

Traditional Poultry Strategy Brief

Executive Summary

Rearing local breeds of chicken is a typical activity of rural households across Nigeria, including in the Niger Delta. Approximately 3 million households keep local chickens across the region, with an average flock size of 11 per household. These birds, though not reared with a specific commercial intent, provide a safety net for rural households, and serve several purposes; they provide a store of wealth and occasional income, add to the household protein consumption, and are used in meeting traditional obligations such as gift-giving during festive seasons.

From an M4P perspective, traditional poultry has gained MADE's initial attention due to several reasons. The function of traditional poultry gains additional importance given the dismal poverty and human development conditions in the rural Niger Delta. Approximately 70% of the population of the Niger Delta lives in rural areas, and is plagued by high poverty rates of over 40%. Second, the sector also engages a high number of women. Traditional poultry keeping is primarily a women's activity. It is established that in the majority of rural households, women are in charge of, and manage the income from, local chickens. Under the prevailing norms, rearing local chickens is seen as a low-input, low-output activity. As a result, production processes are inefficient, and subject the birds to a number of environmental risks. These include the risk of infection from disease, threat of attack from predators, and theft. In addition, inefficient feeding and watering practices also mean that birds are not as productive as they could potentially be.

The main constraint on output from local chickens in rural areas is Newcastle's Disease (NCD), which has a high mortality rate of over 30 percent for the Niger Delta's local chicken population. 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 distribution system in Nigeria has been structured around the commercial poultry sector, and does not extend to rural areas. In the absence of a functioning public sector extension service, and without access to commercially available vaccine, farmers remain at the mercy of NCD. Moreover, they also do not have ready access to any form of technical advisory services, and therefore do not come to realize the value of their lost birds, nor know about how to protect against NCD.

Given these circumstances, MADE has begun to explore the feasibility of market-based solutions which can extend the supply of NCD vaccination to the Niger Delta's rural areas in an affordable, pro-poor manner. For such a system to be established, two elements need to come together. First the demand for vaccination amongst rural farmers has to be catalysed, by convincing them that the benefits of vaccination far outweigh the costs. Second, a business case has to be presented to the vaccine distribution community, which can convince it of the potential of this hithertofore untapped market. MADE's analysis shows that if such a supply could be established, it could boost monthly savings for an average farmer (who maintains a flock of ten birds) by up to ten percent. Given the high density of female involvement in the sector, such a change would have a direct positive impact on the economic position of women.

However, experience from a similar initiative in poultry health currently underway in Northern Nigeria under the PropCom Mai-Karfi (PCMK) project, has highlighted the challenges of establishing such a market system. In particular, the costs of sensitizing villages to create demand, and facilitating a pricing structure which creates a strong incentive for vaccine company and distributor participation, are critical factors for MADE to consider. Using PCMK's current structure MADE's Team Analysis has computed the potential benefits from vaccination, which can be generated at the enterprise and sector levels. This exercise has also identified modifications which could potentially make the intervention model more feasible in the Niger Delta. Two key recommendations for consideration are to structure the pricing mechanism so that adequate revenue flows to private actors, and to consider a one month 'campaign' model, versus a year-round supply chain.

Moving ahead, it is recommended that MADE engage in a rapid rural appraisal in a select sample of villages to document anchor points for a potential vaccine intervention. Based upon this, refined intervention prototypes with accompanying financial analysis can be developed. These should then be used to engage with the

community of vaccine distribution companies, to explore opportunities for partnership as MADE moves towards the pilot testing phase.

End Market Analysis

Demand for Traditional Poultry in the Niger Delta

Demand for chicken meat and eggs in Nigeria substantial and growing due to several factors which include a rapidly increasing population, higher per capita incomes, greater popularity of chicken meat, and increased urbanization, and an expanding fast food sector. While the increase in demand is primarily being met by expanding commercial production of poultry, it is the traditional sector which constitutes the bulk of the country's poultry population. Characterized by a different set of dynamics and inputs, the traditional sector population stood at 172m local chickens, or 94% of a total combined population of 183m local and exotic chickens, in 2009.¹ The traditional poultry sector has been growing at a natural growth rate, with few changes in production practices over the years.

Poultry meat and eggs are considered luxury foods in rural Nigeria, where incomes are below the national average. Meat from traditional poultry is popular, as these chickens are considered to be tastier due to natural growth and feeding. In rural areas, chickens are normally slaughtered for household consumption on special occasions, such as weddings and religious festivals. A large proportion are sold into community markets and collectors eventually end up in live bird markets (LBMs) in urban areas. Local chickens are also used to meet cultural obligations of different types. For example, gifting chickens to relatives and friends is a common practice. Chickens are also used as an ingredient in certain forms of traditional medicine.

There is definite popular demand and trade in indigenous live chickens – IFPRI/DFID, 2010.

In a typical flock in a rural household in the Niger Delta, strong males and female chickens are retained for breeding, while the surplus is either kept for household consumption (39%)², sold for income (53%), used for ceremonial, ritual, or other purposes (8%). For those sold, there are three ways in which the sales take place; sales to nearby community markets (62%), sales to collectors (32%) (who then sell onwards to daily live-bird markets (LBMs) in urban areas), and sales directly to consumers (6%).

Structure of the Value Chain

The Traditional Poultry Value Chain in the Niger Delta

The Nigerian poultry sector consists of both commercial and traditional production, and an array of terms is used to describe both. For clarity, it is helpful to know the various terms which are used to describe the two forms of poultry. Additionally, for the purposes of this brief, wherever 'poultry' is mentioned, it should be understood to refer exclusively to chicken meat and eggs.

Type	Alternate Terms
Traditional Poultry	Indigenous, Rural, Extensive, Subsistence, Village, Local, Free-range
Commercial Poultry	Intensive, Exotic

Table 1: Description of terms

Production Systems

Traditional and commercial poultry are distinguished from each other by the variety of production systems deployed. The differences include the population of birds handled, nature and intensity of inputs, product offering, and end markets. The FAO classifies these production systems into the following four:

¹ 2009 Federal Department of Livestock National Livestock and Poultry Population Estimate

² Local chickens are an important source of nutrition for rural households

#	System	Average Number of Birds
1	Industrial integrated	> 10,000
2	Commercial production	2,500 – 10,000
3	Small-scale commercial production	500 – 2,500
4	Village or backyard	Village: A few – 200, Backyard: A few-1,500

Table 2: Classification of Production Systems

This brief concerns itself with System 4 – Village and backyard poultry, which has the greatest potential for positively impacting a large number of low-income females. Traditional chickens in villages receive little or no care and roam freely, scavenging on food scraps, seeds, insects, worms, and household waste, amongst other things. Occasionally, they are provided with basic grains from the household, but this is rare. Local chickens are subject to a number of risks, which include predator attacks, disease, and theft. Normally, the chickens are looked after by women and children but are not reared with commercial intent. Rather they are seen as a low-risk, low-effort way of wealth preservation, occasional income, a source of nutrition, and as a way to meet traditional obligations.

Size

Though accurate current surveys of the traditional chicken population are not available, a point estimate of the population in the Niger Delta can be estimated using a combination of statistical sources. These include:

- Rural population estimate: Niger Delta Development Corporation Master Plan, 2010 projection
- Average Rural Household Size: National Bureau of Statistics, Social Statistics in Nigeria, 2012
- % of households keeping local chicken: FAO, 2006
- Average Flock Size, per State: FAO, 2006

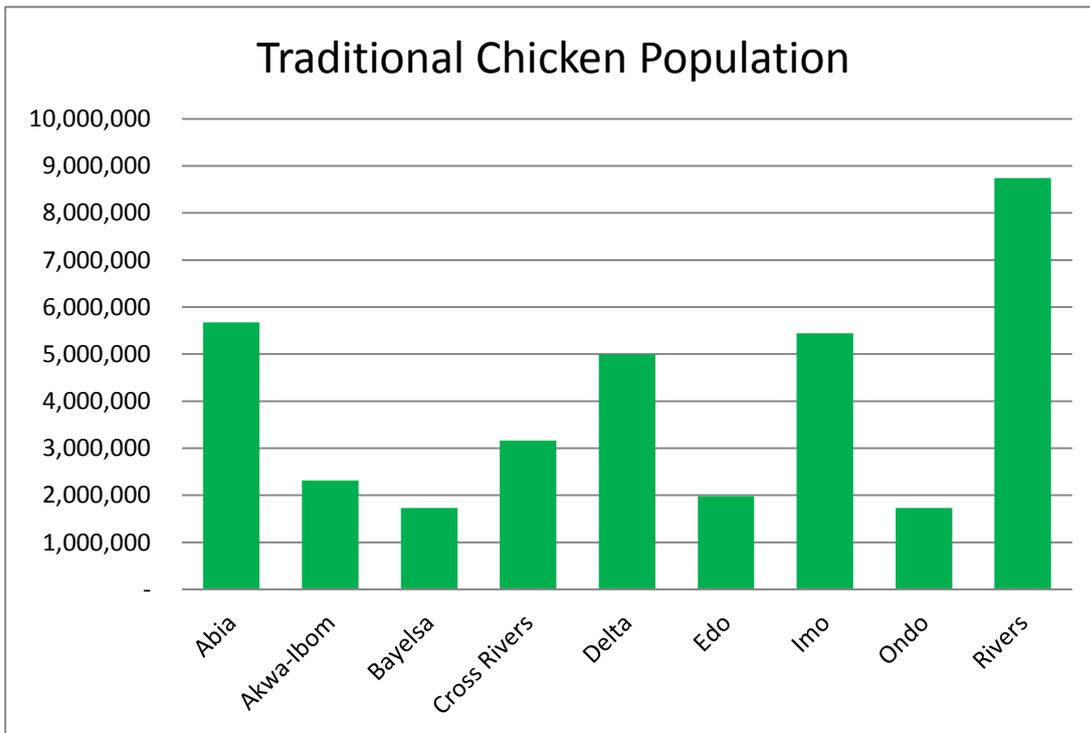
Combining these sources, the population of traditional chickens in the Niger Delta has been estimated to stand at 35.7 million, with an average flock size of 11 chickens per household.

S#	State	Rural Population Estimate	Avg. Rural HH Size	# of Rural HH	HH with Chicken (%)	HH with Chicken (#)	Avg. Flock Size/HH	Est. Trad Chicken Population
1	Abia	2,634,100	3.8	693,184	58.5	405,513	14	5,677,179
2	Akwa-Ibom	2,726,500	5.1	534,608	48.1	257,146	9	2,314,317
3	Bayelsa	1,394,400	4.8	290,500	N/A	157,576	N/A	1,733,331
4	Cross Rivers	2,230,900	4.2	531,167	59.6	316,575	10	3,165,753
5	Delta	2,930,200	3.5	837,200	100	454,121	177	4,995,333
6	Edo	2,461,200	4	615,300	53.6	329,801	6	1,978,805
7	Imo	2,725,800	4.4	619,500	48.8	302,316	18	5,441,688
8	Ondo	2,466,800	3.9	632,513	54.7	345,985	5	1,729,923
9	Rivers	3,961,300	4.6	861,152	56.4	485,690	18	8,742,417
	ND Total W/O Outliers	23,531,200	4.3	5,615,124	54	3,054,722	11	35,778,745

Note: Where values were missing or clear outliers, as in the case of Bayelsa and Delta states, averages have been used. Source: MADE Team Analysis.

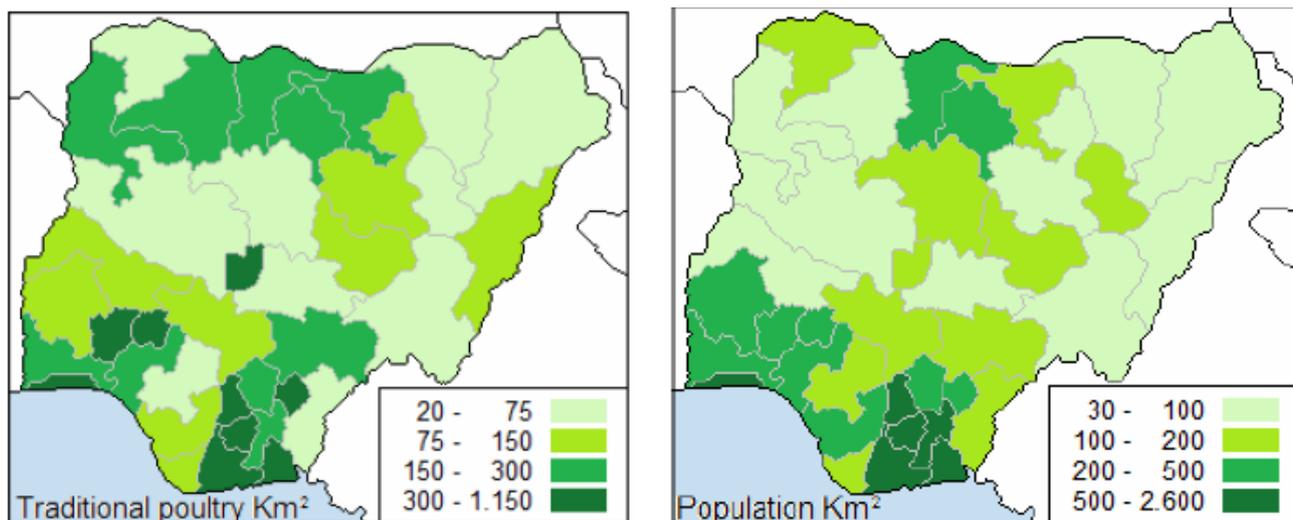
Geographic Distribution

The Niger Delta is known to have a high density of traditional poultry, likely in part due to its high population density. The distribution is shown below:



Source: MADE Team Analysis.

The following maps developed by the FAO in 2008³ add to the picture. Imo, Abia, River, and Akwa-Ibom have a high density of traditional chickens. Traditional chicken density also corresponds roughly with the population density for the various states, which is plausible given that approximately 70% of the Niger Delta’s population is rural, and a majority of rural households keep traditional chickens.



Source: Assessment of the Nigeria Poultry Market Chain to Improve Bio-security, FAO, 2008.

Main Functions, Actors, and Dynamics

The majority of traditional chickens are reared on an extensive basis by villagers who normally have alternate sources of primary income from crops and/or livestock. They usually start small, either buying a parent hen (NGN 1,500) and cock (NGN 2,000-2,500) at the market, or receiving them as a gift. The flock is then allowed to grow naturally. Output from village chickens is low – egg yield is around 45-60 per annum, in 4-5 clutches, with 10-12 eggs per clutch. At maturity, local chickens are also smaller than commercial broilers at an average weight of 1.5 kg, and sell for between NGN 800-1000/bird. Prices are high before festive seasons (Christmas, New Year’s), and low during the *harmattan* period (dry season from November – February), which is when a higher proportion of chickens fall sick. Chicken owners normally keep a breeding stock, consume some chickens, use some to meet

³ (Pagani, Abumiku, & Emeka-Okolie, 2008), p. 3

cultural obligations, and sell the surplus. Those which are sold either go directly to nearby 'Community Markets,'⁴ or to collectors, and a few are sold directly to consumers. Farmers are able to access community markets directly, and normally sell a few chickens at a time and return home. Trading usually takes place in the morning.

Bird traders known as 'collectors' work between producers and markets. They move from village to village to gather birds, which they then sell at community markets or urban LBMs. Those transferring birds between rural and urban areas normally carry 10-a few hundred per trip. Collectors have a variety of enterprise structures, and make their sales decisions depending upon the prices of the day. Research done by the PCMK project in Jigawa State in Northern Nigeria shows that individual collectors can cover up to 20 villages per month, engaging 40-100 farmers, and selling into up to six markets, making a margin of between NGN 100-500 per bird. During a visit to Oguta village in Imo state, farm gate sales price (for a mature hen) to collectors was observed to be NGN 800, to which collectors are currently adding a margin of NGN 200.

Community markets are also known as 'intermediate' or 'weekly' markets. They do not necessarily always meet once a week, and are found in rural and semi-urban areas. The majority are wholesale rather than retail markets, and feed into urban LBMs.⁵ Direct transactions between producers and consumers are not common at these markets and there is normally one or more mediator involved. Capacity generally varies between a few hundred to several thousand birds, and the number of traders varies from ten to a hundred in each market.⁶

Hygienic conditions are generally extremely poor at these markets, which increases the risk of disease. Sometimes there is a veterinarian or para-veterinarian available, along with a small drugs shop. According to FAO, community markets have three main functions:

- Avenue where rural, small-scale, and backyard producers sell their poultry products
- Drainage of local and some exotic poultry for onward selling to daily markets in urban areas
- As a market for individual consumers to buy chickens for consumption, rearing, or sacrifice

Most of the chickens come from local breeds from nearby villages. A small proportion are from commercial production, and therefore one can also find 2-3 week old broiler chicks, broilers, spent layers. Sometimes these are taken and mixed with local flocks to improve productivity. Eggs in the markets are primarily from the commercial sector.

Supporting services and interconnected industries

Given the low-input, minimal-management model of the traditional poultry sector, there are few supporting services. These can include veterinary services, vaccination, transport to market, and housing. However, the use of these services is highly limited.

Extension Services and Technical Information

The Nigerian Agricultural extension system is in poor shape, and fails to address the needs of rural households keeping chicken. In interviews and focus groups conducted in Imo and Delta states, none of the farmers stated the receipt of any assistance from public extension agents. This is corroborated by the experience of PCMK in northern Nigeria, and is known to be a problem across the country – in a 2010 study of 80 rural poultry farmers in Adamawa state, 100 percent reported 'lack of access to extension service' as a key constraint.⁷ Additionally, the focus of the extension agents is commercial crops and livestock, and local chickens are not counted in this category.

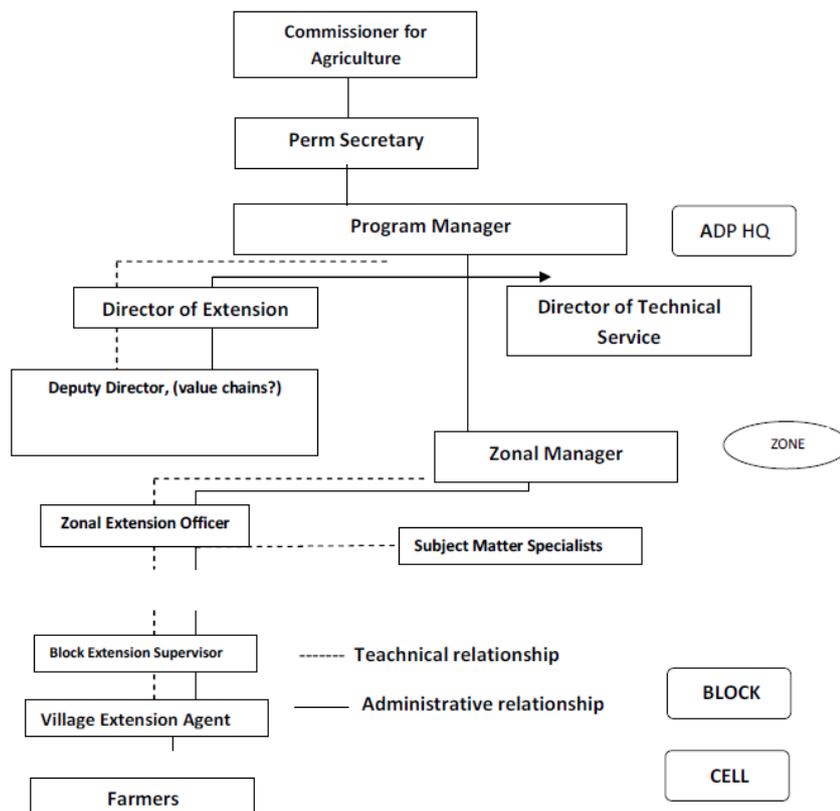
The main agencies responsible for grassroots-level extension in Nigeria are the state Agricultural Development Programmes (ADPs). These agencies use a top-down approach where the farmer is solely the receiver of information. The extension service system faces many challenges, which include policy inconsistency, funding fluctuations, poor coordination, low private-sector participation, and a weak Research-Extension-Farmer-Inputs-Linkages system. The figure below shows the structure of a typical ADP in Nigeria:

⁴ Community markets generally meet once a week

⁵ (Pagani, Abumiku, & Emeka-Okolie, 2008), p. 22

⁶ FAO's assessment of LBMs across Nigeria in 2008

⁷ (Gabdo & Jaaf'ar-Furo, 2010), p.460



In the absence of a functioning extension service system, farmers turn to other sources of technical information such as word of mouth, actors at weekly LBMs, and radio.

Veterinary Services

There are two main sources of veterinary services in Nigeria – public and private. The public veterinary services are organized under the Ministry of Agriculture and Rural Development. At the federal level, they are headed by the Chief Veterinary Officer and at the state level by Directors of Veterinary Services. They are both organized into five service areas:

- Animal health and disease control
- Education and training
- Product and market development
- Animal production and preservation
- External relations

Private veterinarians are gradually replacing government veterinary services all over the country, working principally in urban areas and, most often, associated with a pharmacy through which they derive the largest portion of their income – FAO

However, it is unclear what impact they have on non-commercial livestock rearing. Thus far, primary evidence shows that keepers of household poultry have no exposure to public-sponsored veterinary services. Villagers report that the only time they have seen public vets dealing with traditional poultry was when the Avian Influenza virus outbreak took place.

Private veterinary services are more effective, but focused upon the expanding commercial poultry sector. Vets and para-vets operate in urban and peri-urban areas, and often operate a pharmacy through which their main earnings are derived. Occasionally, vets are brought into villages; however this is normally for larger commercial

livestock such as cattle and goats. While vets are certified from the Veterinary Council of Nigeria, para-vets are not. They have often learnt their trade through experience of being in the poultry business themselves.

Traditional poultry is currently not an attractive market for private vets, since flock sizes are small, and farmers do not spend on bird health. In part, this is because rearing of local chickens is considered to be a low-input activity. Local breeds are also considered to be somewhat more resistant to disease

The Veterinary profession is overseen by the Veterinary Council of Nigeria, which sets industry standards. The membership association for the profession is known as the Veterinary Association of Nigeria. However, its membership is focused on the commercial sector.

Vaccine

Knowledge of diseases affecting traditional chickens is very limited in the Niger Delta’s rural areas. As a result, the vast majority of birds remains unprotected. Occasionally, local medicines or generic anti-biotics such as tetracycline are used when birds display symptoms such as fatigue, and cough, but these are not effective against serious diseases.

The most prevalent and destructive amongst these diseases is Newcastle’s Disease (NCD). NCD hits during the dry months, known as the *harmattan* period, and has a high mortality rate. It affects chickens of all ages, and symptoms include respiratory problems, muscular tremors, drooping wings, twisting of neck, greenish, watery diarrhea, and reduced egg production. It can lead to sudden deaths and wipe out entire flocks.

The impact of NCD in the Niger Delta is significant, and there is a high financial burden of disease. According to the International Livestock Research Institute (ILRI), NCD counts for 54.3% of all bird diseases diagnosed in the Niger Delta,⁸ has a morbidity (prevalence) rate of 51.7%, and a mortality rate of 33.7%.

Apart from NCD, other diseases affecting local chickens include pox, bursal disease, collisepticemia, coccidiosis, and worm infestation. However, their impact is smaller compared to NCD.

The main reason behind the low investment in poultry health is because the rearing of local chickens is not considered to be a commercial activity. Secondly, the distribution system for vaccines has evolved around the commercial poultry industry, and does not extend to the rural Niger Delta. Third, the vast majority of vaccines available in the market are not designed for use by the traditional sector. They are packaged in a minimum of 100 doses, which is too large for an average farmer with a flock of only ten birds.

Waves of NCD outbreaks consistently deplete this population of poultry, as the birds are not routinely vaccinated against the disease (vaccination is the main method of control of NCD). Almost all farmers and smallholder chicken owners admit that NCD is the chief disease constraint to poultry production in Nigeria – ILRI

Table 3 shows the price schedule for different types of NCD vaccines currently available at a poultry shop in Warri, Delta state:

NCD Vaccine Retail Prices at a Poultry Shop in Warri on 18th October, 2013			
Name	Source	Dosage	Price
Lasota	NVRI	200	NGN 450
Lasota	Imported	200	NGN 420
Lasota	NVRI	100	NGN 380
Lasota	Imported	100	NGN 380
NDVK	NVRI	200	NGN 500
NDVK	Imported	1000	NGN 900
NDVK	Imported	400	NGN 600

Table 3: NCD Vaccine Retail Prices

⁸ (Fadiga, Jost, & Ihedioha, 2010), p.26

Table 4 gives an indication of the wholesale prices at a small-scale vaccine distributor based in Sapele, Delta state:

NCD Vaccine Wholesale Prices at a Vaccine Distributor in Sapele on 26 th October, 2013			
Name	Source	Dosage	Price
Lasota	NVRI	200	NGN 250
Lasota	Imported	200	NGN 200
NDVK	NVRI	200	NGN 300

Table 4: NCD Vaccine Wholesale Prices

In Nigeria, vaccines are either produced by the National Veterinary Research Institute (NVRI), or are imported into the country. While NVRI has a good reputation and actively conducts research on new types of vaccines, it is unable to supply the quantity required by the whole industry.⁹ The gap is met by imports from Israel, China, India, Malaysia, and other countries. NVRI's main facility is at Vom, in Jos, and it also has a satellite office in each state. However, its distribution system is not well-reputed, and supply shortages are known to be common. NVRI is a quasi-public institution and is not entirely commercial in nature. It is also dependent upon public funding, which fluctuates, hurting research programmes.

NVRI has tested and introduced a thermostable NCD vaccine known as ND-12, which can potentially increase the viability of the traditional poultry sector as a market for vaccine. ND-12 is an internationally renowned vaccine, and has increased the feasibility of vaccination of village chickens in many countries.¹⁰ The type produced at NVRI comes in a smaller quantity of 50 doses, and has a longer shelf-life (it retains its activity for up to two weeks when stored at 28 degrees centigrade, in freeze-dried form in a dark place).¹¹ While the vaccine technically falls in the 'thermostable' category, it still requires some care. It should not be exposed to sunlight or frequent shifts in temperature. If cold chain facilities are available, it is recommended that they are used, and the vaccine is kept at between 4-8 degrees centigrade. It should not be frozen. If cold chain facilities are not available, the vaccine can also be stored in a cool, dark place, such as beside the base of a clay water pot. During transportation from an urban area into the field, the vaccine should be wrapped in a damp cloth and carried in an open weave basket. If a cold box with cold water is available, that is preferable.

ND-12 can be administered via eye-drop, drinking water, certain feeds, and injection, to birds of all ages. PCMKF's poultry health intervention is currently administering via eye drop, a single dose per bird, once a year. Once open, the vaccine's life is two days, and it has to be diluted in potable water before being administered. Field studies indicate that ND-12 provides approximately 80% coverage in the face of an outbreak.¹²

ND-12 currently sells for NGN 50 at NVRI. NVRI has been keen to promote the vaccine, but has been unable to take the steps required for mass commercialization, which would require a functioning market system around the provision of the vaccine to rural areas. At visits to vets in Delta state and Rivers state, it was observed that there was no awareness of the availability of ND-12. For this to happen, vaccine distribution companies, and smaller urban distributors will have to be convinced of the business case for the large-scale introduction of ND-12. NVRI has expressed an interest in being a partner to programmes looking to increase ND-12 demand, and is currently working with PCMK.

Apart from local production, a significant share of vaccine is imported into the country by private companies, who then distribute the vaccine through networks of sales representatives and small-medium sized private distributors in states across Nigeria. Some of the leading companies are:

- Turnerwright
- Animal Care
- Talacolo
- Global Organics

⁹ (Adene & Oguntade, 2006), p. 9

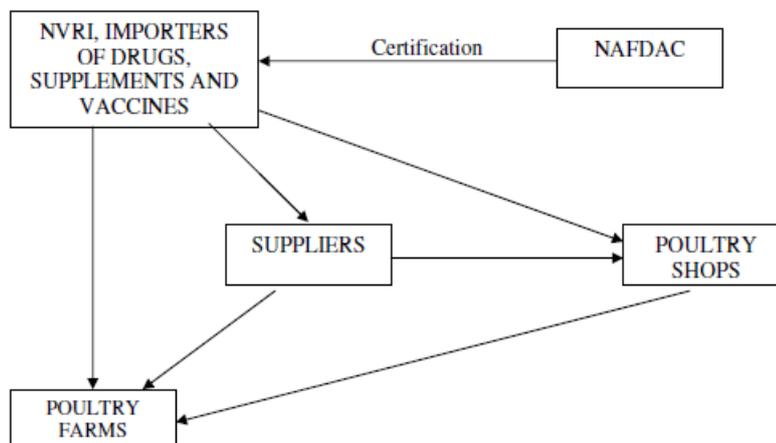
¹⁰ (Mata, Fringe, & Alders), p. 97

¹¹ Reported by PCMK

¹² (Mata, Fringe, & Alders), p. 98

- Global Vet
- Agriproject Concepts International

The main hub for vaccine distribution companies is Ibadon, which is also the largest hub of commercial poultry in Nigeria. The companies directly to large-integrated poultry producers, as well as sell to a network of smaller distributors (often called poultry shops), which in turn supply medium and small-sized commercial farmers. The distribution structure is represented below:



Source: FAO Nigeria Poultry Sector Country Review.

The larger companies all have sales and distribution networks in the Niger Delta. However, as mentioned earlier, the current distribution system does not cater to the needs of rural poultry.

Housing

Housing is typically not provided for rural poultry.¹³ Chickens are allowed to roam free, scavenging for food around the house during the daytime, and typically seeking shelter in trees and bushes during the night. Sometimes, depending upon house structure, they are able to collect in the kitchen or storage room. In some homes, *ruffia* baskets, or a makeshift wire or wooden structure may be provided. 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. Birds packed close together without vaccination would be at greater risk. During consultations, the cost of building a house (of wire mesh and wood) for 50 birds was found to be between NGN 10,000-20,000.

Feed and Water

Feeding and watering practices are consistent with the 'low-input, low-output' model for traditional poultry. Typically, chickens may receive some form of feed, usually millet, corn, or sorghum, from the household in the morning, and then left to scavenge during the rest of the day. Consumption from scavenging can include vegetables, wild fruits, seeds, grits, insects, and earthworms. Other kitchen waste may also be thrown to them. Water is normally provided in metal, plastic, or earthen containers. The quality of water varies from one household to another, depending upon the resources available in the village. Chickens also seek water sources outside the household to supplement their intake.¹⁴

The Poor and their Context

Understanding the extent of poverty in the rural Niger Delta, how it manifests itself at the household level, and the specific economic position of women within rural households, allows for contextualization of the impact of traditional poultry.

Overall, the picture of poverty in the Niger Delta is grim. High levels of poverty exist in the Niger Delta, leading to intense feelings of injustice, given the wealth which the region generates from petroleum resources. The

¹³ (Alabi & Aruna, 2006), p. 533, MADE assessment team direct observation

¹⁴ (Adene & Oguntade, 2006), p. 18

discovery of oil has had a detrimental impact on the rural economy, shifting attention away from agriculture and leading to declines in productivity. Table 5 shows the levels of poverty in states across the Niger Delta:

States	Percent Poverty Level		Food Poverty levels as measured by 2,900 calories, 2004	
	1996	2004	% with calorie intake below 2,900	% with calorie intake above 2,900
Abia	58.6	29.95	22.03	77.17
Akwa-Ibom	72.3	39.86	31.60	68.40
Bayelsa	44.3	25.64	20.77	79.23
Cross River	61.4	52.60	42.30	57.70
Delta	61.9	41.88	35.57	64.43
Edo	53.3	41.40	35.24	64.76
Imo	53.6	24.80	12.75	87.25
Ondo	71.6	88.84	21.21	78.79
Rivers	44.3	40.65	37.56	62.44
Niger Delta	57.9	42.85	28.78	71.22
Nigeria	65.0	56.90	36.04	63.96

Source: Poverty in the Niger Delta Measured by Income and Food Intake, Federal Office of Statistics 2004: 78, 81.

Table 5: Poverty Levels across the Niger Delta

The high levels of poverty have naturally led to low levels of human development, as measured by the UNDP's Human Development Index:

State	Life Expectancy	Education Index	GDP Index	HDI
Abia	0.492	0.578	0.560	0.543
Akwa Ibom	0.506	0.683	0.540	0.576
Bayelsa	0.455	0.523	0.520	0.499
Cross River	0.556	0.630	0.565	0.584
Delta	0.587	0.636	0.621	0.615
Edo	0.579	0.602	0.600	0.594
Imo	0.503	0.546	0.591	0.547
Ondo	0.501	0.575	0.512	0.529
Rivers	0.563	0.590	0.620	0.591
Niger Delta	0.527	0.596	0.570	0.564

Source: HDI for the Niger Delta States, ERML Field Survey, 2005

Table 6: Human Development across the Niger Delta

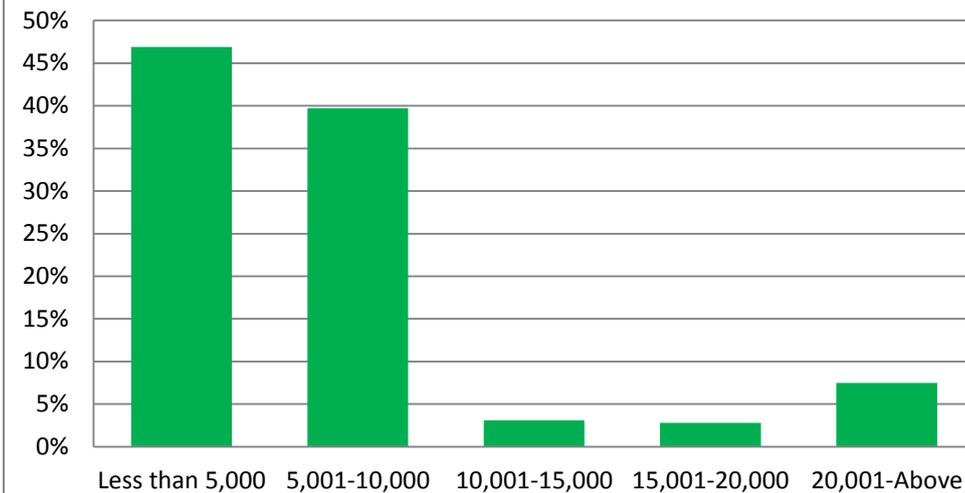
According to the UNDP, self-reported poverty for the region is even higher, at 74.8%. Food poverty is also high, as can be seen in Table 5.

70% of the population of the Niger Delta is known to be rural, and a recent (2013) study of 360 rural dwellers from Delta State allows us to zoom in further and understand household economic conditions.¹⁵¹⁶ The results are consistent with the state-wide poverty estimates – 46.9% of the respondents earned NGN 5,000 or less per month. This is equivalent to less than \$1.5/day, and therefore under the poverty line, and also below the Nigerian minimum wage of NGN 14,200 per month.

¹⁵ Survey areas: three senatorial districts in Delta State (Eruemukohwarien and Orhoakpor in Delta Central, Benekuku and Okpai in Delta North and Oleh and Olomoro in Delta South).

¹⁶ (Pius, 2013)

Monthly Income in Rural Delta State

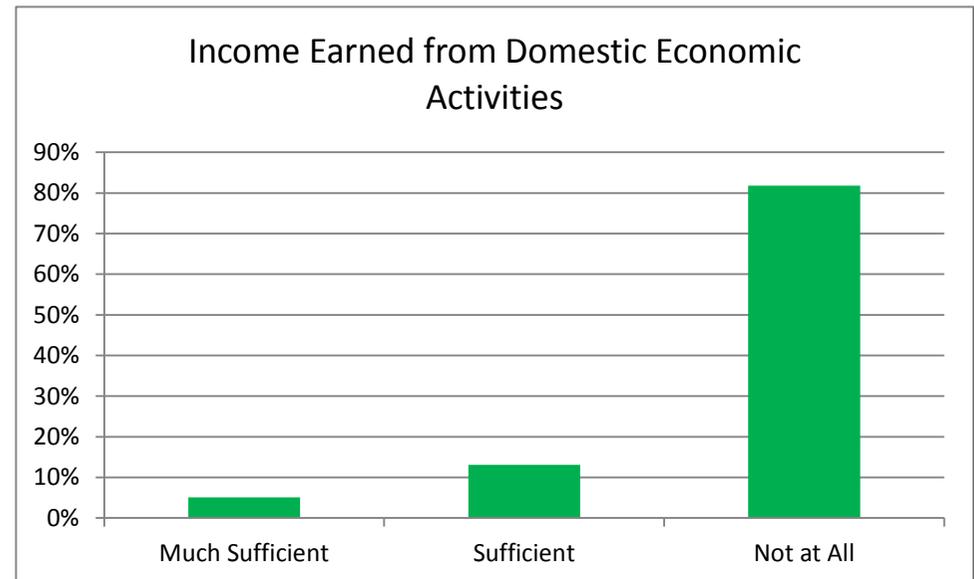
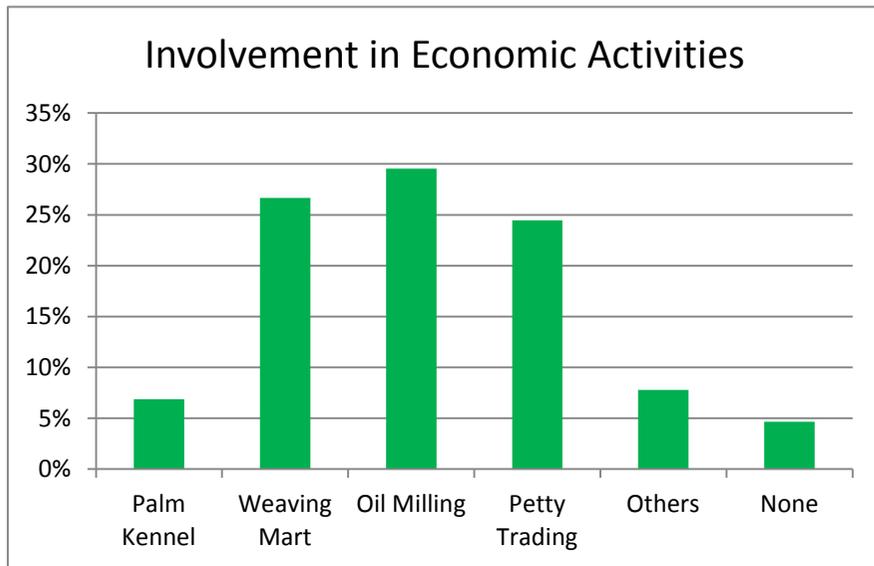
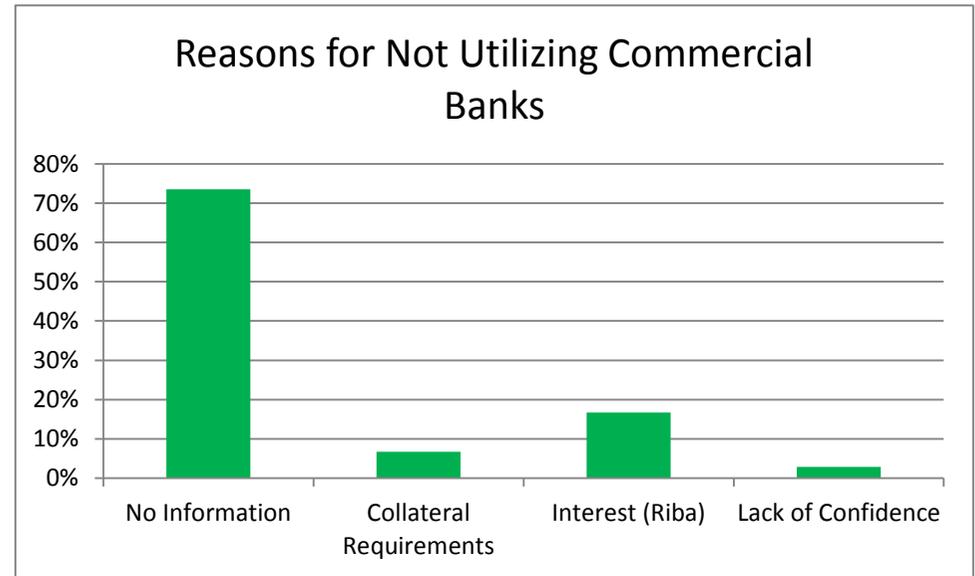
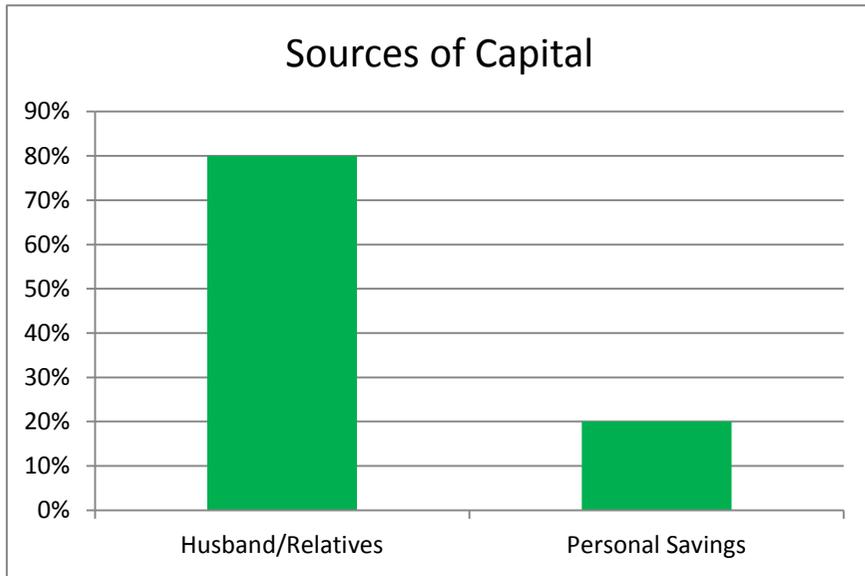


These levels of poverty create excruciating circumstances for residents in rural areas. In the UNDP's last Human Development Report on the region, residents described poverty in the following terms:

The poor person is one who cannot pay school fees for his children; cannot meet any needs, including food; has no farm land and cannot farm well; cannot take part in age-grade activities (responsibilities that are specifically designated to some age groups in communities); cannot afford to send his children to school; wears tattered clothes; is very lean; and has no house to live in. In short, a poor person is one who has nothing. Consequently, he 'has no voice' in the community –

Poverty as described by Niger Delta residents, UNDP Human

Women are disproportionately affected by these conditions, as they are normally dependent upon husbands for income, access to markets, and finance. The household power balance is also normally not in their favour, restricting their ability to make decisions about the generation and deployment of resources. A recent study of 360 low-income females in Delta State illustrates some of these conditions:'



Source: Dynamics of Poverty Amongst Niger Delta Women, Snapps, American Review of Political Economy, 2011.

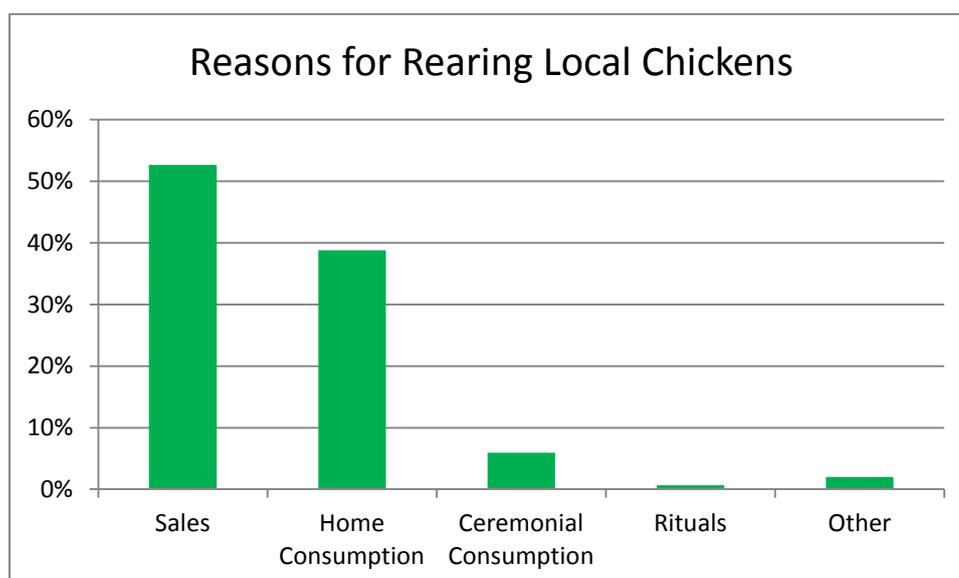
The study offers the following key insights:

- Even working women are highly dependent upon men for capital
- Rural women in this sample are disconnected from the formal financial system
- 80% of women do not consider their income to be sufficient to cover their needs

It is in this context of poverty, which the potential of traditional poultry is better understood. Village chickens kept by the majority of rural households generally serve one or more of the following purposes:

- As a source of extra income, particularly as an informal insurance policy during emergencies or financial hardship
- As a source of nutrition. Occasionally, birds are slaughtered for household consumption. Eggs are normally consumed, with a few sold and a few kept for hatching¹⁷
- As a mechanism for meeting cultural obligations. Chickens are often given as gifts, and also used for traditional medicine and sacrificial purposes.

A study of households keeping traditional poultry in the Niger Delta by Ambrose Alli University illustrates the relationship between these purposes:



Source: Technical Efficiency of Family Poultry Production in the Niger Delta, Alabi and Aruna, Department of Agricultural Economics and Extension, Ambrose Alli University, 2006.

Traditional poultry makes an important contribution to rural incomes and nutrition, and an increase in its productivity can have a significant pro-poor impact, particularly on females. The main roles played by the poor in the traditional poultry value chain are as producers, hawkers/collectors, retailers, and consumers. This impact will be discussed in greater depth in the coming sections.

Gender dynamics and the role of women in the value chain

Women are an integral part of traditional poultry across Nigeria. They can be found at all levels of the value chain, including working as producers, collectors, retailers in weekly markets, and retailers in daily markets, as well as in the provision of supporting services. Their numbers are greatest at the producer level – rearing local chickens in village households across the country. This has been observed during MADE field assessments, and is backed by sector studies conducted by FAO and other international organizations.¹⁸ A high concentration of women is also observed at the retail level in weekly markets. Apart from these functions, other functions have higher concentration of males.

A reliable picture of the extent of female participation in poultry production can be constructed using a combination of sources.

¹⁷ (Adene & Oguntade, Poultry Sector Country Review: Nigeria, 2008)

¹⁸ Ibid.

Direct observation by MADE's assessment team at Oguta and Aradhe villages in Imo and Delta State, respectively, confirm that keeping local chickens is an occupation primarily of women folk. Often, they also involve children in the upkeep of the birds. Secondary literature suggests that at a minimum, 50% of rural individuals keeping chicken are women. Specifically, a study conducted on traditional poultry in the Niger Delta by the Department of Agricultural Economics and Extension, Ambrose Alli University in Edo State, found female participation at 58%.¹⁹ This share is consistent with research on family poultry done by Professor E.B. Sonaiya of Obafemi Awoluwu University, an authority on Nigerian poultry, who estimates women's share at the national level to be 56%.²⁰ The PCMK project in northern Nigeria has also observed greater than 50% female participation.

At 50% the female count in traditional poultry in the Niger Delta amounts to 1,527,361 individuals.

Women are seen to have autonomy when taking decisions on how to utilize birds. They normally have the option of selling to hawkers who collect from several villages, or to take the birds directly to nearby 'community markets.' Normally, they are able to keep the income, and use it to meet family needs. These often include emergency needs, making loan payments, health expenditures, and educational expenditures for children. PCMK's assessments, conducted in the northern states of Niger, Plateau, Jigawa, Kaduna and Bauchi in May-June 2012, also indicate that in 87% of low-income rural households "women are in-charge of, and manage the income from village poultry."

The high degree of female involvement and the dynamics of poultry management in rural households indicate that appropriate interventions which increase productivity can potentially have a direct impact on women's lives and economic position.

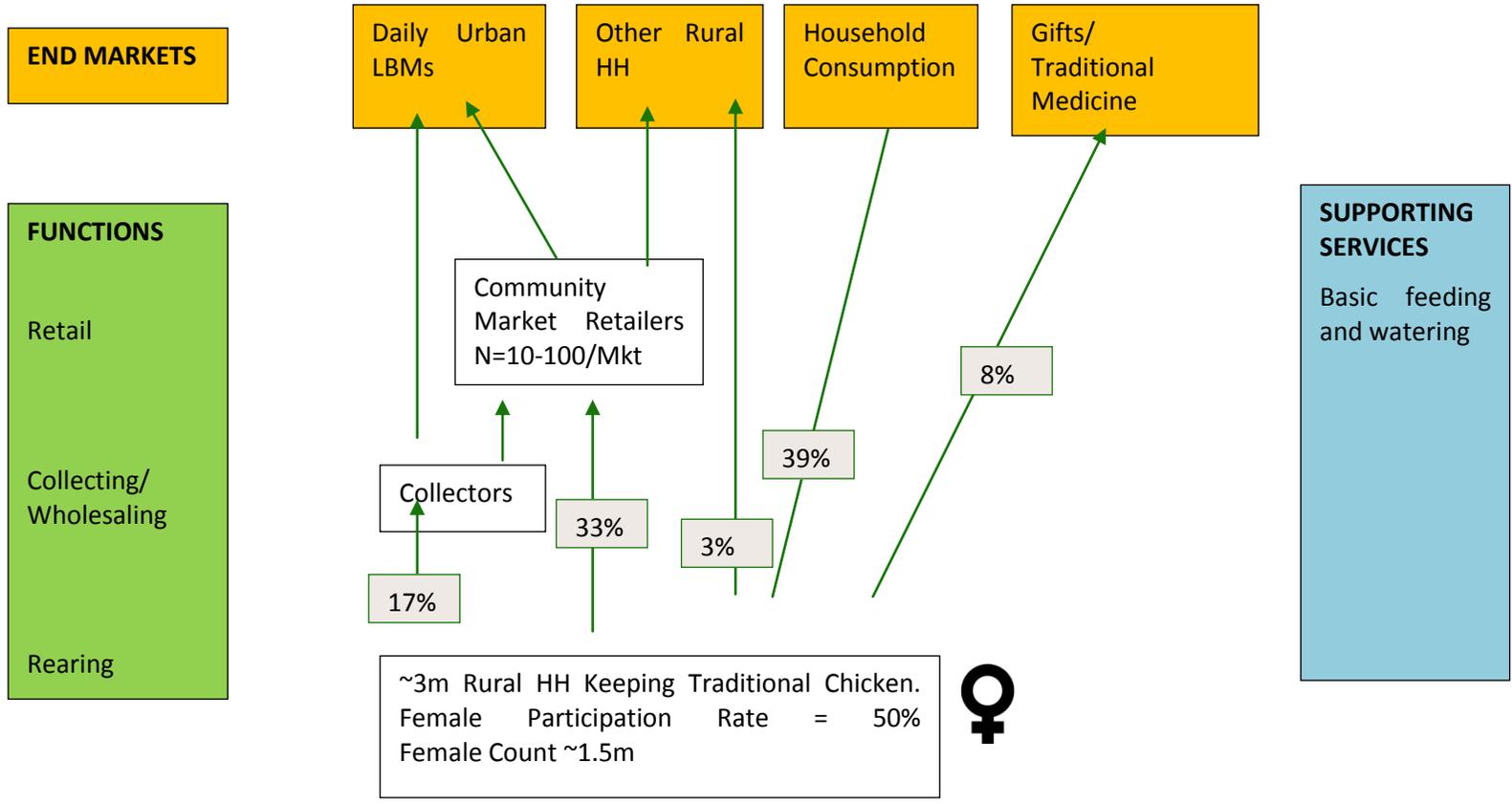


The poultry is kept, mostly by women, both for household consumption as well as an occasional income source – FAO Nigeria Country Review, 2008.

¹⁹ (Alabi & Aruna, 2006), p. 534

²⁰ (Sonaiya, 2001)

Traditional Poultry Value Chain Map



Rules, regulations, and institutional supporting environment for traditional poultry

The focus of the regulatory environment for poultry in Nigeria is the commercial sector. Nevertheless, certain federal and state level policies have relevance for traditional poultry.

The main framework for regulating animal diseases in Nigeria is the 1998 Animal Diseases Control Decree. It is now somewhat outdated in its references to poultry diseases. Additionally, the threshold level defined by it for required poultry farmer registration is 250 birds, which excludes most rural poultry. An accurate record of the traditional poultry population and the number of households keeping local chickens would greatly assist in agricultural planning.

Other policies which have influence have to do with vaccination. Occasional campaigns to vaccinate rural poultry are launched at both the federal and state levels. For example, there exists the 'Presidential Initiative on Livestock,' which has a goal of vaccinating 1 million rural poultry, and imparting technical knowledge to female poultry keepers. However, though such schemes are periodically announced, there is scant evidence of their impact on the ground. At the state level, certain states may also have plans of running vaccination campaigns. These are normally based on donation of vaccines, and therefore unsustainable in the long run. No evidence of state-sponsored vaccination campaigns has emerged during field assessments so far, but before the intervention stage, vaccination plans for all Niger Delta states should be determined by MADE.

At the time of the Avian Influenza outbreak of 2006, the government ran large campaigns in rural areas to educate farmers about hygiene and handling of chicken, as the HPAI virus affects all types of chicken. However, given the enormous number of producers in the traditional sector, it has been difficult for the government to reach everyone.

Other rules are set by the Veterinary Council of Nigeria (VCN) effecting mainly the commercial sector. VCN encourages that only trained vets be allowed to administer poultry vaccines, however, this does not seem to be enforced.

An informal rule which affects rural poultry is the perception that local chickens are resistant to disease, and therefore do not need vaccination. This is not true in the case of NCD.

Role of Associations

While associations are common in the commercial poultry sector, that is not the case in traditional poultry. The interests of the commercial sector are protected by the Poultry Association of Nigeria, which strengthened its ranks during the Avian Influenza outbreak in 2006 with the help of support from the Nigerian government and multilateral organizations such as the FAO. The membership fees for PAN are normally not affordable for rural households.

While there are no associations at the producer level, retailer associations are present in community markets. Retailers, who also often double as bird traders, decide which collectors to buy and sell from.

Enterprise Analysis

A Typical Household Keeping Poultry in the Niger Delta

Local chickens serve as a store of wealth as well as surplus and emergency income. Though the actual characteristics, output, and costs of keeping chickens differ by household, by using the information known about rearing practices and market conditions, a production model for sample rural household with a flock of ten birds can be constructed (See attachment to brief). The model allows for understanding how productive an average rural flock is, and for quantification of the financial impact of NCD on such a household. Key indicators from the analysis are reproduced below:

Indicator	Quantity/Value
Starting Flock Size	10
Pre-NCD Flock Size	32
Ending Flock Size	22
Chicken deaths due to NCD	10
Eggs lost due to NCD	10
NCD Mortality Rate	30%
Total wealth (chicken +eggs) lost in Year 1	NGN 6550
Total wealth (chicken +eggs) lost/Month	NGN 546
Loss as a %age of monthly income for a rural household subsisting at NGN 5,000/month	11%

Table 7: Analysis of a Typical Household Keeping Poultry in the Niger Delta

Quantification of an important constraint such as NCD, allows us to better evaluate the opportunities available for the sector's growth, and to measure the enterprise and market system level impact of interventions which can address this constraint.

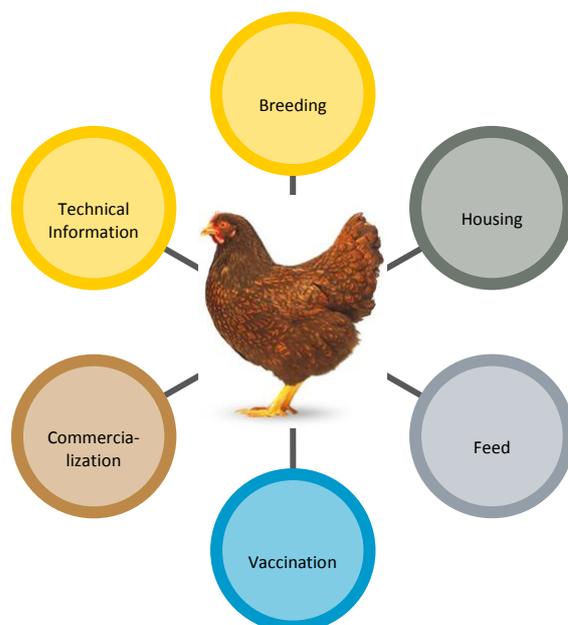
The model shows that rural households are foregoing an extra NGN 546/month, by letting their flocks remain unvaccinated against NCD. For an average a rural household living below the poverty line at NGN 5,000/month (\$1.11/day), this amounts to 11% of monthly income.²¹ In addition to this loss, there is also the foregone wealth/income of future years, which would have materialized with a higher flock survival rate. Given the sector's gender dynamics and clear potential for impact on the female poor, the reduction of this loss would have an immediate positive impact on their wealth, and underscores the importance of combating NCD.

²¹ In addition to NCD, there are also other factors which negatively impact the productivity of rural poultry. These include attacks by predators and theft. While the present production model does not account for these factors, they can be introduced into its future iterations.

Growth Opportunities and Constraints

Growth Opportunities in Traditional Poultry

Opportunities to catalyze pro-poor growth in the Niger Delta's traditional poultry sector exist in breeding, vaccination, feed, housing, commercialization, and technical information.



Source: MADE Team Analysis

Breeding

Local chickens are naturally disposed towards generating a low output of eggs and meat. They take a longer time to mature (8 months), and once mature, their eggs output, at 50-60 eggs/year is miniscule in comparison to the 1000-3000 eggs produced by commercial layers. Occasionally, households will cross-fertilize commercial breeds with their traditional flock to increase output. Such practices are more visible in backyard farms, which keep between 50-500 birds, and are slightly larger than the average village poultry household. Cross-breeding has been known to yield positive results, if conducted appropriately, and new methods are being developed at research institutes in Nigeria. The MADE assessment team has observed work done on hybrid breeds at the Delta State Polytechnic Institute in Ozorro.

Housing

The vast majority of rural poultry keepers do not invest in housing, which exposes chickens to attacks by predators, in addition to making it difficult to administer feed or vaccine. The lack of housing is regularly brought up as a reason for bird deaths in rural areas. A regular cage/hen house can be built from wire mesh and wood, but since it involves a significant one-time financial outlay, (NGN10-20,000 for a 50 bird house), most farmers avoid it. Adequate housing for chickens could reduce the losses caused by these two activities.

Feed

Current feeding practices are minimally nutritious, and do not enable local chickens to reach their full growth potential. Research shows that local chickens, like commercial chickens, respond well to customized feed. However, the cost of feed in Nigeria is high, and is one of the main constraints for small-to-medium sized commercial farmers. Therefore, the use of commercial feed on traditional poultry is not a viable option for rural farmers at present. Nevertheless, there may be opportunities to improve feeding practices using grains and foods that are commonly available in rural areas of the Niger Delta. This would require further study, and the impact on productivity would need to be quantified.

Commercialization

Commercial poultry production is being used as part of poverty alleviation strategies in many African countries. Under a standard model, this involves assisting farmers with asset financing for purchase of a commercial poultry 'system' supporting around 50 laying birds. The average package consists of the chickens, housing, feed, and vaccines. Juhudi Kilimo's 'Kuku Kilimo' intervention with farmers in Kenya is one example of such work.²² While such initiatives have the potential to generate significant income for farmers and change their economic trajectory, there is a significant jump between low-input chicken rearing and commercial production.

A quick transition to a commercial model may be possible for some farmers, but it is not likely to enable MADE to quickly scale up its outreach and impact to the substantial level required by the project. During a MADE discussion session on poultry sector opportunities in Warri on November 1, it was highlighted that commercialization comes in later in the growth spectrum, and females in rural households will need to graduate through levels to reach a point where they are ready to enter the commercial poultry business.

Technical Information

As in many agricultural market systems, improved access to technical information can have a significant positive impact on traditional poultry productivity. As the public extension service system does not currently work in the interest of rural chicken keepers, they are unable to access information on poultry management (including the use of feed, water, vaccination, housing, and sanitation), amongst others. Some simple changes in behavior, such as rounding up chicks in the evening and keeping them in shelter, are low-cost ways of reducing mortality rates.

How can valuable technical information be provided to rural households in a sustainable manner? This is a key challenge, particularly since rural households are not currently in the business of poultry. While a standalone market for technical services will not be viable, it may be possible to bundle technical assistance with other services. For example, under a village-based vaccinator model, vaccinators could also dispense technical information on poultry management, as it would increase the likelihood of farmer success, build client rapport, and enlarge the market for their vaccine products. Other mechanisms, such as telecommunications networks, can also be used.

Vaccination

MADE's enterprise analysis shows clear potential for enabling average households (and particularly the females keeping poultry), to preserve a significant amount of their wealth if losses from NCD can be reduced. Therefore, vaccination currently emerges as the lead opportunity area to positively impact the incomes of thousands of low-income females in the Niger Delta.

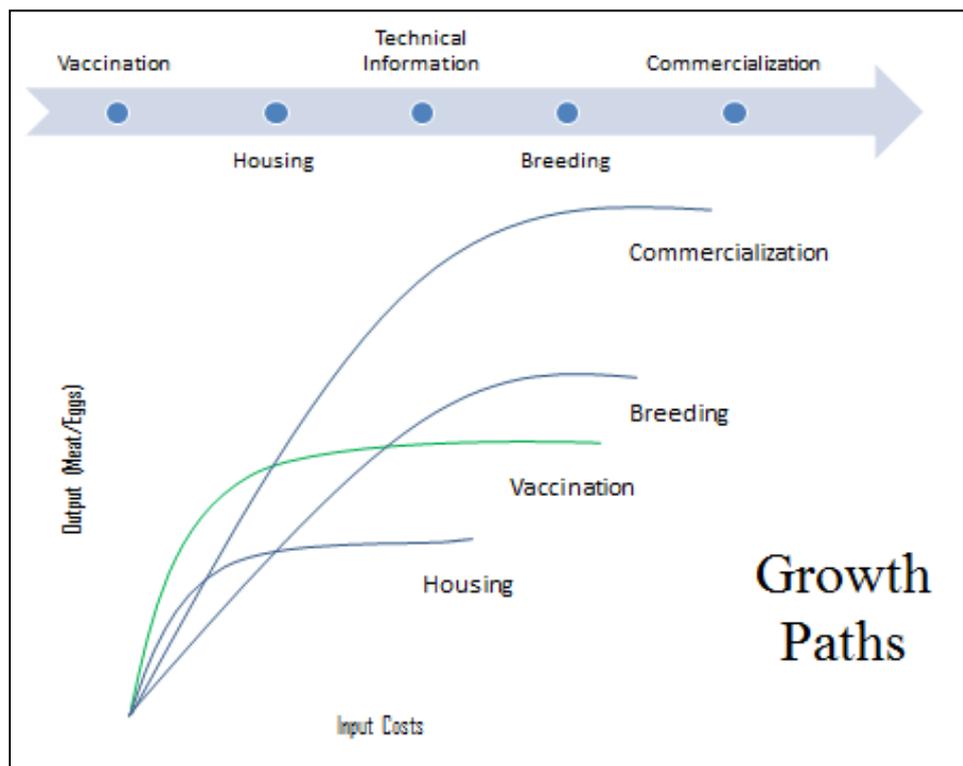
The assertion that NCD is causing tremendous financial loss in the traditional poultry sector is not new. The problem has been known to agricultural policy-makers for years, but thus far mitigation approaches have been predicated on government patronage through vaccine donation, rather than the establishment of a market-driven approach which can deliver vaccination to low-income households at feasible rates. Ideally, such an approach would introduce NCD vaccine on commercial basis through an efficient distribution system. For this to happen, the following questions must be answered:

- Can effective demand for NCD vaccination be created if rural households are able to understand the costs and benefits associated with vaccination?
- Will vaccine distribution companies be able to recognize the market potential of traditional poultry?
- If so, what would be the most efficient and effective system of supply, distribution, technical assistance, and follow-up which would kick-start the market system for NCD vaccine in rural Niger Delta?
- Can this be done in a manner that is profitable for private actors who will bring NCD vaccine to the rural market?

²² This [training video](#) developed by Ideo.org, showcases how the Kuku Kilimo intervention is helping Kenyan farmers enter commercial poultry keeping.

Selecting an Initial Opportunity Area

While there are likely viable intervention options in several opportunity areas, it is also clear that they cannot all be executed simultaneously. Rather, they should be seen to fall along a spectrum of growth. Interventions in vaccination, housing, and technical information are likely to give a large initial boost to productivity in the sector, while commercialization leading to longer-term sustainable income generation is likely to come at a later stage. At the outset, it is also important to consider which opportunity area can yield a better output-to-cost ratio at the start. These considerations are represented in the figure below:



Source: MADE Team Analysis

During MADE's team discussion on poultry on November 1, the feasibility of different opportunity areas was evaluated against each other, and vaccination was selected as the initial area of focus.

Constraints to Accessing Value Chain Opportunities in Vaccination

As discussed in the previous section, while opportunities to encourage value chain upgrading are available in several sectors, vaccination has been identified as the leading opportunity area for its outreach and income potential. However, commercializing the rural value chain for vaccination is a challenge that has been difficult to overcome in many countries, and in this case too, certain constraints will have to be overcome:

- **Absence of a rural distribution channel for vaccine.** NVRI and vaccine distribution companies have been focused on the commercial poultry sector. Commercial poultry producers exist primarily in urban and peri-urban areas, and therefore the distribution system has not developed beyond cities and towns. For it to extend to rural areas, private vaccine companies will have to realize the market potential of traditional poultry, and the distribution model will have to be reasonably profitable for each actor involved in the distribution chain.
- **Change in farmer attitudes and practices.** Farmers in rural households do not consider local chickens to be an enterprise, and are generally comfortable with the low-input low-output system. Starting to utilize vaccine in an appropriate manner, and accounting for the value of lost flock will require behavioural changes. This is also true for other areas where there is opportunity for growth, such as in housing, improved breeding, feed utilization, technical information, and commercialization.
- **Access to information.** Changes in farmer behaviour can only take place if they have access to affordable and relevant technical information. At present, it is unclear how farmers obtain technical information pertaining to livestock. By all direct observation accounts, role of extension agents in traditional poultry seems negligible. Farmers are not aware of best practices, prices and types of vaccine to use, or how to detect different types of disease and protect against them. In the absence of a

functioning public sector extension service, alternatives are required. The appetite for increased access to technical knowledge certainly exists.

- **NVRI supply constraints.** NVRI is presently limited in the amount of thermo tolerant ND 12 vaccine it can produce. For full commercialization of the vaccine and strong uptake by private vaccine companies, an adequate source of supply will have to be found. Either NVRI could boost its capacity, or an import substitute will have to be used.
- **Capacity of Private Sector Partners.** Even if the business case is accepted by private vaccine distributors, their capacity to move vaccines through their distribution channels, and effectively establish and operate a link to rural areas will have to be carefully evaluated.

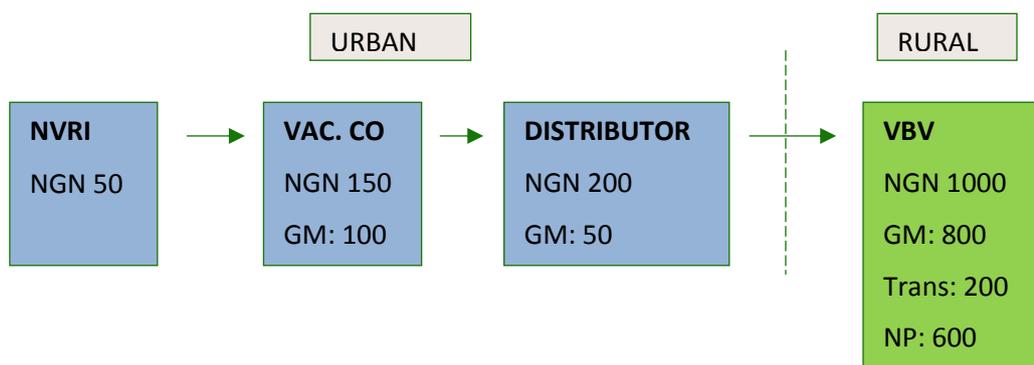
Illustrative Interventions

Following the selection of vaccination as the primary opportunity area, the team’s analysis has focused upon the structure of a possible intervention. PCMK’s Poultry Health intervention currently taking place in northern Nigeria has offered a starting point. Combining PCMK’s intervention structure with MADE’s poultry production model, the potential enterprise and sector-level impacts of adapting the model to the Niger Delta as is have been estimated. This has led to several important insights for how MADE’s intervention could potentially be designed.

The Village-based Vaccinator Model

PCMK’s Poultry Health intervention is under way in Jigawa, Benue, Nassarwa, and Gombe states. After learning of the availability of the thermostable ND-12 vaccine at NVRI, and appraising the need for vaccination in rural areas in the north, PCMK designed an intervention based upon the concept of stimulating demand for NCD vaccine in rural areas and facilitating the development of a commercially viable distribution system. It utilizes individual Village-based Vaccinators (VBVs) as intermediaries between urban and rural areas. VBVs purchase vaccine from poultry shops in urban areas, and administer it to traditional chickens for a fee.

The VBV model and pricing structure are shown in the figure below. The sales prices listed are per vial. Each vial contains 50 doses.



Source: MADE Team Analysis

Under the PCMK model, NVRI supplies the vaccine to the project’s private vaccine distribution partner at NGN 50/vial. The distribution company then sells the vaccine to smaller urban distributors at NGN 150/vial, who sell it onward to VBVs at NGN 200/vial. VBVs sell the vial for NGN 1000, by charging farmers about NGN 25 for each dose. They make a net profit of NGN 500-600 per vial (variation due to transport costs).

Enterprise Impact

By using this pricing structure and MADE’s enterprise analysis model, the financial benefit of NCD vaccination for a rural household keeping an average poultry flock can be computed. The benefit amounts to additional saving of NGN 5075 over the course of the first year of vaccination. This is equivalent to an additional income of NGN 423/month, or 8%/month, for a household subsisting at NGN 5000/month (\$1.11/day).

Indicator	Quantity/Value
Starting Flock Size	10
Pre-NCD Flock Size	32
Ending Flock Size	30
Chicken deaths due to NCD	2
Eggs lost due to NCD	5
NCD Mortality Rate	7%
Total savings (chicken+eggs) in Year 1	NGN 5875
Vaccination requirement (doses/flock)	32
Vaccination cost	NGN 800
Net savings (chicken+eggs) in Year 1	NGN 5075
Net savings (chicken+eggs)/Month	NGN 423
Net savings as a %age of monthly income for a rural household subsisting at NGN 5,000/month	8%

Table 8: Enterprise-level Impact. Source: MADE Team Analysis

Sector Impact

Computing the enterprise level impact then allows for the vaccine requirement and associated cumulative financial benefits (at different levels of coverage) to households, as well as to VBVs, distributors, a vaccine distribution company, and NVRI.²³

Coverage	Households Covered	Doses Required	Vials Required
100%	3,054,722	97,751,104	2,172,247
10%	305,472	9,775,110	217,225
5%	152,736	4,887,555	108,612
1%	30,547	977,511	21,722

Table 9: Sector-level Vaccination Requirements. Source: MADE Team Analysis.

Annual Savings Rural (GBP)	Cumulative by HH Income (GBP)	# of Net VBVs Req.	Net Income/VBV (GBP)	Cumulative Distributors' Gross Income (GBP)	# of Dist. Req.	Gross Income/Distributor (GBP)	Vaccine Company Gross Income (GBP)	NVRI Gross Revenue (GBP)
£ 52,235,746	£ 7,602,864	8485	£ 896	£ 434,449	6109	£ 71	£ 868,899	£ 434,449
£ 5,223,575	£ 760,286	849	£ 896	£ 43,445	611	£ 71	£ 86,890	£ 43,445
£ 2,611,787	£ 380,143	424	£ 896	£ 21,722	305	£ 71	£ 43,445	£ 21,722
£ 522,357	£ 76,029	85	£ 896	£ 4,344	61	£ 71	£ 8,689	£ 4,344

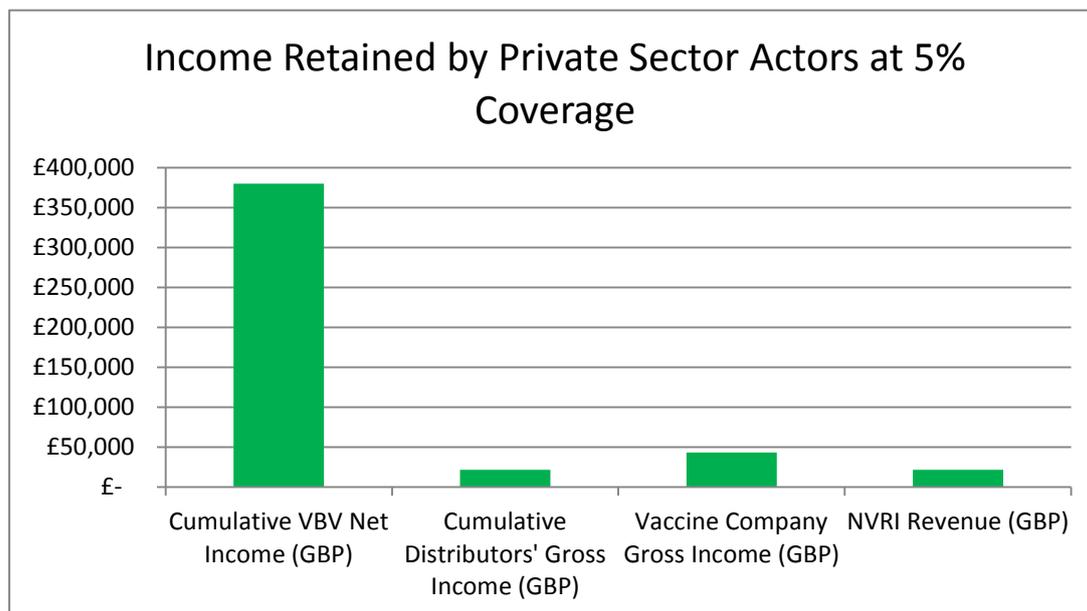
Table 10: Financial Benefits to Private Sector Actors. Source: MADE Team Analysis.

While the analysis shows the clear potential for significant financial benefits at the household level, it has also illustrated certain core issues with the way that the delivery chain has been structured under the VBV intervention.

Challenges

While the PCMK intervention has the potential to yield significant financial benefits at the household level, the analysis above raises concerns about the current model's feasibility for adoption by the private sector. Under the model, VBVs currently retain the bulk of the income, while distributors and the vaccine distribution company are making a much smaller share of the total income generated. If 5% (152,736) of the households keeping poultry in the Niger Delta are covered, this means that while VBVs will earn GBP 380,143, distributors will only earn GBP 21,722 in gross income, while the vaccine company will retain GBP 43,445.

²³ Detailed calculations are available as an attachment titled 'MADE Poultry Production and Impact Model.'



Source: MADE Team Analysis.

The present terms are unfavourable for distributors and vaccine companies, and will likely not generate much enthusiasm for the traditional poultry market. The analysis may explain some of the challenges that PCMK has been having in obtaining distributors' buy-in and covering intervention costs at the vaccine company level.

Potential Modifications

Under the model's present form, it will likely be difficult to obtain private sector buy-in, particularly if a year-round distribution chain is to be established. As the analysis shows, with a modest number of distributors, the revenue would be spread thin. Nevertheless, the model offers a good position to start from, and its feasibility can likely be increased with some enhancements. The following points should be considered by MADE:

- How can the share of income for distributors and the vaccine company be increased? It may be possible to modify intervention's pricing structure for a more even spread of the income.
- What alternatives to using VBVs are available? It may be possible to structure the intervention for a more robust role by urban distributors, if there is greater incentive for them to participate. For example, it may be more feasible to facilitate distributors to access rural areas directly, at a specific time in the year, using temporary labour. Urban distributors are also often vets or para-vets themselves, and already know how to administer vaccines and are also capable of disseminating technical information.
- It may be more feasible to structure the intervention so that rather than having the vaccine trickle into rural areas the year round, it is made available as part of intensive, time-bound campaigns. This technique has been tried in other countries, such as Mozambique, with some success. The advantage of the campaign style would be that the income to private sector actors would not be spread over a period of time, less of their time would be required, it would be easier to access villages during a specific period of time, and raise the likelihood that awareness building activities would be successful.
- Depending upon availability and price, it may be more feasible to use imported rather than local vaccine.

Potential Lead Firms for Poultry Interventions

There are several vaccine companies operating in Nigeria. Potential lead firms can be drawn from this population once discussions based upon an intervention prototype take place. The majority of firms are located at Ibadon, near Lagos, which is a hub for the commercial poultry industry.

Potential Public Sector Partners for Poultry Interventions

On the public sector side, NVRI will likely be the primary choice for partner, as it is the only entity currently producing vaccine inside Nigeria. The remaining supply of vaccines is imported by a multitude of vaccine

companies. However, the arrangement with NVRI will be dependent upon their ability to supply vaccine for both the pilot phase and a potential scale-up, as well as their ability to supply into the Niger Delta. It will also be important to liaise with the state Agricultural Development Programmes, both to verify that they are not planning any free vaccination campaigns, as well as to assess whether existing structures such as the FADAMA self-help groups could be leveraged for a poultry intervention. Finally, the state-level Directors of Veterinary Services should also be engaged, to assess their capacity and extent of activities (or lack thereof) in the traditional sector.

Recommendations for Additional Research

The analysis of the traditional poultry market system in the Niger Delta shows that there is clear potential to strengthen the economic position of low-income females by combating the prevalence of Newcastle's Disease. The medical solution for this, in the form of vaccine, is available both locally and internationally, but what is lacking is a market-based mechanism to deliver the vaccine to rural areas in a pro-poor manner. If the appropriate intervention can be found, there is potential to create sustainable impact on tens of thousands of households.

If it is decided that the feasibility of working in the Niger Delta's traditional poultry sector should be further assessed, it is recommended that MADE incorporate the following additional objectives into its research:

- **Appraisal of demand, purchasing power, and preferences.** During interaction with villagers in Oguta village near Owerri on 23rd October, and later in a focus group with 15 residents of Aradhe village in Ozorro, on 25th October, keen interest in treatments which could protect birds from illnesses was witnessed. When told about the potential vaccine, and asked whether farmers would be willing to spend between NGN 50-100 to protect their birds, their responses were overwhelmingly positive. Farmers inquired about how the vaccine could be obtained, who was selling it, and how it would be given to the birds. While this anecdotal evidence is now available, as a next step, MADE can quantify latent at given vaccination price points, as well as deepen insights into consumer behaviour through a survey of a statistically significant number of rural households. Such a survey should also be used to obtain additional information to help design a potential intervention.
- **Appraisal of rural anchor points.** Penetrating rural areas with 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:
 - Village-based general stores selling different forms of consumer goods and farm inputs
 - Presence of lead farmers in rural areas. E.g. medium-scale commercial poultry farmers present in the village could be an anchor point.
 - Social structures, such as self-help groups and cooperatives. E.g. the World Bank's FADAMA programme has a network of crop and livestock cooperative groups in states throughout Nigeria. There are also groups for poultry, but they are currently focused on backyard commercial poultry in rural and peri-urban areas.²⁴
 - Other types of village-based entrepreneurs selling consumer goods, fertilizer, pesticide, or feed
 - Presence of bird collectors, since they already move between several villages and urban areas.
- **Investigation of state-level vaccination plans.** State governments in Northern Nigeria have been known to embark upon their own NCD vaccination campaigns. While this is not standard practice, it should be determined whether any of the Niger Delta states have such plans to either conduct or subsidize NCD vaccination. Such plans could have a direct impact on a market-based NCD intervention.
- **Alternate cold-chain and distribution solutions.** Globally, several projects are trying to tackle the problem of vaccination of local chickens in a cost-effective manner. A review of these projects can help inform MADE's own activities. For example, the [CHARS Livelihood Project](#) in the riverine islands of Northwest Bangladesh has a poultry market development intervention which is also trying to work with the VBV model. The project is also experimenting with the use of solar-powered refrigerators to try and overcome cold-chain challenges. However, it should be noted that many projects are not utilizing market-based models, and often the vaccination of local chickens is subsidized by government agencies.

²⁴ ADP FADAMA in Benin has expressed interest in cooperating with MADE on areas of mutual interest.

- **NVRI's ability to supply into the Niger Delta.** Through discussions with PCMK, it has been learnt that their distribution system is weak and likely unable to support a large scale-up phase. The exact capacity at NVRI should be determined, along with their ability to supply the Niger Delta states. NVRI has [its own labs](#) in certain states, but they are not reputed for regularity of supply.
- **Vaccine company distribution networks and interest.** It is well known that the larger vaccination companies have distribution networks inside the Niger Delta. These normally consist of a sales force, operating with the help of a central management unit, and utilizing one to a few vaccine depots. Initial conversations with [Animal Care Konsult](#) and [CHI Pharmaceuticals](#) have confirmed this structure. Further discussions with vaccine companies can lead to a more thorough understanding of their operating model. Once an initial prototype has been agreed upon, discussions can be taken to the next level of soliciting interest from companies which would like to partner with MADE.

Annexure 1 Contact List per State

NAME	DESIGNATION/ORGANIZATION	CONTACT	LOCATION	STATE
Rita Ogbe	Live-bird Market Retailer	08029-5315-01	Ugbuwangue Market, Warri	Delta
Dr. Kent Akpojivi	Veterinarian/Poultry product distributor	0805-6650-779, 0805-6650-779	State Ministry of Agriculture, Warri	Delta
Dr. Patrick Okonkwo	Pejice Agrovet Ltd.	0803-471-8011, 0803-243-9797, 0705-400-8811 pagrovet@yahoo.com	73 Akintola Rd. Sapele	Delta
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