UNIZIK Journal of Agricultural Economics and Extension (UJAEE) Vol. 1 No.2 (2024): 325-333
A Journal of the Department of Agricultural Economics and Extension, Nnamdi Azikiwe University, Nigeria
Available at: https://journals.unizik.edu.ng/ujaee

Herd Health Needs Program for Local Poultry Production in Gizawa Community of Dutsin-Ma Local Government Area, Katsina State, Nigeria

Peter, J. G.[1]*, Salisu, U. S.[2] and Ebenehi, O.[1]

[1]*Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Federal University Dutsin-ma, Katsina State, Nigeria.*
[2]*Department of Animal Science, Faculty of Agriculture, Federal University Dutsin-ma, Katsina State, Nigeria.*

KEYWORDS:
Biosecurity measures, Livestock extension, Local poultry, Needs assessment, Newcastle disease

***CORRESPONDING AUTHOR:**
godwinpeterjatau@gmail.com

ABSTRACT

This study was conducted to introduce herd health programme to reduce the economic loss of local chickens and increase the income of poor households in Gizawa community of Dutsinma Local Government of Katsina State. A purposive and stratified sample method was used in selecting 16 local poultry farmers in the study area. Biosecurity measure was introduced with disinfectant (7% Tar Acid Phenol and 2% crysylic creosote). It was used to fumigate all stagnant and flowing sewage water. The result of the study revealed that biosecurity measure is effective method used to reduce/limit the rate of mortality and economic loss of local poultry farmers due to Newcastle disease. There was reduction in mortality and improve productivity thereby increasing farmers income. Biosecurity measure has been a method of preventing Newcastle disease, thus can be recommended to public and private extension agent to advocate or amplify the use of biosecurity measures in the prevention of Newcastle disease.

INTRODUCTION

Poultry are avian species including chicken, turkeys, ducks, pigeon, and geese. They are kept for economic importance throughout the world (Alfras, 2018). The global poultry industry is projected to rise continuously due to demand for eggs and meat which is compelled by increasing in human populations, rising in income of workers and migration from rural area to urban area (Atela et al., 2016; Mottet & Tempio, 2019). It is the most successful livestock sector around the globe and tends to grow due to the increasing consumption of its products, as a reliable source of protein.

Chicken production in many parts of rural and urban areas in African countries has contributed significantly as sources of protein, food security, employment, and income in resource-constrained communities (Ngongolo et al., 2019). Local chicken, as an aspect of livestock production outnumbers all other forms of livestock in Nigeria and not surprisingly is found throughout the country (Anosike et al., 2018). They are major asset that provide income and food security and also perform major and also used for social cultural functions and activities in rural community (Lindahl et al., 2019). They are preferred because of the little investment required, low input, and short production cycles compared with other livestock enterprises (Atela et al., 2016)).

In 2017, the global poultry population was greater than 22 billion (Food and Agriculture Organization, (FAO) 2020). By the year 2020, the poultry sector generated almost 101 metric tons

of meat and 1.65 billion eggs (Food and Agriculture Organization Statistics, (FAOSTAT) 2022). Chicken has 35 percent of the global production in 2020, its meat showed the largest growth in absolute and relative terms since 2000 (+104 percent, or 61 million tones) and was the highest produced type of meat in 2020 (FAOSTAT, 2022). They are bred on all continents and countries except Antarctica and Vatican City (Masaki, 2021)

In Nigeria, the local poultry population is estimated to be about 180 million birds, a significant increase from roughly 151million birds (FOA, 2018) of which are in the southern part of the country either in semi-intensive farms or intensive ones (FAO, 2018). To meet the growing populations demand for protein animal foods, high-yielding commercial chicken breeds were breed and developed in recent decades for meat and egg production. Practically, 1,600 different local chicken breeds are universally recognized (FAO, 2020). Local chicken farming, is being practiced in many developing and underdeveloped countries throughout the world (Giri, 2023)

Local chicken is a low input or no input activity primarily depending on scavenging on the natural feed base with little supplementary feeding, night shelter, and minimum health care practices (Sheikh et al., 2018).

Rural farmers reared chicken in small units (10–20 birds per household) primarily for family consumption and game purpose in social events. The birds scavenge for their own feed, consume mostly household waste, fresh grass and insects, and also utilize the resources that are not directly useful to human beings or livestock. Besides, they can be sold or bartered to meet emergency family needs such as medicine, clothes, and school fees (Alders et al., 2018). Despite small flock sizes, in aggregate, rural poultry flocks account for 60–90% of the poultry population across Africa and Asia (Wong et al., 2017).

Even though effective poultry farming practices against diseases are available in most countries, the uptake by poultry farmers is often very low (Lindahl et al., 2019). The sector is facing unprecedented challenges among them diseases which include; viral, fungal, bacterial and parasitic infections (Apopo et al., 2019, Mutinda et al., 2019)

In rural areas, Newcastle disease can kill up to 80% of unprotected local poultry and is thereby one of the biggest constraints to village poultry production and a considerable restrict of rural development (Masaki et al., 2023). Newcastle disease (NCD) is a severe and highly contagious viral infection that can affect most local chicken species (Abolnik, 2017). The disease is endemic in many parts of the world and causes high economic important losses due to high mortality and reduced poultry production (Qosimah et al., 2018). It is highly contagious infectious disease of poultry caused by virulent strains of avian paramyxovirus type 1 (World Organization for Animal Health, (WOAH) 2022). Infection can reduce output to about 80 % in unprotected local poultry farm and is a major constraint in production (Tadiose et al, 2016).The disease can vary from mild to severe. A highly contagious and severe form of the disease, called exotic Newcastle disease (END), is so deadly that many birds die suddenly without showing any signs of disease.

Needs assessment is a process driven by the question, “What do clients need and how those needs should be met? (Donaldson J.L, and Franck K.L, 2016) Needs assessments is used significantly for a number of reasons, where the community is faced with unlimited needs, but limited resources. Needs assessments help to identify areas that will do the most good for the people over time. A comprehensive needs assessment help identify the most critical areas that require action. It provide a strong basis for implementing relevant development programs. It investigate into the audience perceived solution, as well as their priorities and their preference.

Herd health refers to an all-inclusive and systematic method taken to safeguard the health and wellbeing of a group or population of animals, habitually livestock (Bage et al., 2020). It includes put into action numerous and diverse approaches, procedures and practices to prevent, control and manage diseases and other health related issues within a group of herd. The purpose of herd health management is to improve the overall health, production output and wellbeing of the animals while minimizing economic losses and risks to public health.

The absence of herd health programme could result to high mortality rate caused by diseases. Farmers who maintain proper herd health programme by veterinarians in cooperation with producers will maximize health and increase production and decrease the incidence of disease (Bowen, 2016). In view of the above the researcher investigated herd health needs programme for local poultry production in Gizawa community with the following objectives:

i. To identify the causes of economic loses of local poultry in Gizawa community

ii. To develop an effective herd health management programme for poultry farmers.

iii. To promote hygiene practice of poultry farmers in the study area.

Methodology

The study was conducted in Gizawa community of Dutsin-ma Local Government Area of Katsina State. The area is bounded by Safana and Dan-Musa local governments to the west, Kurfi and Charanchi local governments to the north, Kankia to the east, Matazu and Dan-Musa local governments in the south. Dutsin-ma town is located within Longitude 07º29,56”E and 07º30,04”E and Latitude 12º27,10”N and 12º27,16”N of the equator. It is also found in the basement complex area of Katsina State (Oguntoyimbo, 1983) as cited in Tukur et al., (2013). Gizawa community is one of the communities in Dutsinma local Government where poultry production is high, as a result of the fore-going the community was purposively selected and use for the study.

Dutsin-ma local Government Area has an area of 527 km² and a population of 311,671 (NPC, 2023). The Local Government is located in the Sudan savanna zone of the central part of Katsina state with two distinct seasons, the tropical wet and dry seasons and endowed with vast fertile land suitable for the cultivation of cereal crops, tree crops, trading and rearing of livestock.

Gizawa community is one of the communities in Dutsin-ma Local Government area of Katsina State and it was purposively selected and use for the study because of the high volume of poultry production in the area.

The table 1 shows stratified sample method used in selecting 16 local poultry farmers in the study area. The farmers are divided into four strata that make up of 16 poultry farmers across each of the identified occupation. Their occupations are farmers, traders, teachers and local leaders.

Table 1: Stratification /Sampling of poultry farmers

S/N	Poultry Farmers	Occupation	Percentage %
1	4	Trader	25
2	4	Teacher	25
3	4	Farmer	25
4	4	Traditional/Religion Leader	25
	Total		100

Result and Discussion

Causes of economic loses of local poultry in Gizawa Community

Figure 2 shows the workings of PRA pairwise ranking, which reveals that poultry mortality in the study area was due to Newcastle disease infection which ranked first as the most pressing needs of the farmers in the study area. During the focus group discussion, the farmers reported local poultry came down with difficulty in breathing, accompanied by nervous signs, such as paralysis or twisted necks (torticollis) and sudden death were the main prognosis presented by the poultry in the study area. According to the World Organization for Animal Health (WOAH, 2024) Newcastle disease is susceptible in both local and exotics chickens. Pairwise ranking is participatory rural appraisal tool used for problem identification. As shown in table 3 below. From a list of five (5) identified problems Newcastle disease rank 1st among others problem

The result is in line with Pym & Alders (2016) that infectious diseases are one of the factors responsible for decreased and lost in the production of poultry products. Many studies confirmed the potential risk of small backyard flocks roaming in or near water lands and thus being exposed to Avian Influenza or Newcastle Disease (Rehman et al 2021, Abdi et al, 2016**).** Newcastle disease is one of the major serious viral diseases of poultry birds which have caused huge economic losses to rural local poultry farmers in recent past. (de Bruyn et al., 2017 ; Waweru et al., 2023., Sadiq & Mohammed 2017)

Table 2: Pairwise ranking method

	TICKS	**NEWCASTLE DISEASE**	**FOWL POX**	**LYMPHOID LEUCOSIS**
TICKS	----------	NEWCASTLE DISEASE	FOWL POX	TICKS
NEWCASTLE DISEASE	NEWCASTLE DISEASE	----------	NEWCASTLE	NEWCASTLE
FOWL POX	FOWL POX	NEWCASTLE DISEASE	---------- -	LYMPHOID LEUCOSIS
LYMPHOID LEUCOSIS	LYMPHOID LEUCOSIS	NEWCASTLE DISEASE	LYMPHOID LEUCOSIS	---------- -

Table 3: Result of the pairwise ranking

Basic Problems	Score	Rank
Newcastle Disease	6	1st
Lymphoid Leucosis	3	2nd
Fowl	2	3rd
Tick	1	4th

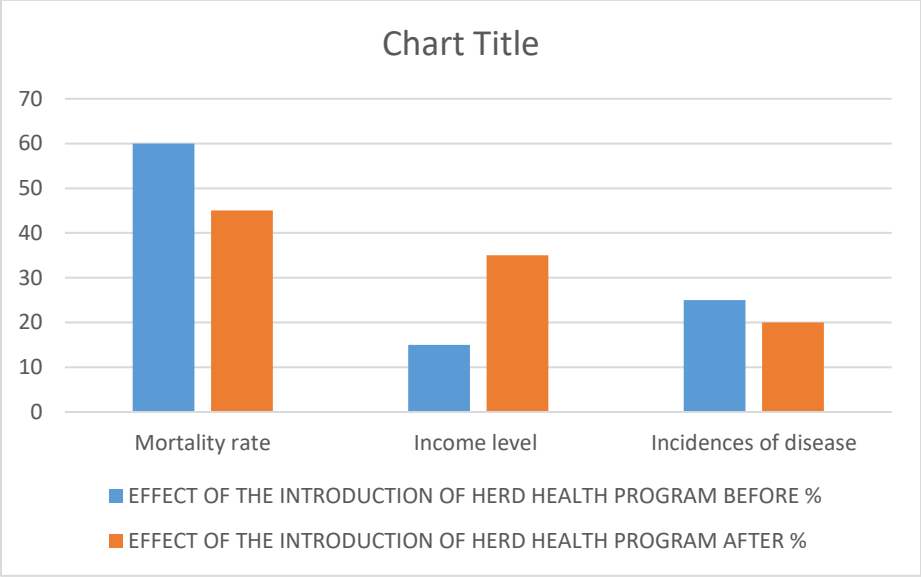
Herd health management programme for poultry farmers.

Table 4 reveals the effect of the introduction of the Herd health Program among local poultry farmers in the study area. The findings reveals that mortality rate before the introduction of herd health program was 60% while after the introduction it was 45% which means that farmers adoption of the herd health program has a significantly reduce mortality rate by 15%. In the same venn the income level of the local poultry farmers in the study area before the introduction of the Herd Health Program was 15% while after the introduction the study recorded 35% which implies that there is a 10% increase in the income level of the poultry farmers as a result of the introduction and

subsequent adoption of the herd health in the study area. Similarly, the incidences of disease before the introduction of herd health program was 25% while after the introduction of the herd health was 20% which means that herd health program has reduced the incidences of the disease by 5% in the study area. This is in line with the findings of (Ifeduba et al., 2020) who state that herd health program has the potentials of reducing mortality and increase income of poultry farmers in Nigeria.

Table 4: Effect of The Introduction of Herd Health Program

		BEFORE	AFTER
S/N	**Basic Problem**	**Percentage %**	**Percentage %**
1	Mortality rate	60	45
2	Income level	15	35
3	Incidences of disease	25	20
		100	**100**



Hygiene practice of poultry farmers in the study area.

Objective three was achieved through the use of focus group method to educate and enlightened the respondents who are local poultry farmers on the importance of hygiene in local poultry production. The livestock farmers were informed and educated on the importance of adopting maintaining a hygienic housing which is in line with international best practices in the business of poultry production. Mirza et al, (2020) posited that, cleaning the chicken house helps to prevent and control diseases, especially external parasites such as fleas and mites. –The major causes of poultry diseases is due to inadequate backyard flock hygiene (Grace et al., 2024) Proper environmental hygiene such as keeping grasses low around the chicken house, should be a routine exercise in and around the poultry houses as this will help check the activities of predators and others external treat (Mahoro et al., 2017). Regularly observe birds for any signs of ill health or problem related to feather pecking. Isolate sick chicken from the flocks (Queensland Government, 2016). Culling of sick birds, burying of feathers and bones of infected animals that were slaughtered, cooked and eaten by family members. Farmers were also advised to avoid buying sick and dead chicken as well as receiving chicken during harmattan.

Conclusion and recommendation: It can be concluded that biosecurity method in herd health programme is effective and can be used to reduce/limit or eliminate the rate of mortality and economic loss due to Newcastle disease and other diseases in local poultry production. The most important measure for sustainable and profitable production on a poultry site is therefore to have a forward defense in place – i.e., a biosecurity programme whose components work together to reduce the risk of introduction of poultry pathogens into a production site. It is recommended that biosecurity method in herd health program can be used to reduce the rate of mortality in local poultry production. This result agrees with Oluwasusi et al (2018) who opined that strict biosafety measures, in addition to vaccinations, are strategies to prevent and control some infectious poultry diseases as vaccination alone is not enough to curb the menace under field conditions. Feeders and drinkers should be kept clean, safe and from predators and wild birds to avoid contamination with pathogens from wild birds and predators.

Acknowledgement

I sincerely express my gratitude to Sasakawa Africa Fund for Extension (SAFE) for introducing Livestock Extension Program in the Department of Agricultural Extension and rural Development, Faculty of Agriculture, Federal University Dutsin-Ma, Katsina State, Nigeria

REFERENCES:

Anosike, F. U., Rekwot, G. Z., Owoshagba, O. B., Ahmed, S. and Atiku, J. A. (2018). Challenges of poultry production in Nigeria: A review. Nigeria. *Journal. Animal. Production. 2018, 45(1): 252 - 258*

Abdi RD, Amsalu K, Merera O, Asfaw Y, Gelaye E, et al. (2016) Serological response and protection level evaluation in chickens exposed to grains coated with I2 Newcastle disease virus for effective oral vaccination of village chickens. *BioMed Central Veterinary Research 12(1): 1-11*.

Abolnik, C. (2017). History of Newcastle disease in South Africa. *Onderstepoort Journal of Veterinary Research, 84: e1-e7*.

Atela J. A. ,Ouma P. O., Tuitoek J. , Onjoro P. A. and Nyangweso S. E. (2016) A Comparative performance of indigenous chicken in Baringo and Kisumu Counties of Kenya for sustainable agriculture. *International Journal of Agricultural Policy and Research Vol.4 (6), pp. 97-104, June 2016. ISSN 2350-1561*

Afras A. (2018) Review on chicken production in Ethiopia with emphasis on meat production. Munich: GRIN Verlag; 2018. Available at: https://www.grin.com/document/385849

Alders R. G, (2018). Sarah E.Dumas, Elpidius Rukambile, Godfrey Magoke, Wende Maulaga, Joanita Jong, Rosa Costa; 2018. Family poultry: Multiple roles, systems, challenges, and options for sustainable contributions to household nutrition security through a planetary health lens. Maternal Children Nutrition.2018 Oct: 14(Suppl 3): e12668. Published online 2018 Oct.doi:10.1111/mcn.12668 PMCID:30332533

Apopo A A, Kariithi H M, Ateya L O, Yatinder S B, Jane H S, Thomas D D, Catharine N W, Sonia M H, and Claudio L A (2019) A retrospective study of Newcastle disease in Kenya. *Tropical Animal Health and Production, Article 52, 699-710 Retrieved February 16, 2020, from https://doi.org/10.1007/s11250-019-02059-x*

Bage, R., Jacobson, M., Dione, M., Gertzell, E., Genfors, E., Kiara, H., König, U., Rajala, E., Ström-Hallenberg, G., Wieland, B. and Magnusson, U. 2020. A practical guide to herd health management in pigs, dairy and small ruminants. Nairobi, Kenya: ILRI, pp. 4-7.

Bello, M. B., K. Yusoff, A. Ideris, M. Hair-Bejo, B. P. H. Peeters and A. R. Omar (2018). Diagnostic and Vaccination Approaches for Newcastle Disease Virus in Poultry: The Current and Emerging Perspectives. BioMed Research International, 2018: 7278459.

Bounds, M & Zinyemba, O. 2018; Poultry Farming: lessening poverty in rural areas. *South African Journal of Agriculture Extension Vol. 46, No. 1, 2018: 59 – 70 DOI: http://dx.doi.org/10.17159/2413-3221/2018/v46n1a436*

de Bruyn J, Thomson PC, Bagnol B, Maulaga W, Rukambile E, and Alders RG (2017). The chicken or the egg? Exploring bi-directional associations between Newcastle disease vaccination and village chicken flock size in rural Tanzania. PLoS ONE, 12(11): e0188230. Available at: https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0188230&type=printable

Donaldson J.L, and Franck K.L, (2016). Needs Assesment Guidebook for Extension Professionals, Institute of Agriculture. The University of Tennessee

Eze, C.O., Chah, J.M., Uddin, I.O., Anugwa, I.J., & Igbokwe, E.M. (2017). Biosecurity Measures Employed by Poultry Farmers in Enugu State Nigeria. *Journal of Agricultural Extension, Vol. 21 (3): 141-155.*

FAO (2018) Africa Sustainable Livestock 2050: Livestock and livelihoods spotlight. NIGERIA. Cattle and Poultry Sectors. Available at: http://www.fao.org/3/CA2149EN/ca2149en.pdf. Accessed on the 15th March 2020.

Food and Agriculture Organization of the United Nations (FAO) (2016). The Biosecurity Approach: A review and Evaluation of Its Application by FAO, Internationally and in various 22nd December, 2016. http://doi.org/10.13140/RG.2.2.34154.52165

FAOSTAT. Available online: https://www.fao.org/faostat/en/#data/QCL/visualize (accessed on 6 July 2022)

Giri SC. (2023) Backyard poultry production: the future source of egg and meat under fast changing climatic scenario. *International Journal Avian & Wildlife Biology. 2023; 7(1):21–25. DOI: 10.15406/ijawb.2023.07.00186*

Grace, D.; Knight-Jones, T.J.D.; Melaku, A.; Alders, R.; Jemberu, W.T. The Public Health Importance and Management of Infectious Poultry Diseases in Smallholder Systems in Africa. Foods 2024, 13, 411. https://doi.org/10.3390/ foods13030411

Ifeduba, A.V., Achonwa, C.C., Ukwu, I.P., Ogbuewu, E.B., & Okoli, I.P. (2020). Commercial Intensive Poultry Production in Tropical Environments with Particular Reference to Nigerian Poultry Industry. World Rural Observation. *Marsland Press Multidisciplinary Academic Journal Publisher, 12(3): 1-18.*

Ipara O Billy, David Jakinda Otieno, Rose Nyikal, Nabwile Stellah Makokha; (2021). The contribution of extensive chicken production systems and practices to Newcastle disease outbreaks in Kenya. *Tropical animal Health and Production (2021)53:164 https://doi.org/10.1007/s11250-0202550-w*

Lindahl, J. F., Young, J., Wyatt, A. et al. (2019) Do vaccination interventions have effects? A study on how poultry vaccination interventions change smallholder farmer knowledge, attitudes, and practice in villages in Kenya and Tanzania, *Tropical Animal Health and Production, Article 51, 213-220.*

Mahoro J., Muasya T. K, Mbuza F, R. Habimana, and Kahi A. K (2017) Characterization of indigenous chicken production systems in Rwanda. Poultry Science 96:4245–4252 http://dx.doi.org/10.3382/ps/pex240

Masaki Eda, (2021) Origin of the domestic chicken from modern biological and zoo archeological approaches. Animals frontiers, 11(33) P52-61

Masaki E, Hiroe I, Minoru Y. and Saburo F. (2023). The earliest evidence of domestic chickens in the Japanese Archipelago. Frontier in Earth science

Matilda, A.A., Ralf, K.J., Jurgen, M., & Eva, M., (2020). Understanding Attitude, Practices and Knowledge of Zoonotic Infectious Diseases Risks among Poultry Farmers in Ghana. Journal of Veterinary Medicine and Science. Vol 6(3): 4-9.

Mebrate Getabalew Tewodros Alemneh, Dawit Akeberegn, Daniel Getahun and Derbie Zewdie (2019). Epidemiology, Diagnosis & Prevention of Newcastle Disease in Poultry. *American Journal of Biomedical Science & Research*

Mirza, M.M., Jaisan, I., & Marya, A. (2020). Investigation of Risk Factors and Biosecurity Measures Associated with Prevalence of Newcastle Virus in Broiler Farm. Turkish Journal of Agriculture, Food Science and Technology, 8(11): 2426-2432.

Mottet A & Tempio G (2019) Global poultry production: current state and future outlook and challenges, *World's Poultry Science Journal, Volume 73 Article 2, 245-256.*

Mutinda W. U., P. G. Mbuthia, L. W. Njagi, L. C. Bebora and P.N. Nyaga, (2019). Pathogenicity of Poultry Farming and Disease Management Practices in Small-Scale Farmers in Kisii County, Kenya © 2020 Global Journals 1 Year 2020 7 Kenyan Infectious Bursal Disease Virus Isolates in Indigenous Chickens. *International Journal of Poultry Science, Article 18, 523-529.*

Ngongolo, K., E. Sigala, and S. Mtoka. (2019). Community poultry project for Conserving the wildlife Species in Magombera forest, Tanzania. Asian Journal of Research in Agriculture and Forestry. 2:1–7.

Oluwasusi, J.O., Akanni, Y.O., & Sodiq, A.R. (2018). Effectiveness and Benefits of Biosecurity Practices in Small-scale Broiler Farmers in Ekiti State, Nigeria. Journal of Poultry Research 15 (1): 6-12

Oguntoyinbo J.S. (1983) A Geography of Nigeria Development, Heinemann Educational Books (Nigeria).

OIE. 2013. Newcastle disease. Etiology Epidemiology Diagnosis Prevention and Control References OIE Technical Disease Cards. Paris, France.

Pym, R. & Alders, R. (2016). Helping smallholders to improve poultry production. In Achieving Sustainable Production of Poultry Meat; Burleigh Dodds Science Publishing: Cambridge, UK, 2016; pp. 441–471.

Qosimah, D, Murwani S, Sudjarwo E. and Lesmana M. (2018). Effect of Newcastle disease virus level of infection on embryonic length, embryonic death, and protein profile changes. Veterinary World, 11: 1316-20.

Rehman S, Khan M. I, Rantam F.A, Effendi M. H, Shehzad A and Tariq A. (2021). Seroprevalence and associated risk factors of avian influenza virus subtype H9N2 in backyard poultry of Peshawar Pakistan. Journal Indonesian Tropical Animal Agriculture. 46, 209–218. https://doi.org/10.14710/jitaa.46.3.209-218 (2021).

Tadiose, H., D. Reta, I. Dawud and E. Wondemeneh. (2016). On Station Evaluation of Thermo-Stable Newcastle Disease Vaccine. *Global Journal of Science Frontier Research: D Agriculture and Veterinary, 16: 43-49.*

Tagesu A. S and Tolera T. T, (2017). Review on Newcastle Disease in poultry and its Public Health Importance. *British Journal of Poultry Sciences 6 (2): 2-39,2017.DOI: 10.5829/idosi.bjps.2017.29.39.*

Tukur, R., Garba, K. A., Abdulrashid, I., and Murtala, R. (2013) Indeginous Trees Inventory and

Their Multipurpose Uses in Dutsin-Ma Area Katsina State. European Scientific Journal 9(11), 288-300

Sadiq M. B & Mohammed B. R, (2017). The economic impact of some important viral diseases affecting the poultry industry in Abuja, Nigeria. *Sokoto Journal of Veterinary Sciences, 15(2): 7-17.*

Sheikh I. U, NIssa S. S, Bushra Z, Akand A. H, Bulbul A. H, Hasin D, Isfaqul Hussain and Hussain S. A (2018). Propagation of backyard poultry farming for nutritional security in rural areas. *International Journal of Veterinary Sciences and Animal Husbandry 2018; 3(4): 03-06*

World Organization for Animal Health (WOAH), 2024

Wong, J.T, de Bruyn, J., Bagnol, B., Grieve, H., Li, M., Pym, R. and Alders, R.G. (2017). Small-scale poultry and food security in resource-poor settings: a review. Global Food Security. 15, 43–52