries. Thus a veterinary doctor and probably an auxiliary officer may be approved for a major slaughter point, while auxiliary officers is approved for miniatures slab. It was observed that veterinary personnel were hardly regular in reporting for duty.

Meat inspection proper in the state is based ante-mortem and post-mortem examination of animals intended for human consumption and is hardly efficiently carried out. This is partly because of the relatively high number of animals slaughtered at the major points and the limited time (usually between 6.30 to 8 am) available to the veterinary personnel to carry out their duties. More importantly, butchers were found to stiffly resist meat condemnation by the veterinary personnel Animals discovered with major infections were hardly ever wholly condemned. Instead, the affected parts were trimmed off against the protestations of the affected butcher.

In Nigeria, illiterates and school dropouts dominate butchery. Because of divergent goals and clear misconception of the aims of meat inspection by these operators, stiff and sometimes violent resistance to meat or carcass condemnation is common.(3) Cases of pre-selection of ill-looking animals for slaughtering at unofficial points by butchers as shown in **Plate III** have been reported.(3,16,19) Meat inspectors are usually under pressure from butchers and may trim affected tissues or glands and then pass the carcass for human consumption.(19) Although the law provides that meat or parts thereof condemned should be compensated for, perpetual scarcity of funds hinders the carrying out of this obligation.(17) The butchers thus view

condemnation as a source of serious economic loss and therefore avoid possible means by which their stock may be condemned.

Plate III: A highly emaciated cattle in poor condition pre-selected for slaughter at a non-veterinary approved point.

In addition to cases of fascioliasis, mastitis and tuberculosis were other common disease conditions warranting partial condemnation of carcasses during the study visits.

Meat handling, transportation and sales: Plate IVa depicts a common meat handing procedure at the slaughter points studied. A casual worker or apprentice butcher is seen carrying part of a carcass with blood oozing out of the carcass unto his body. It is also observed that the attendant is wearing cloths hardly meant for the job and may actually be his every day dress. **Plate IVb** similarly showed a group of poorly dressed attendants dragging some carcass on the ground. Similar reports of apprentice butchers and retailers being seen sitting on the carcasses or resting on them inside the vehicles have been made by Ogunyemi (17) and Aladi.(19)

Plate IVa: A slaughter point attendant or apprentice butcher carrying a carcass on his body, with blood dripping all over his body.

Plate IVb: A slaughter point attendant or apprentice butcher dragging a carcass on the bare ground.

Plates IVa and V again highlights the poor nature of meat transportation at the state. A commercial pickup van and an unregistered taxi cab hired for the days job are seen fully loaded with carcass parts for onward transportation to the market.

Plate V: An unregistered taxicab fully loaded with carcass.

Plates VI equally depicts a typical fresh meat market scenario in the state. The market is an out door affair with operators again being poorly dressed for the job. The humid tropical environment of state encourages the breeding of flies, which form a major nuisance at these markets. The public health significance of these flies in the transmission of important zoonoses has been reported.(2,21) Most importantly, these poor meat handling, transportation and sales practices subject meat to contamination leading to

poor quality and exposure of human consumers to health to risk.

Plate VI: An open meat market unprotected from flies and dust

Meat inspection records: Our scrutiny of the official meat inspection records for the state from 2001 to 2004 revealed that 159,000 cattle, 101,000 goats and 67,000 sheep were slaughtered in the state during the period (**Table 2**).

There was again a steady increase in the number of animals of any of the species slaughter across the years reflection the observed similar increases in supply during the same period. These increases may be reflecting improvements in the meat demand of the state. However they may not reflect the true level of slaughtering done in the state during the period since earlier report on official slaughter figures for the state has been shown to be grossly under estimated.(16)

Table 2: Annual slaughter figures of cattle, goat and sheep at veterinary approved point in Imo state from 2001 to 2004

Year	Cattle	Goat	Sheep	Total
2001	21,000	13,000	5,000	39,000
2002	30,000	18,000	11,000	59,000
2003	48,000	30,000	21,000	99,000
2004	60,000	40,000	30,000	130,000
Total	159,000	101,000	67,000	327,000

Table 3 compared the official supply and slaughter figures for the state during 2001 to 2004. Overall figures of 359,000, 234,000 and 158,000 for cattle, goat and sheep respectively were supplied to the state, but only 44%, 43% and 43% of these were slaughtered at veterinary approved point respectively. This accounts for about 56%, 57% and 57% shortfall of cattle, goat and sheep respectively at the veterinary approved slaughter points and may represent the volume of un-inspected animals of the species under consideration during the study period. These results again reflect the grow underestimation of abattoir records in from the state.

Table 3: Comparison of animal supply and inspection figures of cattle, sheep and goat from 2001 to 2004 in Imo state.

Year	Annual supply figure			Annual slaughter figure			% Inspected			% Un-inspected		
	Cattle	Goat	Sheep	Cattle	Goat	Sheep	Cattle	Goat	Sheep	Cattle	Goat	Sheep
2001	45,000	23,000	11,000	21,000	13,000	5,000	46%	56%	45%	54%	46%	55%
2002	70,000	40,000	25,000	30,000	18,000	11,000	42%	45%	44%	58%	55%	54%
2003	100,000	75,000	50,000	48,000	30,000	21,000	48%	40%	42%	52%	60%	42%
2004	144,000	96,000	72,000	60,000	40,000	30,000	41%	41%	41%	59%	59%	59%
Total	359,000	234,000	158,000	159,000	101,000	67,000	44%	43%	43%	54%	57%	57%

The public health implications of these revelations are grave and specifically indicate that over 50% of food animals different types supplied to the state may pose health risks to consumers since meats derived from them were not never inspected. For example, In Nigeria, incidence levels of grave public health concern have been reported for tuberculosis, cysticercosis, fascioliasis, teniasis and brucellosis among others in slaughtered animals.(22-24) Ona and Chiejina (25) reported that as many as 8.6% of hospitalized patients in southeastern Nigeria had taenia eggs in their stools and over 20% of trade pigs had *T. solium* cysticercosis.

Table 4 highlighted the prevalence of different diseases in cattle, goat and sheep slaughtered in Imo State in 2004. Fascioliasis and tuberculosis were the most common infections encountered in cattle gave percentage occurrences of 16.7 and 7.5 respectively, whereas mastitis was common on goat and sheep at percentage occurrence of 5.8 and 5.0 respectively. Again out of the annual total of 130,000 livestock slaughtered in the state for the year, 4.4%, 8%, 3.2%, 3.3% and 1.5% were affected by tuberculosis, fascioliasis, streptotricosis, mastitis and worms respectively.

Similar results have been returned for fascioliasis in the state by other workers (18), however only a lowly 0.46% occurrence of lung nodules indicative of tuberculosis was returned for the state in a previous study spanning 1995 to 1999.(26) Ogunrinade and Oyekole (22) however estimated that meat inspectors in Nigeria detected only 0 to 20% of TB cases occurring in slaughter animals.

Table 4: Prevalence of different diseases in cattle, goat and sheep slaughtered in Imo State in 2004.

Specie of animal	No slaughter	No (%) Tuberculosis	No (%) Fascioliasis	No (%) Streptotricosis	No (%) Mastitis	No (%) Worms
Cattle	60,000	4,500(7.5)	10,000(16.67)	2,500(4.17)	500(0.8)	1,000(1.67)
Goat	40,000	700(1.75)	240(0.60)	900(2.25)	2,300(5.75)	550(1.34)
Sheep	30,000	550(1.83)	160(1.83)	700(2.33)	1,500(5.00)	400(1.33)
Total	130,000	5,750(4.42)	10,400 (8.00)	4,100(3.15)	4,300(3.31)	1,950(1.5)

It is clear that veterinary authorities in Imo state still harbor an old-fashioned view of meat inspection services as entirely a device for consumer protection. Thus, facilities for the diagnosis of important zoonoses of public health relevance such as brucellosis, Q fever, salmonella, toxoplasmosis and leptospirosis are lacking. Development and adoption of an integrated meat inspection system, where information from the farm level is included has been suggested for abattoir services improvement in the state.(2)

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