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Non-implementation of Planning Laws and Its Resultant Consequences as a Basis for Zoonotic Diseases Transmission among Urban Livestock Keepers in Potiskum Town, Yobe State, Nigeria

Usman Adamu
Lecturer, Department of Geography, Yobe State University Damaturu, Nigeria

Abstract:
This study examined the management strategies applied by livestock producers and its resultant consequences on the environment and as such a threat to public health emanating basically from small land holdings in some selected wards in Potiskum town. Coordinates of 25 dumpsites generated through livestock waste disposal were taken using handheld GPS. Buffer of 200 meters radius was created at each dumpsite points where livestock farmers were randomly selected for oral interview. The results show that most of the livestock farmers acquire their land by mode of inheritance where a household died and his or her landed asset was shared among his/her heirs. Majority of the respondent's views revealed that the sizes of their residential buildings where livestock were raised are less than a quarter plots with limited space for both human and animals. The study also revealed that there is direct closed association between human and animals due to small land holdings. The distance estimate between human habitat and that of livestock animals of the majority of the farmers is less than four meters (<4m). Findings shows that direct animals and human interaction has became a serious health issue as some symptoms of zoonotic diseases (cholera. abortion, diarrhea, typhoid and so on) has been reported among livestock farmers. Some of the effects include degradation of land, deterioration of structures and contamination of water, noise pollution and destruction of properties among others. Descriptive research design method was used for the study. Data were analyzed using descriptive statistical tools such as percentage computation, frequency distribution table, line and bar graph respectively

Keywords: *Urban, Livestock, Degradation, Inheritance, zoonotic*

1. Introduction

From independence to date, after oil, the major economic background of Nigeria is agriculture. Hamaduo A. et al (2012) lamented that the contribution of the livestock sector to the agricultural gross domestic product is 49, and 44 % for Nigeria. While the growth rate of the regional animal production is estimated at 4 % per year. The regional demand for livestock products is expected to increase by 250% until 2025 as compared to 2005 (SWAC-OECD/ECOWAS 2008). Given the current degree of urbanization of about 20% and an annual growth rate of the urban population of 5–7 %, an important proportion of the total population of sub-Saharan will definitely live in cities. It is perceived generally that people with low income levels degrade the environment by practicing improper solid waste disposal practices. Households with low levels of income are willing to practice proper waste disposal but their economic hardship force them to dispose indiscriminately. A research conducted by Medina (2002) also observed a significant relationship between a community's income and the amount of solid waste generated. This means that low- and middle-income households generate high amount of waste. Waste generation and its disposal is greatly influenced by household's level of income.
In a study by Bandara et al. (2007) on household income and types of waste generated noted that organic waste and waste separation is high among household with high levels of income. This may imply that high income household could afford plenty waste for different waste generation but with proper disposal. For example, in Niamey, Niger (Graefe et al. 2008), reported that more than half of the households involved in UPA were rearing livestock. In Kano, Nigeria, Muhammad (2008) found that keeping livestock was a considerable source of additional income for civil servants and traders. Many more researches have been carried out by drawing their conclusion that there is a significant growth of the numbers of urban households involved in livestock rearing, and identified related constraints and opportunities. However, cities may differ in size, structure, degree of urbanization, development history, and environment, socioeconomic and cultural circumstances as cited in (Cissé et al. 2005). Subsequently, the legal framework within which urban livestock husbandry in particular is practiced, varies across West African countries and cities and may significantly affect locally observed management practices, production strategies and levels of crop-livestock integration.

With reference to the findings mentioned so far, this study was carried out to examine the management strategies applied by livestock producers and its resultant consequences on the environment and as such a threat to public health emanating basically from small land holdings in some selected wards in Potiskum town.). Findings from Lynch et al., 2001;

Briggs and Mwamfupe, 2000; Tacoli, 1998; Aldington, 1997), has focused on many issues confronting the sustainability of urban and peri-urban areas. In some cases, damage has been spectacular and even tragic. In June, 1995, the artificial lagoon at a hog farm in North Carolina burst. Orheruata A.M. (2008) reported that the sudden release of nearly 100 million litres of hog urine and faeces polluted neighboring communities and killed millions of fish in nearby rivers. In 2000, drinking water contamination by livestock waste led to several deaths in Canada town of Walkerton (Catelo et al., 2001). Environmental hotspots for poultry production reflect the environmental distortion and interference caused by livestock production. Surveys conducted in Benin City, Nigeria showed that although economic performance is competitive, most producers are operating outside the boundaries of sustainability because of inadequate waste management and excessive waste produced in small geographical areas, beyond the assimilation capacity of the local environment. With small holders' farmers, waste could be applied to land used to produce food and other crops. But with development and specialization in livestock production that requires large herds, waste may exceed the carrying capacity of local ecosystem and are a potential cause of a number of pollution and health problems related to their organic matter, nutrients, pathogens, odours, dust and air borne micro-organisms (Zlang & Felmann, 1997).

In Nigeria, there is absence of true figures of waste produced. This is as the environmental consequences and hazards are enormous and obvious. Itodo et al., (2000) estimated 1.4 million, 6.40 million and 5.2 million kilograms of cattle, poultry and piggery manure per day respectively. Sangodoyin (1996) also noted that the quantity of waste varies with species. He put daily manure of animal/day as 30.00, 15.00, 1.10 and 0.12 for dairy cattle, beef cattle, pigs and layers respectively. This is still a fraction of the Nigerian livestock. In most cases, scientists and producers are rarely concerned on the waste management but rather on increase production. It is commonly observed in major farms in Nigeria that animal waste discharges by backyard in commercial piggeries and poultry farms run into rivers and erosion courses. These contribute a substantial amount to river pollution. Generally, livestock production and their waste have polluted the environment in various ways: These include chemical and biological impact of manure and urine, physical impact, air pollution, environmental consequences, heavy metal (copper and zinc which is essential mineral of livestock diet), land degradation, socio economic problems and so on.

Health implications of landfills according to UNEP (2007) include odour nuisance; ozone formation (from reaction of Nitrogen Oxide and non-methane organic compounds with sunlight) that cause pulmonary and central nervous system damage; fire and explosion hazards from build-up of methane; an increase in the number of vermin (birds, rodents and insects) which act as disease vectors; and ground and air pollution from leachate and landfill gases. Recycling as a solid waste disposal method also has health implications.

From the health concepts highlighted so far, it has become apparent that there is therefore a strong link between human and animal health worldwide. About 60 percent of all human infectious diseases are transmitted from animals. According to Bamaiyi PH (2016) brucellosis is also known by their names such as malta fever, intermittent fever bangs diseases, undulant fever, gibralter fever, Mediterranean fever contagious abortion, maltese fever, crimean fever, and rock fever is a bacterial zoonotic infection cause by a gramb negative coccobacilli bacteria that affect almost all species of domestic animals and man.

David Musoke (2016) also lamented that at least 75% of emerging and re-emerging diseases are either zoonotic (spread between humans and animals) or vector-borne (carried from infected animals to others through insects). The World Health Organization (WHO), for Animal Health (OIE), and the Food and Agriculture Organization (FAO) collectively reported that approximately 60% of new viral disease affecting humans will emerge from animals, and some of these infectious diseases may become public health emergencies.

According to Schurer JM (2016), the recognition that many emerging infectious diseases arise from complex, diverse, and constantly evolving factors related to the environment (e.g. deforestation, climate change), people (e.g. urbanization, food procurement), and animals (e.g. livestock production intensification, wildlife translocation). Similarly, Gijs Klous (2016) also in his research concluded that 60% of human diseases are from livestock or during incidents such as biting or other injuries inflicted by animals. Furthermore, aerosols contaminated with micro-organisms from respiratory or fluid sources, can play an important role in the transmission of micro-organisms between humans. The US Centre for disease control and prevention reported that generally, 3 out of 5 emerging infectious diseases of humans are also caused by infection transmitted from animals. Zoonotic diseases are definitely animal diseases that can be transmitted to humans. GALVmed works on four neglected zoonotic diseases that have the most severe constraints on small-scale agriculture in Africa and South Asia. These diseases are: brucellosis, porcine, rift valley and trypanosomosis. Dogs are the host for a wide helminth spectrum including tapeworms, flatworms and nematodes. These parasites affect the dog health and cause morbidity and mortality, especially in young and old animals. Some species as Toxocara canis, Ancyclotoma caninum, Diplydium caninum and Echnococcus are well known zoonotic parasites worldwide, resulting in high public health risk.
Moreover, the consequent low quality of veterinary monitoring and use of preventive measures as the case in Potiskum, the high rate of environmental contamination by dog faeces and the oxocariasis was recorded in 2.1 per 100,000 people from 2008 to 2012 in Russia. Lawal JR, Jajere SM, (2016) recorded in their research on chicken in Maiduguri Nigeria discovered about 1800 Eimeria colonize and infect the intestinal tract of different animals and birds and infection with this parasite normally occurs through ingestion of feed or water contaminated with sporulated oocysts. About nine species of Eimaria have been recognized in domesticated chickens, of which Eimeria brunet, Eimeria maxima, Eimeria necatrix are the most pathogenic. Under this investigation, high mortality was recorded from diseases, predators that have direct contact with the general public.

Farmers face daily exposure to LA-micro-organisms in every aspect of their work as contained in International Fund for Agricultural Development IFAD (2016), Also in http://dx.doi.org/10.1016/j.onehlt.2016.10.001br 2352-7714/©

2016. In fact, scientist estimates that more than 6 out of every 10 infectious in humans are spread from animals. Disease outbreaks have risen rapidly over the last decade and are a major cost to the global economy. This have been proven in a Nature journal article titled "Global trends in emerging infectious diseases" that "The main source of EIDs is zoonotic transmission, accounting for 60 percent of all outbreaks" Zoonoses Animal diseases and its symptoms that may also affect humans.

Occasionally infection can also occur through indirect contact with other animals such as Listeriosis from drinking un-pasteurized milk or Leptospirosis from contact with infected urine that has contaminated streams or ponds. Some people are more susceptible to contracting a zoonotic disease due to their immune status, for example those people who are on immunosuppressive treatment, pregnant women, alcoholics and diabetics. Fortunately the occurrence of zoonotic disease is uncommon and contact with zoonotic disease agents is preventable by taking a number of precautions including: practicing good personal hygiene; providing prompt and effective first aid treatment to cuts and scratches; using personal protective equipment for example overalls, gloves, boots, goggles, aprons; cleaning and disinfecting work spaces and equipment; vaccinating pets and livestock; worming pets; controlling rodents; isolating and treating sick animals. It is important to realise that zoonoses may be contracted from both ill and apparently healthy animals.

There is an indication that close contact to livestock animals was not necessary for a transmission event to occur, but that already living in close vicinity of livestock could be enough for the occurrence of adverse health effects among residents. Respiratory health can be affected by many sources, including livestock farming in the vicinity of a residence. In Germany, reduced respiratory health of residents was linked to the presence of Confined Animal Feeding Operations, industrially managed livestock stables, near their home address. In a Dutch study investigating LA-MRSA presence in a rural population, only direct animal contact was found as a risk factor. When the Danish national human MRSA database was checked for a livestock-associated MecC resistance gene, this was mainly found in samples from people living in rural parts of the country and animal contact was an important risk factor. Still, the gene was also discovered in human MRSA samples from people living in rural areas, but having no livestock contact. An attempt to identify risk factors for Extended-Spectrum Beta-Lactamase (ESBL) Enterobacteriaceae carriage among people living in high- and low-poultry density areas in the Netherlands showed no elevated risk between the distance of positive poultry farms from the home and ESBL carriage of residents. For Q-fever, however, the link between living close to infected farms and human cases of the disease is well established. In the Netherlands, a large outbreak occurred in recent years and an exposure– response-like relationship was found for the number of goats within 5 km of the home address and human cases. In Germany, a specific flock of sheep could even be identified as the source of a human Q-fever outbreak in a village. In Italy, where in some areas free-range sheep herding is still common practice, the passing of three flocks of infected sheep through a village led to an outbreak of Q at GALVmed.

On the planning aspect, Bouvier, (2012), cited in McClintock Nathan; (2014) that in many cities, planners are updating codes to reflect changing land uses and activities including the production and sale of agricultural products and the keeping of urban livestock such as chickens, geese, ducks, goats, pigs, rabbits and bees. While most cities already have ordinances in place that regulate animals in some manner, Historically, the presence of livestock in the city was controversial, earlier in the 20 century, many municipalities restricted or prohibited livestock ownership citing the public health risks of keeping farm animals in close proximity to humans. While some of the concerns over waste and nuisances were warranted, restrictions on livestock and agricultural practices. A good example is:

2. Review of planning laws in Nigeria

2.1. Review of Constitution of the Federal Republic of Nigeria (1999)

For example, the 1999 constitution of Nigeria has provided laws in many sections relating to pollution of environmental components that has direct effects on public health, as the national legal order, which recognizes the importance of improving and protecting the environment. Relevant sections are as follows:

Section 20 makes it an objective of the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria.

Section 12 establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria.

Section 33 and 34 which guarantee fundamental human rights to life and human dignity respectively, have also being argued to be linked to the need for a healthy and safe environment to give these rights effect. Despite Nigeria has been in the forefront in attending and signing treaties, at the international levels yet pollution of land, air and water has been a common phenomenon in most urban centers.

2.2. Review of Planning and Environmental Laws

National Environmental Standard and Regulation Enforcement Agency (NESREA) Act 2007. This act replaced the Federal Environmental Protection Agency (FEPA) Act. It is the embodiment of laws and regulations focused on the protection and sustainable development of the environment and its natural resources. The following sections are worth noting:-

Section 7 provides authority to ensure compliance with environmental laws, local and international, on environmental sanitation and pollution prevention and control through monitory and regulatory measures.

Section 8 (1) (K) empowers the Agency to make and review regulations on air and water quality, effluent limitations, control of harmful substances and other forms of environmental pollution and sanitation.

Section 27 prohibits, without lawful authority, the discharge of hazardous substances into the environment. This offence is punishable under this section, with a fine not exceeding, N1,000,000 (One Million Naira) and an imprisonment term of 5 years. In the case of a company, there is an additional fine of N50,000, for every day the offence persists. In a research conducted by Tanko A. (2002) in Kano metropolis on land, water and health in urban and peri urban food production found that industrial effluents and solid waste were discharged directly in the rivers thereby contaminating both surface and underground water. And no action has ever been made to address the issue in spite of its public health threat.

2.3. Regulations under (UNDER NESREA)

National Effluent Limitation Regulations.

- Section 1 (1) requires industry facilities to have anti-pollution equipment for the treatment of effluent.
- Section 3 (2) requires a submission to the agency of a composition of the industry's treated effluents.

National Environment Protection (Pollution Abatement in Industries and Facilities producing Waste) Regulations (1991).
Section 1 Prohibits the release of hazardous substances into the air, land or water of Nigeria beyond approved limits set by the Agency.
Section 4 and 5 requires industries to report a discharge if it occurs and to submit a comprehensive list of chemicals used for production to the Agency.

2.4. Federal Solid and Hazardous Waste Management Regulations (1991).

Section 1 makes it an obligation for industries to identify solid hazardous wastes which are dangerous to public health and the environment and to research into the possibility of their recycling.
Section 20 makes notification of any discharge to the Agency mandatory.
Section 108 stipulates penalties for contravening any regulation.

2.5 Environmental Impact Assessment (EIA) ACT. CAP E12, LFN 2004.

An Environmental Impact Assessment (EIA) is an assessment of the potential impacts whether positive or negative, of a proposed project on the natural environment:
The E.I.A Act, as it is informally called, deals with the considerations of environmental impact in respect of public and private projects. Sections relevant to environmental emergency prevention under the EIA include:-

- Section 2 (1) requires an assessment of public or private projects likely to have a significant (negative) impact on the environment.
- Section 2 (4) requires an application in writing to the Agency before embarking on projects for their environmental assessment to determine approval.
- Section 13 establishes cases where an EIA is required and Section 60 creates a legal liability for contravention of any provision. Under these sections urban livestock farmers use their residence no matter the size to rise animals and generate solid waste in the study area thereby contaminating the environment,

2.5. The Nigerian Urban and Regional Planning ACT CAP N138 LFN 2004

The Urban and Regional Planning Act is aimed at overseeing a realistic, purposeful planning of the country to avoid overcrowding and poor environmental conditions. In this regard, the following sections become instructive: -
Section 30 (3) requires a building plan to be drawn by a registered architect or town planner.
Section 39 (7) establishes that an application for land development would be rejected if such development would harm the environment or constitute a nuisance to the community.
Section 59 makes it an offence to disobey a stop-work order. The punishment under this section, is a fine not exceeding N10, 000 (Ten thousand naira) and in the case of a company, a fine not exceeding N50, 000.
Section 72 provides for the preservation and planting of trees for environmental conservation. These sections have also been abused by the planning authorities in their effort to always embark on what is popularly known as curve out and redesign which is a direct contravention of the planning ordinance that promote overcrowding and its resultant effects on the public health.

By virtue of these provisions, urban land use is categorized into commercial, residential and industrial. Urban residential areas are further classified into high, medium and low. The ratio specified for land development and their respective sizes are described as follows;

- High residential area is entitled to 80 - 100 percent development with 15/30meters
- Medium residential area has 50 -70 percent development with 20/50meters
- Low residential is permitted 30 percent development with 100/150meters

From the reconnaissance survey as part of the field work, it was observed that urban livestock keepers are mostly found within the high residential area with small land holdings and has been fully developed. Information for poor urban households has been very scarce, but a recent survey in 2 cities in Nigeria found that more than one-half of all urban households were keeping livestock; the highest rates were found in the most densely populated, lower-income areas. J. Olawoye and T. F. Randolph, International Livestock Research Institute (ILRI), unpublished results]. Even the said allocated plots have also been shared among the family members especially where land was acquired through inheritance by heirs.

2.6. Land Use Act Cap 202, LFA 2004

The Land Use Act places the ownership, management and control of land in each state of the federation in the Governor. Land is therefore allocated with his authority for commercial, agricultural and other purposes.

2.6.1. The Effect of the Land Use Act on small land holders

Since the inception of the Land Use Act over two decades ago, it created a new genre of serious problems for land management in the country as cited in Mabogunje (2002). Hence it is wrong to assume that the Land Use Act of 1978 has totally transferred ownership of land to the government, regrettably, this wrong position has great fellowship. It is argued that the natives could not claim any interest in any other land beyond their occupations because such interest has been lost by virtue of section No.1 of the Act. Section 28 of the act stipulated, that the governor has the right to revoke a right of occupancy for overriding public interest or for a breach of the provision of the certification of occupancy.

Babalola in Akinpelu, (2010) also lamented that a lot of injustices had been perpetrated under the provision for overriding public interest. He said that government officials had often times substituted their personal interest for that of the public in several cases of acquisition. Section No.9 of the Act as noted by Babalola empowered the governor to issue the document to evidence right of occupancy upon payment of prescribe fee. However, unlike the deed of conveyance, which is a title to land, the Certificate of Occupancy (C of O) issued under the Act did not confer any title as it was a mere evidence of it. Failure to pay for it was one of the grounds upon which the governor could revoke the right of occupancy. One of the problems associated with the C of O, is that it does not transfer any interest in land. Babalola faulted sections 21 and 22 as well as section 315 of the 1999 constitution and he identified the following problems. Problems associated with land use Decree include the lack of adequate compensation and inability of small holders to increase the size of their holdings. Furthermore, adequate administrative and enforcement agencies were not provided as Arua in Akinpelu D. (2010)) noted that a national cadastral survey and effective registration instrument were omitted.

2.7. Environmental Pollution Control Law

Section 12 of this law under the Laws of Lagos State makes it an offence to cause or permit a discharge of raw untreated human waste into any public drain, water course or onto any land or water. This offence is punishable with a fine not exceeding N100, 000 (One hundred thousand naira) and in the case of a company, a fine not exceeding N500, 000. Except Lagos being an industrial centre, its proximity to the sea and its aquatic nature, there is serious shortage of land for development. Most development in this area is vertical development and as such environmental laws are strictly adhered to in many parts of the city. This is due to the fact that opponents raise concerns over smell, noise than desire to acquire urban livestock. However, scholars have not thoroughly examined the actual motivations and management practices of urban livestock owners, nor have they investigated whether or how existing regulations transform these practices.

More than simply a gap in academic scholarship, this lack of understanding has policy implications. As Thibert (2012, p. 349) notes, planners and municipal officials rarely understand this lacuna thereby poses a challenge to the development of ordinances that can effectively regulate such practices. Indeed, as cities develop policies to facilitate (or curtail) the expansion of urban livestock ownership, it would help to first characterize what urban livestock ownership and management actually look like on the ground.

(Bouvier, 2012) cited in McClintock Nathan; (2014) in his work reported that 33 of the 48 (69%) municipalities regulate chickens in some manner. Eight of these cities have zoning requirements that delineate where chickens are allowed (Hawthorne, Los Angeles, San Francisco, Oak Park, Minneapolis, Missoula, Nashville, and Salt Lake City). In Minneapolis, for example, chickens are not allowed in multi-family residential zones. Other cities establish minimum lot size requirements. Twenty-one of sampled surveyed cities established limits on the number of animals, ranging from 1 and 25 chickens. Generally, this approach establishes the maximum number of a particular type of animal on any given residential lot. Some cities, however, do not differentiate between types of livestock. In Portland, for example, residents may keep up to three animals in combination of chickens, ducks, doves, pigeons, pygmy goats, or rabbits without a permit.

While most cities adopted a set limit with regard to number and ownership of animals per residential area, others do so as a function of lot size addition to other small animals requiring permits (and which include potbelly pigs). Urban farms 10 and community gardens can exceed this maximum, however, additional fowl for every 1,000 square feet of lot area over 10,000 square feet in community garden or urban. Cleveland uses a similar approach to regulate chickens, ducks, rabbits, and similar animals. Such animal shall be kept on a parcel of land for each eight hundred (800) square feet of parcel or lot area. For a standard residential lot of four thousand eight hundred (4,800) square feet, this regulation would permit no more than a total of six (6) such animals Codified Ordinances §347.02).

As earlier mentioned, policy makers in Nigeria have been on the contrary in the implementation of laws. There is no limit with regard to livestock ownership, number of livestock, and size of land use to raise animals in the urban centres in Nigeria as compared to the developed world. As well, animals and human are kept in close association on a small parcel of land where diseases can easily be transmitted.

3. Statement of Research Problem

There are many disease agents that can cause disease in multiple species of animals including humans. These diseases are called zoonoses. People are exposed to the bacteria, protozoa, fungi, viruses and parasites that cause zoonoses in a number of ways and therefore anyone working with or handling animals needs to know about zoonoses and the precautions they must take to minimize their risk of infection. People who have close contact with large numbers of animals such as farmers, abattoir workers, shearers, knackery workers and veterinarians are at a higher risk of

contracting a zoonotic disease. Members of the wider community are also at risk from those zoonoses that can be transmitted by family pets. For example, most of the urban livestock keepers in the study area lives in small sizes residential buildings with limited spaces provided between human habitat and that of livestock. The solid waste generated from the livestock is usually packed in bags in their houses or disposed on the street thereby contaminating the environment. it has become apparent that there is therefore a strong link between human and animal health worldwide. Direct interaction of urban livestock animals with human has increased the rate of quick transmission of zoononic diseases from livestock to man and no effort has even been made to address the situation in the study area. It is this reason that prompted the researcher's mind to embark on this work.

4. Aim and Objectives

The aim of this research is to examine the management strategies applied by livestock producers and its resultant consequences on the environment and as such a threat to public health emanating basically from small land holdings in some selected wards in Potiskum town. This can be achieved specifically through the following objectives:

- To identify the problems of urban land use planning that poor livestock keepers face in the area.
- To assess the sizes of residential plots, own by livestock owners in the study area
- To measure the distance between livestock habitat and human in the residential buildings
- To identify some zoonotic diseases symptoms presence in livestock keepers in the study area.

5. Research questions

- What are the problems that poor livestock farmers faced at the planning stage in urban and peri urban environment?
- What are the various distances between human habitat and that of livestock in the study area?
- What are the sizes of residential plots own by the livestock keepers?
- Does the symptom of zoonotic diseases have a significant relationship with public health?

6. Significance of the Study

The study in Potiskum at this time of our educational development will help to create awareness to the urban farmers. As the study area is now considered as the periods of post insurgence, where many people engage in livestock production as an alternative of poverty alleviation. Findings from such studies will be useful to policy makers, hydrologist, veterinary workers and town planners on future livestock production in the area. The information from this research will also serve as a useful feedback and of benefit to research institutes, students among others. Finally, it is hoped that the study would generate enough insight to give a broad overview of the present state of affairs and to identify gaps in existing knowledge and to recommend areas that would be required for subsequent research with a view to uplifting poor livestock keepers. Knowledge on the effect of this economic activity will be vital for future planning and management of land in the research area.

7. Research Methodology

7.1. Buffer Creation

The location of dumpsites generated by livestock was determined using GIS Buffering operation Figure 1 below. GIS Buffering operation could create a radius of specified distance around a point feature class such as wells or parallel measured distance from linear features such as roads or rivers (Ormsby et al, 2001).

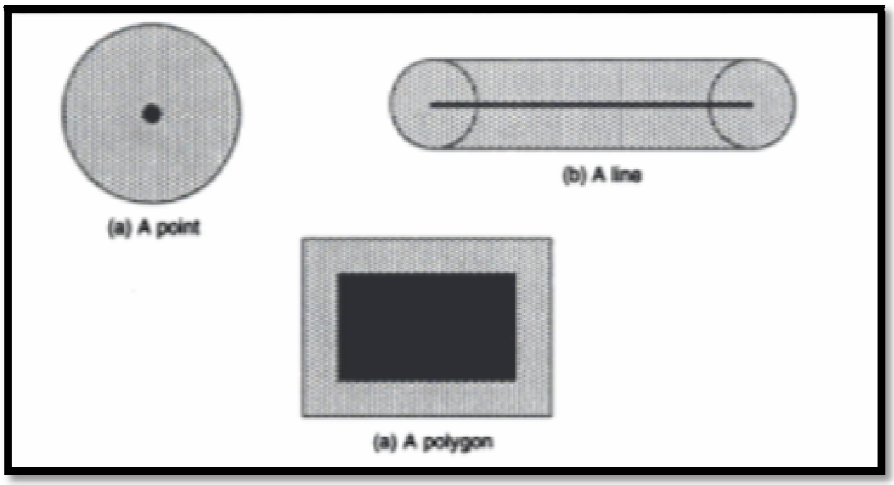

Figure 1: Above Is an Example of Buffer around Point, Line and Points Feature

Therefore, the resulting influence from a point, area or linear items could easily be determined as concentrating area of interest. In this Connection, buffers measuring 200 Metres Radius are created over the identified dumpsites of the study area so as to assess the impact of land degradation on the dwellers of the area as Presented in Figure 1.The Buffered

Zones of 200M radius was used and houses that fall within the zones are randomly selected and counted to evaluate the infection incidences resulting from the contamination. Traditionally, buffer zones form new polygons, and these could be used in conjunction with other map layers of the same area for complex spatial analysis and overlay operations (Ormsby, et al, 2001).

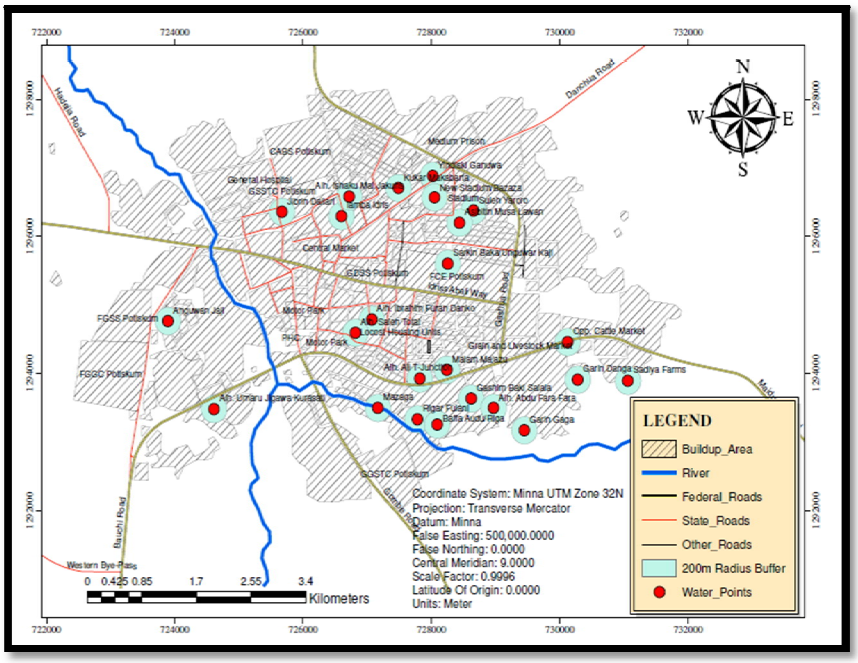

Figure 2: Showing Dumpsites Point Locations And The 200M Radius Buffer

For the purpose of field investigation, a copy of 150 questionnaires was used to interview poor urban livestock farmers. Farmers were selected randomly within a buffer radius of 200m from each dumpsite points as contained in the above figure. The researcher also used the Global Positioning System (GPS) during a transact walk with some farmers (team work) to obtain the coordinates of heaps of refuse generated through the process of livestock production. In addition to the primary data generated, secondary information from government officials, environmentalist and so on were gathered in other to support and supplement the primary data. It also created bases for comparison among respondent's views. The issues covered for the purpose of this work included the following:

- Peri-urban and urban livestock keeping
- Reasons for keeping livestock
- Livestock species/breeds numbers and space provided
- Livestock waste disposal and period of sanitation
- Ownership and decision-making processes
- Sizes of residential plots of livestock owners
- Distance estimate of livestock habitat and that of human
- Environmental and health aspects

S/N	Address	Northings	Eastings	Size (sqk)
1	lamba Idris	11.27167N	11.76972E	102
2	Jibrin Dallari	11.13028N	011.78028E	357
3	Ishaku Mai Jakuna	11.29056N	011.81278E	314
4	Suleh Yaroro	11.32528N	011.77972E	92
5	Kukar Makabarta	11.14667N	011.83083E	336
6	Yindiski Ganuwa	11.22889N	011.85667E	62
7	New Stadium/Bazaza	11.23278N	011.80944E	102
8	Asibitin Musa Lawan	11.29167N	011.75306E	286
9	Sarkin Baka	11.26306N	011.92472E	314
10	Furan Danko	11.34250N	011.80361E	314
11	Alh. Saleh Total	11.30306N	011.77472E	305
12	Anguwan Jaji	11.11778N	011.80361E	161
13	Mazaga	11.09417N	011.87056E	92

S/N	Address	Northings	Eastings	Size (sqk)
14	Umaru Kurasati	11.22611N	011.87083E	268
15	Malam Ma'azu	11.25917N	011.95306E	100
16	Alh. Ali T-Junction	11.19472N	011.93417E	599
17	Rigar Fulani	11.18833N	011.84500E	280
18	Baffa Audu/Riga	11.23528N	011.83306E	210
19	Gashim Baki Salala	11.31667N	011.88944E	198
20	Alh. Abdu Fara	11.10889N	011.86861E	280
21	Garin Gaga	11.18167N	011.81889E	408
22	Garin Danga	11.30972N	011.92917E	240
23	Keran Farms/ Malka	11.38778N	011.95611E	982
24	Sadiya Farms	11.16806N	011.92583E	974
25	Opp. Cattle Market	11.28639N	011.75056E	168

Table 1: Names of Geographical Location of Dumpsites in the Study

8. Data Analysis

The data obtained were subjected to both descriptive research design. Data were analyzed using descriptive statistical tools such as percentage computation, frequency distribution table, line and bar graph respectively

9. The Study Area

Potiskum town is located roughly between latitudes 11^0 03^1 and11^0 30^1 North of the Equator and between longitudes 10^0 50^1 and11^0 15^1 East of the Meridian. Its distance by road from Damaturu (the State capital) is about 98 kilometers west. It is bounded on the north and west by Nangere local government, on the south by Fika local government and on the east by Fune local government. It covers an area of roughly 120,000 ha or about 12 square kilometers.

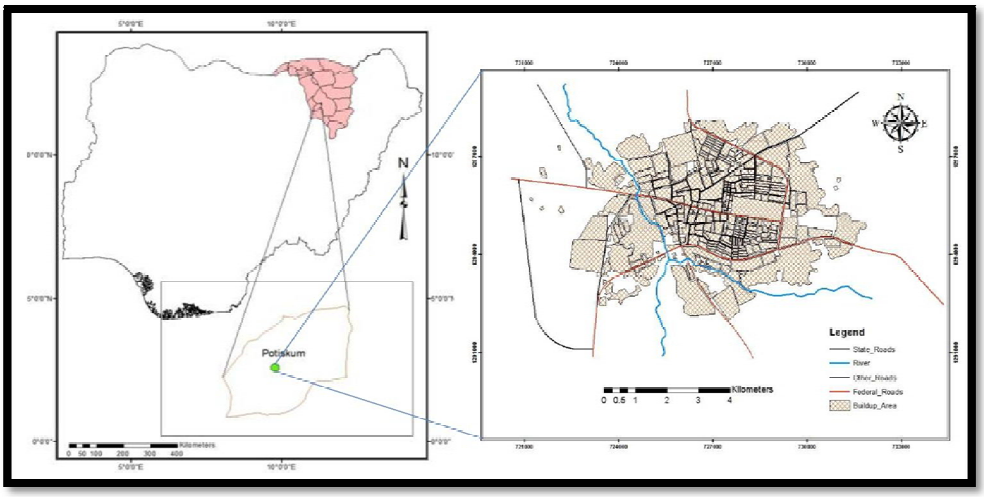

Figure 1: Study Area Map

10. Geology and Hydrogeology

10.1. Hydrology

The project area is located at the southwestern margin of the Chad basin which is the largest inland basin with a surface area of more than 600,000 sq km. borehole and geophysical data indicate its floor to consist of a series of troughs and uplifted blocks. The trough structures correspond to the most northwestern part of the Benue Trough and to its lateral troughs.

The Chad formation was deposited over the Kerri-Kerri Formation except along part of the basin margins and at occasional highs in the basin floor where it directly transgressed the crystalline basement or Cretaceous sediments. The formation corresponds to an almost flat lying, undisturbed fill of a vast but shallow depression. The Chad basin is bounded to the south by a vast area of crystalline Basement and by limbs of cretaceous sediments of the Benue Trough like the continental Bima Formation, the transitional Yolde Formation and the marine Fika Shale's.

The project area falls within Kerri-Kerri formation of the Chad basin. The Kerri-Kerri Formation was very well to excellent aquifer properties. The excellent aquifer properties ensure high yield (>24m3hr-1) from wells tapping these aquifers. However, these are localized areas where matrix content in sands give rise to moderate to very low yield (150 to <6.0 m3 hr-1). The aquifer in these areas similarly have moderate to very low aquifer properties (T and K). The notion that Kerri-Kerri aquifers has low yield because of their low permeability has been discredited. On the contrary, the aquifer has high hydraulic conductivities and transmissivities, given rise to excellent and in some places exceptional yields.

The ground water in the Kerri-Kerri formation aquifers occur mainly under water table condition, but locally confined and semi-confined aquifers occur where thick and sometimes, laterally extensive lenticular clays are inter-bedded with sands. At shallow levels these clays lenses rise to perched aquifers which are exploited by hand dug wells in some areas. The widespread aquifers are medium-coarse friable sandstone and sands which form excellent aquifer. There is also the indication that the Kerri-Kerri formation was deposited on an uneven surface of the underlying Basement rocks in the basin, where it appears to have reportedly thinned out, with proven thickness of 200 to 300m.

10.2. Climate

The climate of Yobe state is hot and dry for most periods of the year. The mean temperature of the most stations in the state is about 37C.The highest temperature about 42C is normally experienced in April, while minimum temperatures about 30C are usually recorded in December. (Iloeje, 1977). The state exhibits a remarkably high annual range of mean monthly temperatures.

For example, Nguru shows a mean maximum temperature of 30.8C in August and 39.8C in April and mean minimum temperature of 12.1C in January and 29.1C in June. The effect of continental air mass shift is clearly brought out from above means. Rainfall in Yobe state decreases both in duration and amount from place to place. Generally, it last for about 120 days in the northern part of the state and more than 140 days in the south. There is marked dry season of between eight to nine months and a wet season of only three to four months. Rainfall in the state is highly irregular in space and time, which makes farming difficult since small differences in the amount and timing of rain received at a point, may determine the success or failure of critical stages in vegetation development and hence crop production. The development of agriculture would, therefore, effectively depend on irrigation farming especially in the drier part of the state.

The present landscape is inherited from former wetter and drier conditions during the Quaternary (valley cutting, Aeolian ergs, respectively). The research area is therefore situated within the tropical savanna (dry and wet) type classified by Koppen as Aw with rainfall ranging from 750mm -900mm per year. The temperatures are high from (March 39.2^0cto October 37.8^0 c) which marks the period of raining seasons and are low in August to about 29.3^0 c. The mean maximum temperature is attained in April and May with 29.2^0 c and 37.8^0 c respectively which also marked the beginning of raining season.

Temperature is extremely low from November to February, ranging from 20.4^0 c to 27.2^0c when the area is under the influence of harmattan which marked part of the dry season. The predominant winds are the two trade winds, (the North- East and the South West) trade winds in between lies the Inter-Tropical Convergence zone (ITCZ). The North East Trade Wind operates from November to April bringing along the harmattan (cold dry and dusty) originating from the Sahara Desert. Visibility is highly impaired during this period. From May to September, the South West Trade Winds predominate. This is a moisture laden air mass which blows north ward from the coast and brings rainfall to this region. The seasonal migration of the Inter-tropical Convergence Zone (ITCZ) from the south to the north and vice versa determined the season of the study area.

10.3. Ecological Problems

The increasing incidence of desertification is the most disturbing ecological problem faced in Yobe state. Wind erosion is found to aggravate the problem through the formation of sand dunes in the northern part of the state especially around Machina, Yunusary, Yusufary, Gaidam Nguru and so on. Today the lives of the people around these areas are seriously threatened such that the trend in migration is southward. The poor management of this fragile land through anthropogenic forces (deforestation, overgrazing, bush burning, over cultivation) which has resulted to adverse climatic conditions identified as some of the factors responsible for some of the growing menace of desert encroachment.

10.4. Population Growth

Potiskum settlement is moderately populated with an average density of 0.58person/ km^2. It covers an area of roughly 120,000 ha or about 12square kilometers. The highest density is recorded within the old settlement around Arikime Ward with about 9447 persons/km^2.The total population was 205,876 by the 2006 population census. Its major ethnic groups include Ngizim, Bolewa, Karekare and Fulani. Other minor tribes found in the area include Ngamo, Hausa, Igbo and Yoruba. Natural increase of population growth was experienced through high rate fertility (birth rate). Early marriages and improvement in health care services are determining factors of such rapid growth. Many family sizes have therefore increased considerably from nucleated to extended family as a result of this factor and virtually the demand for more residential land increased too. The residents depended absolutely on hand-dug wells for their water supply. Access to safe drinking water for every individual regardless of the economic and social status is one of the objectives of the World Health Organization (WHO) (Lefort,2006). Large proportions of livestock populace are obvious victims in developing countries. Therefore, frequent intake of contaminated water can consequently affect the lives of human. Groundwater is a major water source in Potiskum for both domestic and drinking purposes. However, groundwater

resources through hand-dug wells may be contaminated by soil particles eroded during heavy downpours on which water-impairing substances like nitrates and phosphates are washed into the wells.

10.5. Socio- Economic Organization

The predominant occupation is subsistence agriculture using local implements (hoes, cutlasses axes, knives ox drawn plough) as well as the use of animal dung, refuse as manure. However new ways of agricultural practices have been adopted over the years. The people have become receptive in the use of fertilizer, tractor, combined harvester, pesticides and improved seedling in addition to the traditional techniques. This has been achieved through educational campaign and extension services.

The main crops that are cultivated include maize, millet, guinea corn, groundnut and beans. In the wetland areas, rice, wheat, cotton, cowpea cassava, sugar cane and vegetables are however grown on small scale. Agricultural practice and trading links persisted for long between Kano and Potiskum. This has transformed the lives of the people in the research area. They have graduated from subsistence agriculture to road transport from the north to the southern part of Nigeria notably Lagos, Delta, Enugu, Port Harcourt, and so on. Small-scale industries have been established for a long time. They include flourmill, toilet soap production, detergent production, pomade and skin lotion etc as job opportunity.

10.6. Market

Another issue of concern that led to the rapid growth and the demand for more urban land is market. Potiskum town is a centre of trading of both livestock and farm produces. The best cattle market of West Africa is located in Potiskum. Hundreds of cattle, sheep and goats are transported to the southern parts of Nigeria on daily basis. In terms of grains and edible fruits, the villages and the neighboring towns patronizes Potiskum town to sell their farm produce and in turn buy other finished goods for their livelihoods. This led to the emergence of chain of trailer transport owners which serve as a source of employment and investment in houses, education and business as highlighted by Mortimore (2009). In addition to the many retail businesses peculiar to the town, there are now emerged large number of wholesale traders who supply both the retail traders within the town and those within the surrounding regions.

11. Results and Discussion

Types of livestock	Number	%
Cattle	13	4
Goats	133	39
Sheep	88	26
Chicken	80	24
Rabbit	06	2
Others	17	5
Total	337	100

Table 2: Types of Livestock Owned by Respondents
Source: Field Work 2017

The table above shows the proportion of types of livestock available in the study area. It revealed that one quarter of the people own goats followed by sheep with 26 percent, chicken with 24 percent and rabbit constituted only 2 percent. Others include cat, pigeon with 17 percent whereas cattle have 4 percent. This shows that goats and sheep are the predominant types of animals raised in Potiskum town and this correspond with what the researcher observed during reconnaissance survey.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Education	83	24.6	27.9	27.9
	Health	103	30.6	34.6	62.4
	Food	103	30.6	34.6	97.0
	Others	9	2.7	3.0	100.0
	Total	298	88.4	100.0	
Missing	System	39	11.6		
Total		337	100.0		

Table 3: Respondent's Views on Reasons for Livestock Rearing

The reasons for urban livestock rearing are for the purpose of getting milk, egg or as a source of meat for daily consumption by its owners and for sale to the teaming population in Potiskum. Other reasons which constitute the majority of the respondent views with 74 percent include the acquisition of other food items, settlement of house rent, clothing, education and health as well as other basic live necessity.

Kind of Structure	Number	%
Mud house	152	77
Concrete	40	21
Thatch house	03	2
Total	195	100

Table 4: The Kind of Structure Owned by Respondents
Source: Field Work 2017

The sizes and kind of structure own by the livestock keepers is of great concern. The study shows that most of the farmers dwelled in mud house that can easily be deteriorated especially when livestock waste is kept very close to the building. It shows that more than half of the respondents reside in a structure made from mud, 21 percent are in concrete building while 2 percent are in thatch house which revealed the high level of poverty in the area. There is lack of support from the authorities concerned (planning unit) for the farmers to build standard residential houses for themselves and to raise animals.

Waste Disposal	Number	%
Inside the house	41	24
On the street	107	63
Inside bags	17	2
Inside the drainage	04	10
Others	02	1
Total	171	100

Table 5: Respondents Views on Places of Livestock Waste Disposal
Source: Field Work 2017

The solid waste generated from urban livestock is usually disposed on the available spaces inside the house in bags, on the street, inside drainage as can be depicted in the table above. Majority of the respondent's views shows that livestock waste is been disposed on the street that usually blocked water ways during the rainy season which has a deteriorating effect on the environment. The effects of this is not limited to the environment in terms of the collapse of buildings, contamination of water, eyesore among others and also the people in terms of breakout of diseases as can seen in the table below.

Figure 4: Showing the Real Feature of How Livestock Waste Is Packed In Bags inside the Houses

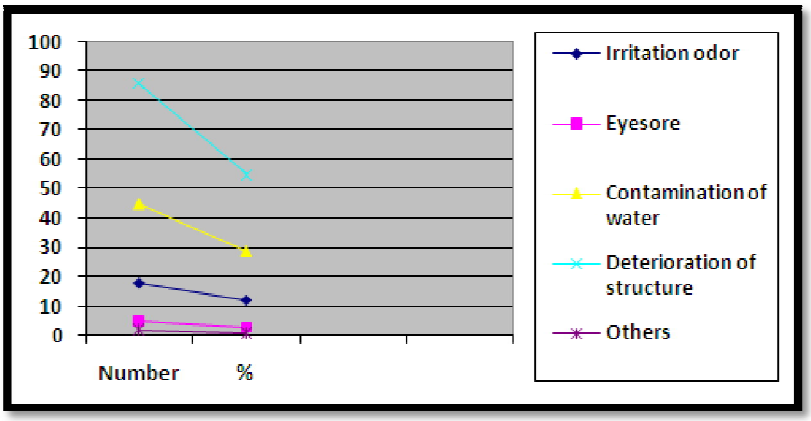

Figure 5: Line Graph Showing Respondent's Views on Categories of Bad Odor to the Environment

The graph above indicates the extent of disturbance livestock waste can cause if it is indiscriminately disposed. The study revealed that 55 percent of the respondent said that livestock waste has deteriorated their buildings, 29 percent said it leads to water contamination while 12 percent said there is presence of irritation of odor and so on.

Type of Disturbance	Number	%
Noise	72	40
Odor	39	22
Land degradation	65	37
Others	01	1
Total	177	100

Table 6: Respondent's Views on the Type of Disturbance of Urban Livestock on Living Standard
Source: Field Work 2017

Other effects of urban livestock production include noise with 40 percent from the respondent's views, odor with 22 percent, and land degradation with 37 percent. Some of the effects of urban livestock to the people and their immediate environment lead to conflicts between neighbors as s result of animals roaming about. The effects ranged from destruction of plants, foot items, among others due to non restriction of animals in the study area. Lack of implementation of planning and environmental laws has contributed negatively towards the emergence of some of these problems.

Figure 6: Showing the Real Feature of Deterioration of Structure in the Study Area

Available Space	F	%	Livestock Movement	F	%
Enough	91	50	Restricted	91	54
Not Enough	90	50	Roaming	76	46
Total	181	100	others	167	100

Table 7: Respondents Views on the Provision of Enough Space and Livestock Movement
Source: Field Work 2017

From the table above, findings revealed that half of the respondents were unable to provide enough space for the animals within their houses due to small land holding. The animals therefore roam about to disturb the immediate neighbors and hence the basis for conflict. The study further reported 46 percent of the animals that were not restricted. However, 50 percent of them have been reported to have provided enough space for their animals and with 54 percent of animals restricted. Environmental transmission of livestock associated diseases (LA) may not be associated to direct contact to livestock animals, but people may experience adverse health effects due to livestock in their immediate surroundings. According to some of the respondents that close contact to livestock animals was not necessary for a transmission event to occur, but that already living in close vicinity of livestock could be enough for the occurrence of adverse health effects among residents

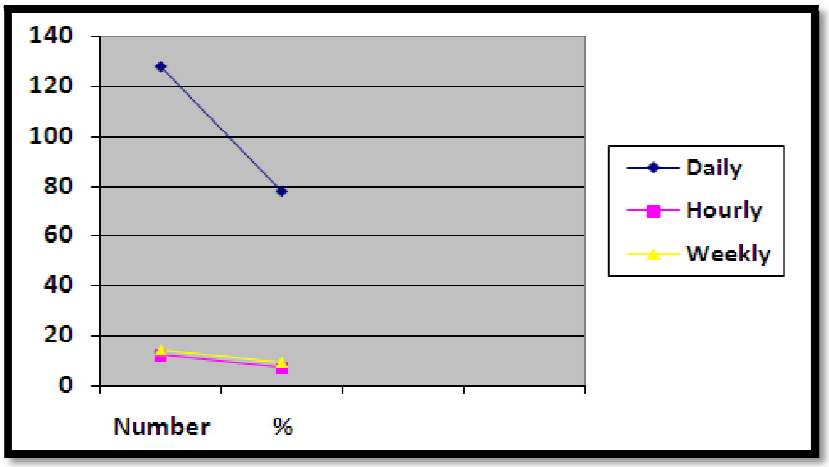

Figure 7: Line Graph Showing Respondent's Views on the Period of Livestock Premises Sanitation

More than ¾ of the respondents are of the views that sanitation of the livestock premises was carried out on daily bases except there is no enough spaces to dispose it and this constitute a serious health issue to the environment. Others maintained that sanitation of livestock premises is on weekly bases with 9 percent and 7 percent on hourly while 6 percent is periodical as can be depicted in the graph above.

Livestock Diseases	Number	%
Brucellosis	127	49
Q-fever	07	3
Cryptosporidiosis	60	23
West Nile fever	62	24
Non	01	1
Total	257	100

Table 8: Respondents Views on Types Of Livestock Diseases Associated with the Livestock
Source: Field Work 2017

Many zoonotic diseases associated with animals have been reported in the course of the research. The diseases available in the area include Brucellosis with 49 percent views, Q-fever with 3 percent, cryptosporidiosis with 23 percent, and West Nile fever with 24 percent views. The work of some scholars in the previous chapter shows that, these diseases can be easily and quickly transmitted to human being. This is obvious because the symptoms of such diseases have been mentioned by the respondents in the preceding table below.

Symptoms in Human	Number	%
Cholera	06	2
Typhoid	98	42
Diarrhea	73	31
Hepatitis A & E	16	7
Abortion	34	15
Others	07	3
	234	100

Table 9: Symptoms of Livestock Diseases Experienced In Human
Source: Field Work 2017

The direct association of animals and human, interacting in the same habitat has a lot of resultant effect on human health. The table above revealed that about half of the respondents are suffering from typhoid, 31 percent from diarrhea, 15 percent had cases of crude abortion, 7 percent of hepatitis A & E and 2 while 6 percent had cases of cholera in the study area.

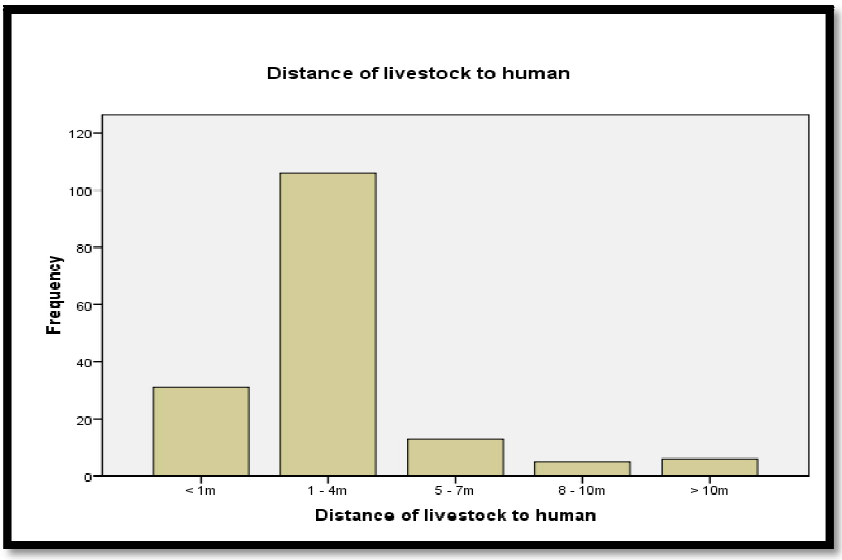

Figure 8: Bar Graph Showing the Distance Estimate from Livestock to Human

Contact with livestock animals can lead to transmission of microorganisms by inhalation, ingestion, via conjunctiva, or during incidents such as biting or other injuries inflicted by animals. Furthermore, aerosols contaminated with micro-organisms from respiratory or fluid sources, can play an important role in the transmission of micro-organisms between humans, but also from animals to humans. Aerosols have been suggested to play a role in micro-organism transmission over very short distances, sometimes as a parallel route to direct contact. It is thus clear that for transmission of zoonotic diseases to occur, the presence of animals or some type of contact with (livestock-) animals is crucial.

As most of the water points are located very close to the dumpsites on one hand, the distance from livestock to human habitat in the selected residential areas on the other hand is also close to each other. More than half of the respondent's views revealed that one to four meters is the distance estimate from livestock points to human habitat. 19 percent said the distance estimate between animals and human habitat is less than one-meter length, while seven to 10 percent and or above ten percent has each 3 percent as can be seen in the graph above. This indicates that there is direct contact or close association between urban livestock and human habitat that can lead to quick transmission of zoonotic related diseases to human since all the distances estimate is below the acceptable planning laws of 50 meters. In this respect, it is clearly perceived that urban livestock keepers face the problem of small land holdings allocated for them by urban planning department.

Proportion	Types	Number	%
50: 50	Sheep	19	16
60: 40	Goats	78	67
70: 30	Chicken	09	8
80:20	Cattle, rabbit etc	10	9
Total		116	100

Table 10: Proportion of A Combination of Livestock
Source: Field Work 2017

Where in a situation a livestock keeper has more than one type of livestock restricted or roaming about in a given environment, the people around are more vulnerable to quick occurrence and transmission of zoonotic diseases. The study revealed that almost all respondents try to keep two or more types of livestock animal together. According to the above table, 16 percent of the respondents have half of the livestock from sheep and half goats with ratio of 50:50. In the same vein 67 percent has a ratio of 60:40 of goats and sheep, 8 percent with 70: 30 with the majority chickens while cattle, rabbit cat and so on constituted 9 percent. Many scholars have found it to be more dangerous to keep many livestock of different types under one umbrella in an urban set up as highlighted in the previous chapter

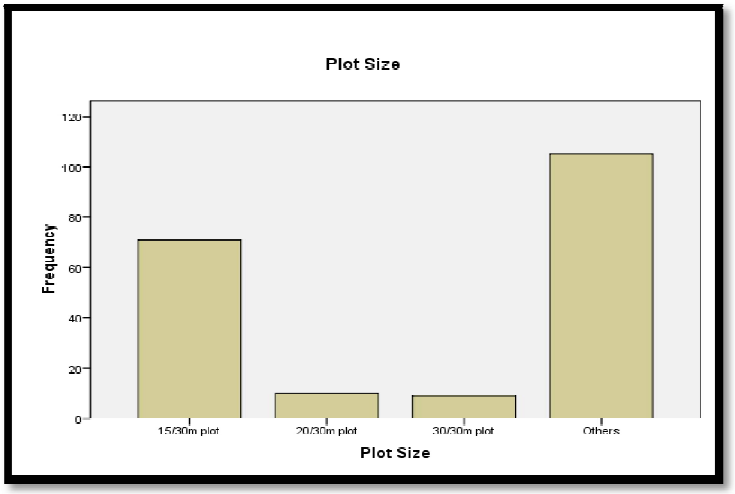

Figure 9: Bar Graph Showing Sizes of Plots Allocated to Livestock Farmers

Zoonotic infectious diseases transmitted from vertebrate animals to humans account for an estimated 60% of all human infectious diseases as cited in Gijs K.et al (2015). The rise of zoonotic diseases in humans began after the introduction of agriculture and the domestication of animals when humans started living in large numbers together, in close contact with other vertebrate animals. The sizes of the residential houses of the respondents, is also a great concern in the study area. From the table above it can depict that the sizes of the houses of the majority of urban livestock keepers are smaller than the required plot size of 15/30 meters. It is usually a half plot, a quarter plot or even less than which falls under the category of others in the bar graph. This indicates that there is a close association between the animals and human in such habitat such that zoonotic diseases can easily be transmitted to human. Nowadays, livestock associated infectious diseases are still a major threat to human health. Only few livestock keepers have enough space to rise animals in their houses as can be seen that plots sizes of 20/30and 30/30 has short bars on the frequency array. Most livestock keepers reside together with their animals in small size houses in the study area because of three major reasons;

- Due to rapid growth of population in the study area.
- Due to the land tenure system.
- Level of education

The population of Potiskum is fast growing because of some socio-economic factors that have been highlighted in chapter three.

On the land tenure system, most of the respondent's views revealed that their lands were acquired through inheritance. This is a situation when a household died and the house and other properties is shared among the heirs inform of inheritance which perhaps result to fragmentation of land. From the table below the study revealed that half of the respondents are of the view that inheritance was their mode of land acquisition. It also indicates that 34 percent of the respondents purchased their lands, 10 percent rent and only 5 percent acquired through gift, loan or on temporary basis.

Land Acquisition	Number	%
Inheritance	99	51
Purchase	66	34
Rent	20	10
Others	10	5
Total	195	100

Table 11: Mode of Land Acquisition by Respondents
Source: Field Work 2017

12. Recommendations

- Urban livestock farmer should constitute part of the negotiation at planning stage when land is demarcated into residential, commercial or industrial plots.
- 2 The sizes of plots allocated to livestock farmers should meet the Nigerian standard and therefore must be checked periodically in case of contravention.

- 3 The distance estimate between livestock habitat and that of human or water sources must not be less than 50 metres to avoid direct contact with the animals.
- 4 There should adequate sanitation of livestock habitats and their waste disposal so as to avoid zoonotic diseases outbreak in the study area.
- 5 Farmers should have direct access to veterinary services so to remedy the breakout of zoonotic diseases that serve as a threat to human health.
- 6 Zoning ordinances, planning as well as environmental laws should be strictly adhered to so as to check offenders in the study area.
- 7 At the time of zoonotic diseases outbreak, the case has to be documented for further investigation and research.
- 8 Finally the researcher recommends for further medical research on both the health of the animals and its owner to be conducted so as to avoid transmission of zoonotic diseases to human

13. Conclusion

Direct contact of urban livestock and human has been a serious threat to human health in the study area. This emanated as a result of non implementation of planning and environmental laws in terms of small lad holding allocated to the farmers that contribute negatively towards quick transmission of zoonotic diseases to human.

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