



**MARKET
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IN THE NIGER DELTA**

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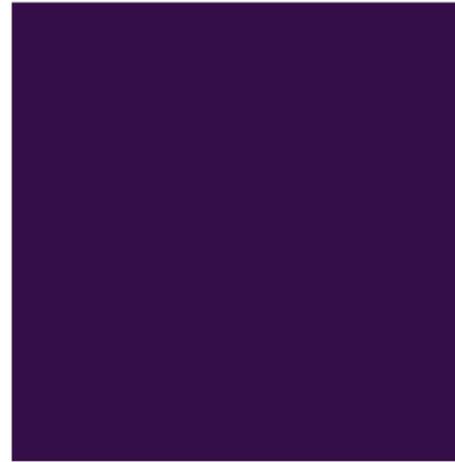
MADE SURVEY REPORT ON TRADITIONAL CHICKENS IN DELTA AND IMO STATES

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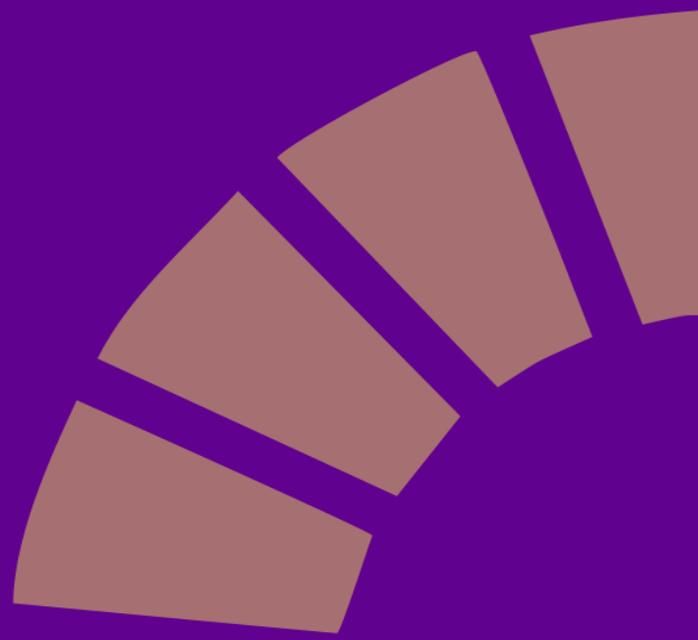


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2014



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EXECUTIVE SUMMARY

Traditional poultry production is an important agricultural activity of most rural communities in the world where they are kept by the rural poor for meat, eggs, supplementary income and for meeting a wide range of social obligations. The production of traditional chickens in Nigeria is however hampered by the risk of infection from diseases, predators, theft, smaller numbers and sizes of eggs, smaller sizes of birds and slow growth rate. The main constraint on chickens output in rural areas is the Newcastle's disease with its high mortality rate. In order to capture what presently obtains in the Niger Delta rural areas, this survey was carried out to provide baseline information.

Questionnaire was used to elicit information on the social-economic profile of each household, role and economics of chicken in the household, real demand for vaccine and identification of rural anchor points. The questionnaires were administered to three hundred and twenty (320) households that raise rural chicken in each of the state. The survey lasted eight (8) days. Data obtained were coded and analysed. From the results obtained the following findings were made.

Results of the survey showed that the farmers had average flock size of 18 chickens of mixed sexes with a standard deviation of 9.06 which suggest a high variability in the flock size. The flock size had a median of 18 with the most occurring flock size of 8 chickens. The minimum and maximum flock size was 1 and 40 chicken respectively. Average mortality was 11% and could be as high as 25%. The average cost of mortality was N2, 324.10, median of N2, 000.00 and mode of N1.00 with a minimum and maximum cost of N1.00 and N14, 400.00 respectively. The average selling price of the chickens was N1, 383.45 with median of N1, 500.00 and the most frequent selling price was N1000. On cost and returns, traditional chicken farmers incurred average total variable cost of about N4, 602.91. The average profit generated was N17, 532.31. The return per naira invested was N3.81 at the gross margin.

The traditional chickens were raised under scavenging production. The breakdown of flock size by gender showed that female participation is about 73%. The chickens were majorly sold in the village market (61.1%) while others were sold to customers who buy them from the house and in very rare cases were taken to urban markets for sale to consumers and or collectors. The amount derived from the sale was kept by the woman who majorly owned and cared for the chickens. Diseases and parasites were observed to be the major cause of death in the flock. Among the diseases, Newcastle disease was the major killer disease (90.8%). Mortality was observed to be highest in the dry season (64%) of between October and March and less in the rains (36%) of between April and September. Mortality during the dry season especially during the *hamattan* months could be ascribed to Newcastle as this is the period of its prevalence. The age of mortality cut across the different phases of growth of chicken. However, mortality was highest in the chicks (41%) followed by adult (37.7%) and the least (21.3%) in the grower stage.

Only a small proportion of the respondents knew of Newcastle disease and how to prevent it (32%). Even those that knew did not even vaccinate but rather used drugs since over 85 percent of the respondents

used drugs while only a very small percent (7.8%) of the respondents vaccinated against Newcastle disease. In traditional chicken production, no regular health programme of disease control measures are in place as it is with the exotic commercial stock that has well defined vaccination programme that all involved in their production key into to prevent mortality caused by diseases. The hardy nature of the traditional chickens had helped them to survive to their innate capability and if boosted with vaccine will prevent mortality more in the traditional chickens. For the traditional chickens producers to effectively adopt the use of vaccine as a preventive measure, deliberate sensitization must be done and the vaccine must be made available at a pro poor cost and be within their reach without necessarily travelling far to buy it.

The farmer's awareness of village based general stores where they could purchase feed or run to for health advice was poor. This result calls for massive sensitization through enlightenment campaign on the importance of vaccines in reducing mortality due to Newcastle disease if the effect of any intervention is to be felt.

The perceived value of a bird was N1,624.95 for the cock and N1,105.51 for the hen. The farmers were willing to pay N441.67, 296.15 and 328.00 for NDVK, coccidiostats and lasota respectively. The preferred price will assist vaccine manufacturers to determine a pro-poor price for the farmers because the use of vaccines will no doubt increase the output of traditional chickens.

Since conventional Newcastle disease vaccines share with other vaccines the defect of heat liability. It is not possible to bring viable vaccines into villages where there is no constant electricity or an effective cold-chain which are extremely expensive to operate. For the traditional chicken producers to effectively adopt the use of vaccine as a preventive measure, deliberate sensitization must be done and the vaccines must be made available at a pro poor cost and be within their reach without necessarily travelling far to purchase it.

The lack of use of vaccines could be attributed to the non availability of suitable vaccine for use in the village chickens. Until this MADE survey, village chickens have proved an elusive target for vaccination for several reasons. They exist in small, multi-aged flocks scattered over vast areas and they cannot be readily caught for individual vaccination. Conventional Newcastle disease vaccines share with other vaccines the defect of heat liability. It is not possible to bring viable vaccines into villages when there is no constant electricity or an effective cold-chain which are extremely expensive to operate. To effectively take the vaccine to the rural areas some big farmers or village based store that could provide some cooling facilities should be targeted. The farmers awareness of village based general stores where they could purchase feed or run to for health advice should be broadened. The enormous resource of the traditional chicken population if fully explored will present a potential market for vaccines manufacturers who may want to catch on this goldmine¹.

¹ This document was prepared and submitted to MADE by: Professor Arierhire M. ORHERUATA, Department of Animal Science, University of Benin, Benin City

INTRODUCTION

Rural poultry production is an important agricultural activity of most rural communities in the world where they are kept by the rural poor for meat, eggs, supplementary income and for meeting a wide range of social obligations. The meat from local chickens is popular and considered to be tastier due to their growth pattern and scavenging nature for feed.

Local poultry species represent valuable resources for livestock development because of their extensive genetic diversity which can contribute toward the improvement of poultry (Chen *et al.*, 2004). Several strains of traditional chicken with distinctive colour characteristics exist in Nigeria. The traditional chickens are characterized with poor productivity, yielding only 35 to 40 eggs per year (Islam *et al.*, 2003) and weighs between 1 to 1.5 kg at maturity. They are also known to be hardy, adaptive to rural environment, adjust to fluctuations in feed availability and possess qualities such as ability to hatch their own eggs.

In Nigeria, traditional chicken constitutes 80% of the 120 million poultry type raised in the rural areas (RIM, 1992). Despite the high population of traditional chicken, their production had not been included in the mainstream agricultural and economic activities in Nigeria. There are paucities of quantitative data to support the importance of the enterprise. Rather there had been more development focus on introducing exotic high yielding breeds than traditional chicken. The rearing of traditional chicken is seen as a low-input and low-output activity. As a result, production processes are inefficient. Chowdhury *et al.* (2006) observed that the traditional chicken in Nigeria may be more productive with improved diets and when in confinement as compared to those who derived their feed only from scavenging. The local chicken production in Nigeria is greatly hampered by a number of environmental risks and genetic problems (Adomako, *et al.*, 2010). Prominent among these problems are the risk of infection from disease, threat of attack from predators, theft, smaller numbers and sizes of eggs, and birds and their slow growth rate. The genetic factors can be improved through the application of genetic improvement strategies in their production. The main environmental constraint on output from traditional chickens in rural areas is Newcastle Disease (NCD), which has a high mortality rate of over 30 percent for the Niger Delta's traditional chicken population as observed by MADE market system brief. NCD strikes every year during the *harmattan* period, or dry season. It causes flu like symptoms in chickens, decreases their activity, and causes their heads to droop, eventually leading to death. Deaths from NCD are avoidable through vaccination. Unfortunately, the vaccine distribution system in Nigeria has been structured around the commercial poultry sector, and does not extend to rural areas. According to the International Livestock Research Institute (ILRI), NCD accounts for 54.3% of all bird diseases diagnosed in the Niger Delta with a mortality rate of 33.7% and morbidity (prevalence) rate of 51.7%. With such mortality (33.7%), the income of farmers will definitely be affected. Please note that the MADE and ILRI percent mortality of 30 to 33.7 were obtained from books that may have quoted the Nation's average.

Given these circumstances, an intervention is needed if the income of the resource poor farmers in the rural areas must be increased. Any intervention towards enhancing productivity of local chickens and

improving the income of farmers should focus on limiting the incidence of NCD, improved quantity and quality of feed supply and provision of better management.

Therefore, for this to be achieved there is need for a baseline study to capture what presently obtains in the Niger Delta rural areas hence this survey was carried out to provide such baseline information to enable MADE take an informed decision

Terms of reference

The TOR of this study include but not limited to designing and deploying a survey that would assess the distribution of traditional bird owners in **40** households (HH) which have some chickens in 8 local government areas in Imo and Rivers States respectively. Specifically to determine:

A. Socio-economic profile of each HH, including:

1. Income profile of 640 households with chickens in Imo and Rivers state i.e. sample of 40HH in 8 rural communities per state
2. How many people live in a household?
3. Gender distribution of each household

B. Role and economics of Chicken in the HH, including

1. Current Number of birds in the household with chickens e.g. (0-10, 10-30 and 30 and above), broken out by
 - a. The number of birds raised/HH in a year
 - b. The number of birds sold/HH in a year, at what price, who do they sell to and to what market(s)
2. Does the HH have a strategy for poultry rearing (i.e. specifically for income, to eat, or simply as a reserve?)
3. The quantity and value of eggs consumed by the household from the flock
4. The quantity and value of eggs sold in each HH/year
5. How, and by whom are the chickens sold?
6. Who keeps the income from the sale of birds and eggs?
7. The number of birds/HH that die in a year, reasons for death and period of high mortality
8. If the HH feeds the chickens, how they feed the chickens and with what?
9. If the chickens are provided with any shelter.
10. Use of outside veterinary services for chickens, purchase of feed or medicines specifically for chickens
11. The number of household interviewed that do not raise birds at all exclusive of the 40HH with chickens per community.
12. In passing the Consultant should also note any cases where HH are engaging in small small-scale broiler production using day old chick and poultry feed, and what size the flocks are.
13. Estimate of the number of HH in the community/village

14. Estimate of the %age of HH in the village which keep traditional poultry

- C. Appraise real demand for vaccines, purchasing power, awareness and preferences of vaccine and understanding of the cause of death of chickens. There exists anecdotal evidence of demand for vaccination among traditional bird owners however, there is need to quantify this demand as well as deepen insights into bird owner's behaviour. In broader terms, the consultant will seek to clarify if bird owners know:
1. Why their birds die and how deaths can be prevented?
 2. The level of awareness about vaccines that could prevent the death?
 3. Their perceived value of a bird (how much do they think they are worth?)
 4. How much they might be willing to pay for vaccination
- D. Identify and appraise rural anchor points - Penetrating rural areas to distribute the vaccine will be easier if existing enterprises and social structures can be leveraged. Therefore it is important to understand what these are in the rural Niger Delta context. For example, such anchors could include:
1. Presence of village-based general stores selling different forms of consumer farm inputs - fertilizer, pesticide, or feed.
 2. Presence of lead farmers in rural areas e.g. medium-scale commercial poultry farmers present in the village could be an anchor point.
 3. Presence of bird collectors, since they already move between several villages and urban areas.

CONCEPTUAL FRAMEWORK

Traditional chickens have the potential of increasing food production and income in the rural communities in Nigeria. To achieve this feat, there must be a concerted intervention programme which should combine technical improvement and socio-economic aspects. According to FAO (1996), in the classification of world livestock production systems, the poultry systems are described under landless monogastric systems, where feed is introduced from outside the farm. Although, the intensive production systems can be found in the rural areas, the most dominant production system is the scavenging system that is based on traditional chickens. The commercial producers have integrated vaccination routine in their production but this is not a common practice with traditional chicken producers because there is no established market driven approach which can deliver vaccines to low-income household at a feasible rate. Investment into such venture has a great market potential since traditional chicken constitutes 80% of the 120 million poultry type raised in the rural areas of Nigeria.

Recently, traditional chicken production with higher input and output known as the backyard system (a modification of the free range) is gradually coming up. Therefore, the economy of the rural household can be improved by sensitizing them toward adopting the backyard system that has better management practices. To be able to achieve this, there is the need for baseline information on the current practice that will give direction to whatever sensitization that needed to be done. This survey whose focus is on



traditional chickens will be carried out in different communities in Imo and Delta States in the Niger-Delta region of Nigeria to gather baseline data on traditional chickens.

METHODOLOGY

Locations of the study

The survey was carried out in Imo and Delta States, Nigeria. Imo State lies between Latitude $4^{\circ} 45'$ North and $7^{\circ} 15'$ East and Longitude $6^{\circ} 50'$ East and $7^{\circ} 25'$ East of the Greenwich Meridian. It has twenty seven (27) Local Government Areas as shown in Figure 1. Imo state has an annual rainfall varying from 1,500 mm to 2,200mm with average annual temperature of above 20°C and average relative humidity of 75%.



Figure 1. Map of Imo State showing the Local Government Areas.

Delta State lies between longitude 5° and 6° 45' and latitude 5° and 6° 30' North of the equator. It has 25 local Government Areas as shown in Figure 2. The state has a tropical climate characterized by two distinct seasons with average temperature range of 24° C and 27° C, rainfall of 2,000 – 3,000mm/ annum and relative humidity of 57 to 91%.

Population of the study

The population of the study comprise of all the resource poor farmers who raised traditional chickens in the Niger Delta. The Niger Delta consists of nine (9) states and the estimates of the rural population of the nine states are in Table 1.

Sample and sampling technique

The sample consists of eight (8) Local Government Areas each in Imo and Delta States. A multistage sampling procedure was used. The first involve a random selection of eight (8) LGAs, followed by random selection of 2, 3 or 4 communities in each of the eight selected LGA depending on level of urbanization or riverine nature of the LGA and the third stage involve a snowball sampling of forty (40) traditional chicken producers in each of the communities. The names of the enumerators and the respective Local Government Areas and the communities covered are in appendix 1.





Figure 2: Map of Delta State showing the Local Government Areas

Instrument and Administration

The instrument for this survey is questionnaire that captured the social-economic profile of each household, role and economics of chicken in the household, real demand for vaccine and identification of rural anchor points. The questionnaires were administered to three hundred and twenty (320) traditional chicken farmers in each of the state to elicit information contained in the questionnaire from the households. The survey lasted eight (8) days.

Data collation and statistical analysis

The responses in the questionnaires were coded, entered into excel spreadsheet and subjected to statistical analysis using SPSS package to generate percentages and descriptive statistics. Net profit of the farmers was also determined.

Table 1: The distribution of the rural population estimate in the nine Niger Delta states

S/N	States	Population Estimate
1	Abia	2,634,100
2	Akwa-Ibom	2,726,500
3	Bayesa	1,394,400
4	Cross Rivers	2,230,900
5	Delta	2,930,200
6	Edo	2,461,200
7	Imo	2,725,800
8	Ondo	2,466,800
9	Rivers	3,961,300

Source: adapted from MADE Team Analysis (2014)

RESULTS INTERPRETATION AND DISCUSSION

Social – economic profile of respondents

The marital status, educational qualifications, household head age and household size of the respondents are presented in Table 2. Over 90 percent of the respondents are married with 37 percent and 35 percent having primary or secondary education respectively. Majority (66.4%) of the household head aged between 50 to 70 years with household size of 5 to 9. Such age is usually the average age of people in the village that may have spent their useful age in the city. No wonder you find more aged people in the village. The reasonably large household size was necessary to assist in farm work before they migrate to the city. This may have accounted for the additional income generated by the farmers. However, the household size perfectly fit 6.4 reported by Moreda *et al.* (2013). Feeding which is an important aspect of poultry production is not a common practice among traditional poultry farmers with less than 20 chickens. It is therefore not surprising why productivity of traditional chicken on free range is poor.

Table 2: Socio-economic characteristics of respondents

Variable	Number	Frequency (%)
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Marital status		
Single	31	4.8
Married	609	95.2
Educational level		
No formal education	85	13.3
Primary education	238	37.2
Secondary education	226	35.3
NCE/OND	58	9.1
B.Sc/HND	33	5.2
Age category		
Less than 25	1	.2
25 to 49	194	30.3
50 to 74	425	66.4
Above 74	20	3.1
Household size		
Less than 4	55	8.6
5 to 9	421	65.9
10 to 14	164	25.6
Do you Feed your chickens		
Yes	437	68.3
No	203	31.7
Additional income from other source		N150,000.00

Source: Made field survey 2014

The results of the survey on gender distribution of household head showed that men accounted for 73.6% and women accounted for 26.4 percent of the entire household interviewed as depicted in Figure 3. This result suggests that the majority of the women were married with very few (26.4%) being either divorce or widows judging from the age of household head of 50 to 70 years old.

Traditional poultry keeping was taken as a part time activity as over 86 percent of the respondents have indicated (Figure 4). Only 13.6 percent took it as full time activity. This is not surprising because traditional poultry has not fully received the attention it deserved by including it in the mainstream agricultural and economic activity in Nigeria. Rather emphasis had been placed on introducing exotic high yielding breeds. Countries or communities where they are taken as full time activity had very large household flock sizes. Those who took it as full time activity had high flock size due to intensification of production. The high



amount (N150,000.00) generated from other activities by traditional poultry farmers is therefore not surprising since over 86% took it as part time activity as depicted in Figure 4.

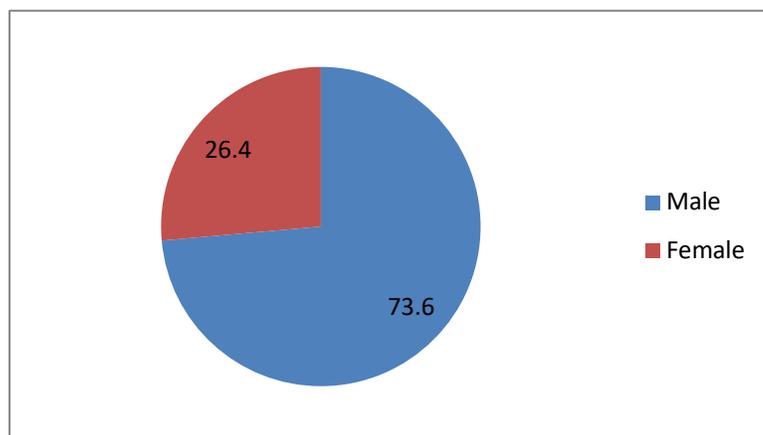


Figure 3: Percentage distribution of household head

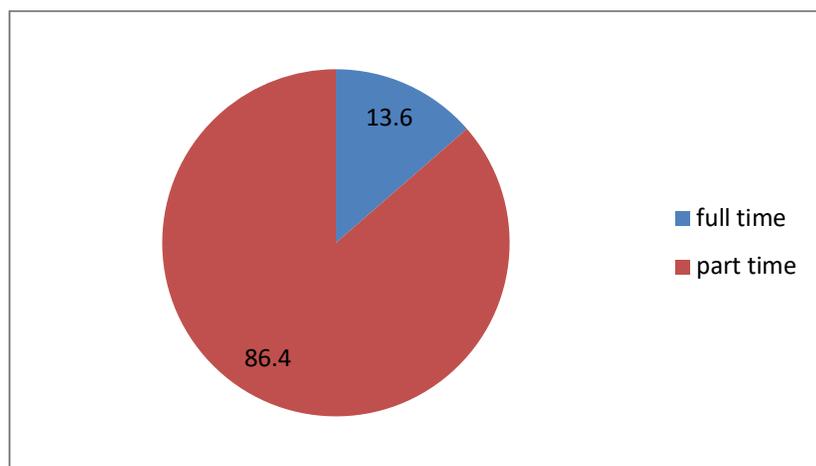


Figure 4: Percentage distribution of involvement in local chicken production

Role and economics of chicken in the household

Flock size

The household flock size varied from less than 10 to above 31 chickens with over 90 percent of the respondents having flock size of less than 10 to 30 chickens. Only about 9 percent of the respondents had flock size of over 31 chickens. Number of chickens in scavenging production are reported to have less than 50 birds per flock. In this survey the average flock size of 18.03 obtained was slightly higher than 11 to 15

reported by some workers for traditional chickens under scavenging production system but within the 50 reported for chickens under scavenging production. Traditional poultry production system with flock sizes of over 50 chickens per flock are described to be under semi-intensive system (Sonaiya, 1990). The higher flock size observed in this survey could be attributed to the high population density of traditional chicken farmers in the states covered in this survey. Larger flock sizes are associated with a need for greater intensification in housing, feeding, disease control, marketing and any management factors that would have a positive output on local chicken.

The breakdown of flock size group by gender shows a higher number of female farmers in each group compared to the male farmers (Table 3). On the average, female participation is about 73%. The result of this survey shows that women are an integral part of traditional chicken production in the Niger-Delta region of Nigeria. With the level of female participation in traditional chicken production, appropriate interventions that increase productivity will no doubt have a direct impact on their lives and economic fortune.

Table 3: Flock size by gender

Gender	Flock size				Total	by gender
	10 and below	11 to 20	21 to 30	31 and above		
Female	116(69.05%)	170(75.22%)	135(73.37%)	50(80.65%)	471(73.59%)	
Male	52(30.95%)	56(24.78%)	49(26.63%)	12(19.35%)	169(26.41%)	
Pooled total	168(100.0%)	226(100.0%)	184(100.0%)	62(100.0%)	640(100.0%)	

Production and economics of traditional chicken

The production capacity and profitability analysis of traditional chicken producers are shown in Table 4. The results showed that traditional chicken farmers raised an average of 18 chickens of mixed sexes with a standard deviation of 9.06 which suggest a high variability in the flock size. Such variability can be harnessed to increase the flock size if incentives and necessary inputs are provided. The flock size had a median of 18 with the most occurring flock size of 8 chickens. The minimum and maximum flock size was 1 and 40 chicken respectively. On the average traditional chicken are raised under scavenging production. Chickens under scavenging production are reported to have less than 50 birds per flock (Sonaiya, 1990). Average mortality was about 2 with minimum and maximum value of 1 to 10 respectively. If expressed in percent it will mean average percent mortality of 11 and minimum and maximum percent of 5 and 25. The mortality rate observed in the traditional chickens could be said to be due to the lower access to drugs and vaccines. The average cost of mortality was N2, 324.10, median of N2, 000.00 and mode of N1.00 with a minimum and maximum cost of N1.00 and N14, 400.00 respectively. The average selling price of the chickens was N1, 383.45 with median of N1, 500.00 and the most frequent selling price of N1000. The minimum and maximum selling price was N210 and N2, 500.00. On cost and returns, traditional chicken farmers incurred

Profit	17,532.31	16,050	-1000	12,967.0	66,200.0	-5,000	61,200	17,532.31
Return/ N investm ent								3.81

It is worth noting that the chickens were sold in the village market (61.1%) while others were sold to customers who buy them from the house and in very rare cases were taken to urban markets (Figure 5) for sale to consumers and or collectors.

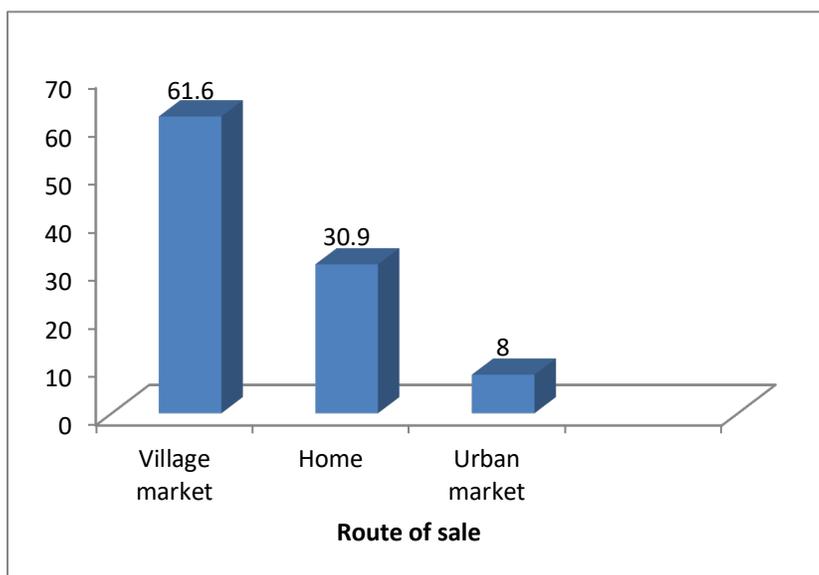


Figure 5. Percentage distribution of where the chicken are sold

The household strategy for keeping poultry was majorly for income as depicted in Figure 6. The sales of the chickens serve as a source of income to the women since they are mainly farmers or petty traders who do not have any formal employment. However, the chickens were also kept for home consumption as a source of animal protein and for different other purposes, like, as a reserve and for pleasure. Despite differences in order of importance of why the chickens were kept, their multi functional use remain obvious. Traditional chickens are not kept for just one purpose.

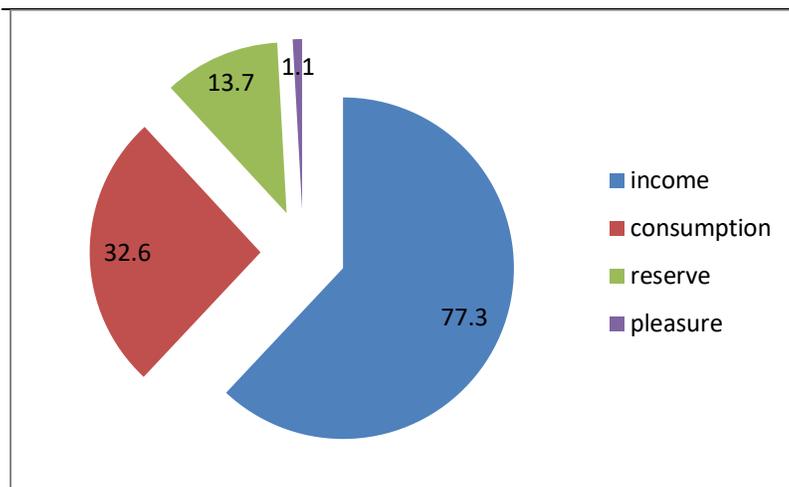


Figure 6: Percentage distribution of reasons for raising local chicken

The chickens were sold to consumers and collectors at the village market, home and sometimes urban markets. The amount derived from the sale of the chickens was kept by the woman who majorly owned and cared for the chickens. Since the chickens were sold to generate income any intervention that will increase their number will afford the women more opportunity to increase their income to take care of personal needs. One such ways is to reduce mortality which from this survey can cause up to 50% death in the flock.

Majority of the respondents (91.3%) says the money used for the production of the traditional chickens was from their personal savings (Figure 7). There was no access to credit that would have boosted the flock sizes and for the good management of the flock to obtain more chickens in a year. Access to credit will also help in the development of traditional chicken production.

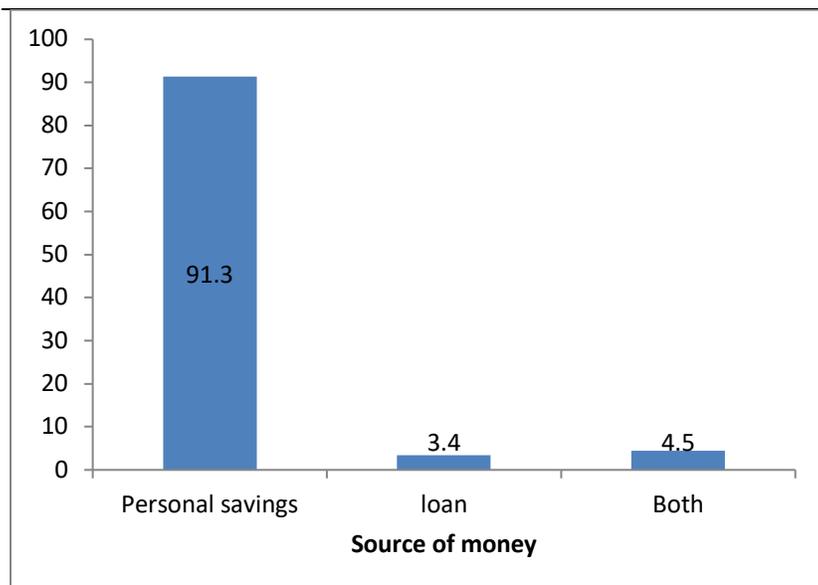


Figure 7: Percentage distribution of source of money

Disease and parasites were observed to be the major cause of death in the flock as 40 percent of the respondents indicated it as the major cause of death, followed by the combination of disease, predators and weather hazards that were responsible for 36.5% of the death of the chickens as depicted in Figure 8. Weather hazards and predators had almost equal effects since they both represents 12.2 and 10.9 percent respectively.

Mortality by flock size showed that mortality increased with increase in flock size (Table 6).

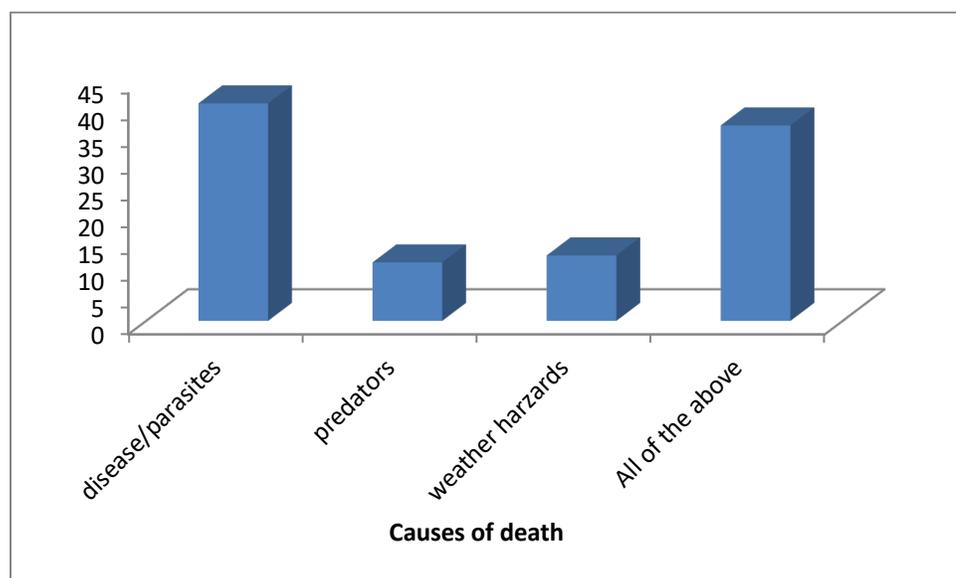


Figure 8: Percentage distribution of causes of death



Table 6: Mortality by flock size

Flock size	Mortality (number)
10 and below	3 and below
11 to 20	4 -6
21 to 30	7 – 9
31 and above	10 and above

Although, diagnosis of diseases based on the symptoms by farmers may be very difficult but among the diseases of traditional chicken, newcastle disease was the major killer disease (90.8%), followed by gumboro (4.2%), coccidiosis (2.3%) and fowl pox (1.9%) in a descending order as depicted in Figure 9. Newcastle disease had been reported to be the most severe disease in traditional chicken production with devastation up to 100% in some cases (Sonaiya and Swan, 2004). Mortality was observed to be highest in the dry season (64%), between October and March and less in the rains (36%), between April and September as depicted in Figure 10. Mortality during the dry season especially during the *harmattan* months could be ascribed to Newcastle, as this is the period of its prevalence.

Only a small proportion of the respondents knew of Newcastle disease and how to prevent it (32%) as indicated in Figure 11. Even those that knew did not even vaccinate but rather used drugs. Over 85 percent of the respondents used drugs while only a very small percent (7.8%) vaccinated against newcastle disease (Figure 12). Most farmers may not have vaccinated because of lack of knowledge about disease transmission and vaccine availability. All of these may have been responsible. Majority of the respondents also saw the use of drugs and enthnovet practices as a way of preventing newcastle disease and other diseases. In traditional chicken production no regular health programme of disease control measures are in place as it is with the exotic commercial stock that has well defined vaccination programme. All involved in their production key into to prevent mortality caused by diseases. The hardy nature of the traditional chickens had help them to survive to their innate capability. This hardy nature if boosted with vaccine will prevent mortality more in the traditional chickens.

Most of the farmers took chicken production as part time activity, hence did not care much for the chickens and as a result did not take vaccination seriously. For the traditional chicken producers to effectively adopt the use of vaccine as a preventive measure, deliberate sensitization must be done and the vaccine must be made available at a pro poor cost and be within their reach without necessarily travelling far to buy it. Veterinaty cost should be low in order not to further increase their cost of production to the extent that the benefits the farmer would have enjoyed will now be swallowed by veterinary cost.

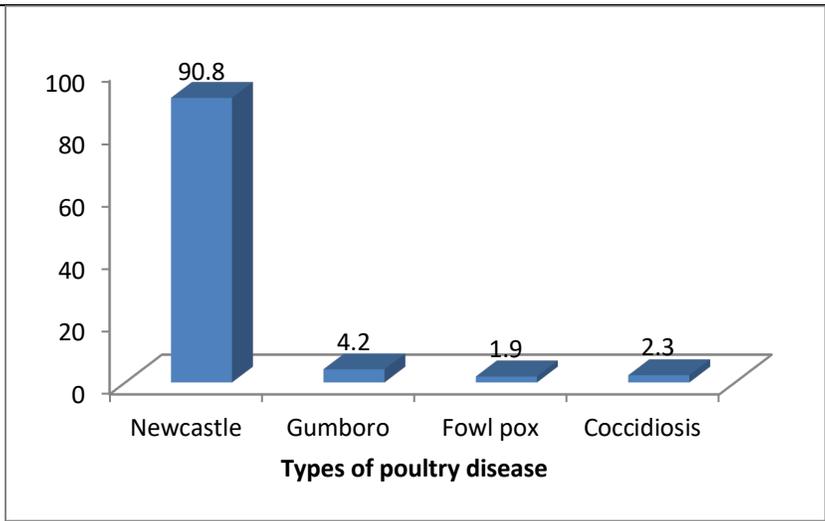


Figure 9: Percentage distribution of types of poultry disease

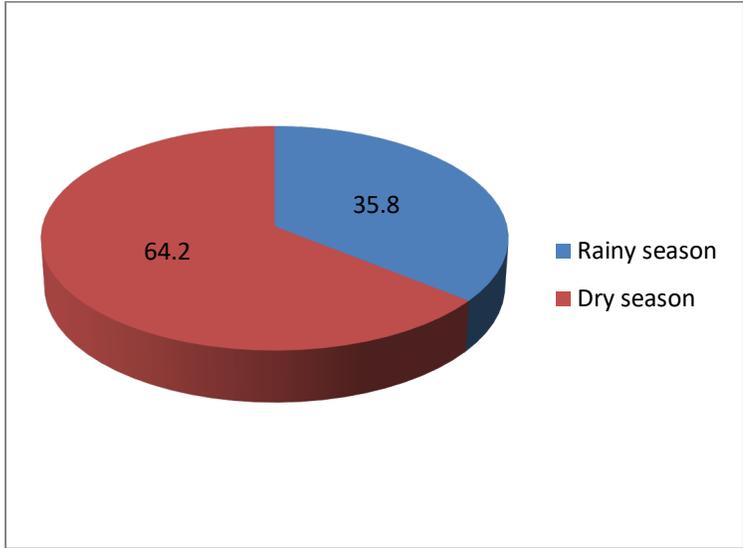


Figure 10: Pie chart of season of mortality



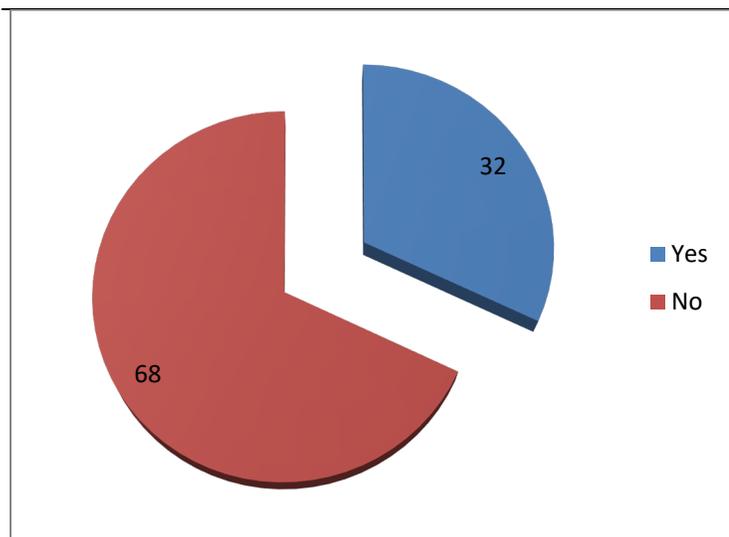


Figure 11: knowledge of disease prevention

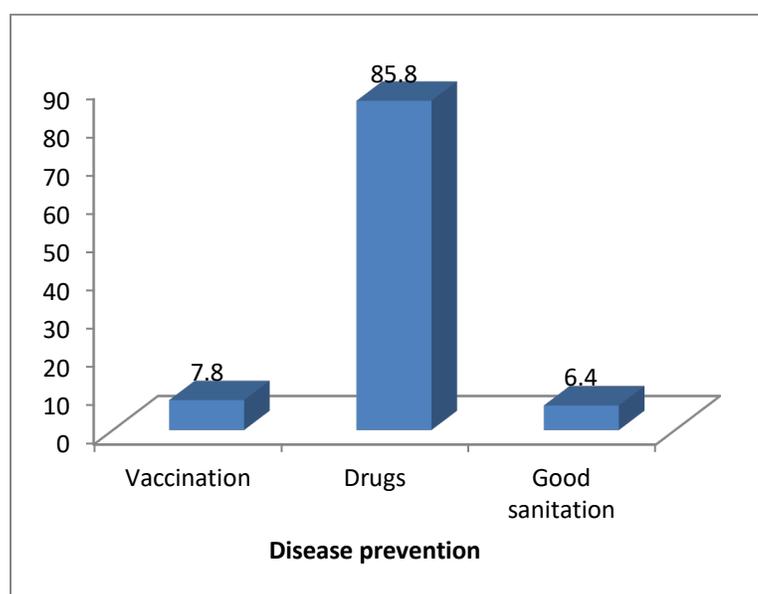


Figure 12: Percentage distribution of how to prevent disease

The flock size group by medication cost is presented in Table 7. The results showed that medication cost increased with number of chickens. It increased from N221.68 in flock size of 10 and below to N918.25 in flock size of 31 and above. The flock size groups spent less than a thousand naira on medication which is lower than the selling price of the chickens. The amount spent on vaccine by flock size group is presented in Table 8. The 7.9% of the respondents reported to have vaccinated their chickens fell within farmers that had between 11 to above 31 chickens. However, the bulk of those who used vaccines were those with over

31 chickens. Looking at the proportion of traditional chicken farmers that did not use vaccine, they are large and if such population is adequately sensitive towards the economic benefit of using vaccine they will constitute a potential market for vaccine.

Table 7: Flock size by medication cost of traditional chicken farmers in the Niger-Delta region

Flock size	Medication cost (%)	Amount (#2,170.9)
10 and below	10	221.68
11 to 20	23	502.13
21 to 30	24	528.84
31 and above	43	918.25

Table 8: Flock size by cost of vaccine

Flock size	Percent of vaccine use	Amount (#1,233.36)
10 and below	0	0
11 to 20	15	185.00
21 to 30	25	308.34
31 and above	60	740.02

Feeding was not a common practice among traditional chicken farmers as over 68.3 percent of the respondents do not feed their chickens (Table 2). Feeding and watering practices are consistent with the 'low-input, low-output' model for traditional poultry. The chickens received some form of feed, usually grains/kitchen waste from the household in the morning, and then left to scavenge during the rest of the day. Feed from scavenging alone with the kitchen waste will not lead to improved productivity because the chickens will only be able to consume for maintenance and little or nothing for production hence the low productivity of the traditional chicken can be attributed much to the poor feed resource base. It was also observed during the survey that water was not readily provided and the quality of water varied from one household to another. Any intervention that will lead to improved feeding with regular access to water will enhance performance.

The chickens were mostly managed on free range system (Figure 13). The chickens were allowed to roam freely, scavenging for food around the house during the daytime picking on kitchen waste, worms, insects and gleanings of gardens. The very few percent of the respondents that raised exotic breeds (layers and broilers) used the deep litter (12%) and battery cage (5%). These farmers belong to FADAMA that received support from World Bank and their respective state governments. Such farmers used commercial feed and also stock with day old birds. The flock size by use of purchase feed and by production system are presented

in Table 9. However, there were commercial chicken farmers that owned up to 500 chickens that were not captured in this survey.

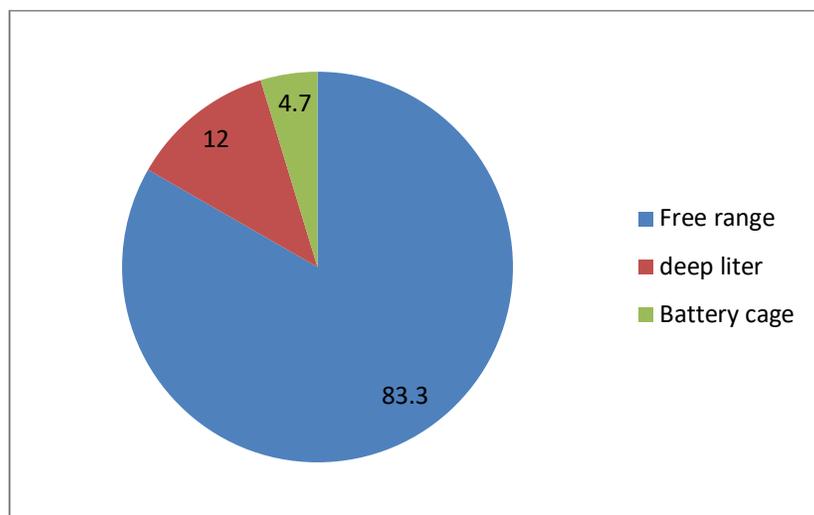


Figure 13: Distributional pattern of management of the chicken

Table 9: Flock size by use of purchase feed and by production system

Flock size	Use of purchased feed (%)		Production System (%)		
	No	Yes	Free range	Deep litter	Battery cage/cages
10 and below	100	0	100	-	-
11 to 20	71.6	28.4	95	-	5
21 to 30	68.2	31.8	84.7	10.3	5
31 and above	73.3	26.7	69.9	20	8.1

The households majorly (82.8%) bought their chickens (stock) from the market. Others bought from ADP (Figure 14). The feed (grains) were also bought from the market while the medicines were purchased from chemist or patent medicine stores. There were instances where veterinary doctors provided drugs for the household. Some of the addresses and or telephone numbers in the tables on presence of village collectors and lead poultry farmers perform such functions.

The chickens were not provided with shelter. However, they sometimes seek shelter in trees and bushes during the night. Depending upon the house structure of the household, they are able to roost in the kitchen or storage room (Figure 15). As a result, during the daytime the chickens are prone to attacks from predators such as hawks and snakes. They are also subject to theft. Given the fact that most birds are not vaccinated, the lack of housing may have a positive impact in reducing the (already high) likelihood of transfer of NCD amongst the flock. Chickens packed close together without vaccination would be at greater risk. However, good housing promotes better performance.

Correlation coefficients between profit and number of chickens, gender and medication cost are presented in Table 10. The coefficients range from negative value (-.037) between profit and gender to as high as .663 between profit and number flock size. Profit had a very highly significant relationship ($P < 0.01$) with the flock size (.663**) suggesting that it is the number of chickens owned by a farmer that is available for sale that will determine the farmers profit. The low but significant coefficient ($P < 0.05$) between profit and medication cost (.254*) also suggest the importance of vaccination and general health management. Vaccination and general health management will determine available live animal. Gender had a negative value with profit. The high coefficient between profit and flock size therefore suggests that any intervention that will lead to increase number of chickens by reducing mortality will lead to higher income for the farmers.

Table 10: Correlation coefficients between profit and number of chickens, gender and medication cost

Variables	Number of chicken (flock size)	Gender	Medication cost(vaccine)
Profit	.663**	-.037	.254*

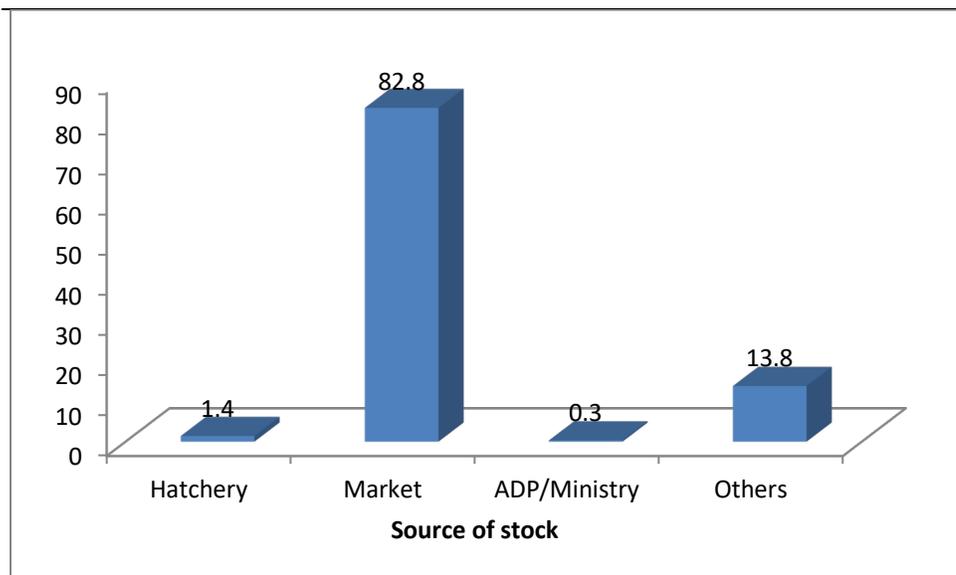


Figure 14: Percentage distribution of source of stock

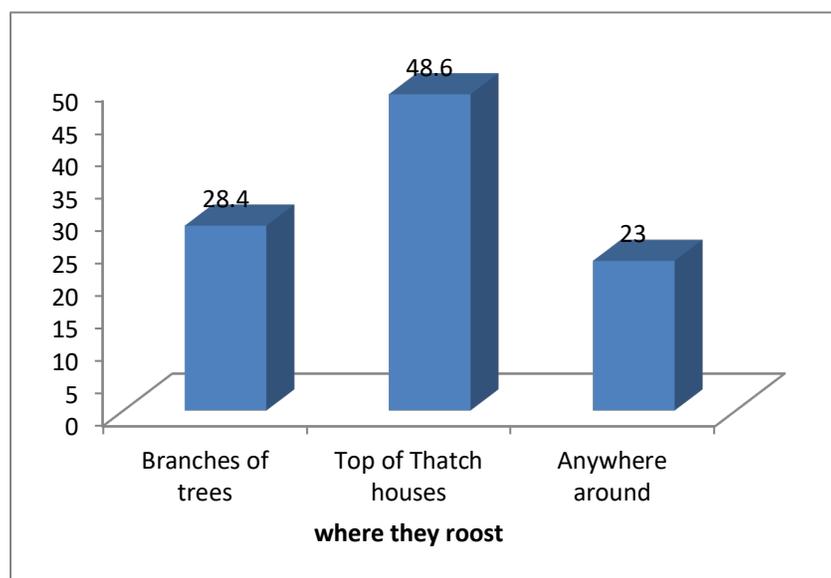


Figure 15: Percentage distribution of where the chickens roost at night

On the number of households interviewed that do not raise chickens at all exclusive of the 40 household with chickens per community do not arise because the methodology used in the survey to identify the respondents was the snowball technique which will only administer questionnaire to traditional chicken producers.

Estimate of the number of household in the community/ village will require another survey that will focus on number of household in each community/village. However, from secondary sources, it can be estimated

for each local Government Area. Presented in Table 11 is the estimate of number of household in each Local Government Areas used in Delta and Imo States for this study and the percentage of household in the states that keep traditional poultry. Generally, Delta and Imo are mainly rural. Local chicken is seen as a source of income to the rural household. Imo State have more household raising local chicken because it is odd if a household in the rural area of Imo State do not raise local chicken. However, the percentage of household with local chicken is higher in Delta State.

Table 11: Estimates of the number of household and percentage of household that keep traditional poultry

	DELTA STATE			IMO STATE	
LGA	Rural population estimate		LGA	Rural population estimate	
Bomadi	86,016		Adoh Mbaise	194,779	
Ethiope East	200,942		Ehime Mbano	130,931	
Isoko North	143,559		Isiala Mbano	198,736	
Isoko South	235,147		Njaba	145,110	
Ndokwa West	150,024		Okigwe	132,701	
Okpe	128,398		Unuimo	99,368	
Ughelli North	320,687		Owerri North	176,334	
Warri South-West	116,538		Owerri West	101,754	
Traditional chicken population	4,995,333		Traditional chicken population	5,441,688	
%age of HH with Local chicken	100		%age of HH with Local chicken	48.8	
Number of HH keeping chicken	ND		Number of HH keeping chicken	208,844	

Source NPC (2010), Oguntade (2006)

ND- not determined

Appraise demand of vaccine, purchasing power, awareness and preferences of vaccine and understanding of cause of death of chicken

The traditional household have idea of why their chickens die because 40 percent of the respondents indicated that disease was the major cause of death, followed by the combination of disease, predators and weather hazards that were responsible for 36.5% of the death of the chickens as depicted in Figure 9 and even in Figure 12, 32 percent of the respondents had knowledge of disease prevention. There was no evidence that they vaccinated their chickens since only 7.8 percent indicated that they vaccinated. Population of traditional chickens are subjected to mortalities because even with their awareness of

prevention of death with vaccine, 92.2 percent of the respondents did not vaccinate their chickens rather they use drugs (tetracycline capsule) and some “ethno vet” practices to treat any disease outbreak. The predominant disease observed in the survey was the Newcastle as 90.8 percent of the respondents implicated the Newcastle amongst other diseases as can be inferred from Figure 9. The age of mortality cut across the different phases of growth of chicken. However, mortality was highest in the chicks (41%) followed by adult (37.7%) and the least (21.3%) in the grower stage (Figure 16). The implication of this observation is that there was no particular phase of chicken growth that is immune to mortality caused by Newcastle disease. Therefore, the use of vaccine becomes pertinent to reduce mortality. The lack of use of vaccines could be attributed to the non availability of suitable vaccine for use in the village chickens. Until this MADE survey, village chickens have proved an elusive target for vaccination for several reasons. They exist in small, multi-aged flocks scattered over vast areas and they cannot be readily caught for individual vaccination. Conventional Newcastle disease vaccines share with other vaccines the defect of heat liability. It is not possible to bring viable vaccines into villages when there is no constant electricity or an effective cold-chain which are extremely expensive to operate. To effectively take the vaccine to the rural areas some big farmers or village based store that could provide some cooling facilities should be targeted. The farmers awareness of village based general stores where they could purchase feed or run to for health advice are poor as can be inferred from Figure 17. Farmer’s awareness of such stores was not encouraging as only about 32 percent were aware. This result calls for massive sensitization through enlightenment campaign on the importance of vaccines in reducing mortality due to Newcastle disease if the effect of any intervention is to be felt.

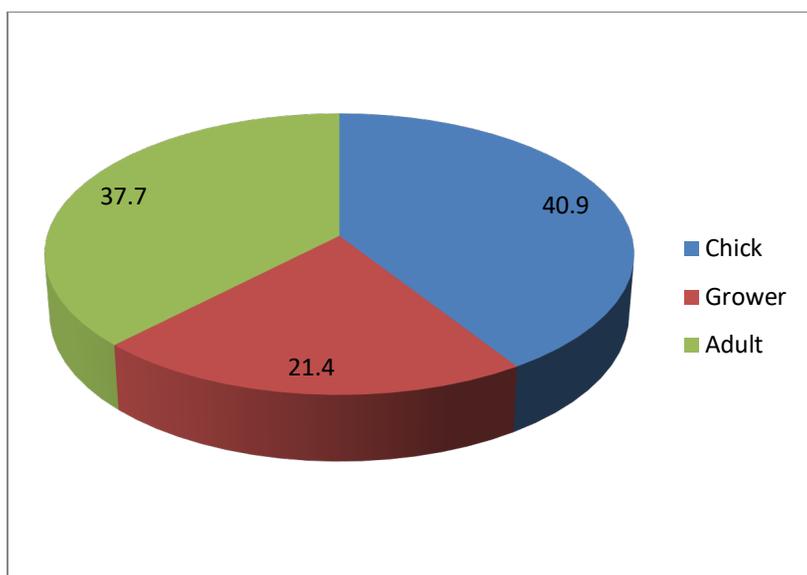


Figure 16: Percentage distribution of stage of mortality



The actual and preferred price of inputs and outputs are presented in Table 12. The perceived value of a bird was N1,624.95 for the cock and N1,105.51 for the hen. The farmers were willing to pay N441.67, 296.15 and 328.00 for NDVK, coccidiostats and lasota respectively. The preferred price will assist vaccine manufacturers to determine a pro-poor price for the farmers because the use of vaccines will no doubt increase the output of traditional chickens.

Table 12: Mean actual and preferred price of inputs and outputs

Variables	Price sold or bought (N)	Preferred price (N)
Inputs		
Feed	-	-
Vaccine NDVK	693.33	441.67
Coccidiostats	519.60	296.15
Dewormer	444.23	297.92
Kerosene	272.52	52.30
Lasota	527.09	339.66
Antibiotics	542.43	328.00
Output		
Cock	1400	1624.95
Hen	950	1105.51

Source: MADE field survey (2014)

Identity and appraisal of rural anchor points

The identity of rural anchor points for general stores, lead poultry farmers and chicken collectors are presented in Tables 13, 14, and 15 respectively. The qualities of the services they render are also indicated. The rating of chicken and egg collectors must have been done majorly by the small scale exotic chicken producers with average total chicken of broiler 100 and 83.3 layers.



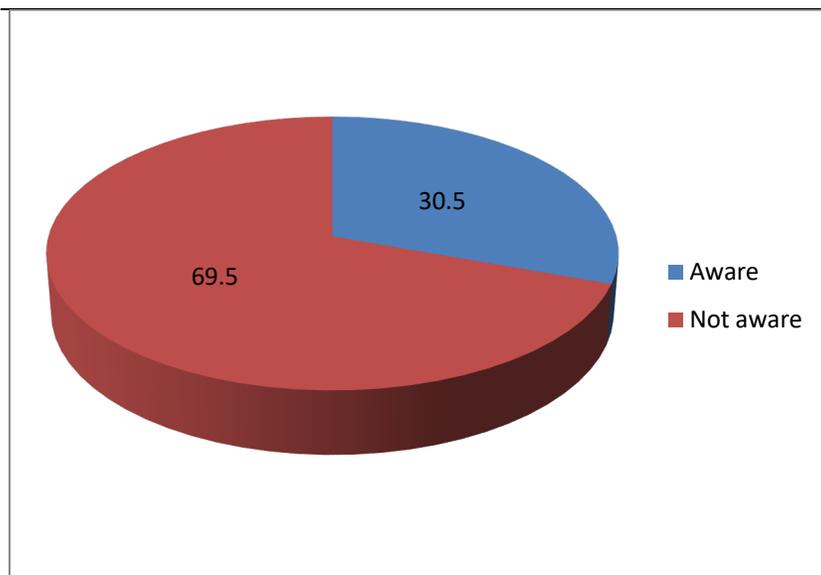


Figure 17: Percentage of awareness of village based stores

Conclusion

The traditional chicken constitutes 80% of the 120 million poultry type raised in the rural areas characterized with low productivity that can be attributed much to the poor feed resource base and lack of vaccination against Newcastle disease. Until this MADE survey, traditional chickens have proved an elusive target for vaccination for several reasons. They exist in small, multi-aged flocks scattered over vast areas and they cannot be readily caught for individual vaccination. Conventional Newcastle disease vaccines share with other vaccines the defect of heat liability. It is not possible to bring viable vaccines into villages when there is no constant electricity or an effective cold-chain which are extremely expensive to operate. For the traditional chicken producers to effectively adopt the use of vaccine as a preventive measure, deliberate sensitization must be done and the vaccines must be made available at a pro poor cost and be within their reach without necessarily travelling far to purchase it. The enormous resource of the traditional chickens if fully explored will present a potential market for vaccines manufacturers who may want to catch on this goldmine.

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Appendix 1:

List of enumerators for Delta State

S/N	ENUMERATORS	LGA COVERED	COMMUNITIES
1	ISRAEL IFOWE	Ukwani	Ogume, Osisa, Amai and Ishska
2	OMATSULI ORITSEMA	Warri South West	Ogidigben, Ode-Ugborodo, Madagho and Oghoye
3	OGORODE EDESIRI	Ughelli North	Ediode, Omavovwe, Awhire and Oghara- Agbarha Otor

4	SAPILO AFOKEOGHENE	Isoko North and South	Irri, Olomoro, Uzere, and Igbide
5	IBIRI EMOEFE	Ethiope East and Okpe	Igun, Eku, Okuoечи and Ororokpe
6	KEKAI YINTARE PAULA	Bomadi	Okoloba, Esanma and Kpakama
7	KPEREBEYI JAMESLOVE (08062380445)	Supervisor	jameslovekperebeyi@gmail.com or kperebeyi@yahoo.com

List of enumerators for Imo State

S/N	ENUMERATORS	LGA COVERED	COMMUNITIES
1	NNODIMELE IFENYINWA	NJABA	Amakor, Ugbele, Ibele and Obeakpu
2	JOY EZEALA	ISIALA Mbano and UNUIMO	Osuama, Anara, Umucheke and Ndikpa Aboh
3	OJUKWU KODILI	ABOH MBAISE	Amuzu, Lorji, Uvuru and Okwuato
4	CHARLES ANYANWU	EHIME MBANO	Umuchoke Umunumo, Umuakagu Nsu, Agbaghara Nsu and Umualumaku
5	INYAMA KELECHI	OKIGWE	Amagu, Ogube, Okigwe and Aro Okigwe
6	AMAHIRI CHRISTIAN	OWERRI WEST and NORTH	Ihiagwa, Nekede, Egbu and Obibiezena
7	Dr, O. T. I. Amunwa. (08035527408)	SUPERVISOR	tedyoguns@yahoo.com

TABLE 13: PRESENCE OF VILLAGE-BASED GENERAL STORES SELLING INPUTS

S/N	State	District	LGA	Ward	Community	VILLAGE-BASED GENERAL STORES			No of respondents (213)
						Name/address	No. present	Quality of service	
1	Delta	Delta Central	ughelli north		OGHARA		1	Good	1
2	Delta	Delta Central	Okpe		Ororokpe	Escom Veterinary service	1	Very good	1
3	Delta	Delta Central	Okpe		Otor-bio(Otor-Igho)	Escom Veterinary service	1	Very good	2
4	Delta	Delta Central	Okpe		Adagbrasa-Ugolo	Escom Veterinary service	2	Very good	2
5	Delta	Delta Central	Isoko North		Ekue	Holy Believe and sons	2	Very good	2
6	Delta	Delta Central	Ethiope East		Okuoечи	Holy Believe and sons	1	Good	1
7	Delta	Delta Central	Ethiope East		Okuoечи	Integrity Agric Ventures	1	Very good	1
8	Delta	Delta Central	Ethiope East		Obajere	Integrity Agric Venture	1	Very good	1
9	Delta	Delta Central	Ethiope East		Igun	Integrity Agric Venture	1	Very good	6
10	Delta	Delta South	Isoko South	7	Uzere	25 uzere road	1	Very good	2

11	Delta	Delta North	Ndokwa West		Amai	Okemena animal house	1	Very good	2
12	Delta	Delta North	Ndokwa West		Ogume	Okemena animal house		Very good	2
13	Delta	Delta North	Ndokwa West		Ugulliamai	Okemena animal house	1	Very good	1
14	Delta	Delta South	Isoko South	10A	Olomoro	20 igbe olomoro road	1	Very good	1
15	Delta	Delta South	Isoko South	10A	Olomoro	piuano farm shop opp. Ecobank	1	Very good	1
16	Delta	Delta South	Isoko South	10A	Olomoro	olomoro main market	1	Very good	1
17	Delta	Delta South	Isoko South	7A	Igbide	pivano farm shop opp. Eco bank		Very good	1
18	Delta	Delta South	Warri South-West		Madagho	philano farms shops by eco bank	1	Very good	1
19	Delta	Delta South	Isoko South	10B	IRRI	philano farm shop opposite ecobank		Very good	2
20	Delta	Delta Central	Isoko North	10B	Otor-bio(Otor-Igho)	Okemena Animal House		Very good	17
21	Delta		Bomadi	10B	Otor-bio(Otor-Igho)	In community	Several	Very good	3
22	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Okpuala	Otor-bio(Otor-Igho)	Okpuala Eziamma Isiala Mbano	2	Very good	5
23	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Oboh	Otor-bio(Otor-Igho)	Eziamma Isiala Mbano	2	Very good	2

24	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)		1	Good	1
25	Imo	Okigwe	Isiala Mbana	Osuama ward 3 Umunachi	Otor-bio(Otor-Igho)	Umunachi Isiala Mbano	2	Good	5
26	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Okpuala	Otor-bio(Otor-Igho)	Eziama Isiala Mbano	2	Very good	1
27	Imo	Okigwe	Isiala Mbana	Osuama Anara ward 2	Otor-bio(Otor-Igho)		2	Very good	11
28	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	7030735037	3		1
29	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	7035018906	1	Good	2
30	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	8036129383	1	Good	1
31	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	8063148675	1	Very good	1
32	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	7038881840	1	Very good	1
33	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	8036039750	1	Very good	1
34	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	8065257001	1	Very good	1
35	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	7035077006	1	Excellent	2
36	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	7031634951	1	Excellent	1
37	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)	816903571	2	Very good	2
38	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	7037355085	5	Very good	2

39	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	7062680186	2	Excellent	2
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S/N	State	District	LGA	Ward	Community	VILLAGE-BASED GENERAL STORES			No of respondents
						Name/address	No. present	Quality of service	
40	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	8035092292	5	Very good	1
41	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	7066773725	5	Very good	1
42	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	8068135760	5	Very good	1
43	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	8039346982	2	Excellent	1
44	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)	7062681086	2	Excellent	1
45	Imo	Orlu	Njaba	umuaka 2 Umuasharam	Otor-bio(Otor-Igho)	Afor Umuaka	2	Very good	3
46	Imo	Orlu	Njaba	Umuaka 4 umukwu	Otor-bio(Otor-Igho)	Afor Umuaka	1	Good	1
47	Imo	Orlu	Njaba	Umuaka 4 umukwu	Otor-bio(Otor-Igho)	Amakor Community	2	Good	1
48	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)	Amakor Community	1	Very good	1

49	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)	Afor Umuaka	1	Good	2
50	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Umuakagu	2	Very good	1
51	Imo	Owerri	Aboh Mbaise	Ikpe-NSU	Otor-bio(Otor-Igho)		2		1
52	Imo	Imo East	Aboh Mbaise	Ikpe-NSU	Otor-bio(Otor-Igho)	8038916183	1	Excellent	1
53	Imo	Imo East	Aboh Mbaise	Ikpe-NSU	Otor-bio(Otor-Igho)	Ovie uvuru		Good	19
54	Imo	Imo East	Aboh Mbaise	Ikpe-NSU	Otor-bio(Otor-Igho)	Eke Nguru		Good	1
55	Imo	Imo East	Aboh Mbaise	Ikpe-NSU	Otor-bio(Otor-Igho)	Uvuru Mbaise	2	Fair	1
56	Imo	Okigwe	Onuimo	Aboh/Okohia ward 6	Otor-bio(Otor-Igho)	8061631891	2	Very good	1
57	Imo	Okigwe	Onuimo	Aboh/Okohia ward 6	Otor-bio(Otor-Igho)	8124703730	2	Good	1
58	Imo	Okigwe	Onuimo	7	Otor-bio(Otor-Igho)	8030602819	2	Good	1
59	Imo	Orlu	Njaba	Amazano 3 okpurufor	Otor-bio(Otor-Igho)	Orlu Afor Umuaka	1	Good	1
60	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)	Afor Umuaka	1	Good	1
61	Imo	Orlu	Njaba	Amazano 3 okpurufor	Otor-bio(Otor-Igho)	Afor Umuaka	1	Good	2
62	Imo	Orlu	Njaba	Umuaka 2 Umulolu	Otor-bio(Otor-Igho)	Afor Umuaka	2	Good	2
63	Imo	Orlu	Njaba	Umuaka 2 Umuduruoji	Otor-bio(Otor-Igho)	Afor Umuaka	1		1
64	Imo	Orlu	Njaba	Amazano 3 okpurufor	Otor-bio(Otor-Igho)	Afor Umuaka	1	Good	1
65	Imo	Orlu	Njaba	Umuaka 3 Ibele	Otor-bio(Otor-Igho)	30, orlu rd umuaka	1	Good	1
66	Imo	Orlu	Njaba	Amazano Okpirufor	Otor-bio(Otor-Igho)	30, orlu rd umuaka	1	Good	6
67	Imo	Orlu	Njaba	Umuaka 2 umuokuluku	Otor-bio(Otor-Igho)	30 orlu rd umuaka	1	Good	1

68	Imo	Orlu	Njaba	Umuaka 2 umuogwugwu	Otor-bio(Otor-Igho)	afor umuaka	1	Good	2
69	Imo	Orlu	Njaba	Umuaka 2 Umulolu	Otor-bio(Otor-Igho)	afor umuaka	1	Good	1
70	Imo	Orlu	Njaba	Umuaka 2 umuokwokwo	Otor-bio(Otor-Igho)	22, Orlu rd Umuaka	1	Excellent	1
71	Imo	Orlu	Njaba	Umuaka 2 Umudinji	Otor-bio(Otor-Igho)	afor umuaka	1	Good	1
72	Imo	Orlu	Njaba	Umuaka 2 umuogwugwu	Otor-bio(Otor-Igho)	afor umuaka	1	Good	1
73	Imo	Orlu	Njaba	Umuaka ward 2	Otor-bio(Otor-Igho)	afor umuaka	1	Good	1
74	Imo	Orlu	Njaba	Umuaka ward 2 Umuojukwu	Otor-bio(Otor-Igho)	Orlu umuaka rd	1	Good	1
75	Imo	Orlu	Njaba	Umuaka 2 umuogwugwu	Otor-bio(Otor-Igho)	Umidibe Amakor	1	Very good	1
76	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)	Orlu umuaka rd	1	Good	1
77	Imo	Orlu	Njaba	Umuokwukwu	Otor-bio(Otor-Igho)	Umidibe Amakor	1	Good	1
78	Imo	Orlu	Njaba	Umuaka 2 umudibe	Otor-bio(Otor-Igho)	Umidibe Amakor		Very good	1
79	Imo	Orlu	Njaba	Umuaka 3 Umudibe	Otor-bio(Otor-Igho)	Umidibe Amakor	1	Very good	1

S/N	State	District	LGA	Ward	Community	VILLAGE-BASED GENERAL STORES			No of respondents
						Name/address	No. present	Quality of service	
80	Imo	Orlu	Njaba	Umuaka 3 umuogwugwu	Otor-bio(Otor-Igho)	afor Umuaka market	1	Good	1

81	Imo	Orlu	Njaba	Umuaka 2 Umuolulo	Otor-bio(Otor- Igho)	orlu rd umuaka	2	Good	1
82	Imo	Orlu	Njaba	Umuaka 3 umuogwugwu	Otor-bio(Otor- Igho)	Umidibe Amakor	2	Good	1
83	Imo	Orlu	Njaba	Umuaka 4 ndiokwu	Otor-bio(Otor- Igho)	Umidibe Amakor	1	Good	1
84	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	Umuaka rd Afor umuaka	1	Good	1
85	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	31 Orlu road Umuaka	1	Good	1
86	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	afor Umuaka market	1	Very good	1
87	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	Umidibe Amakor	1	Good	1
88	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	30 orlu rd umuaka	1	Good	1
89	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	Afor umuaka	2	Good	1
90	Imo	Orlu	Njaba	Amazano Okpurufor	Otor-bio(Otor- Igho)	Orlu Rd Umuaka	1	Good	1
91	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor- Igho)	Umudibe Village Amakor afor Umuaka	1	Good	1
92	Imo	Orlu	Njaba	Umuaka 4 ndiokwu	Otor-bio(Otor- Igho)	Orlu Afor Umuaka	2	Good	1
93	Imo	Orlu	Njaba	Obeakpu ward Umuasaram	Otor-bio(Otor- Igho)	afor Umuaka market	2	Very good	1
94	Imo	Okigwe	Ehime-Mbano	Ihitte-nsu	Otor-bio(Otor- Igho)		2	Very good	2
95	Imo	Imo East	Aboh Mbaise		Otor-bio(Otor- Igho)		1	Good	12

96	Imo	Imo East	Aboh Mbaise		Otor-bio(Otor-Igho)	Eke Ngwu market		Fair	1
97	Imo		Owerri West	Emekuku	Otor-bio(Otor-Igho)	Ezedibia	1	Good	1
98	Imo		Owerri West		Otor-bio(Otor-Igho)	ihuagwa	10	Good	1
99	Imo	Owerri	Owerri North	Emakuku Ezeogba	Otor-bio(Otor-Igho)	Eke Ngwu market	10	Good	1
100	Imo		Owerri North		Otor-bio(Otor-Igho)	Isuzo Egbu	10	Good	1
101	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)	Oneagu NSU	4	Very good	2
102	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)		3	Very good	7
103	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Orieagu	1	Good	1
104	Imo	Okigwe	Ehime-Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)	Orieagu market	2		1
105	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)			Very good	2
106	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Umunumo	2	Excellent	1
107	Imo	Okigwe	Ehime-Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)	Obi farm Omuhimo		Excellent	1
108	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)	Orieagu market	2	Good	2
109	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)	NSU	1	Excellent	1



TABLE 14: PRESENCE OF LEAD POULTRY FARMERS

S/N	State	District	LGA	Ward	Community	LEAD POULTRY FARMER			No of respondents (123)
						Name or address	No. present	Quality of service	
1	Delta	Delta Central	Isoko North		Eku	holy believe and sons	1	Very good	1
2	Delta	Delta Central	ughelli north		Edoide	42, pilano farm shop		Very good	1
3	Delta	Delta Central	ughelli north		AWHIRE	42, pilano farm shop		Good	3
4	Delta	Delta Central	ughelli north		OMAVOVINE	42, pilano farm shop		Good	1
5	Delta	Delta Central	ughelli north		OGHARA	42, pilano farm shop		Good	1
6	Delta	Delta Central	Isoko North		Eku	Holy Believe and sons	1	Excellent	1
7	Delta	Delta South	Warri South-West		Madagho	philano farms shop by Eco bank	1	Very good	1
8	Delta	Delta South	Isoko South	10B	IRRI	philano farm shop		Very good	2
9	Delta		Bomadi		Otor-bio(Otor-Igho)	In community	1	Very good	1
10	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Okpuala	Otor-bio(Otor-Igho)	Okpuala Eziam Mbano	8	Excellent	4
11	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Oboh	Otor-bio(Otor-Igho)	Eziam Mbano	5	Very good	1
12	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)		3	Excellent	1
13	Imo	Okigwe	Isiala Mbana	Osuama ward 3 Umunachi	Otor-bio(Otor-Igho)	Umunachi Isiala Mbano	5	Excellent	5

14	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Okpuala	Otor-bio(Otor-Igho)	Eziama Isiala Mbano	5	Very good	1
15	Imo	Okigwe	Isiala Mbana	Osuama ward 1 Okpuala	Otor-bio(Otor-Igho)	Okpuala Eziama Isiala Mbano	5	Excellent	1
16	Imo	Okigwe	Isiala Mbana	Osuama Anara ward 2	Otor-bio(Otor-Igho)		3	Very good	11
17	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6) Ndiobi	Otor-bio(Otor-Igho)		3	Very good	1
18	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)		4	Very good	14
19	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)		7	Very good	11
20	Imo	Orlu	Njaba	umuaka 2 Umuasharam	Otor-bio(Otor-Igho)		2	Very good	2
21	Imo	Orlu	Njaba	Umuaka 4 umukwu	Otor-bio(Otor-Igho)		1	Very good	1
22	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Umuakagu	1	Good	1
23	Imo	Okigwe	Onuimo	Aboh/Okohia ward 6	Otor-bio(Otor-Igho)		5	Very good	2
24	Imo	Okigwe	Onuimo	Ward 7	Otor-bio(Otor-Igho)		5	Very good	1
25	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)		2	Very good	1
26	Imo	Orlu	Njaba	Umuaka 2 Umulolu	Otor-bio(Otor-Igho)		1	Nil	1
27	Imo	Orlu	Njaba	Umuaka 2 umuogwugwu	Otor-bio(Otor-Igho)		1	Fair	1
28	Imo	Orlu	Njaba	Umuaka ward 2	Otor-bio(Otor-Igho)		1	Good	1
29	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)		3	Good	1
30	Imo	Orlu	Njaba	Umuaka 2 umudibe	Otor-bio(Otor-Igho)	Afor Umuaka		Good	1

31	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)	Orlu Umuaka Rd by Afor Umuaka	1	Good	1
32	Imo	Orlu	Njaba	Amazano Okpurufor	Otor-bio(Otor-Igho)		1	Good	1
33	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)		1	Very good	1
34	Imo	Orlu	Njaba	Umuaka 4 ndiokwu	Otor-bio(Otor-Igho)		1	Good	1
35	Imo	Orlu	Njaba	Obeakpu ward Umuasaram	Otor-bio(Otor-Igho)		2	Good	1
36	Imo	Okigwe	Okigwe	Ihube ward 2	Otor-bio(Otor-Igho)	Ndiobilikpa Amegu	2	Very good	1
37	Delta		Bomadi		Otor-bio(Otor-Igho)	in community	1	Nil	1
38	Delta		Bomadi		Otor-bio(Otor-Igho)	Unaware	2	Very good	1
39	Delta		Bomadi		Otor-bio(Otor-Igho)	Akaware quarters	1	Very good	1
40	Imo	Okigwe	Ehime- Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)		7	Good	3
41	Imo	Okigwe	Ehime- Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)	Umuakagu	2	Good	1
42	Delta	Delta Central	Okpe		Otor-bio(Otor-Igho)	Escom Vet. Services		Very good	2
43	Imo		Owerri West	Emekuku	Otor-bio(Otor-Igho)		2	Good	1
44	Imo		Owerri West		Otor-bio(Otor-Igho)		25	Very good	1
45	Imo	Owerri	Owerri North	Emakuku Ezeogba	Otor-bio(Otor-Igho)		25	Very good	2
46	Imo	Okigwe	Ehime- Mbano	Umunumo	Otor-bio(Otor-Igho)	Umuakagu	2	Very good	2
47	Imo	Okigwe	Ehime- Mbano	Umunumo	Otor-bio(Otor-Igho)		4	Good	1
48	Imo	Okigwe	Ehime- Mbano	Umunumo	Otor-bio(Otor-Igho)	Umunumo	2	Very good	1
49	Imo	Okigwe	Ehime- Mbano	Umunumo	Otor-bio(Otor-Igho)	Orieagu NSU	5	Good	1

50	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)		10	Excellent	5
51	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Orieagu market	2	Very good	1
52	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Umuakagu	4	Very good	1
53	Imo	Okigwe	Ehime-Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)	Orieagu market	1	Excellent	1
54	Imo	Okigwe	Ehime-Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)	Ezeoke	2	Excellent	1
55	Imo	Okigwe	Ehime-Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)	Agbaghara	2	Good	1
56	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Orieagu NSU	4	Excellent	1
57	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)		5	Very good	3
58	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Umuakagu	2	Excellent	1
59	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Umuhim	2	Excellent	2
60	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Umuezerea	1	Fair	1
61	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Aba Branoh	2		1
62	Imo	Okigwe	Ehime-Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)	Umuakagu NSU	4	Very good	1
63	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)		1	Good	2
64	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)	Umunumo	2	Excellent	1
65	Imo	Okigwe	Ehime-Mbano	Umunumo	Otor-bio(Otor-Igho)	Umudibia	1	Excellent	1



TABLE 15: PRESENCE OF CHICKENS COLLECTORS IN THE STUDY AREA

s/n	State	District	LGA	Ward	Community	PRESENCE OF CHICKENS COLLECTORS			No of respondents (66)
						Name/address	No. present	Quality of service	
1	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)		1	Good	1
2	Imo	Okigwe	Isiala Mbana	Osuama ward 3 Umunachi	Otor-bio(Otor-Igho)	Umunachi Isiala Mbano	1	Good	4
3	Imo	Okigwe	Isiala Mbana	Osuama Anara ward 2	Otor-bio(Otor-Igho)		1	Good	4
4	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6) Ndiobi	Otor-bio(Otor-Igho)		2	Good	1
5	Imo	Okigwe	Onuimo	3 umucheke Okwe	Otor-bio(Otor-Igho)		3	Good	8
6	Imo	Okigwe	Onuimo	Ward 6	Otor-bio(Otor-Igho)		10	Good	2
7	Imo	Okigwe	Onuimo	Aboh/Okohia (ward 6)	Otor-bio(Otor-Igho)		10	Good	11
8	Imo	Orlu	Njaba	umuaka 2 Umuasharam	Otor-bio(Otor-Igho)		2	Good	2
9	Imo	Orlu	Njaba	Umuaka 4 umukwu	Otor-bio(Otor-Igho)		2	Very good	1
10	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)		2	Good	1
11	Imo	Okigwe	Onuimo	7	Otor-bio(Otor-Igho)		2	Fair	1
12	Imo	Orlu	Njaba	Amazano 3 okpurufor	Otor-bio(Otor-Igho)		2	Good	6
13	Imo	Orlu	Njaba	Umuaka 2 Umuduruoji	Otor-bio(Otor-Igho)		2	Good	1
14	Imo	Orlu	Njaba	Umuaka 3 Ibele	Otor-bio(Otor-Igho)		2	Good	1
15	Imo	Orlu	Njaba	Umuaka 2 Umulolu	Otor-bio(Otor-Igho)		1	Good	1
16	Imo	Orlu	Njaba	Umuaka 2 umuokwokwo	Otor-bio(Otor-Igho)		3	Good	3
17	Imo	Orlu	Njaba	Amazano Okpirufor	Otor-bio(Otor-Igho)		3	Good	1

18	Imo	Orlu	Njaba	Umuaka 2 Umudinji	Otor-bio(Otor-Igho)		2	Very good	1
19	Imo	Orlu	Njaba	Umuaka ward 2	Otor-bio(Otor-Igho)		2		1
20	Imo	Orlu	Njaba	Amazabo ward 3 Ndiezima	Otor-bio(Otor-Igho)	Umidibe Village Amakor		Very good	1
21	Imo	Orlu	Njaba	Umuaka 4 ndiokwu	Otor-bio(Otor-Igho)		2	Good	1
22	Imo	Orlu	Njaba	Amazano 3 Umudibe	Otor-bio(Otor-Igho)		3	Good	4
23	Imo	Orlu	Njaba	Umuaka 4 ndiokwu	Otor-bio(Otor-Igho)		2	Good	1
24	Imo	Okigwe	Okigwe	Ihube ward 2	Otor-bio(Otor-Igho)		2	Very good	1
25	Imo	Okigwe	Ehime- Mbano	Ihitte-nsu	Otor-bio(Otor-Igho)		2		1
26	Imo		Owerri West		Otor-bio(Otor-Igho)		15	Good	1
27	Imo	Owerri	Owerri North	Emakuku Ezeogba	Otor-bio(Otor-Igho)		15	Excellent	1
28	Imo		Owerri North		Otor-bio(Otor-Igho)		15	Excellent	1
29	Imo	Okigwe	Ehime- Mbano	Ikpe-NSU	Otor-bio(Otor-Igho)		20		1
30	Imo	Okigwe	Ehime- Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)			Fair	1
31	Imo	Okigwe	Ehime- Mbano	Umualumaku Umuihim	Otor-bio(Otor-Igho)		1		1



Table 16: Traditional Poultry VC: Results and Results Indicators

Level	Results	Indicators	Baseline Data Key Outcomes and Impact Indicators
IMPACT	Increased Incomes (Net attributable income change - NAIC)	# direct beneficiary farmers reporting (at least 15%) increased income;	
		# indirect beneficiaries reporting increased income;	
		average net additional income change (£, %)	
OUTCOMES	More farmers will seek advice on vaccine availability and use from distributors and/or farmers with reduced bird mortality or just copy from the latter	# other farmers copy new practices	
	Reduced bird mortality, increase production, increased protein intake, increased sales	Bird mortality rate (%) 21.5%	
		# rural farmers with reduced bird mortality rates 50 (7.8%)	
		# rural farmers with increased bird sales Increase in sales (% , ₦)	
	Increased adoption of bird vaccination by traditional poultry farmers	# rural farmers using bird vaccines (50 which is equivalent of 7.8% of respondents)	
		Farmer investments in vaccine purchases (₦) 1,740.02	
	Vaccine distributors in neighboring communities supply NCD vaccines and technical info to rural bird farmers	# of support providers crowding in	
	Increased supply of vaccines and technical advisory services to rural areas NIL	Proportion of sales to rural farmers (%)	
		Value of sales to rural farmers(₦)	

	Support services providers (VBVs or vaccine distributors) have improved knowledge, capacity, interest and commitment in providing appropriate technical services to traditional poultry farmers NO	# Vaccination campaigns completed Reach of vaccination (# farmers) NIL
	Alignment of vaccine distribution and technical support services with the needs of traditional poultry farmers	# and type of pro-poor vaccine distribution and technical support services established (list)
	Increased investment in vaccine production and/or vaccine imports and distribution	Increased investments in pro-poor vaccine production and distribution systems (% & ₦ value)
OUTPUTS	Facilitate vaccine distributor access to rural communities directly	Vaccination campaign designed and implemented
	Facilitate selection and training of Village Based Vaccinators (VBVs)	TOT for VBVs designed and implemented
		# VBVs trained
	Engagement with selected project partners and farmer representatives to determine pro-poor vaccine pricing structure that creates strong incentives to vaccine companies and distributors. NO	Pricing structure in place NIL
	Engagement with community of vaccine production and distribution companies to identify and select project partners for the pilot NO	Partners identified; MOU signed NO
	Farmer sensitization campaign designed and implemented	Yes/No NO
	Develop refined intervention Prototypes	Prototype developed - Yes/No NO
	Rapide Rural Appraisal of potential anchor points (stores, lead poultry farmers, farmer groups, co-ops, agrochemical dealers) for NCD vaccine intervention	Appraisal report; # Anchor points for potential vaccine identified YES
Carry out Survey to establish new castle disease (NCD) vaccine demand, purchasing power, preferences and gauge potential state govts activities in the sector. YES	Survey report detailing potential demand and purchasing power SEE TABLE 3 of survey report	