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Strengthening Resilient Livelihoods Project (RELIP)

Report on Local Poultry Market Assessment in Yumbe District

By

Wilfred Eneku

December 18, 2019

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Acronyms and Abbreviations

AFARD	Agency for Accelerated Regional Development
AHO	Animal Husbandry Officers
AWO	Arbeiterwohlfahrt
BMZ	The Germany Development Ministry (Federal Ministry of Economic Cooperation and Development)
CARITAS	Caritas Internationalis
CBA	Cost-Benefit Analysis
CEFORD	Community Effort for Rural Development
COVAB	College of Veterinary Medicine, Animal Resources and Biosecurity, Makerere University
CRS	Catholic Relief Services
DCA	Danish Church Aid
DDP	District Development Plan
DLG	District Local Government
DOC	Day-old-chicks
DVO	District Veterinary Officer
EUTF	European Trust Fund
FAO	Food and Agricultural Organization of the United Nations
FG	Farmers Group
FGDs	Focused Group discussions
GPS	Geographical Positioning System
HPAI	Highly Pathogenic Avian Influenza
IDI	In-depth interview
Kg	Kilograms
Km	Kilometers
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MS-Excel	Microsoft Excel
MTN	Mobile Telephone Network (telephone company)
NALIRI	National Livestock Research Institute
NARO	National Agricultural Research Organization
NGOs	Non-Governmental Organizations
OPM	Office of the Prime Minister
OWC	Operation Wealth Creation
P1, P2, …	Participant numbers for interviews
PTC	Primary Teachers Training College
RELIP	Resilient Livelihoods Project
UBOS	Uganda Bureau of Statistics
UNHCR	United Nations High Commissioner for Refugees
VSLA	The Village Savings and Loans Association

Executive summary

Poultry production is rapidly gaining popularity in Uganda in recent times. The flock numbers steadily increased between 2013 and 2017, by 9.6% and egg production grew by 9% with chicken being predominant.

Poultry keeping has several advantages over other livestock. It is one of the key livestock industries that does not discriminate against gender in terms of ownership and nature of work. Their small size, short generation cycle and high-value products front them as a suitable option for food security in limited land holdings, a common feature in refugee settlements and host communities.

Despite the known advantages of local chicken rearing, the current status of production of poultry and marketing systems is not clear enough to allow an entry point for intervention. As stated earlier, there has been an influx of refugees into the district in the recent past, making Yumbe the largest refugee-hosting district in Uganda. An increased population of people into an area creates congestion, affects local demographics, land-use and socio-economic environment. Consequently, the production and marketing activities are affected, notwithstanding the prevailing local circumstances.

It was, therefore, essential to characterize the local poultry production practices and marketing so as to identify an entry point for intervention by stakeholders.

This study was conducted in Yumbe district with a particular focus on refugee settlements and host communities. The survey employed a cross-sectional design to collect data on demographics, poultry production characteristics and marketing. Semi-structured and in-depth interviews for participants, key informant interviews and focus group discussions were used to explore the perceptions and experiences in poultry rearing. Both quantitative and qualitative data were collected concurrently and results mixed at the analysis stage. A total of 89 households, 3 focused group discussions and 10 key informant interviews were conducted between 26th October and 8th November 2019.

The results showed that men, women, and youth are all involved in poultry rearing in the settlements and host communities. The main poultry breed kept was the indigenous chicken maintained on the free-range or scavenging system with minimal or no inputs at all. Kuroiler breeds have been introduced as superior alternatives to the indigenous chickens as they are known to grow faster, heavier and lay more eggs. Commercial layers and broilers were only found in 2 farms (one farm producing strictly for its own established hotels).

Poultry diseases constitute the most limiting factor in advancing indigenous poultry production in Yumbe. Newcastle disease stood out as the most important cause of mortality, followed by fowlpox. Dwarf tapeworms were identified as a significant cause of mortality among pullets and cockerels in the settlement.

Veterinary services are scarce and not available when needed. The staff available are overstretched and cannot meet all the needs of poultry farmers. Moreover, poultry production is less prioritized and not regulated at all.

The main poultry product in Yumbe is live birds sold alongside small ruminants in livestock markets. The markets are structured into informal, primary, secondary and urban types. Most farmers sell informally to peers or middlemen and they sometimes exchange poultry for goats. Secondary markets and urban markets serve wider areas and are often operated by 20 to 30 traders on designated market days. The prices of cocks range from Shs. 25000 to 35,000 and hens at Shs. 13,000 to 18,000 in different markets in non-festive seasons. The current estimated market value for live birds on weekly basis in all the 5 major livestock markets in Yumbe is 3988 birds (Shs. 79,760,000) against the weekly supply of 829 chicken (Shs. 19,753,500). The unmet weekly gap is 3159 chicken translating into lost income of Shs. 60,006,500. Eggs on the market are imported from central Uganda with an estimated turnover of 900 trays per week. Egg prices are Shs. 11,000 per tray and Shs.500

per egg. The current estimated weekly demand for eggs in Urban Yumbe district is 1507 trays (Shs Shs.22,600,000) against supply of 909 trays (Shs. 10,008,000) in the same period. This leaves unmet supply gap of at least 598 trays (Shs. 12,592,000). This therefore provides opportunity for prospective investors.

The main actors in the poultry industry in Yumbe are the poultry farmers; Traders, transporters, restaurants, and hotels; breeders from central Uganda, poultry drugs and vaccine suppliers. Institutions with presence in poultry industry in Yumbe are government ministries, departments and agencies (MAAIF, UBOS, District local governments and Operation Wealth Creation); Humanitarian agencies, development partners and NGOs (UNHCR, OPM, FAO, AFARD, CEFORD, CARITAS, DanChurchAid); training and research institutions (COVAB-MaK, NARO, NALIRI).

Cost-benefit analysis based on a model programmed hatching and minimum improved husbandry practices being practiced by some beneficiaries shows impressive projections and prospects for improving indigenous chicken productivity. With only 5 hens and 1 cock on programmed hatching technology, an individual is estimated to have 173 chicken for sale and 22 retained as parent stock for the following year. The annual income estimates stand at Shs. 825,200. Compared with annual income estimates of cash crops such as maize (Shs. 582176), ground nuts (Shs. 256, 504) and sunflower (Shs. 516058), local poultry is more profitable. Further more, with 22 parents retained for the start of the following year, the sales are expected to increase by atleast 4-fold. In addition, there are no severe price fluctuations in local chicken prices and their production is not dependent on rain as is the current state for all the crops grown in the region.

As local chicken production is profitable and an integral part of livelihoods, I recommend the following for their improvement:

- Improving breed quality: There is need to improve the quality of local breeds so as to improve essential productivity indices such as growth rates, feed conversion, disease resistance and numbers of eggs laid. Crossbreeding with breeds that perform relatively well in free-range such as Kuroilers should be considered.
- Improving feeds and feeding practices: Local feed sources that enhance poultry productivity should be identified and promoted as an integral part of routine or cash crops grown. Supplementary feeding of the birds for quicker growths should be promoted among farmers by all stakeholders. Minimum supplementation has positive impact on growth rates.
- Improving disease and death controls: Enhanced disease prevention and control through routine vaccinations, education of farmers on basic husbandry practices and veterinary services should be provided to the poultry keepers. Diseases to be targeted for vaccinations are Newcastle disease and fowl pox as these were reported the most common in the flocks. Also research be conducted to identify other diseases that cause mortality in the flock and yet are not defined. For example, the necropsy diagnosis of pathogenic dwarf tapeworms during the survey with significant mortalities in the pullets and cockerels was not known in the area previously. Poultry housing and artificial brooding should be promoted among farmers so as to reduce deaths (particularly among chicks) from bad weather, predators and outdoor accidents.
- Increasing profitability through programmed hatching technology promotion and selling collectively for example, through poultry farmer groups or poultry cooperative society. This will increase the numbers of birds available for sale, minimize marketing costs and increased bargaining power and stabilize live bird prices.
- Institutional reforms and prioritizing poultry in national poverty reduction strategies: There should be increased popularization of enterprises that require small landholdings with significant returns such as poultry.

1.0 Overview of Yumbe district

The Yumbe District Development Plan (DDP) shows that the district, formerly Aringa county, was created in November 2000 from Arua District. Bordered by South Sudan in the north, Moyo district to the east, Koboko district to the west and Arua district to the south, the district covers a total area of 2,411 km^2. Administratively, Yumbe has one county, 12 sub counties, 01 town council, 101 parishes, and 636 villages. Demographically, there are 532,870 nationals and 223,253 refugee population (42% of local population). Women and children constitute 86% of the total population. The average household size is higher for nationals (10 people) than refuges (7 people). Equally, nationals have more land holding sizes (5 acres) than the 1 acre for refugees. About 94% of the population live in rural areas. Socio-economic infrastructures are poorly developed i.e., murram road network of 15 Km urban council road, 72 Km of trunk roads, 149 Km of feeder roads, and 654 Km of community roads (that are all in sorry but motorable states). Grid electricity covers less than 1% of the households. Mobile telephone connectivity exists (for MTN, Airtel and Africel) however internet use is low. The presence of trading centres and weekly markets is supportive of building sustainable income generating activities for both host and refugee populations. In spite of the three piped water schemes (town council, Kuru and Lodonga), access to safe water is only at 37%. Pit latrine coverage stands at 69%. With the influx of refugees, health (22 facilities) and education (131 primary schools, 18 secondary schools, 1 Core PTC and 3 Technical Colleges) services are over stretched. Finally, the main source of livelihoods is subsistence farming. The main food crops grown are maize, cassava, beans, groundnuts and simsim and livestock reared are goats, sheep, cows, birds, rabbits and in some non-Muslim families, pigs. Major cash crops are tobacco and cotton.

1.2 Background to the study

The civil conflicts in South Sudan has since 2013 resulted into increased influx of refugees into West Nile, Uganda that by January 2019, totaled to more than 700,000 refugees (86% women and children, 3% the elderly). In spite of the progressive Uganda Refugee Act (2006) and Refugee Regulations (2010), livelihood insecurity is a norm. In a bid to empower refugees and host communities to achieve economic, social and environmental self-sufficiency, the Agency for Accelerated Regional Development (AFARD) secured a 39-month funding from the AWO International and the Federal Ministry of Economic Cooperation and Development (BMZ) to Strengthening Resilient Livelihoods Project (RELIP) in Yumbe district.

Targeting 2,115 persons (2,100 FG members' household population and 15 AFARD staff; 60% female and 50% each South Sudanese refugees and nationals including people with special needs), the primary objective of RELIP is, "Refugee and host communities in Yumbe district, Uganda are economically integrated and have resilient livelihoods." The specific objectives are: 1) 300 target households in refugee and host communities have improved food and nutrition security status by 2022; 2): 300 targeted households in refugee and host communities have increased income; 3): Peaceful co-existence within and among refugees and host communities has improved by 2022. The project seeks to secure livelihoods for vulnerable households due to (i) low production of subsistence farming technologies that are less resilient to

adverse climate change; (ii) limited alternative sources of income due to lack of skills for microenterprise management and access to business capital; and (iii) weak community dialogue for harmonious and peaceful co-existence and limited initiatives for environment conservation. Through Peer learning approach for sustainable access to extension services, VSLA methodology for alternative income generation, Climate-smart agriculture practices, Livelihood diversification, and Stakeholders engagement the project envisages increased agricultural production and livelihood diversification that will ultimately improve food and nutrition and income security and trigger peaceful co-existence between refugees and host communities.

1.3 Purpose, Objectives and Scope

RELIP seeks to promote local poultry production and marketing because it contributes to healthy diet, gender-sensitive income, and the waste supports kitchen gardening. The purpose of this study is to assess the current status of the local poultry industry in Yumbe district to determine production and marketing practices and products as well as challenges and opportunities in the poultry value chain. This will support the identification of entry points for intervention for sector improvement and market positioning for improved livelihoods. Specifically, the study will:

1. Assess and understand the production practices/ technologies and levels including the identification of the sector actors/stakeholders including input suppliers, their contributions to the value chain, and their existing linkages, strengths and weaknesses.
2. Determine the local market demand and supply in the district including mapping out of potential markets/customers, and profitability (with clear cost and margin analysis using locally appropriate methods).
3. Recommend appropriate strategies and intervention for the promotion of local poultry agribusiness in poor rural refugee and host communities in Yumbe district.

1.4 The Scope of the study

Geographically, the study will be carried out in Yumbe district. The project outreach of host communities and Bidibidi refugee settlement will be covered. Consultations will be made with all key stakeholders including UNHCR, OPM, district and sub county leaders, youth, women and men in host communities and refugee settlements, and private sector actors.

1.5 Poultry production

Poultry production is rapidly gaining popularity in Uganda in recent times. Chickens are the most widely distributed livestock among households in Uganda, with at least half of all households in Uganda owing chickens as of 2008 livestock census (MAAIF & UBoS, 2009). Ninety-nine percent of these households owned indigenous chickens with an average flock size per household of 6 chickens. In 2008, the national chicken numbers stood at 37.2 million, 87.7% of which were indigenous breeds. The number of chicken in Uganda has been increasing by 2.8% in recent years approaching 47.6million as of 2017(UBOS, 2018). In this same period, the proportion of indigenous chicken remained the same at 87.7% of the total population while the rest were exotic birds (layers and broilers). These indigenous chicken were mainly found in Eastern and northern parts of Uganda while the exotic breeds were more in Central Uganda.

Poultry keeping has several advantages over other livestock. It is one of the key livestock industries that does not discriminate against gender in terms of ownership and nature of work. Their small size, short generation cycle and high-value products front them as a suitable option for food security in limited land holdings, a common feature in refugee settlements and host communities.

Local poultry, like in many parts of the country makes the largest number of chickens in West Nile. Since time immemorial, people in the West Nile region have kept indigenous poultry at homes as sources of food and income (State, Birungi, & de Haan, 2009). The predominant type kept are chicken followed by ducks, turkeys, Guinea fowl and sometimes pigeons.

The numbers of these chickens have remained low in communities despite the relatively high value they have in terms of the acceptability of their meat and price locally. These chickens are maintained on minimum or no inputs at all. They continue to suffer from a variety of preventable diseases, both infectious and non-infectious. The most common infectious cause of death among the chickens is Newcastle disease. The birds generally have low production characteristics such as low flock numbers with multiple age groups reared together, few eggs per clutch, low egg and chick weights, poor hatchability (as low as 40%), low chick survival with mortalities ranging from 50-90%, longer sexual

maturity period and longer chick-rearing period of up to 3 months after hatching.

Despite the known advantages of local chicken rearing, the current status of the production of poultry and marketing systems in Yumbe are not clear enough to allow an entry point for intervention. As stated earlier, there has been an influx of refugees into the district in the recent past, making Yumbe the largest refugee-hosting district in Uganda. An increased population of people into an area creates congestion, affects local demographics, land use and socio-economic environment. Consequently, the production and marketing activities can be affected, notwithstanding the prevailing local circumstances.

It was, therefore, essential to characterize the local production practices and marketing so as to identify an entry point for intervention by stakeholders.

2.0 Methodology

2.1 Study Area

This survey was conducted in Yumbe district (Figure 1). In particular, participants from the host communities and Bidibidi refugee settlement were visited. Major live bird markets, egg shops and poultry input suppliers in various parts of the district were also visited and consultations with key stakeholders made. A non-refugee setting away from the settlement in Yumbe were sampled for comparison.

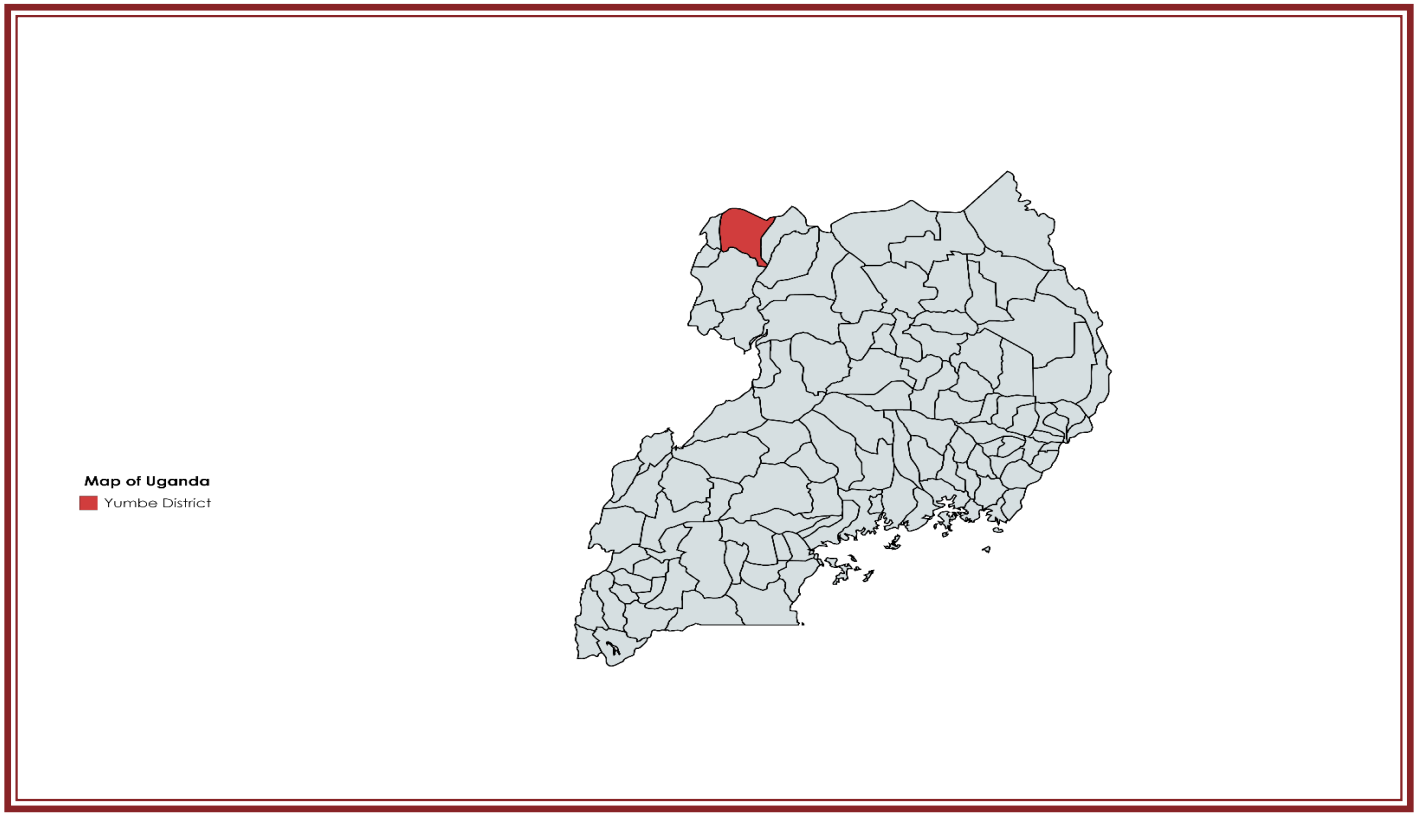

Figure 1: Map of Uganda showing Yumbe district in red

2.2 Study Design

This was a cross-sectional survey in which both quantitative and qualitative data were concurrently collected and separately analyzed, then the results triangulated. These methods were employed to achieve the set objectives as follows:

2.2.1 Sampling and Data collection for objective 1

A list of villages poultry beneficiaries in the host communities and settlements were obtained from District, OPM, and AFARD. Also, a community outside the camp surrounding was selected. At least 100 participants were targeted but eight-nine participated.

Structured questionnaires were used to collect quantitative data on production methods, technologies, and levels of production. In-depth interviews of participants and key informant interviews with district staff, UNHCR, OPM and sub-county staff were conducted to gain more understanding of the production practices, experiences of the farmers and the dynamics therein. Further independent observations and transect drives were conducted by the researcher to understand the production and marketing practices of poultry in the district. The key areas assessed during this survey included:

- Poultry housing and production systems in use (Free-range, Semi-intensive, Intensive and Others), brooding methods and biosecurity practices.
- Breeds and breeding methods to include available breeds, breed improvement practices and production indices of the breeds. Also, identify actors (breeders) in the breed improvements in the district and their contributions.
- Feeds and feeding methods in relation to systems of production. Also identified were potential local feeds for poultry, commercial feed producers and their installed capacities and their limitations.
- Diseases affecting poultry their prevention and control methods. Also identified were suppliers of veterinary products, their locations, product ranges, and delivery methods.
- Extension services in all the above four areas. Identified were the extension actors and what they provide, the frequency of encounters and the impact of the knowledge transfer.
- Marketing practices (batter trade, where they sell their poultry, means of transport, how long to sell when taken to market, current prices).
- The actors, their contributions, strengths, and weaknesses

Three focused group discussions, participatory rural appraisal, and observations were used to gain a quick understanding of the production practices.

2.2.2 Data analysis and Presentation for objective 1

Quantitative data collected from questionnaires were entered into MS-Excel and imported to STATA software to generate descriptive statistics about demographics and production parameters measured. Associations between production and demographic factors were measured using multinomial logistic regression.

The recorded interviews and notes taken were later transcribed and coded deductively to generate themes. Meaning units extracted from the transcripts and field notes were used in the presentation of qualitative results. The final result contains a mix of qualitative and quantitative results.

2.3.1 Sampling and Data collection for objective 2

Structured questionnaires were used to collect data of markets, product prices and customers/consumers. GPS locations for the markets were taken to generate distribution maps. The markets were categorized according to FAO criteria into informal, primary, secondary and urban depending on: facilities present in the market (sanitary, existing buildings/infrastructures/utilities), level of activities, market catchment areas, poultry products/live poultry and their prices/turn-over rates, origin of the products/price at origin and main customers. Observations, semi-structured interviews and one focus group discussion were conducted to understand the traders' experiences and perceptions about poultry trade in Yumbe.

2.3.2 Data analysis and presentation for Objective 2

Survey data were summarized to generate descriptive statistics and distribution maps for markets in the district. The field notes and transcripts were coded to generate themes that were presented with meaning units extracted.

2.4 Ethical considerations

The activity was non-invasive. However, verbal consent was sought from the participants before the interviews. Participation was voluntary without any inducements or coercion.

2.5 Limitations

All the local chicken farmers did not keep records. The numbers of chicken were obtained by making attempts to count them. The semi-adult to adult birds were easily counted but the numbers of chicks were based on recalls of numbers present the previous day or from the hatch.

For the same reasons for lack of records, the numbers of chicken sold were obtained by verbal declaration of sales and calculations of cost-benefit were based on relevant assumptions. The prevailing diseases were judged from the description of clinical signs, verbal autopsy, and actual autopsy.

3.0 RESULTS

3.1 Production systems, technologies, levels and stakeholders

3.1.1 Demographics

Of the 89 survey participants, 50 (56%) were males and 49 (44%) were females. The median age was 33 years with a range of 18 to 72 years. Twenty-six (29.2%) were refugees, 24 (27%) host community members and the rest were non-residents of refugee-hosting sub-counties. Seventy-two (81%) were Muslims, and 61 (68%) belonged to groups formed by various organizations, not necessarily poultry-keeping groups.

3.1.2 Production systems

Three production systems were encountered in Yumbe during the study period. The main system of production was the free-range system. All the participants in the settlements and host communities kept their poultry on the free-range system, where birds scavenge for their own feeds. The chicken could be seen roaming around homesteads, trading centers, and crossing roads. In this system, encounters with wild birds and animals cannot be avoided. This can predispose the birds to highly pathogenic poultry diseases as well as to predation. Chicks can also die from bad weather, especially heavy rains. Although the participants recognize that it is not possible to get commercial on this system, they, however, prefer it as a "cheap way of keeping of keeping chicken".

The second system of production encountered was the semi-intensive system. In this system, chickens are kept indoors and then released out for 2 to 4 hours a day. On one farm of 1000 broilers in Lodonga, chicks were brooded for at least 4 weeks and then released into fenced areas to graze and later get back into the house. In the refugee camp, groups supported by CEFORD kept their birds indoors for several weeks, but released them to feed outside "when feeds became scarce". The release was reported to be for at most 4 hours.

The third production system was an intensive system where birds are kept strictly indoors. This was seen with two farms. Both of them used the system to raise commercial laying chicken. One of the farms in Kuru sub-county raised 350 chicken while the other in Lodonga raised 1000 laying chicken. The Kuru farm stocked 520 birds as day-old-chicks but the rest died from suspected coccidiosis during growers'stage.

Housing Most people 47 (53%) had no separate chicken house but rather shared a kitchen or abandoned old house with chicken. All the 25 (28%) participants who had separate chicken houses were either refugees or host communities who benefitted from NGOs working in the area and the are all members of a group. Seventeen (19%) other members belonged to groups that built communal houses with support from an NGO (CEFORD) in villages 5,6,7 and 9 in zone 1, Bidibidi refugee camp. The median house area was 6.25m^2 range (1.5 to 18m^2). The houses were relatively small and would accommodate between 15 chicken (for 1.5m^2) and 180 chicken (for 18m^2) assuming floor space as the unit of measurement. Except for the communal houses used for semi-intensive production, the rest of the houses were for night boarding.

All the houses used for chicken in host communities were roofed with thatch grass and had unplastered mud walls. The walls in the settlements were similar to host communities but roofs were mostly made of taupulines. Many houses were fenced with mosquito nets to provide a resting yard for the chicken in the settlements (Appendix III, Figure 7). Biosecurity measures were not possible under this system and so the flocks are at risk of contracting diseases.

Actors/stakeholders in the poultry housing sector

There were no actors involved in building poultry houses or supplying materials for the houses (Table 2). All the houses were built from temporary locally available materials. Building a house by individuals or groups was a precondition to receiving chicken from livelihood projects.

3.1.3 Poultry species and Breeds

Chickens were the predominant type of poultry seen in the homesteads and markets. In fact, no other species

were seen in the markets other than the chickens. In addition to the chickens, three homesteads had ducks and one had both guinea fowls and pigeons. The guinea fowls and pigeons were rather kept as a hobby than for income.

Indigenous chickens were found in all homesteads visited. They were either owned by the participant or a member of the family. The breeds are still poorly characterized genetically and phenotypically like in the rest of the country. In addition, 21 homesteads owned both Kuroilers and indigenous breeds. The kuroilers are Indian breeds that were first introduced in the country by National Animal Genetic Resources Centre and Data Bank (NAGRC & DB), Entebbe in July 2010, to crossbreed with the indigenous chickens. The breed is known to possess traits of high growth rate, higher egg production than indigenous chicken and are non-broody. The eggs were hatched by indigenous chickens that were laying at the same time.

The local birds were mainly self-stocked while the kuroilers were introduced by several Non-governmental organizations under livelihood projects to support the refugees and host communities. Some farmers bought kuroiler eggs from previous project beneficiaries and were hatched by the local birds.

Breeding of the kuroilers and local birds was at random. In the free-range system, no one controls the mating and resultant offsprings. This is rather a challenge the actors need to address before further distorting the local genetic resources of the indigenous birds.

3.1.4 Flock sizes and structures

On average, each household had 12 chicken in total. Most of the participants did not initially count chicks as part of their flocks. This is because of their feelings that they rarely survive to weaning stage. This was expressed by one of the participants that "…we do not count chicks because they most of the times die. Very few usually survive" (P2, IDI). When added together, chicks usually constitute the largest numbers in established flocks. The average flock structures per homesteads are presented in Figure 2.

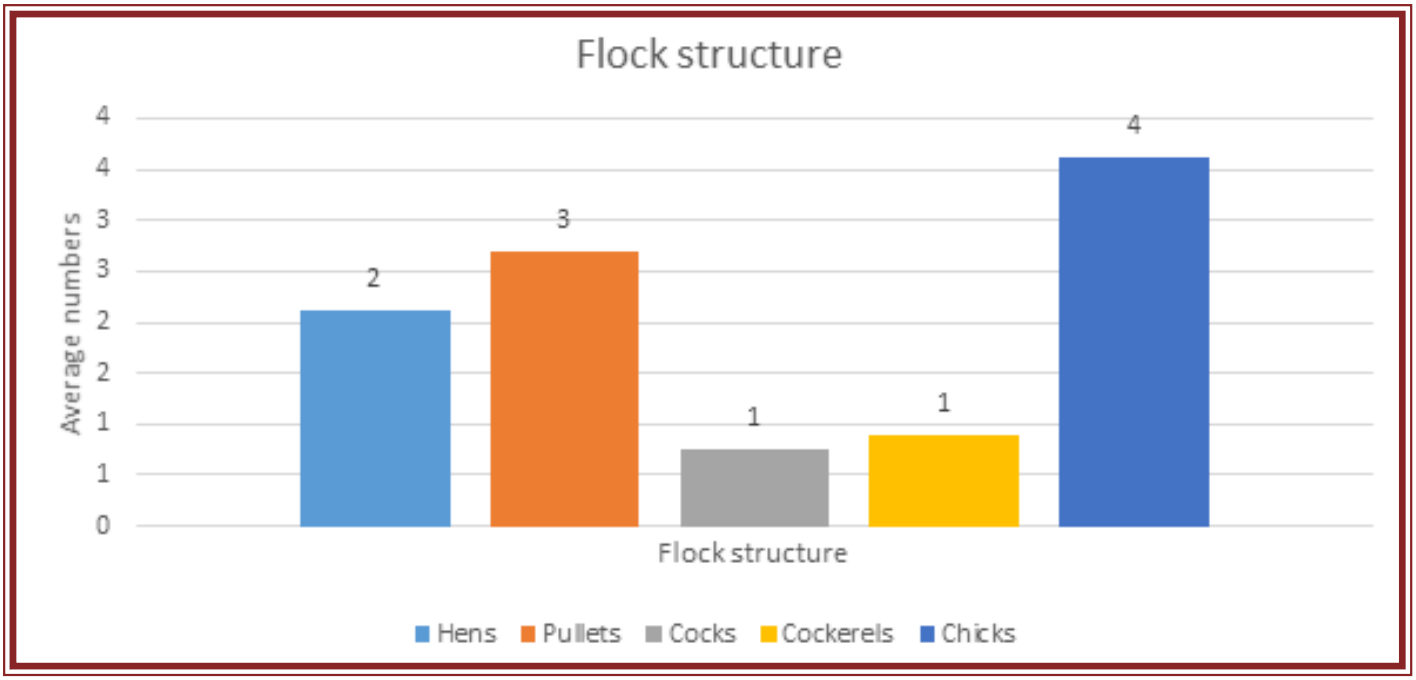

Figure 2: Average flock structure of chicken in the homesteads

3.1.5 Breed and Flock improvement technologies in Yumbe

In Zone 1 and host communities of Bidibidi settlement, programmed hatching was practiced by 2 beneficiaries of the AFARD poultry project. One of the beneficiaries reported the sale of 25 birds in the week of the survey at an average cost of Shs. 15,000. He started the practice in March 2019. Programmed hatching is a technology that was developed a decade ago in central Uganda to improve the numbers of local chicken. In this, hens lay eggs, the first egg is boiled marked with a pencil. The subsequent eggs are removed and also marked. The eggs will only be set when at least 3 hens start incubating. The boiled egg is removed and fresh ones set, with those laid last set first. When hatched, the chicks are removed at night brooded artificially and a new batch of eggs set.

The same beneficiaries were trained in para-veterinary practices and so help their village mates in vaccinating chickens and deworming them.

3.1.6 Commercial Poultry breeds in Yumbe

The commercial poultry kept in Yumbe were Brown layers and Broilers. Only two layer farms with flock sizes of 350 and 900 were identified by the key informants at the district level. The flock of 350 birds is located in Kuru sub-county and produces for the general public while the flock of 900 birds, located in Lodonga produces eggs for its own hotel and bulk buyers from Koboko district. For the broilers, it also the same farm in Lodonga that has them on the semi-intensive system.

Day-old-chicks (DOC) for these flocks are purchased from Kampala or from middlemen located in Arua or Koboko district. Each layer chick is purchased at Shs. 3500 while broilers are at Shs. 2500/=. They are transported on buses. Mortalities during transit are common but do not exceed one percent.

Actors in Breeding and stock supply

Apart from fellow farmers and local markets from where indigenous chickens are got, there are no local suppliers of starting stocks in Yumbe district. The DOCs for the two commercial poultry farms came from Kampala or agents in Arua and Koboko (Table 2 and Figure 3). The kuroilers supplied to the refugees and host communities came from Chick Masters (U) Ltd, a breeder from Mukono, central Uganda. The supplies were done in contract framework arrangements between local NGOs working with the refugees and the breeding company. The NGOs that supplied Kuroilers and their sites of supply are listed in Table 1. Maintenance support of the flocks was within the project period

and ended with the project lifecycle. In short, obtaining starting or breeding stock for poultry is a big challenge in Yumbe district.

Other challenges reported by the Key informants at refugee settlements in relation to the actors/ partners included:

- few numbers of chicken given to the beneficiaries. All partners gave between 2 to 12 chicken per beneficiary in selected zones, while some gave 2 to 3 chickens. The informant wondered "what change would this bring to the life of the beneficiaries". This was attributed to limited budgets the partners operated with. Some of the chickens were reportedly distributed without consulting the OPM that oversees operations of the partners in refugee settlements. As a solution, the key informants proposed distributing more chickens to a few members.
- some partners distributed chickens late in the year (towards Christmas) without training. Most beneficiaries ate the chickens or never gave proper care to them and so the stock was lost.
- Sustainability of these projects before the project life-cycle has been a challenge. At the end of the cycle, the supply of inputs like feeds, drugs and advisory services cease and often, the groups disintegrate. The beneficiaries are also not well linked to input suppliers before the end of the project.
- disease outbreaks were reported to be the biggest obstacle in increasing the chicken numbers in the settlements and host communities. In the opinion of the OPM and UNHCR key informants, training the beneficiaries in basic husbandry practices and disease prevention by vaccinations is necessary to avert such occurrences in the future.

Table 1: List of NGOs and Agencies that supplied kuroilers in Yumbe in the last 18months

NGO	Area of operation (Village/ Zone)	Group numbers	No. of chicken per person/group	Current status
CEFORD/FAO	Zone 2	Closed, groups scattered	Information not obtained	Project closed in Mar.2019, all birds sold already
CEFORD/EUTF	Village 5, 6, 7 and 9, Zone 1	6 groups with 25 people each	12 chicken/person and 300 for each group	Ongoing
Catholic Relief Services (CRS)	Zone 1	Information not obtained	Information not obtained	Project closed
AFARD	Zone 1	7 groups with 25 members each	15 birds per beneficiary	Project closed
CARITAS	Zone 3	Information not obtained	Information not obtained	Project closed
DanChurchAid (DCA)	Zone 5	Information not obtained	Information not obtained	Information not obtained
Operation Wealth Creation (OWC)	Citizens selected in the entire district	Beneficiaries are being selected	Beneficiaries being selected	Most chicks died. No new supplies now but expected in April 2020

3.1.7 Feeds and Feeding

Under the free-range system, chicken fend for their own food. They roam freely in the villages to feed on grass, insects and household refuse. The chicks and adults are roamed together. This study was conducted in the rainy season when insects and green grass were abundant. The thick vegetation covers also provided hiding grounds for predators. As alluded to by most farmers, predators often fed on the chicken "…one of the challenges we face is nyaraga (wild cat) that eats our chicken" P2, IDI.

Feeds were considered as a major limitation in poultry keeping in Yumbe. It was the reason why beneficiaries of a poultry project released chickens from intensive to the free-range system when the start-up feeds were exhausted.

According to the information obtained from the District Agricultural office, the main food crops grown in Yumbe are cassava, sweet potatoes, maize, sorghum, and finger millet. However, records of quantities produced per annum were not available. These can serve as good energy sources. The protein sources were remnants of fish from local markets, legumes (beans, sunflower) and insects/ worms.

Actors in Feed supplies and processing

There were no stockists of compounded poultry feeds or ingredients in Yumbe district during the survey period. The nearest source of ingredients or feeds was in Koboko district, from where the commercial poultry farms purchased the supplies. From the experience of the 350-layer farm, the challenge of the feed was very severe. The cost of compounded feeds for 70kg bag of layers marsh was Shs. 96,000 (approx. Shs. 1372/kg) in Koboko. The transport cost per bag to the farm was Shs. 4000. The flock ate 45kg per day, therefore a bag of feed lasted 1½days. The percentage lay was about 62% (230-240 eggs/day), translating to 8 trays per day. The price for the tray of eggs was Shs. 10,000 and Shs.400 for individual eggs. Therefore, the farmer's daily sales from the 8 trays was Shs. 80,000. If the daily cost of feed is Shs. 61,740 (from Shs. 1372 multiplied by 45kg), then the farmers earning per day is Shs.18,260 without other routine costs. This minimal margin after feed costs leaves the farmer vulnerable to other catastrophic expenditures.

From the stockists in Koboko, the farmer also obtained ingredients such as maize bran, cottonseed cake, shells, premix, salt, fish meal, and other additives. They provided the farmer with a formula to mix up to 180.5kg of feed at Shs. 293,500. This translated to Shs. 1626/kg, way above the already compounded feed. Some of the ingredients used in the feeds such as meat booster were unnecessary. Therefore, the challenge of feeding poultry in Yumbe is real and needs investment for any commercial poultry business to survive in the district.

3.1.8 Poultry diseases and Healthcare

Diseases were reported as the most limiting factor in poultry keeping in Yumbe. From the key informants to the farmers, the most prominent disease reported was Newcastle disease. The disease outbreaks seemed frequent. "Like April this year, I lost 19 chicken to diseases" P6, IDI, zone 1, Village 4, at the settlement.

The farmers described Newcastle disease as the one that causes massive deaths of all age groups of chicken in the homesteads. They also reported signs of drooling from the mouth, sneezing, dullness, weakness, whitish fecal matter staining the cloacal area as common indicators of the disease. Some people associated the diseases with "tasteless meat of the sick birds".

The second disease reported was fowlpox. this was mainly reported to be in young birds and manifested with scabs on the combs and on the skin around the eyes and ears. such birds would eventually die when they do not eat.

These diseases were rather diagnosed by syndromes which have their limitations as several diseases may manifest with general signs. For example, in one home in village 4, zone 1, the farmer reported having lost several birds to Newcastle disease recently. But more chicks of 2 to 3 months old continued to die after the major outbreak. He had reportedly lost 12 chicks in this age group for over 3 weeks preceding the survey date. On the day of the interview, one chick was reported sick with similar signs of disease that caused the previous deaths. The bird was emaciated, weak and sitting on hocks. It had little appetite and was likely to die. Upon seeking consent, the farmer agreed to sacrifice the chick for necropsy examination. The major findings were atrophy of muscles, spleen and liver, numerous dwarf tapeworms in the duodenum and tetramers in the proventricular wall. With a hand lens, these tapeworms were identified as *Davainea proglottina*, a pathogenic worm of backyard chicken worldwide (O'Connell & Christensen, 2016). This finding suggests the occurrence of several undiagnosed diseases in chickens that may be confused based on clinical syndromes.

Other causes of chicken deaths were reported as predators ("nyaraga" and eagles), rainfall for chicks and accidents such as being crushed by the many moving vehicles in the settlements. On the other hand, theft of birds and malicious killing of birds by neighbours were also reported as causes of losses of birds.

Under the free-range system, the birds are highly exposed to diseases, including those transmitted by wild birds. Biosecurity measures were absent in all homesteads and are not practical. Vaccines and veterinary drugs are rarely used on the indigenous. Although Newcastle disease is considered a state-controlled disease and to be controlled by free vaccinations from the government, it was not reported anywhere in the districts by both key informants and participants. Drugs for chickens are relatively cheap for the numbers of birds to be treated, but farmers found it expensive.

Actors in Veterinary service provision

There were three veterinary drug shops operating in Yumbe town. These included Uma, Elite and Mupa veterinary drug shops. They stocked a wide range of products but mostly for ruminants. Only Mupa vet drug shop stocked poultry vaccines but most were on orders made by NGOs implementing poultry projects in the settlements. The vaccines were ordered from Kampala and transported in public buses.

3.1.9 Extension Services and regulation of poultry sector

The district has relatively adequate numbers of lower cadre veterinary staff. Yumbe district has one Veterinary doctor at a Master's level and 15 animal husbandry officers who serve in different sub-counties and town councils. These staffs offer advisory services to farmers, but mostly to cattle farmers. Due to the subsistence and "care-free style" of raising chicken, little veterinary attention is provided. The poultry sector is not well regulated in Yumbe as is the case in the rest of the country. Moving chicken from one district to another or even across the borders does not attract movement restrictions.

Table 2: Poultry value chain and stakeholders for inputs for poultry production

Category	Name	Capacity	Strengths	Weaknesses	Comment
Poultry Housing and Equipment	None identified	-	-	-	Opportune area for masions, capenters and other youth
Feeds and Feeding	No stockist present	-	-	-	Opportune areas for investment given the production of maize, soy beans and sunflower in large scale
Breeds and DOCs	No local breeders, in the entire West Nile region	-	-	-	Opportunity for investment
Poultry product traders	Live bird traders	Over 20 traders per livestock market	Provide a ready market for local chicken, link the villages to towns	Death of birds to diseases, vehicles for disease spread, transportation difficulties and operate as individuals instead of groups	Need for registration and regulation of live birds trade
	Egg traders	900 trays per weak	A ready market for eggs, established source of supply	Irregular supplies of eggs from source due to distance.	Opportunity to produce eggs locally given that factors for poultry production are available in the place
Consumers	Restaurants	The exact number of restaurants not established. On average, a restaurant in Yumbe town was reported to slaughter 7 birds per day	A large number of residents and visitors in Yumbe town		
Government departments	District Veterinary and Agricultural departments	One vet and 15 Animal husbandry officers	Existing systems, personnel and transport	Weak policies on the poultry industry	Need to improve extension services and disease control
OPM and UNHCR	-	Presence in the settlements	Provides oversight role for development partners	-	-
Development partners & NGOs	AFARD, CEFORD, CARITAS, DCA, CRS, ZOA, FAO	-	Available funding networks, available personnel and existing systems	Sustainability of interventions beyond project periods is limited, Limited budgets for poultry projects	
Research Institutions	NARO	Existing zonal research institution in Arua	Available personnel, existing structures	Limited budget allocation from the government	

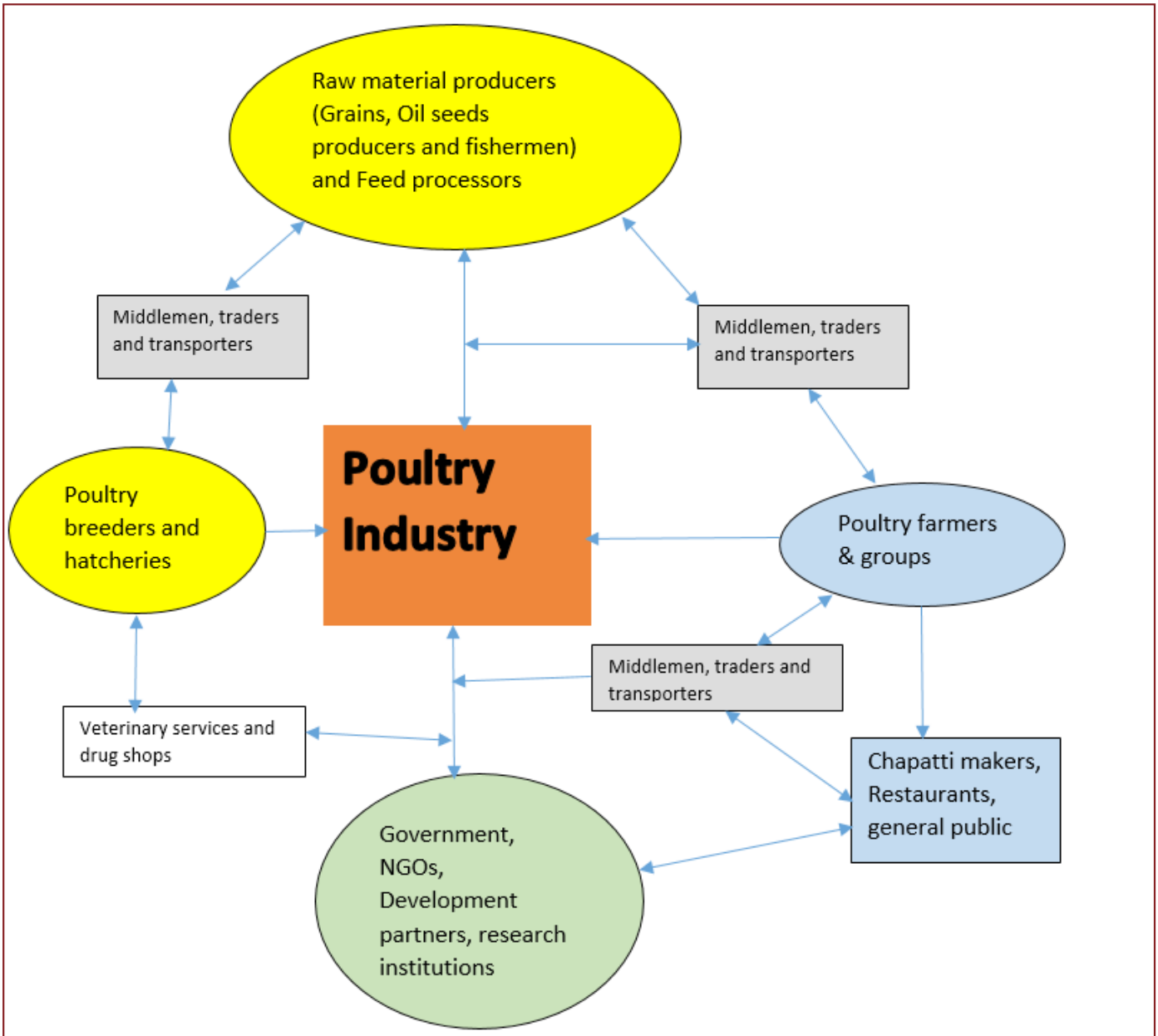

Figure 3: Stakeholders in the poultry value chain and their linkages

3.2 Marketing of Poultry, Actors and cost-benefit analysis for local poultry in Yumbe

3.2.1 Poultry products in Yumbe

The main products of poultry on the market in Yumbe are live birds and eggs. Other products such as frozen meat, sausages and meat-by-products were not available on the market.

3.2.1 Live bird sales

Live birds were the main poultry product sold in the markets and at homes. The prices of the birds varied by sexes, age groups, seasons and locations from the town centre. In addition, chickens with yellow legs were more preferred and bought faster in the markets than others.

Cocks on average cost twice the price of hens. For example, the prices of cocks in all the live bird markets visited ranged between Shs. 27,000 to 35,000/= while hens were sold at be-

tween 13000 to 18,000. Cocks were the most sold chicken on the market. In Legu market in Yumbe town and Meroa market in Kerwa sub-county, cocks constituted 85.7% (n=48, N=56) and 92.5% (n=37, N=40) respectively of birds sold. The reason was that cocks are bigger and "fetch more money than hens to settle urgent domestic needs". Other traders reasoned that "not many cocks are needed at home as they keep fighting" and sometimes get lost. Younger birds were rarely sold but when available, their prices were lower. Cockerels were also sold at higher prices than pullets.

Seasonal price fluctuations were also reported. Lowest prices of chicken were reported to be between January and February at the beginning of school terms when quick money is needed for scholastic items and fees. In that season, a cock is reported to go for Shs. 18,000 to 25,000. The highest prices were reported during the Christmas season and the Islamic festivities of Ramadhan. Around Christmas, a big cock (estimated weight of 3 to 3.5Kg) on average goes for Shs.40,000 with some rare extremes of Shs 60,000 reported in Legu market in Yumbe town.

The prices of chicken were Shs 2000 to 5000 less in rural markets than in Yumbe town. This was attributed to transportation costs and people in urban centres having higher purchasing power. A rather interesting observation was that chickens with yellow pigmented legs were reported to have better-flavored meat and were bought faster than those with darker shanks.

3.2.2 Types of markets

Markets included informal, primary, secondary and urban markets based on FAO criteria (Byarugaba, 2009). Informal markets are those where chickens are sold at homes to traders or fellow farmers. Under this marketing, farmers also exchanged chicken for goats. Four farmers reported having exchanged chickens for goats in the settlement and host communities. For a goat, four adult chicken were given, with at least one hen among them.

Primary markets are those that serve neighboring villages and have few facilities. They do not have large supplies of chicken. In this survey, four markets in or near the settlement were identified as primary markets. These were Barakala, Reception, Base camp, and Kochi markets.

Secondary markets serve a wider area such as sub-counties, neighboring districts or countries. Four markets were identified as the secondary type and included the Yumbe town abattoir market, Lodonga, Meroa, and Okubani markets. These were livestock markets in which poultry, predominantly chicken were sold along-side them. Only Legu market in the town which operated on a daily basis was identified as an urban market. The distribution of the markets and their characteristics are listed in Table 6 and Figure 4.

3.2.3 Demand and supply of the Chicken

The demand for local chicken outweighed the supply. In the live bird markets visited, particularly Meroa and Lodonga markets, traders literally competed for one or two chicken brought by farmers. These two markets are 45 and 18 kilometers away from Yumbe town respectively. No farmer goes back home with unsold chicken. The prices from the farmers were Shs. 3,000 to 7,000 below the market price and the farmers who sell along the way do not pay market dues. The market dues in all the markets were uniform at Shs. 1000 for chicken and other poultry.

In Meroa market that reportedly receives chicken and livestock from neighboring South Sudan and surrounding sub-counties, only 40 chickens were present in the market by 11:20 am on 29th October 2019 by the end of group discussions. These were already bought by traders from Yumbe town and surrounding sub-counties and were still waiting for more farmers to arrive. The livestock market is known to be more active in the morning and closes by 2 pm.

The current estimated market value for live birds on weekly basis in all the 5 major livestock markets in Yumbe is 3988 birds (Shs. 79,760,000) against the weekly supply of 829 chicken (Shs. 19,753,500). The unmet weekly gap is 3159 chicken translating into lost income of Shs. 60,006,500. Eggs on the market are imported from central Uganda with an estimated turnover of 900 trays per week. Egg prices are Shs. 11,000 per tray and Shs.500 per egg. The current estimated weekly demand for eggs in Urban Yumbe district is 1507 trays (Shs Shs.22,600,000) against supply of 909 trays (Shs. 10,008,000) in the same period. This leaves unmet supply gap of at least 598 trays (Shs. 12,592,000). This therefore provides opportunity for prospective investors. Clearly, there is not enough chicken and eggs for the available market (Table 3 and 4).

Table 3: An estimate of the current demand and supply of live birds in Yumbe district

Demand for live birds (Weekly)							
Market	Key markets	Regularity (per week)	Number of middlemen	average buying capacity	Unit price	Market volume	Market Value
Legu	1	7	6	23	20000	966	19,320,000
Abattoir	1	1	36	32	20000	1152	23,040,000
Meroa	1	1	18	15	20000	270	5,400,000
Lodonga	1	2	20	22	20000	880	17,600,000
Okubani	1	2	24	15	20000	720	14,400,000
	5	13	104	107	20000	3988	79,760,000
Supply for live birds (Weekly)							
Market	Key markets	Regularity (per week)	Number of sellers	average number of birds sold	Unit price	Supply volume	Supply value
Legu	1	7	15	3	26500	315	8,347,500
Abattoir	1	1	48	3	26500	144	3,816,000
Meroa	1	1	40	2	20500	80	1,640,000
Lodonga	1	2	25	3	21000	150	3,150,000
Okubani	1	2	35	2	20000	140	2,800,000
	5	13	163	13	114,500	829	19,753,500
Unsatisfied weekly gap						3,159	60,006,500

Table 4: An estimate of the current demand and supply of eggs in Yumbe

Current demand for eggs in Yumbe town							
Market	Key markets	Regularity (per week)	Number of buyers	Average number of eggs bought	Unit price	Market Value	Market Volume (weekly consumption of eggs)
Yumbe town	1	1	22600	2	500	22,600,000	45200
							1507
Current supply of eggs in Yumbe town							
Egg type	Key markets	Regularity (per week)	Number of sellers	average number of egg trays sold	Unit price	Market Value	Supply volume
Commercial layers	1	1	3	300	11000	9,900,000	900
Local chicken eggs	1	1	3	3	12000	108,000	9
Total	2	2	6	303	23000	10,008,000	909
Supply gap						12,592,000	598

Assumptions

- the projected urban population of Yumbe in 2019 is 42,500 people
- Average egg consumption per person per week in Uganda is 2 eggs (UBOS, 2019
- If only 50% of the population consumes the eggs, then average number of buyers is 22,600 people

Actors in the Live bird sales

Traders and middlemen

The main dealers in the local poultry business were middlemen (Table 2 and Figure 3). The middlemen go to homesteads to buy chicken at relatively low prices and sell to traders in secondary and urban markets on specific market days.

Transporters

Most traders and farmers transport their own chicken by hand, bicycles, and motorcycles. For bicycle and motorcycle transporters, they placed the chicken into aerated wire-baskets (Appendix III, Figure 17). Trucks were seen to carry mostly cattle, goats, and sheep.

Customers and consumers

The main customers of the live birds at the homesteads are the traders/middlemen while at the markets and towns are the restaurants and the general public. Because of the high presence of humanitarian agencies, NGOs, traders and other service providers working with the refugees, the population in Yumbe town is quite large. This increased number is in addition to the existing population which is also growing. This population provides a ready market for poultry and its products. In all the eight restaurants and one hotel, the researcher visited, a meal of chicken meat cost between Shs. 1000 to 2000 more than beef. Therefore, chicken meat is more expensive than beef in both rural and urban Yumbe.

Regulation of Poultry trade

As of now, the poultry industry is not regulated in the district. Movement of live birds from home or one market to another is not regulated by movement permits, which are in fact certificates of health. The absence of such a system provides a conducive environment for the persistence of poultry diseases such as Newcastle disease and threats of other diseases such as highly pathogenic avian influenza (HPAI).

3.2.4 Cost-Benefit Analysis (CBA) of local poultry business

Estimation of cost-benefit analysis for local poultry is quite challenging due to the absence of records on production and costs involved. It is difficult to compute expected sales when the survival rates of the young birds are not guaranteed. For this CBA, I have assumed the full-scale adoption of the programmed hatching being promoted in Zone 1 of Bidibidi and host-communities with scanty information available for cost-benefit analysis. Assuming a farmer starts with 5 hens and 1 cock, he should be able to breakeven by 12 months and have at least Shs 825,200 in annual income. This is more profitable than estimated annual incomes of households that depend on the common crops such as maize (Shs. 582176), ground nuts (Shs. 256, 504) and sunflower (Shs. 516,058) (Dalipagic & Elepu, 2014). The summary of CBA is in Table 5 and the details plus assumptions are in Appendix II.

Table 5: Summary of Cost-Benefit Analysis for local chicken on programmed hatching technics

	Batches of eggs laid and hatched by 5 hens in a year				Amounts	Offshoot into the second year		
Production	Batch 1 (Start)	Batch 2 (4th Month)	Batch 3 (8th Month)	Batch 4 (12th Month)		Batch 5 (16th Month, Not computed in annual income)		
Parent stock (5 hens, 1 cock)		Parent stock	Batch 2 retention	Batch 3 retention		Batch 4 retention		
Eggs laid	60	60	120	120		240	240	480
Chicks hatched	50	50	100	100		200	200	400
Chicks survived	40	40	80	80		160	160	320
Total birds after first cycle	46	46	91	91		182	182	364
Retention	0	11	22	22		33	33	66
Sales	0	35	69	69		149	149	298
Total Sales				**173**	**2,595,000**			
Feeds	Batch 1	Batch 2	Batch 3	Batch 4	Qty	Rate		Amounts
Chick Marsh (Kgs)	75	75	150	150	450	950	427,500	
Growers' Marsh (Kgs)	27	90	117	117	351	800	280,800	
Adults (Kgs)	5	5	10	10	30	1000	30,000	
Sub Total							**738,300**	**738,300**
Vaccinations							**156,000**	
Drugs/Chemicals							**156,000**	
Equipment, housing, utilities, Starting birds							**719,500**	
Total Investment								**1,769,800**
Net returns								**825,200**

3.2.5 Eggs and their markets

Three major egg dealers were found in Yumbe. All the three import the eggs from the same commercial supplier in Luwero and Kampala (SR AFRO chicks U Ltd) or from Stockists in Arua. Of the three, the biggest was the "Ideal Group Association" with a stocking capacity of 400 trays per week in peak business seasons. In "bad days", he stocks 300-350 trays per week. All the stock is over within 10days from the stocking date. The Ideal Group Association is a registered business entity recognized by the town council and located adjacent to Legu live bird market in the town. The two other stockists are smaller with stocking capacities of 100 to 250 trays per week and are located along the main street in Yumbe town.

The retail price of the eggs was Shs.11,000 per tray and Shs.400 per egg. The purchase price of eggs at the source was Shs.10,200= but the price was reported to fluctuate between Shs. 10,100 to Shs. 10,500 within the previous 4 months. However, the purchase price has been in an upward trend from Shs.9800 at the beginning of the year to the current price. It is likely on upward trend if no major investments in poultry occur in Yumbe over the period.

Two main challenges were reported by the egg traders. First, delays in supplies leading to stockouts and loss of customer trust are common. In some instances, delays of up to 2 weeks in supply were reported. Secondly, eggs are not sorted according to size. Small eggs are difficult to sale yet they are bought at the same price in a tray from the supplier. This leads to losses.

Local chicken eggs were rare on the market. The few that were present in Yumbe town were sold by three women at Shs. 500 per egg. Local eggs were mainly sold in rural trading centres by women and children to buy basic domestic needs such as salt and matchbox.

Customers/consumers of the eggs

The main customers reported by the egg traders were chapatti sellers, restaurants and women. Chapatti sellers and restaurants often buy in trays while women buy in pieces. Chapatti sellers mainly operate in the evenings and early mornings. During the survey period, nearly every 10 metres distance and junctions on the main street had "Rolex makers". Rolex is a Ugandan delicacy made from fried eggs and chapatti rolled into one complete meal. It is by far the most practiced activity on the roadsides of Yumbe town by youth. Women buy eggs mostly to make quick meals for the family. Eggs are one of the cheap sources of animal protein in the town.

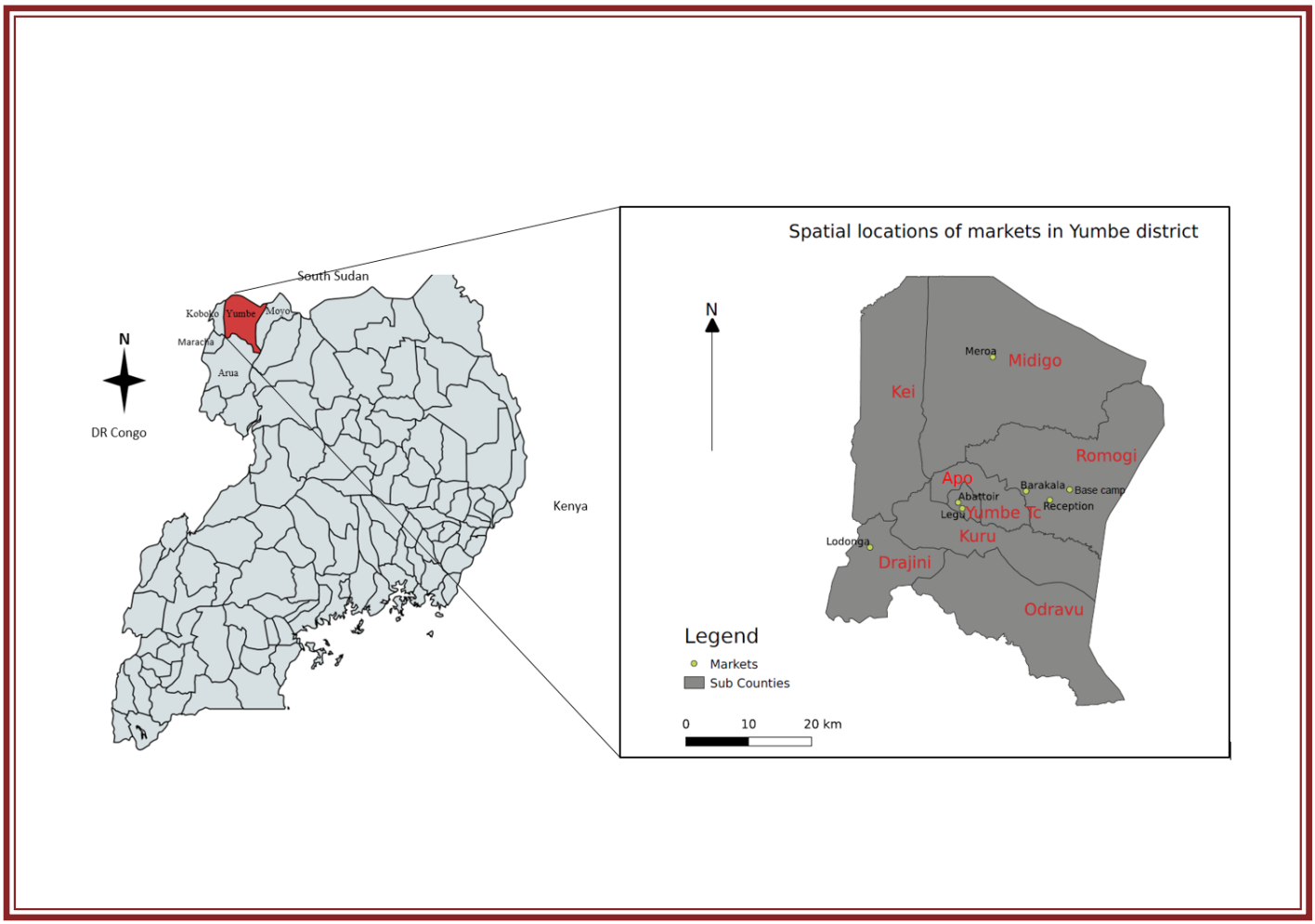

Figure 4: Spatial distribution of live bird markets in Yumbe district. The three markets in Romogi sub-county are roadside markets in which few chickens are sold occasionally

Table 6: List of livestock markets and their distribution in Yumbe district

No.	Market Name	Market type	Market days	No. of traders selling in the market	Location	Distance from Yumbe Town (Km)	GPS	Market dues per bird (Shs.)	Average price of chicken in ordinary days	Average price of chicken in festive seasons
1	Legu Market	Urban	Daily	6	Yumbe Town	0	N 03°27'56.4" E 031°14'42.9"	1,000/=	Cock 35,000/= Hen 18,000/=	Cock 40,000/= Hen 20,000/=
2	Abattoir Market	Secondary	Saturdays	36	Yumbe town, near the abattoir	0.6	N 03°28'27.2" E 031°14'21.5"	1,000/=	Cock 35,000/= Hen 18,000/=	Cock 40,000/= Hen 20,000/=
3	Meroa Market	Secondary	Tuesdays	18	Kerua Subcounty (close to South Sudan border)	45	N 03°40'55.6" E 031°17'20.4"	1,000/=	Cock 27,000/= Hen 14,000/=	Cock 33,000/= Hen 17,000/=
4	Lodonga	Secondary	Tuesdays and Thursdays	20	Lodonga town council	18	N 03°24'36.0" E 031°06'46.2"	1,000/=	Cock 27,000/= Hen 15,000/=	Cock 27,000/= Hen 15,000/=
5	Okubani	Secondary	Tuesdays and Fridays	-	Ariwa Subcounty	46	Not visited, not taken	1,000/=	Cock 26,000/= Hen 14,000/=	
6	Base Camp	Primary	Roadside market, daily but infrequent sales of chicken	No regular sellers, only when an individual needs quick cash	Base camp, Romogi sub-county	18	N 03°29'33.2" E 031°23'56.8"	Not regular poultry market, so no dues	Cock 27,000/= Hen 13,000/=	Cock 27,000/= Hen 15,000/=
7	Reception Market	Primary	Roadside market, daily but infrequent sales of chicken	No regular sellers, only when an individual needs quick cash	Entrance to Bidibidi refugee camp, Romogi subcounty	15	N 032839.7 E 0312215.1 Elevation 838m	Not regular poultry market, so no dues	Cock 27,000/= Hen 14,000/=	Cock 27,000/= Hen 15,000/=
8	Barakala	Primary	Roadside market, daily but infrequent sales of chicken	No regular sellers, only when an individual needs quick cash	Barakala Trading centre, Romogi Subcounty	11	N 03°29'25.6" E 031°20'12.2"	Not regular poultry market, so no dues	Cock 27,000/= Hen 14,000/=	Cock 27,000/= Hen 15,000/=
9	Kochi	Primary	Roadside, Not regular poultry market	Not visited	Not visited	-	-	-	-	-

4.0 Conclusions and Recommendations

4.1 Conclusions

Production systems and the importance of poultry:

From this survey, few households in Yumbe owned indigenous chicken on the free-range system in settlements, host communities and away from the settlements. In these households, chickens are an integral part of the family livelihoods and act as a direct source of income. Youth and women are indirectly employed by poultry-related businesses such as "rolex" (chapatti and egg rolls), restaurants and hotel food services. A substantial number of the participants were women involved in poultry keeping and therefore contributing to the food security of the families.

Breeds:

The local poultry breeds are predominant and are believed to be resistant to a number of diseases and are suited for the environment. The meat of local birds is believed to be better flavoured and so preferred by the local consumers. Kuroiler breeds have been introduced to the settlements and host communities to improve the vigour of the local breeds. The breed is not yet widely spread in the district for many to multiply the stock. Mating is random and so difficult to trace pedigree in case pure lines are desired in the future. Stock multiplication through programmed hatching is an interesting technique that could benefit rural farmers. Implementation strategies and measures of outcomes need to be developed to determine success rates in the current context of refugee settlement.

Only two farms were involved in commercial poultry rearing. They faced immense challenges from sourcing day-old-chicks, lack of local feed stockists to lack of cheap source of poultry drugs and vaccines.

Poultry diseases and Healthcare:

Newcastle disease is the most reported cause of death of birds and so the single most important disease affecting poultry livelihoods. The second important disease is fowl pox. Most diagnoses were syndromic or by verbal necropsy and so accurate diagnoses may be difficult to establish when not corroborated with laboratory or true necropsy findings. Other pathogenic parasites like dwarf tapeworms were identified as significant causes of death of pullets and cockerels in the settlement by necropsy. Therefore, investments in identifying local causes of mortality in poultry is necessary.

Veterinary services were reported to be scarce and access to drugs limited by availability and costs since farmers get these drugs privately. Selected members in the communities should be trained in para-veterinary skills similar to village health teams operating under the ministry of health. These cadres can help in vaccinating chicken against common diseases, deworming and liaising with the government veterinarians in disease surveillance.

Marketing: The main product of the poultry industry in Yumbe is live-bird. These are sold in informal, primary, secondary and urban livestock markets distributed in the district. The main customers are the middlemen. Poultry meat is relatively more expensive than other meat in Yumbe. Local chicken eggs are not common in the market and so not a reliable source of income. Trade in poultry is not regulated and has no movement restrictions in the district and the region. Commercial eggs in Yumbe is sourced from central Uganda and from stockists in Arua.

Poultry farming opportunities: High demand for poultry and its products from the large local population and rapid development of trading centres. There is also a ready market for poultry in neighboring districts and South Sudan.

There is increased awareness of the need to consume animal proteins for better growth and development of children. Being small animals with short generation cycles and adaptable to confinement, they are suitable sources of income in small land-holdings.

Another opportunity exists in the production of feeds as Yumbe has fertile arable land. With the right linkages with existing partners, the locals can produce feeds for local poultry production and export. The improved road network would aid easy transportation across the district and national borders.

Existing groups, informal and social networks have improved communities' access to markets, source of financing and training opportunities on farming including poultry. The high presence of development partners and NGOs in the district has improved and continues to improve the communities' access to production inputs such as good breeds, drugs, vaccines and linkages to markets.

4.2 Recommendations

As local chicken production is profitable and an integral part of rural livelihoods, I recommend the following for their improvement:

- Improving breed quality: There is need to improve the quality of local breeds so as to improve essential productivity indices such as growth rates, feed conversion, disease resistance and numbers of eggs laid. Crossbreeding with breeds that perform relatively well in free-range such as Kuroilers should be considered. This should be done in consultation with potential consumers as people in the district and region have preferences for local chicken meat and attribute certain flavours as markers of uniqueness.
- Improving feeds and feeding practices: Local feed sources that enhance poultry productivity should be identified and promoted as an integral part of routine or cash crops grown. Supplementary feeding of the birds for quicker growths should be promoted among farmers by all stakeholders. Minimum supplementation has positive impact on growth rates to at least 30%.
- Improving disease and death controls: Enhanced disease prevention and control through routine vaccinations, education of farmers on basic husbandry practices and veterinary services should be promoted. Diseases to be targeted for vaccinations are Newcastle disease and fowl pox as these were reported the most common in the flocks. Also research be conducted in partnership with veterinary professionals and laboratories to identify other diseases that cause mortality in the flock and are not yet defined. For example, the necropsy diagnosis of pathogenic dwarf tapeworms causing significant mortalities in the settlement in pullets and cockerels during survey was not known in the area previously. Additionally, poultry housing and artificial brooding should be promoted among farmers so as to reduce deaths (particularly among chicks) from bad weather, predators and outdoor accidents.
- Increasing profitability through programmed hatching technology promotion and selling collectively for example, through poultry farmer groups or poultry cooperative society should be encouraged by stakeholders intending to improve productivity in Yumbe. This will increase the numbers of birds available for sale, minimize marketing costs and increase bargaining power and stabilize live bird prices.
- Institutional reforms and prioritizing poultry in national poverty reduction strategies: There should be increased popularization of enterprises that require small landholdings with significant returns such as poultry.

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Appendices

Appendix 1: List of Key informants

No.	Name	Designation	Organization
1	Dr Matinda Nekyon Mukasa	District Veterinary Officer (DVO)	Yumbe District Local Government (DLG)
2	Mr Agotre Zubair	District Commercial officer	Yumbe DLG
3	Mr Bakole Stephen	District Agricultural Officer	Yumbe DLG
4	Mr Shaka Kenneth	Assistant Settlement Commandant	OPM, Base camp
5	Mr Peter Opolot Israel	Focal Person-livelihood projects	UNHCR Zone 1, Base camp
6	Ms Julie Flavia Draru	Head AFARD-Yumbe Field Office	AFARD, Yumbe
7	Mr Toha Taban	Project Officer (Animal husbandry officer-AHO)	CEFORD (AHO-DVOs office)
8	Lema Aaron Gift	AHO, In-charge Keroa Subcounty	Yumbe DLG
9	Mr Etogoson Ocile Rashid	Subcounty Agricultural Officer, Keroa subcounty	Yumbe DLG
10	Mr Mugisha Geofrey	AHO, In-charge Lodonga Town council	Yumbe DLG

Appendix II: Cost-Benefit Analysis for Local Poultry on Programmed Hatching

	Batches of eggs laid and hatched by 5 hens in a year				Amounts	Offshoot into the second year		
Production	Batch 1 (Start)	Batch 2 (4th Month)	Batch 3 (8th Month)	Batch 4 (12th Month)		Batch 5 (16th Month, Not computed in annual income)		
Parent stock (5 hens, 1 cock)		Parent stock	Batch 2 retention	Batch 3 retention		Batch 4 retention		
Eggs laid	60	60	120	120		240	240	480
Chicks hatched	50	50	100	100		200	200	400
Chicks survived	40	40	80	80		160	160	320
Total birds after first cycle	46	46	91	91		182	182	364
Retention	0	11	22	22		33	33	66
Sales	0	35	69	69		149	149	298
Total Sales				**173**	**2,595,000**			
Feeds	Batch 1	Batch 2	Batch 3	Batch 4)	QTY (in a year)	Rate		Amounts
Chick Marsh (Kgs)	75	75	150	150	450	950	427,500	
Growers' Marsh (Kgs)	27	90	117	117	351	800	280,800	
Adults (Kgs)	5	5	10	10	30	1000	30,000	
Sub Total							**738,300**	**738,300**
Vaccinations								
Newcastle + IB	1	1	1	1	4	8000	32,000	
IBD	2	2	2	2	8	8000	64,000	
Fowl pox	1	1	1	1	4	15000	60,000	
Sub Total							**156,000**	**156,000**
Drugs/Chemicals								
Oxytetracycline chick forumula 100g	2	0	1	1	4	9000	36,000	
Glucose (500g)	1	0	0	0	1	15000	15,000	
Anticoccidials (Toltrazuril and Amprolium)	1	0	0	0	1	15000	15,000	
Levamisole 100g	3	0	0	0	3	11000	33,000	
Antibiotics (Assorted, Lumpsum)	1	0	0	0	1	50000	50,000	
JIK (litres)	1	0	0	0	1	7000	7,000	
Sub Total							**156,000**	156,000

Equipment, housing, utilities, Starting birds								
Drinkers (plastic round)	2	0	0	1	3	15000	45,000	
Feeders (metalic round)	1	0	0	1	2	15000	30,000	
Laying nest	5	0	0	0	5	5000	25,000	
Charcoal stoves/ pots	1	0	0	0	1	10000	10,000	
Charcoal bags	1	1	1	0	3	30000	90,000	
litter, bags	3	0	0	0	3	9000	27,000	
Egg trays (cartons)	0.5	0	0	0	1	75000	37,500	
House construction or repairs	1	0	0	0	1		300,000	
Labour (family labour)	0	0	0	0	-	50000	-	
Utility bills (water, electricity & miscellaneous/month)	3	3	3	3	12	5000	60,000	
Hens	5	0	0	0	5	15000	75,000	
Cocks	1	0	0	0	1	20000	20,000	
Sub Total							**719,500**	719,500
Total Investment								**1,769,800**
Net returns								**825,200**

Assumptions

- A farmer starts with 5 hens and 1 cock
- Each hen lays 12 eggs, 10 hatch, 8 chicks survive per batch. at start of year 1, 40 chicks expected plus 6 parents.
- Puberty sets at 8 months and birds from first batch retained for replacement add to the number of parents at batch 3 (8 months of age)
- Assume uniform price of Shs 15,000 for sales of offsprings (both males and females)

Appendix III: Photos on data collection, production systems and marketing

Figure 5: Inception of focus group discussion at Romogi subcounty headquarter

Figure 6: A participant in Apo subcounty feeding his poultry (chicken, guinea fowl and pigeons)

Figure 7: A poultry house with 300 pullets for a group in Village 9, Zone 1. The chicken were released on free-range when feeds got finished

Figure 8: A kuroiler hen (in middle) and a local cock on the left on free range in a homestead in host community (Swinga village). In the image the appear same size but the kuroiler hen was nearly heavier than the cock.

Figure 9: A hen roaming around with chicks in Apo subcounty

Figure 10: Kuroilers in free range in Kuru subcounty

Figure 11: Chicken roaming freely at Romogi subcounty headquarters. These are prone to predation considering the high vegetation cover nearby

Figure 14: Spent layers on free range in one of the hotels in Yumbe. These were from the other commercial farm that produces broilers and eggs for its hotels only.

Figure 12: A sick cockerel in Village 4, zone 1. The age mates had died previously were thought to have died of Newcastle disease. On necropsy, it had severe dwarf tapeworm infestation

Figure 15: Meroa live bird market in Keroa subcounty. The traders are seated waiting for farmers to bring chicken into the market

Figure 13: Kuroilers intensively managed in Kuru subcounty

Figure 16: A trader negotiating the price of a cock brought to the market by the woman. She brought one cock for sale to buy home needs (in this particular occasion, paraffin and salt). The orange item under her armpit is the top of paraffin bottle. In the background is the car that transports traders from Yumbe town to the market.

Figure 17: Chicken being transported to Arua after purchase from Lodonga livestock market

Figure 18: A flock of 350 layers in Kuru subcounty. The farmer stocked 520 but lost 150 to various causes

Figure 19: Eggs in the major stockist in Yumbe. Has capacity of stocking 400 trays per week

Appendix IV: Terms of Reference

Local Poultry Market Assessment Study
Call for Proposal

Background

The civil conflicts in South Sudan has since 2013 resulted into increased influx of refugees into West Nile, Uganda that by January 2019 totaled to more that 700,000 refugees (86% women and children, 3% the elderly). In spite of the progressive Uganda Refugee Act (2006) and Refugee Regulations (2010), livelihood insecurity is a norm. In a bid to empower refugees and host communities to achieve economic, social and environmental self-sufficiency, the Agency for Accelerated Regional Development (AFARD) secured a 39 month funding from the AWO International and the Federal Ministry of Economic Cooperation and Development (BMZ) to Strengthening Resilient Livelihoods Project (RELIP) in Yumbe district.

Targeting **2,115 persons** (2,100 FG members' household population and 15 AFARD staff; 60% female and 50% each South Sudanese refugees and nationals including people with special needs), the primary objective of RELIP is, "Refugee and host communities in Yumbe district, Uganda are economically integrated and have resilient livelihoods." The specific objectives are: 1) 300 target households in refugee and host communities have improved food and nutrition security status by 2022; 2): 300 targeted households in refugee and host communities have increased income; 3): Peaceful co-existence within and among refugees and host communities has improved by 2022. The project seeks to secure livelihoods for vulnerable households due to (i) low production of subsistence farming technologies that are less resilient to adverse climate change; (ii) limited alternative sources of income due to lack of skills for microenterprise management and access to business capital; and (iii) weak community dialogue for harmonious and peaceful co-existence and limited initiatives for environment conservation. Through Peer learning approach for sustainable access to extension services, VSLA methodology for alternative income generation, Climate-smart agriculture practices, Livelihood diversification, and Stakeholders engagement the project envisages increased agricultural production and livelihood diversification that will ultimately improve food and nutrition and income security and trigger peaceful co-existence between refugees and host communities.

PURPOSE, OBJECTIVES AND SCOPE

RELIP seeks to promote local poultry production and marketing because it contributes to healthy diet, gender-sensitive income, and the waste supports kitchen gardening. The purpose of this study is to assess the current status of the local poultry industry in Yumbe district to determine production and marketing practices and products as well as challenges and opportunities in the poultry value chain. This will support the identification of entry points for intervention for sector improvement and market positioning for improved livelihoods. Specifically, the study will:

4. Assess and understand the production practices/ technologies and levels including the identification of the sector actors/ stakeholders including input suppliers, their contributions to the value chain, and their existing linkages, strengths and weaknesses.
5. Determine the local market demand and supply in the district including mapping out of potential markets/customers, and profitability (with clear cost and margin analysis using locally appropriate methods).

6. Recommend appropriate strategies and intervention for the promotion of local poultry agribusiness in poor rural refugee and host communities in Yumbe district.

THE SCOPE OF THE STUDY

Geographically, the study will be carried out in Yumbe district. The project outreach of host communities and Bidibidi refugee settlement will be covered. Consultations will be made with all key stakeholders including UNHCR, OPM, district and sub county leaders, youth, women and men in host communities and refugee settlements, and private sector actors.

METHODOLOGY

The consultant will be expected to employ a mixed method approach that will ably triangulate quantitative, qualitative, and PRA methods of data collection and analysis. The study design is expected to conform to research ethical standards with clear quality control measures and adherence to do no harm and child protection policy.

TIME FRAME

The activity will commence on October 2019. The assignment is anticipated to get accomplished within 30 days (not later than December 15, 2019). The consultant is expected to develop appropriate work plan for the assignment as part of the technical proposal/ inception report to be submitted to AFARD.

STUDY DELIVERABLES

The study will produce the following outputs:

- ***Inception report detailing a study methodology, implementation plan and data collection tools.***
- ***A draft report (25 pages max) that will be presented for review by AFARD.*** *This report will include: executive summary, introduction, description of study objectives, study methods and limitations; study findings, conclusions, recommendation, and appendix.*
- ***Final report printed (hard copy) in five copies.***
- A clean data set and transcriptions together with a soft copy of the final report on CD.

QUALIFICATION AND EXPERIENCE

- Master's degree or higher in Agriculture, Agricultural Economics, or Agribusiness;
- Demonstrate knowledge of and familiarity with poultry management and market assessments and research methodologies.
- Expertise and experience in designing, planning and implementing qualitative and quantitative research methods, including community-based participatory appraisals.
- Expertise and experience in conducting data analysis using statistical packages;
- Excellent analytical, report writing skills and documentation skills including photography and recording are an advantage.
- Ability to work under tight schedules with minimal supervision.
- Excellent spoken and written English, working knowledge of local languages needed.

SUPERVISION

In order to ensure quality support to the external consultant, the assignment will be supervised by the Programmes Manager.

PAYMENTS

Terms of payment shall be 40% after approval of the inception report, 60% upon the submission and approval of the final report. All costs (administrative and professional fees) will be subjected to 6% withholding tax.

SUBMISSION OF TECHNICAL AND FINANCIAL PROPOSALS

Interested individuals can express interest in undertaking the consultancy by submitting technical and financial proposal together with an up-to-date CV. This is a single person assignment.

Submit your application addressed to the Executive Director, AFARD: afard@afard.net

Deadline for submission: October 21, 2019

at 12:00 EAT.