Prevalent Livestock Diseases in South East Nigeria and their Control Measures: A Review

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ABSTRACT

Globally, livestock diseases are major constraints to animal production and management, usually resulting in economic losses, reduced productivity and quality of livestock products. The livestock diseases prevalent in south east Nigeria were evaluated based on data collected between January 2010- June 2023 from the epidemiology unit of the Federal Department of Veterinary and Pest control services, Federal Ministry of Agriculture and Rural Development Abuja, Nigeria. Diseases of cattle reported ranging from the highest to the least occurrence included, Contagious Bovine Pleuropneumonia (CBPP), Bovine Tuberculosis, Brucellosis, Fascioliasis and Mastitis. Major disease of small ruminants (sheep and goats) was Pests des Petits ruminants (PPR). Diseases of pigs reported included: African swine fever, Swine Erysipelas and piglet anaemia. Poultry diseases were New Castle Disease (NCD), Infectious Bursal Disease (IBD), Coccidiosis, Fowl typhoid, Fowl pox and Highly Pathogenic Avian influenza (HPAI). The article also reviewed the notifiable diseases reported by Nigeria Center for Disease Control through its Integrated Disease Surveillance and Response system (IDSR) known to be zoonotic. Diseases in this category were Tuberculosis, Anthrax, Rabies, HPAI, Food and water borne diseases such as Brucellosis, Colibacillosis, Cysticercosis. Control programmes included; Biosecurity measures, disease surveillance in flocks and farms, seromonitoring of animals, routine vaccination, accurate diagnosis and treatment of sick animals, stamping out flocks once disease is detected as in the control of HPAI and CBPP. The evaluation of the disease prevalence, economic and public health effects of these diseases could not be accomplished in the course of this review as a result of underreporting and inaccurate disease identification due to lack of basic veterinary diagnostic facilities. It was therefore recommended that developing an operational digital livestock information system for livestock farmers, disease surveillance and reporting will be needful. Decentralizing the National Veterinary Research Institute Vom function of disease diagnosis/surveillance to the six geopolitical regions in Nigeria as well as employing the one health approach to livestock disease control and management would also be apposite in unlocking the livestock potentials of Southeast Nigeria.

INTRODUCTION

Agriculture was the main stay of Nigeria's economy as it was the highest earner of foreign exchange for Nigeria which was also largely sufficient in food production. Revenue from agriculture was deployed to develop the crude oil sector. Today agriculture is playing second fiddle to oil and contributing only about 30% to 40% of Nigeria's Gross Domestic Product(GDP) and employing about 70% of the population mainly at subsistence level (Ikponmwosa 2017). Nigeria's GDP from Agriculture decreased from N5,456,895.81 (fourth quarter 2021) to N387,973.92 (first quarter 2022) (National Bureau of statistics, Nigeria)

Recent events in the global oil industry and their drastic effects on Nigeria's economy coupled with the effects of COVID-19 pandemic and Russian-Ukrainian war have driven home the fact that we have to diversify and take agriculture more seriously than we are currently doing.Nigeria has a very high rate of youth unemployment and this is the root of the security challenge in the country. Agriculture has the potential to rescue Nigeria from this major challenge.

Livestock farming also known as animal husbandry is the management and breeding of domestic or farm animals for the purpose of obtaining their meat and other products which include milk, eggs and leather. Some animals are grouped as micro-livestock and they include rabbits, giant rats, guinea pigs, grass cutters, snails and various edible insects. (Akinbobola 2022).

Livestock or farm animals constitute a major component of the agricultural economy and a source of animal protein. Nigeria's negative balance of trade is evidenced by a condition referred to as a "diary dilemma" which implies that Nigeria imports over two thirds of its milk, a sign that local production cannot meet up with demand (Vanessa and Ciara 2019). Currently, Nigeria's per capita animal protein intake is 10g per day and despite over sixty years of Nigeria's existence as a nation, we are yet to meet the minimum per capitaanimal protein requirement of 35g per day (FAO WHO 2020).Africa is 11g per day. Eastern Europe 33g per day, Western Europe 39g per day while North America is 66g.For chicken,Nigeria lags behind in its per capita protein consumption among its African peers. Nigeria is 1.9kg, Ghana is 7kg, South Africa 32kg and USA is 49kg (John Coumantaros 2022).

Animal production has remained underexploited. Livestock mostly reared by farm families in Nigeria are the small ruminants like goats (76 million), sheep (43.4 million) and cattle (18.4 million). The ecology in northern Nigeria makes it famous for livestock keeping. In addition to small and large ruminants, poultry population stands at 180 million (FMARD 2017). Domestic demand outweighs production despite several interventions by development partners to improve production and safeguard against diseases including Trans-boundary animal diseases (TADs) (FAO 2022).

The reasons for this deficiency are partly due to the fact that the growth rate of human population is not commensurate with the growth in livestock population and in part to the economic down turn in Nigeria which has made the conventional and regular sources of animal protein (beef, pork, goat meat, mutton, milk, fish, poultry meat and eggs) an exclusive reserve of the rich (Athanasius 2018).This means that we are unable to produce enough animal products to meet the demand by Nigerians for their wellbeing.

Certain factors areresponsiblefor this shortfall and they include;

- Improper implementation of government policies
- Lack of easily accessible funds (grants and loans)
- Poor infrastructure / modern technology for commercial, largescale production.
- Poor foundation stocks
- High cost of animal feeds
- Poor access to markets
- Disease outbreaks
- Lack of extension
- Insecurity
- Lack of proper training of livestock farmers
- Nonfunctional farmers' associations
- Inadequate veterinary services
- Climate change (Athanasius 2018, FAO 2022)

The Potentials of Livestock Production in South East Nigeria.

South East Nigeria is one of the six geopolitical zones in Nigeria consisting of five states namely Abia, Anambra, Ebonyi, Enugu and Imo.

South East Nigeria borders with Cross river state to the east, River Niger to the West, Kogi/Benue states to the North and Rivers/Akwaibom states to the south.

99.9% of the population are Igbos. Therefore S.E. region of Nigeria is known as Igbo land. Southeast Nigeria is endowed with numerous opportunities for livestock production such as;

a) Terrestrial resources: Land suitable for cultivation of crops and grasses for ruminants is known as arable land. About 80% of the land mass in Nigeria is considered to be arable land, which is equivalent to 82 million hectares. Currently about half of this arable land mass is being cultivated. (Ikponmwosa, 2017).

b) Aquatic resources are also highly required for livestock production and include:

- River Niger and its tributary, Anambra River traditionally known as Omambala River flows through parts of Anambra state (Anambra east and west, Ayamelum LGAs) and Enugu state (UzoUwani LGA).
- Imo River in Imo and Abia states. Abia state also has Aba River.
- Enugu state has Ekulu, Idaw, Asata and Ogbete rivers
- Ebonyi state has Iyioka, Idima and Ubei rivers.
- Other aquatic resources include lakes, streams, springs, ground waters and rain water.

a) High demand of livestock products by households, restaurants, events, hotels etc.
b) Marketing opportunities: South East Nigeria is a hub for marketing livestock products from Northern Nigeria (cattle, sheep and goats including meat, hides and skin), Pig and Poultry products (meat and eggs) from South west Nigeria, and a variety ofcanned meat, milk and pork products imported from various countries (China, Finland, Thailand, Norway, England etc.). The peculiar marketing structure in South East Nigeria is of strategic importance; the fourIgbo market days namely Eke, Oye, Afor and Nkwo. These markets connect the mega commercial centers with rural markets. This structure encourages profitable and sustainable marketing of livestock products in South East Nigeria, making livestock production and marketing attractive for wealth and employment generation. (Athanasius 2018). The marketing potentials in the SE Nigeria made the SE Nigeria evolve into a consumption region rather than productive. The livestock production potentials of the SE region should be unlocked by gearing efforts towards maximizing the opportunities and minimizing the factors responsible for the short fall in livestock production in SE Nigeria.

The Prevailing Livestock Diseases in South East Nigeria.

Livestock diseases are ailments or disorders affecting livestock animals usually resulting to economic losses,reduced productivity and quality of livestock products. Livestock diseases are major constraints to animal husbandry in all the regions of the world.

Reported Livestock Diseases from South East Nigeria:

Based on information sourced from the epidemiology unit of the Federal Department of Veterinary and Pest Control Services, Federal Ministry of Agriculture and Rural Development Abuja, the following livestock diseases are prevalent in South East Nigeria from year 2010-2023.

1. Diseases of cattle:

Contagious Bovine Pleuropneumonia
Bovine tuberculosis
Brucellosis
Fascioliasis
Mastitis

2. Diseases of Sheep and Goats
Pests des Petits ruminants (PPR)

3. Diseases of Pigs
African swine fever
Swine Erysipelas
Piglet Anemia

4. Diseases of Poultry
New Castle Disease (NCD)
Infectious Bursal Disease (IBD)
Coccidiosis
Fowl typhoid
Fowl pox
Chronic respiratory disease (CRD)
Infectious coryza
Avian influenza (HPAI)
Colibacillosis

Diseases of Cattle

Contagious Bovine Pleuropneumonia (CBPP) is an infectious and contagious disease of cattle caused by *Mycoplasma mycoides* subspecies*mycoides*. It attacks the lungs and the Pleura (membranes lining the thoracic cavity) causing fever and respiratory signs; labored or rapid respiration, cough and nasal discharges.

Contagious Bovine Pleuropneumonia is a prominent cattle disease in South East Nigeria and Africa at large. CBPP is highly contagious with a mortality rate of up to 50%. It causes significant losses. CBPP is one of the diseases for which the World Organization of Animal Health (WOAH) has established an official procedure for recognition of status. The Terrestrial Animal Health code specifies the procedure a country must follow in order to be officially recognized by the WOAH as free of CBPP. This disease has no public health risk and has been eradicated in Europe and America where control programs were: Detection of carriers, early detection of outbreaks, control of animal movement (movement restriction). In Africa control is currently based on vaccination campaigns. National Veterinary Research Institute (NVRI) produces CBPP vaccine. Treatment with antibiotics is not recommended as it results in healthy looking animals that are carriers. (WOAH 2022).

Bovine tuberculosis (TB) is a chronic bacterial disease of cattle and all mammals caused by *Mycobacterium tuberculosis*. The disease is zoonotic and humans get infected by drinking raw milk of affected cows. The clinical signs are weakness, debility, formation of a tuberculous nodule in the affected organs, cachexia and death. The disease is identified by a simple tuberculin test. Long term antibiotic treatment may cure Bovine TB. Prevention is by culling positive cases from the herd due to public health significance.

Brucellosis is a highly contagious, economic and reproductive important disease of cattle, buffalo, sheep, goats and other mammals. The causative agent is *Brucellaabortus, B.ovis, B.suis, B.canis and B.melintesis*. The clinical signs in cows are abortion, still birth, orchitis, reduced milk production and producing weak calves. The bulls are normally carriers of brucellosis and transmit organisms through semen during breeding. There is no specific treatment for Brucellosis. Culling of positive cases from the herd is helpful in the control of Brucellosis.

Bovine Fascioliasis (Liver fluke): A disease of ruminants caused by *Fasciola hepatica* and *Fasciolagigantica* which affects the liver parenchyma and bile ducts of ruminants including humans which causes economic losses and threatens public health. In ruminants the liver is damaged and clinical cases usually result in decreased production of meat and milk, secondary bacterial infections, fertility problems, loss of weight, poor carcass quality and high expenditure on anthelmintics. Fascioliasis is a zoonotic disease of public health importance. Man becomes infected when infective stages of the fluke are ingested along with vegetables grown along banks of water reservoirs inhabited by potential snail hosts. (Kalu 2015). Treatment is by

administering fasciolicides e.g., triclabendazole. Prevalence of fascioliasis is 23% in Abia state (Onyeabor and Wosu 2014).

Mastitis is the inflammation of the udder (mammary) tissue and causes physical and chemical changes of milk. It is the most deadly and costly bacterial disease of dairy cattle, caused by several bacteria including *Pseudomonas,Streptococcus,Staphylococcus, E. coli, Pseudomonas, Mycoplasma* etc. The clinical signs are swelling, redness of the udder, reduced milk production, and blindness of the udder. The treatment of mastitis is with antibiotics, anti-inflammatory, and antihistaminic drugs. Prevention of mastitis is by improving milking hygiene, cow management and adequate nutrition.

Diseases of sheep and goats (Small ruminants).

Pests de Petits Ruminants (PPR) also known as sheep and goat plague is a viral disease caused by a Morbillivirus closely related to Rinderpest virus, which affects goats, sheep and some wild relatives of domesticated small ruminants as well as camels. It is characterized by severe morbidity and mortality rates (90%) and has a high economic impact in Africa, Middle East and Asia, where small ruminants contribute to sustainable livelihoods.

PPR is aWOAH – listed disease and must be reported to the WOAH according to the Terrestrial Animal Health Code. WOAH and FAO have developed the Global Control and Eradication Strategy of PPR by 2030. NVRI Vom has produced efficient PPR vaccine for the control of thedisease (WOAH 2018). PPR is the most prevalent livestock disease in SE Nigeria (FMARD 2022). Clinical signs include catarrh, diarrhea, weakness and death.

Diseases of Pigs

African Swine Fever (ASF): ASF is a highly contagious viral and economically devastating swine disease that can affect both farm-raised and feral pigs. ASF is not zoonotic but it readily passes from one pig to another by direct contact with body fluids from infected pigs (U.S Food and Drug Administration 2022). African swine fever has had significant economic and social impacts in Nigeria since 1997. There is no effective treatment and national response to control ASF. Significant reduction of ASF prevalence in Nigeria can be achieved through routine surveillance,reorganizing the market and transportation systems for pigs, on farm biosecurity protocols and consideration of the option of compensation. (Fasina *et al* 2010).

Swine Erysipelas: Swine Erysipelas is caused primarily by *Erysipelothrix rhusiopathiae*, Gram positive bacteria carried by up to 50% of pigs. Clinical manifestations are cutaneous erythema, including characteristic diamond-shaped lesions, septicaemia, arthritis and endocarditis. Erysipelas is a common cause of carcass condemnation at meat inspection. *Erysipelothrix rhusiopathiae* is susceptible to Penicillin (Forde, 2020).

Piglet Anaemia: The main cause of Piglet Anaemiais iron deficiency. Usually piglets are born with levels of iron (about 50mg) that will last them a few days of life. Naturally piglet source iron from the soil and that explains why the scavenging piglets survive piglet anaemia, but in the commercial farms, natural source is very limited. Piglets suffering from this iron deficiency anaemia show tachypnoea (fast breathing), rough hair, wrinkled skin, pale mucous membrane, poor weight gain etc. They are susceptible to other infections and are likely to develop diarrhea. Treatment is by supplementation of iron(150-200mg Iron dextran) through subcutaneous injection by the third day postnatal to ensure the piglet gets the required dose needed to overwhelm this condition (CEVA, 2021).

Poultry Diseases

The list of prevalent poultry diseases in South East Nigeria from the most prevalent to the least are: New Castle Disease (NCD), Infectious Bursal Disease (Gumboro), Coccidiosis, Fowl Typhoid, Fowl Pox, Colibacillosis, Highly Pathogenic Avian Influenza and Infectious Coryza.

According to Nwanta *et al* (2011), there is a high prevalence of gastrointestinal helminths, coccidia and ectoparasites in livestock farms in southeast Nigeria and this suggests the endemic nature of these diseases as contributing to major economic losses in livestock production in southeast, Nigeria.

Disease	Aetiology	Status	Clinical Signs	Treatment	Control	Mode of transmission
New Castle Disease	NCD Virus Paramyxo virus	Endemic, highly contagious. Greatest constraint of poultry production in Nigeria	Decreased feed and water consumption , drastically reduced egg production, Twisting of the neck (torticollis), water discharge from the nostrils	Nil Antibiotics for secondary bacterial infections	Vaccination and stamping out. Consult your local veterinarian	Direct contact with bodily fluids of infected birds especially faeces. Also, through people and objects in contact with infected birds.
Infectious Bursal disease	IBD virus Avibirnav irus (RNA virus)	Endemic contagious immunosup pressive diseases of chickens	Sleeping with their beaks touching the ground, Viscous diarrhea	Nil Antibiotics for secondary bacterial infections	Vaccination	Fecal- oral route through ingestion of contaminated feed and water Ingestion of agents from infected litter.
Coccidiosis	Eimeria species (Protozoa n)	One of the most devastating diseases with substantial economic losses to poultry industry	Scuffled feathers Blood-stained diarrhea inappetence depression	Anticoccidi al Drugs	Avoid wet litter. Avoid overcrowdin g. use of anticoccidial drugs. Vaccination	Ingestion of coccidia oocysts from infected litter.
Fowl Typhoid	*Salmonell a gallinaru m*	Endemic in Nigeria	Yellowish diarrhoea, Ruffled feathers	Antibiotics: Amoxycilli nTetracycli nesand Fluoroquin olones	Vaccination	Transovarian (vertical) or faecal-oral contamination (Horizontal)
Fowl Pox	Fowl Pox virus (Avipoxvi rus)	Prevalent in rainy season. virus can strive in the environme nt for months	Vesicular lesions or wartlike nodules in the month, Combs and throat, Decreased egg production	No specific treatment Antibiotics against secondary bacterial infection	Vaccination Vector control	Transmitted by mosquitoes and other blood sucking insects. By direct contact with infectious wounds.

Colibacillosis	(E. coli)	Triggered by stress	Greenish diarrhea, Droopy wings, Respiratory distress	Antibiotics	Isolation of sick birds. Avoid stress	Normal microflora disease is triggered by stress and unhygienic pens
Highly PathogenicAvian Influenza.	HPAI H5NI strain	Outbreak 2006-2008. Reemerged in 2015 and recorded till 2022	Hemorrhages in the combs, wattles and shanks.	Nil	Stamping out/ compensation. No vaccination in Nigeria	Directly from infected birds or AI virus Contaminated environments through other animals e.g., migratory birds
Infectious Coryza	*Avibacterium Paragallinarum*	Endemic in Nigeria	Swelling of the face, Drop in egg production, reduced feed and water consumption, eye and nasal discharge	Antibiotics	Vaccination Disinfection and no replacement of shock until after 3 weeks of disinfection	Carrier birds Chicken to chicken indirectly through aerosol or contaminated feed, water equipment and clothing.

Table 1. Prevalent Poultry Diseases in South East Nigeria (FMARD 2022)

Public Health Aspects of Some Animal Diseases

The Nigerian Center for Disease Control (NCDC) list of notifiable diseases show a list of diseases that have public health implications. Zoonoses are diseases that are transmitted from animals to human and vice versa. Notifiable diseases are human and animal diseases that ought to be reported to government authorities by law. Nigeria has been collecting information on epidemic-prone and other infectious diseases that can concern the populace through the Integrated Disease Surveillance and Response System (IDSR) since 2001. The IDSR system helps to identify notifiable diseases at all public primary, secondary and tertiary healthcare facilities in Nigeria.

The list of notifiable diseases in Nigeria (Collins 2021)

Cholera
Diphtheria
Leprosy
Meningococcal meningitis
Adverse effects following immunization
Diarrhoea with blood (Shigellosis)
Acquired Immunodeficiency Syndrome (AIDS)
Buruli ulcer (*Mycobacterium ulcerans* diseases)
Pertussis (Whooping cough)
Dengue fever
Hepatitis A, B, C, D and E
Human Immunodeficiency Virus (HIV)
Lassa fever
Zika virus*
Small pox
Rubella
Ebola*
Dracunculiasis
Water borne diseases outbreak*
Anthrax (human)*
Typhoid fever
Tetanus
Chicken pox
Poliomyelitis
Tuberculosis *
Rabies (human)*
Lymphatic Filariasis
Food borne Diseases outbreak*
Avian Influenza (Bird flu).*
Onchocerciasis
West Nile fever
Measles

The diseases marked * are zoonotic.The likes of Covid-19 and Monkey Pox are supposed to be on the list. Their control programmesare professionally handled to achieve measurable success.It is important to note that some food and water borne diseases like Colibacillosis, Brucellosis, Cysticercosisetc are also zoonotic

and could be contacted through livestock.NCD is a mild zoonosis causing conjunctivitis in human. (DAERA 2018).

Control of Livestock Diseases

The control measures put in place against the spread of livestock diseases in order to reduce their health and socio-economic impacts include

1. Biosecurity programmes:

Biosecurity means the prevention of diseaseagents from entering or leaving any place where they can pose a risk to farm animals, other animals and humans. Biosecurity measures include

- Washing and disinfection of equipment, foot baths, cages, pens etc.
- Use of protective clothing
- Strict quarantine programmes
- Water quality management
- Movement restrictions or traffic control
- Isolation of sick animals
- Proper disposal of wastes and mortalities.

2. Disease surveillance in flocks and farm to check for contaminants of animals intended for human consumption. Such contaminants include disease pathogens, drug residues, heavy metals, pesticides, microplastics etc.
3. Seromonitoring of animals to detect antibodies in their blood to identify carriers and regulate vaccination.
4. Routine Vaccination programmes
5. Accurate diagnosis and treatment of sick animals
6. Proper feeding and management to maintain adequate immune status of animals in order to reduce predisposition to diseases.
7. Purchase of replacement stock and breeders from reputable pathogen free sources.
8. Regular deworming and control of ectoparasites with anthelminthics and acaricides
9. Addition of feed additives such ascoccidiostats, antifungals, vitaminsetc
10. Stamping out flocks once disease is detected: effective for the control of HPAI and CBPP.
It is important to mention that the NVRI Vom is the only Veterinary research institute in Nigeria, presently a parastatal under FMARD and was established with the mandate to conduct research into all aspects of animal diseases, develop and produce animal vaccines, provide surveillance and diagnosis of animal diseases as well as provide extension services to poultry and livestock farmers.

CONCLUSION

The actual economic and public health impact of livestock diseases are underestimated due mainly to under reporting or being unaware of these diseases. It is therefore very important to update information on these diseases so as to improve their awareness and facilitate prompt disease diagnosis and reporting. Future outbreaks are controlled by routine surveillance of livestock diseases as a means of developing early warning and emergency preparedness. (Oluwayelu *et al* 2018, Nwokolo 2022).

The following recommendations will help to achieve the desired objectives of controlling livestock diseases in South East Nigeria,

- Developing a comprehensive data base of livestock farmers, disease surveillance and reporting through an operational Livestock Information System.
- Decentralization of the NVRI to every region in Nigeria and improvement of veterinary services to effectively improve on prompt disease diagnosis as a major component of disease reporting and surveillance.
- Enlightenment campaigns and training of livestock farmers, livestock extension officers and animal health service providers.
- Expansion of livestock production from backyard to commercial status through importation of knowledge from western and northern Nigeria.
- Mechanization and digitization of processes.

- One health approach to livestock production and disease management.

Finally, we wish to affirm that adaptation of digital technologies and innovations are necessary to ensure food security and nutrition safety through livestock production in South East Nigeria.

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