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LIST OF ACRONYMS AND ABBREVIATIONS

ADVANCE	Agricultural Development and Value Chain Enhancement
AMPLIFIES	Assisting Management in the Poultry Layer Industry by Feed Improvement and Efficiency Strategy
ARB	Association of Rural Banks
ASA	American Soybean Association
DOC	Day Old Chicks
FAO	Food and Agriculture Organization
GHS	Ghana Cedis
GNAPF	Ghana Association of Poultry Farmers
GPP	Ghana Poultry Project
GPS	Global Positioning System
GSS	Ghana Statistical Service
MS	Market share
MT	Metric Tonnes
NGOs	Non-governmental Organization
PFs	Poultry Farmers
PHHs	Poultry Households
PPs	Poultry Producers
RVO	Netherlands Enterprise Agency
SO	Strategic Objectives
SD	Standard Deviation
USD	United State Dollar
USDA	United States Department of Agriculture
UN	United Nations
VEMTAG	Veterinary Medical Technical Association of Ghana
VSD	Veterinary Services Directorate
VSPs	Veterinary Service Providers
ZOI	Zone of Influence

EXECUTIVE SUMMARY

The Ghana Poultry Project (GPP) Baseline Report is part of a response to the growing contraction of Ghana's poultry industry. As recognized by the Food and Agriculture Organisation (FAO), Global Alliance for Improved Nutrition (GAIN) and stakeholders within the poultry sector, the Ghanaian poultry sector is contracted due to intense competition from imported poultry meat products and decreasing profitability of egg production. Available statistics from FAO indicate that domestic broiler meat production has fallen from nearly 60 per cent of all poultry consumed in Ghana in 2000 to 20 per cent in 2011 (FAO, 2014). Additionally, imports have increased from 13,900 (MT) to over 155,000 MT (RVO, 2014), representing more than a 1000 per cent increase. The other challenges contributing to contraction of Ghana's poultry sector are high cost of quality blended feed, inefficient feed management practices and limited linkages between commercial producers and end market buyers (ACDI/VOCA, 2016). Hence, the GPP intends to strengthen the local poultry industry as a whole by adopting a tiered implementation approach. GPP intends to achieve this aim by increasing productivity and domestic market penetration along the Ghanaian poultry value chain through capacity building, and improving input markets. GPP will promote strategic investments and private partnerships as well as increase the trade of poultry products through product quality improvement, increase production and marketing efficiencies. Three large poultry production regions in Ghana have been targeted by GPP and consequently were selected for this baseline. These are Brong-Ahafo, Ashanti and Greater Accra regions.

The study found that out of 410 commercial poultry producers, 363 were owned by males with only 47 being owned by females. In addition, 212 out of 410 commercial poultry producers (51.7%) had access to formal poultry management training. Also, the sector is dominated by small scale producers in terms of the total number of farms in each size category. However, the commercial flock size and the value of sales of the few (24) large scale producers is substantially higher than the several medium and small scale enterprises combined. In terms of regional distribution, Brong Ahafo region has the highest number producers with Dormaa municipal leading. From the perspective of labour employed, the sector is dominated by male employees both at the managerial and operational levels. The table below presents summaries of values of baseline indicators for 2015 production year computed from 410 commercial poultry enterprises (comprising 24 very large poultry farms, 144 medium and large poultry farms and 242 small and very small poultry farms) and 415 consumer households (for indicator on consumer perception of quality of national poultry products):

Summary Table of Indicator Baseline Values

INDICATOR	BASELINE VALUE
Quantity of maize and soya purchased through contract and/or out grower arrangements	33307.98MT
Average poultry mortality rate : Day Old Chicks Broilers and Layers	8.58% 5.83%
Percentage of farmers who can identify at least four identified best poultry husbandry practices	100%
Value of sales by project beneficiaries Broilers	\$99,285,568.44 \$4,328,855.44

Layers	\$10,248,768.70
Eggs	\$84,707,944.30
Volume of commodities (metric tons) sold by project beneficiaries:	
Broiler	655580
Layer	2249375
Eggs	806891730
Variable production cost per unit of output for broiler (USD):	
Broiler	\$8.93
Layer	\$15.06
Eggs	\$0.07
Consumer perception of quality of national poultry products versus imports (Index)	4.38
Ratio of sales of local poultry products to imported poultry products	1:39
Average number of days between order and delivery of input products :	
DOC	30.1 days
Vaccinations	0.83 day
Feed	0.91 day
Number of firms (tier 1 and 2 poultry farms) that regularly use market information to inform decisions	116
Value of private sector investment supporting the poultry sector	\$393,813,285.15

Poultry producers across the three regions of study purchased a total of 33,307.98MT of maize and soya through either aggregator arrangements or contracts. The results also indicate that most of the poultry farmers purchase most of their feed ingredients without *formal* contracts/agreements with feed suppliers, particularly aggregators.

The study found that the mortality rate among Day Old Chicks is higher (8.58%) than that of broilers and layers combined (5.83%). In addition to this, the study found that Ashanti region recorded the lowest mortality rate among both chicks and broilers-layers with Greater Accra region having the highest. This is explained by the outbreak of bird flu in the 2015 season in some parts of the Greater Accra region.

In assessing the percentage of farmers who can identify at least four best husbandry practices, it was realised that all farmers (100%) of identified at least four best poultry husbandry practices. These practices include the introduction of only Day Old Chicks onto the farm, control of movement of staff and equipment around the farm, provision of shower facilities of staff and visitors, the use of disinfectant food bath at the entrance of shed, weighing and measurement of all ingredients accurately, recording of all business activities and transactions etc.

A total of 655,580 broilers were sold in 2015 by just about 40% of producer (162) whilst total sales volumes from layers and eggs were 2,249,375 birds and 806,891,730 pieces of eggs respectively. These quantities translated into US\$ 4,328,855.44, US\$ 10,248,768.70 and US\$ 84,707,944.30 for broilers, layers and eggs respectively giving an indication that production and sale of eggs constitute a major driver of the overall poultry sector.

Majority of poultry producers (309 out of 410) indicated having access to current market information. Detailed analysis of the type of information used the frequency of information usage revealed that only few (between 29 and 105) use specific information at least once a month with price and buyer information being the most frequently used. With the exception of few producers (17) who indicated

receiving some form of grant or involvement from the public sector, especially, the government, almost all the investment in poultry enterprises surveyed were from private sources. Grants received by poultry producers include cash and production inputs such as day old chicks, feed, watering trough and drugs/vaccines.

Variable cost was thus found to be regressive among poultry producers when compared across tiers. Sufficient economies of scale was observed; farmers in tier one incurred relatively lower costs per production of a bird.

In terms of consumers' perception of quality of national poultry produce, the overall perception regarding the health and safety of local chicken products as well as nutritional and quality perception index was found to be 4.28 on a 5-point ordinal scale where 1 represents a very strong negative perception about the health and safety of locally produced poultry produce, and 5 represents a very strong positive perception, with 3 being a neutral or indifferent state. This implies that consumers have positive perception towards the health and safety of local poultry products. Conversely, the results suggest that consumers generally have a strong negative perception about the health and safety of imported poultry products. The results also give an indication that local poultry products can likely be promoted by highlighting their health and safety aspects relative to their imported counterparts. Consumers agree and are positive about the superior nutritional and quality of locally produced chicken products compared to imports. The overall preference and purchasing perception index for eggs was 3.30. This result provides the rationale for stakeholders to change or influence the attitude of consumers towards preferences and demand for eggs in Ghana.

The results of the study also show that local poultry meat constitutes a very small proportion (1.93%) of the value of meat sold. The percentage of poultry products sold in the Greater Accra region is relatively higher (6.43%), albeit still small when compared with imported. The result on the ratio of sale of local eggs to imported eggs is in sharp contrast to that on meat. The table shows that eggs that are sold on the Ghanaian market are primarily from local sources and that importing eggs for sale in Ghana is uncommon. This implies that local egg production faces little competition as compared to the meat, hence an opportunity for local producers to explore.

The average number of days for DOC, feed and vaccines are 30.01, 0.83 and 0.91 respectively. However, all three inputs can either be obtained through spot transactions or in less than one day.

Table of Required Standard Indicators

Indicator Number	Standard Indicators	Baseline
FFPr INDICATOR 17	Number of individuals benefiting directly from USDA-funded interventions	0
FFPr INDICATOR 18	Number of individuals benefiting indirectly from USDA-GPP funded interventions	0
FFPr INDICATOR 16	Number of individuals who have received short-term agricultural sector productivity or food security training as a result of USDA –GPP assistance	0

FFPr INDICATOR 2	Number of individuals who have applied new techniques or technologies as a result of USDA - GPP assistance	0
FFPr INDICATOR 4	# of individuals receiving grants as a result of USDA assistance to support increased storage capacity and quality	0
FFPr INDICATOR 5	# of grants provided to support increased storage capacity and quality	0
FFPr INDICATOR 6	Value of grants provided to support increased storage capacity and quality	0
FFPr INDICATOR 9	Value of new public & private sector investment leveraged as a result of USDA assistance	0
FFPr INDICATOR 4	Number of individuals receiving financial services as a result of USDA assistance	0
FFPr INDICATOR 5	Number of loans disbursed as a result of USDA assistance	0
FFPr Indicator 6	Value of loans provided as a result of USDA assistance	0
FFPr INDICATOR 3	Number of individuals who have applied improved farm management practices (e.g., governance, administration, or financial management) as a result of USDA assistance	0
FFPr Indicator 13	Value of sales by project beneficiaries (total)	\$99,285,568.44
	Broilers	\$4,328,855.44
	Layers	\$10,248,768.70
	Eggs	\$84,707,944.30
FFPr Indicator 14	Volume of commodities sold by project beneficiaries:	
	Broiler	655580
	Layer	2249375
	Eggs	806891730
FFPr Indicator 15	Number of jobs attributed to USDA assistance	0
FFPr INDICATOR 11	Total increase in installed storage capacity (dry or cold) as a result of USDA assistance	0
FFPr Indicator 9	Value of new public and private sector investment leveraged by USDA assistance	0
FFPr Indicator 12	Number of policies, regulations and/or administrative procedures in each of the following stages of development as a result of USDA assistance	0
FFPr Indicator 7	Number of private enterprises, producer organizations, water users associations, women's groups, trade and business associations, and community-based organizations that applied new technologies or management practices as a result of USDA assistance	0
FFPr Indicator 8	Number of public-private partnerships formed as a result of USDA assistance	0

1.0. INTRODUCTION

1.1. Background and Project Description

The Ghana Poultry Project (GPP) is being implemented by ACDI/VOCA, an international development organization, based on historical evidence that Ghana's poultry industry has significantly contracted over the past decade, largely due to loss of competitiveness in the global marketplace as presently reflected by the intense competition from foreign poultry meat imported from Brazil, USA, and Europe (Food and Agriculture Organisation, 2014). The industry is also facing decreasing profitability in terms of egg production. Statistics from the Food and Agriculture Organisation (2014) indicate that the local broiler meat production decreased from nearly 60 per cent of all poultry consumed in Ghana in 2000 to 20 per cent in 2011. Additionally, the import of poultry products is on ascendancy, as imports have risen from 13,900 metric tons to over 155,000 metric tons between 2002 and 2011 (RVO, 2014). This shows that the import of poultry products has increased by over 1000 per cent. The Global Alliance for Improved Nutrition (2013) revealed that the share of the domestic market for broiler meat was only 10 per cent of national consumption in 2012. Due the uncompetitive nature of locally produced poultry meat products, many poultry producers have shifted from meat production to focus essentially on egg production. This is evidenced in FAO (2014) report which indicated that from the year 2000, the production of eggs in Ghana has increased from roughly 5 million eggs to 10.9 million eggs in 2011.

The overall performance of the Ghana poultry sector is inhibited by inefficiencies across multiple levels of the value chain, including ineffective coordination between firms, and deficiencies in the enabling environment, particularly concerning quality standards and inspection. However, it is difficult to improve the poultry sector's competitiveness without employing a comprehensive approach that greatly increases production efficiency and reduces the retail price, while maintaining high product quality. One of the main challenges in the industry is high cost of quality blended feed and inefficient feed management practices. Feeding cost accounts for more than 60 per cent of the total production cost (ACDI/VOCA, 2016). The current high cost of feed and inputs have led to uncompetitive retail prices for poultry products. This is further complicated by inadequate business planning, poor market-penetration strategies, and weak buyer-supplier linkages. It is against this background that the Ghana Poultry Project was designed and is being implemented by ACDI/VOCA in close collaboration with the ASA AMPLIFIES Project. GPP will assist entrepreneurs in Ghana's poultry value chain to address these constraints in order to grow and build a more competitive poultry sector. By adopting a value chain approach in collaboration AMPLIFIES, GPP activities intend to expand end-markets for maize and soya production, raising the income and employment opportunities for smallholder maize and soy bean producers. The project intends to catalyse improved efficiencies at key stages of the poultry value chain in order to: 1) increase the competitiveness of the Ghanaian poultry sector; 2) improve the profitability of egg production; and 3) expand national and regional trade in poultry products and in sector-related inputs and service markets, resulting in both a sustainable and equitable increase in incomes for male and female producers in the poultry, grains, and related commodity sectors.

1.2. Project Context and Rationale

The context of the Ghana Poultry Project is very important in the baseline survey and is highlighted in this report. The Ghana Poultry Project was envisaged to address constraints confronting Ghana's poultry industry, and therefore at the national level. From the national point of view, the macroeconomic environment in Ghana is presently under stress and characterized by high inflation, un-stable currency, and slow, erratic economic growth. These, among other factors, make it difficult for businesses in the country to grow, diversify and flourish. Access to capital by private firms or enterprises in Ghana is very difficult largely due to the high interest rate of above 30% per annum that makes cost of borrowing very expensive. The poultry industry in Ghana has been hard hit by these unfavourable macroeconomic conditions because of the escalating cost of imported poultry inputs to support local production and falling domestic demand due to the economic slowdown both of which have had both top- and bottom-line impacts on the industry's profitability. Competition from other sectors of the Ghanaian economy (the expanding food processing sector) for maize also limits maize availability for the poultry sector. For instance, existing statistics indicate that the food processing industry in Ghana currently absorbs approximately 15 per cent of the maize produced in the country and this proportion appears to be increasing annually.

The trade of poultry products and inputs in the country is also faced with some constraints which hinder efficient trade and marketing. For instance, the maize trade is highly regulated by government, with ban on imports of maize, except for waivers under certain conditions. The trade in poultry meat, other than imports to Ghana, is also limited. Neighbouring countries such as Cote d'Ivoire have outright bans on importation of poultry, while some countries such as Burkina Faso have weak cold storage infrastructure, which makes importation infeasible. These factors limit the available potential export market for Ghana, especially, when it comes to egg production. The short shelf-life of eggs, especially during bad weather, coupled with poor road infrastructure, also limits their potential for export. The limited trade that does exist is often informal cross-border trade and cannot be used as a reliable model for promoting sustained economic growth. Moreover, the lack of government legislative guidelines as well as inspection and enforcement mechanisms concerning veterinary drugs and other poultry inputs are key factors limiting implementation of quality standards and likely have a significant impact on production efficiencies and final product cost in end markets.

This baseline survey focuses on three large poultry producing regions in Ghana. These regions are Brong-Ahafo, Ashanti and Greater Accra. In the Brong Ahafo region, GPP focused on several poultry clusters, including Dormaa (Dormaa Municipal, Dormaa West and Dormaa Central Municipal), Sunyani (Sunyani Municipal and Sunyani West), Wenchi, Nkoranza and Techiman (Techiman Municipal and Techiman North) districts. In the Ashanti region, GPP focussed on Atwima Nwabiagya, Atwima Kwanwoma, Kumasi Metropolis, Ejisu Juaben Minicipal, Ofinso North, Offinso South and Ejura-Sekyedumasi. In addition, medium to large scale poultry enterprises located in Kwabre East and Bosumtwi districts were also included in the study. Six districts; Accra metropolis, Ga South Municipal, Ga East Municipal, Tema metropolis, Ada West and Dangbe East were also included in the study. The selection of these districts/municipalities/metropolises as GPP project areas was done in consultation with the AMPLIFIES Project, local technical experts, the Ghana Association

of Poultry Farmers (GNAPF), and the Veterinary Services Directorate (VSD), and based upon extensive field research in the major centres of national poultry production.

Poultry producers, with special focus on medium to large scale enterprises, poultry households, consuming households, cold stores, supermarkets, institutional consumers such as schools, colleges, hotels, restaurants, veterinary service providers, and aggregators in these study areas were the focus of interviews and provided much of the context for the subsequent development of project activity areas.

The rationale behind the GPP baseline survey is that the project will provide different levels of support to poultry sector businesses based on their size, capacity, commitment level, and interest in adopting new, innovative management practices and technologies and becoming “game changers” in the Ghanaian poultry sector, in aggregate commercial leaders in developing new, more effective and competitive business models,. This baseline survey will enable an evidence-based assessment of the project’s performance in realizing these objectives. This approach will help to address the gap in the local poultry production and consumption, and is consistent with the rationale for the implementation of GPP linked to its overall strategic objectives which seek to increase the competitiveness of the domestic production and processing of poultry meat and eggs. The strategic objectives of GPP are categorized into: SO1 aimed at increasing agriculture productivity in the poultry value chain through capacity building, improving input markets, promoting strategic investments and private-public partnerships, and SO2 which focuses on increasing the trade of poultry products by improving product quality, increasing production efficiency and improving market linkages, and which provide the overall implementation context for the GPP baseline survey.

1.3. Purpose and Relevance of the Study

Specifically, the baseline survey intends to clarify specific performance indicators in the poultry industry. The justification of these indicators in the baseline survey is that they will: (1) inform possible target revision/verification and provide current quantitative and qualitative data from the Ghana Poultry Project’s zone of intervention (regions and districts); and (2) establish a current, objective and realistic assessment of the present farm or production situation. This will provide project management with a clear benchmark to periodically assess the advancement of the project towards set targets, as well as comparing improvements in production trends during program implementation. Current qualitative and quantitative data on performance indicators captured in the baseline survey will allow project staff to monitor changes as the project progresses and make modifications where necessary, particularly during the project’s annual program assessments, and performance (mid-term) and impact (follow-up) evaluations.

1.4. Objectives of the Baseline Study

The main objective of the baseline was to assess prevailing situations in the poultry industry with respect to key GPP output and outcome indicators, namely: access to inputs for poultry production (feed, day old chicks, veterinary services, and financial services), processing and marketing of poultry products as well as management of poultry businesses in the project implementation zone.

The specific objectives of the baseline survey include:

1. Collect basic socioeconomic data pertaining to poultry farmers in the project zone including income levels, gender-ownership of farms and gender distribution at the farm management level, etc.
2. Determine the baseline values of key outcome level indicators to inform target revision/verification.
3. Identify and assess market linkages between poultry businesses and service providers.
4. Assess existing practices (including access, quality/pricing/payments and competition) and methods used for post-production processing of poultry.
5. Determine the market size/demand and tendencies for poultry farmers in each area.
6. Identify major production constraints in the poultry industry.
7. Identify sector policy/organizational constraints existing in the poultry and related industries and the associated business development environment.

The aim of this report is to present findings and observations from the baseline survey. Pre-intervention values of key indicators for all poultry value chain players included in the study are presented. This will serve as the basis for monitoring the performance of the project to its objectives. This will also enable project management team determine whether it is on course to achieve its strategic objectives.

Detailed description of study design, sampling strategy, data collection methods and key findings are presented in the following sections of this report. Specifically, the report presents the profiles of key chain actors surveyed, baseline values of key outcome level indicators, market linkages between poultry businesses and service providers, existing practices and methods for production and post-production of poultry, intermediate and end market size, demand and constraints confronting the poultry industry.

2.0. METHODOLOGY

2.1. Baseline Survey Approach

The mixed method research approach was applied in this baseline survey. The mixed method approach combines both qualitative and quantitative research methods in the collection and analysis of relevant data for the Ghana Poultry Project. The mixed method approach used in this baseline survey involved the collection, analysis and integration of quantitative and qualitative research. This approach was used because the integration of the two approaches provide better understanding of the local poultry industry than either of each alone. As indicated by Creswell and Clark (2007), the mixed method approach employed helped in addressing wide range of research questions pertaining to the Ghanaian poultry industry. The mixed method approach helped in overcoming the weaknesses in adopting one research approach and hence, the baseline survey has stronger evidence for better conclusion and policy recommendations. Nonetheless, this method is complex and takes much more time and resources to plan and implement in the field. The qualitative data collection methods used in the baseline survey includes observations, and key informant interviews. Quantitatively, structured questionnaires, which consisted of both closed and open ended questions, were used to collect quantitative data.

2.2. Sampling methodology

A representative sample for the various poultry chain actors and other relevant stakeholders was estimated and selected using different sampling procedures. These sampling strategies that were employed are briefly described below.

a. Sampling of Primary poultry producers

Using the scale of production (commercial flock size) as a criterion, poultry producers have been stratified by GPP in tier 1 (very large scale farms with > 50, 000 birds), tier 2 (large and medium scale farms with $\geq 5,000$ but < 50,000 birds) and tier 3 (small and very small poultry farms) (≤ 5000 but > 50 birds). The following sampling techniques were used to select responding enterprises from the three strata.

i. Very Large Scale Poultry Farms

The study employed complete census of all farms within this tier. This is because initial search and available data from ADVANCE (2014), Ghana Statistical Service- (2013) and AMPLIFIES/ASA (2016) prior to the survey suggested that the total number of firms in tier 1 were lower than GPP target beneficiaries of 50. This was confirmed during the process of data collection. In view of this, all poultry producing enterprises falling in this category were surveyed. The study surveyed 24 very large poultry producers.

ii. Large and Medium Scale Poultry Farms

The study employed complete census of all farms within this scale for the reason already outlined for census of the very large scale farms. Also, other farms belonging to this category, but not listed in the above database were identified in each of the study areas and included in the survey. Following this strategy, the study surveyed 144 poultry producers belonging to this size category.

iii. Small and Very Small Poultry Farms

Using a combined database of firms belonging to this tier from ADVANCE (2014), GSS (2013) and AMPLIFIES as a sampling frame, simple random sampling was used to sample small and very small farms (≤ 5000 but > 50 birds). Under the assumption that the total number of small and very small poultry farms are three times the size of tier 1 and 2 combined (based on available database indicated above), a sample size of 320 (including margin for non-response) was estimated. The determination of farms to be selected from each study area was proportional to the number of farms in the various study areas belonging to this operational scale per the sampling frame.

iv. Poultry Households

With an estimated beneficiary population of 10,000 poultry households, a total of 407 poultry households were selected purposively based on their proximity to cluster of or individual farms between the very large and medium operational scales. With GPP's focus of vaccinating poultry households around tier 1 and 2 poultry farms to serve as biosecurity against the outbreak of diseases, purposive sampling was the most appropriate to ensure that selected household produces poultry and it is within the vicinity of medium to large scale poultry farms. The proportion of poultry household that were selected per study area was proportional to the number of tier 1 and 2 farms in each area. However, a considerable number of farms between the very large and medium operational scale were isolated, very distant from settlements. Thus, from the perspective of potential disease outbreaks in these farms resulting from poultry households acting as agents of transmission, it seemed practically and technically unlikely. Thus, the final sample for poultry households was therefore smaller than the estimated.

The representation samples using margin of error of 0.5, confidence level of 95%, alpha value of 0.05 with standard normal distribution of zero mean and standard deviation of 1 and standard score of 1.96 resulted in the above-stated sample sizes.

v. Sampling of households for consumer survey

The study used stratified sampling to select a total of 423 households (using an approximated population of 1,665, 942 households in the study districts based on computations from the summary of final results of 2010 population and housing census by GSS) from the capital towns of the selected districts or municipalities. One suburb was randomly selected from each of the three already existing income strata (low, middle and high) using the lottery approach. In most cases, although local knowledge from District Assemblies was able to stratify the district capital based on income, no official documents existed for this purpose. Using official list of streets from the selected suburbs as sampling frame, 5 streets were randomly selected using the lottery approach. From the selected

streets, households were then selected systematically with the number of household in each study area being proportionate to the total households in the district/municipality based on computation from summary report of results of 2010 population and housing census by the Ghana Statistical Service (GSS, 2012).

vi. Sampling of Hotels and Restaurants

All 3-5 star hotels and major high end restaurants within the selected suburb used for consumer survey were targeted to be interviewed. However, a considerable number of these facilities either explicitly declined to be part of the study or implicitly by subjecting the request of the survey team to never-ending bureaucratic procedures or simply refused to give data on quantities demanded. A total of seven hotels and 15 restaurants were interviewed.

vii. Sampling of supermarkets and cold chain facilities

In addition, major high end supermarkets and wholesaling cold chain facilities in all study areas were targeted for this study. However, the team faced challenges similar to those encountered with hotels and restaurants. In the end, 3 supermarkets and thirty-three (33) cold chain facilities that cooperated with the research team were interviewed.

viii. Sampling of schools and colleges

All heads/matrons/bursars/procurement officers of all government senior high schools and colleges within the study areas were sampled and interviewed. A total of twenty-five (25) schools and colleges were interviewed.

ix. Sampling of veterinary service providers (VSPs)

Complete census of all heads of the Veterinary Service Directorate of each district as well as notable private veterinary service providers in each project district were interviewed to understand the current situation with respect to availability and effectiveness of veterinary services in the districts. A total of thirty (30) veterinary service providers were ultimately interviewed.

x. Financial service providers

Purposive sampling was used to select financial institutions based on historical records of dealing with farmers and in line with GPP's target. There were however instances where eligible financial institutions either declined to participate in the survey or requested the team to negotiate for access from their head office, mostly outside the study area. This significantly reduced the number of financial institutions that were interviewed. The study therefore had access to and interviewed fourteen (14) financial institutions.

2.3. Development of Data Collection Instruments

Comprehensive review of literature relevant to the Ghana Poultry Project/assignment was done. Available reports, publications and documents such as the FAO (2014) report on animal production and health livestock reviews for Ghana, the Ghana Poultry Project documents, published articles

among others, were critically scrutinized for better understanding of the project. The information gathered from these sources was used in the design of the data collection instruments for the study. Separate structured questionnaires were designed for poultry producers and consumers of poultry products. The producers' questionnaire captures important data on socioeconomic profiles of poultry farmers, farm characteristics, farm management issues, institutional factors, production indicators, sales of products, market and governance structure, and knowledge, attitude and practices as well as production constraints. The consumer's questionnaire on the other hand captures relevant data on consumers' personal and household characteristics, purchasing behaviour of consumers, consumers' awareness and knowledge of imported poultry products, consumers' attitude and perception on local poultry products and their preferences for local poultry products. Similarly, separate interview guides were designed for the end market users, and service providers.

The draft questionnaires and interview guides were sent to ACDI/VOCA for reviews and approval. The consultants received comments and suggestions on the draft instruments. These comments and suggestions were incorporated into the data collection instruments.

2.4. Training of enumerators and supervisors and pilot testing

Revised data collection instruments were used to develop training materials for the purpose of training of field supervisors and selected postgraduate students who were used as enumerators/research assistants. Apart from the general techniques for data collection and quality control, trainees were also taken through the data collection instruments question by question. All questions and options available for respondents to choose from were discussed by training participants to ensure that there was common understanding. Having gone through each data collection instruments, special training on the use of tablets for enumeration was also organised for supervisors and enumerators. This aspect of the training programme, aimed at allowing enumerators and supervisors to practise with the tablets, experience possible technical challenges and address the technical challenges that might occur during the actual data collection.

Pre-testing of producer, poultry households and consumer household data collection instruments was carried out after in-class training of enumerators. The data collection instruments were pilot-tested in three communities, one from each of the selected regions to ensure that the instruments were reliable for in the baseline survey. Training participants were sent to communities that are characteristically similar to selected study areas but are outside the project zone to pre-test data collection instruments. This pre-testing was designed to ensure that training participants (potential enumerators) were able to use the questionnaire in the field, interpret questions appropriately in the local language and also to assess the enumeration time per respondent. Supervisors also had the opportunity to correct enumerators when they were making mistakes in the interpretation and recording of responses from respondents. Following the field test, with the enumerators, difficulties encountered in the field were discussed and issues ironed out during the last day of training before the final list of enumerators was selected for the main field survey. Results of the pilot-testing also informed revision of the instrument before the main field survey.

2.5.Data Collection Methods

As indicated above, the study adopted mixed method research approach and as such mixed methods were used in the data collection process. The qualitative data collection methods used in the survey included field observations and key informant interviews. These qualitative methods were used to collect primary data on techniques of poultry production, business management, access to improved poultry input (DOC, Veterinary services, feed) and financial services, existing commercial relationships between poultry farmers, existing market linkages, barriers that may hinder the success of GPP interventions as well as major production, sector policy and organizational constraints.

A structured questionnaire was used to collect quantitative data. The quantitative data collected focused on determining key poultry production indicators and assessing market linkages between poultry businesses and service providers. The quantitative data collected also included the socioeconomic profile of poultry farmers in the project zone such as income levels, gender-ownership of farms and gender distribution at the farm management level. Assessment of existing practices (including access, quality/pricing/payments and competition) and methods used for post-production processing of poultry; market size/demand for poultry were further collected as part of the quantitative data. Quantitative data were also collected on consumer's socioeconomic characteristics, behaviour, attitude, knowledge, perception and preferences for poultry product, and finally data also captured major production and sector policy constraints facing the poultry industry.

Five teams were formed during the data collection process. Each team consisted of four enumerators and one supervisor. Each team was assigned one vehicle to facilitate their movement from one community to another. This was done to ensure that the survey was implemented simultaneously/concurrently across all the target districts. The supervisors monitored the activities of the enumerators closely to ensure that data quality was not compromised. Also, at the end of each day, the supervisors reviewed the completed questionnaires to ascertain if there are any data gaps. Identified gaps were filled before the team left the community. Enumerators were given airtime to communicate with their supervisors whenever they encountered difficulties while administering the questionnaires.

2.6.Data Analysis Procedures

The data collected were transformed into both SPSS and excel file formats. The data was cross-checked, merged and sorted according to zones, and cleaned before data processing and analysis.

1. In analysing the quantitative data on respondents profiles and basic socioeconomic characteristics pertaining to poultry farmers in the project zone including income levels, gender-ownership of farms and gender distribution at the farm management level, etc., descriptive statistics such as means, frequency distribution table, bar charts, histograms, pie charts, and cross tabulations were used.

2. To determine the baseline values of key outcome level indicators such as poultry production output, total variable costs and gross margins to inform target revision/verification, enterprise budget were used.
3. To identify and assess market linkages between poultry businesses and service providers, descriptive statistics such as means, frequency distribution table and flow charts were used.
4. To assess existing practices (including access, quality/pricing/payments and competition) and methods used for post-production processing of poultry, frequencies and percentages were used.
5. To determine the market size/demand and tendencies for poultry farmers in each area, average quantities of poultry meat, eggs and meat products demanded were computed using arithmetic mean of the study sample and projected over the population.
6. Kendall's coefficient of concordance was employed to determine the major production and sector specific policy constraints which impede development in the poultry industry.
7. Perception indices were used to determine consumers' attitude and perceptions on local poultry products.

The qualitative data was triangulated with the quantitative data to crosscheck the reliability and consistency of the information obtained to ensure higher accuracy of the information. Specifically, the qualitative value chain approach was used to map, identify, link and describe the characteristics of the key actors in the poultry value chain. The trends, incentives and relationships that exist among the actors in the value were evaluated with thematic analysis.

2.7.Challenges and limitations of the study

The first challenge the team had to deal with was *misidentification of producers on sampling frame*. The team encountered several cases where names of 'ordinary employees' were used to identify the farm instead of either the owner or the manager in the AMPLIFIES/ASA database. This made identification and booking of appointment difficult as the same farm were called on phone or visited on more than one accession.

Another challenge was *wrong contact numbers provided in the reference database*. There were several occasions where contact numbers provided in the reference database was either not in existence, went to a wrong person or were totally absent. This made it very difficult making prior appointment with respondents. There are cases where a team had to drive for more than an hour only for the respondent to decline access on that day.

In addition, *respondent fatigue and inability of respondents to see the relevance of the exercise* made some producers decline to be part of the study. The poultry sub-sector, like most agricultural sub-sector, has been the study target for several stakeholders such as the government, non-governmental organizations, donor partners, academic etc. In view of this, poultry producers have had to respond to several studies/researches that have similar or related focus. This challenge is exacerbated when respondents are not able to establish any direct benefit to their operations attributable to participation in these studies. According to some poultry farmers, previous exercises similar to GPP's baseline

study have yielded no result or benefit, hence their decision to either decline participation or not fully cooperate with research teams..

Poultry farms outside the study areas: There were couple of farms in the reference database that was outside the pre-sampled 19 districts.

Poor planning of settlements made systematic identification of households difficult. With reference to the household consumption survey, the poorly planned nature of settlements in most towns under the project sometimes made implementation of systematic sampling difficult or practically impossible. In such cases, supervisors had to apply a compromised version of systematic sampling.

Bureaucratic procedure associated with gaining access to end users: The teams were limited in scope due to the denial of access by certain institutions such as financial institutions, schools, colleges, supermarkets and cold stores. There are instances where teams were required to submit request letters to head offices of certain institutions that were outside the project district.

Poor record keeping culture of producers: A major challenge encountered during the survey was the fact that the team sometimes had to rely on responses provided through recall and calculated guesses. This is especially so for small and very small scale enterprises (tier 3) who have minimal formal education Inasmuch as the team carefully probed to obtain the most accurate responses, there may still be some margin of error that can affect, to some extent, the data received.

3.0. RESULTS AND DISCUSSIONS

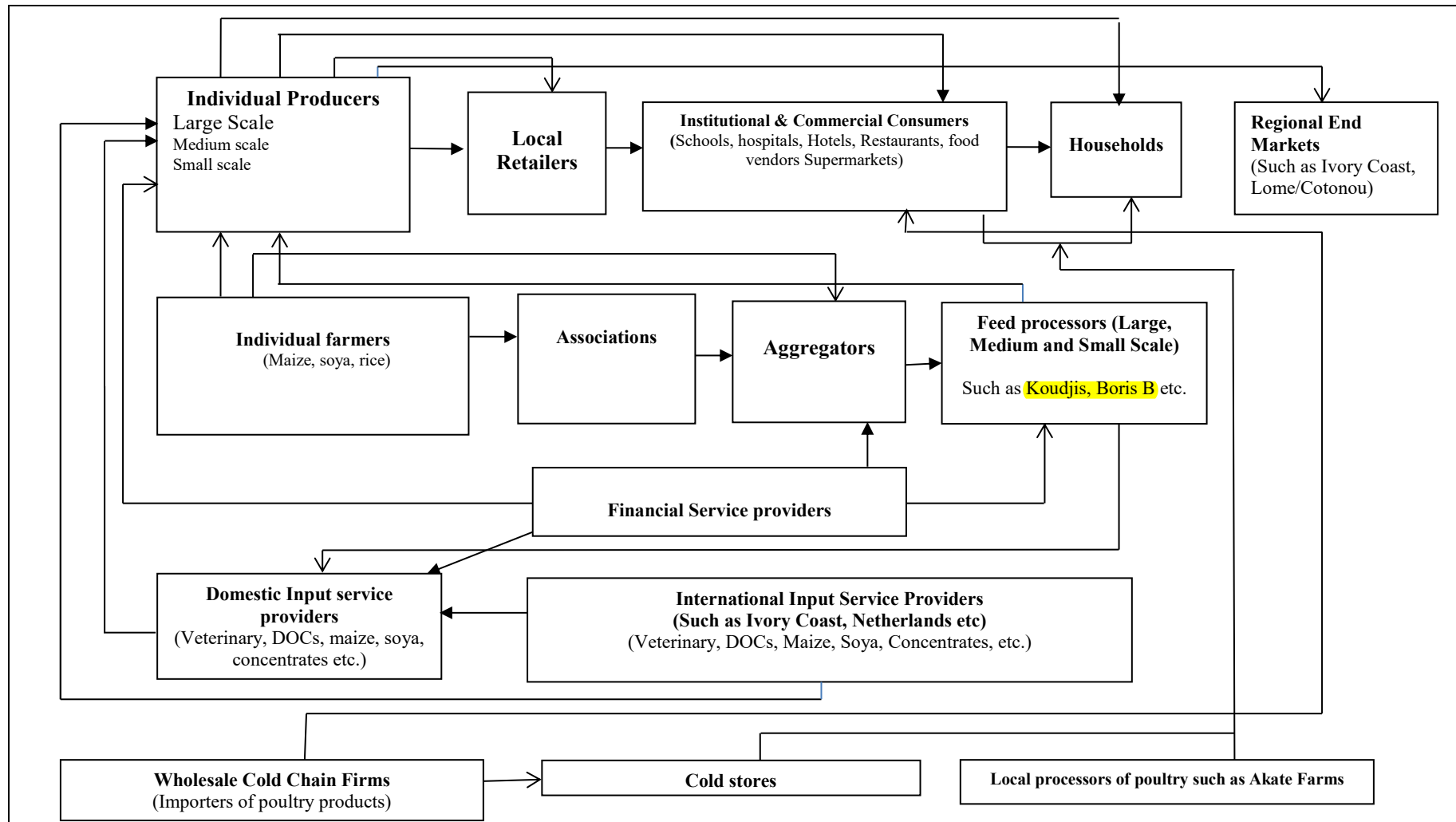
This section presents findings from the baseline survey. Section 3.1 describes the poultry value chain in Ghana whilst section 3.2 presents results from the producer survey. In section 3.3, findings from household consumption study are presented. The next section, 3.4 focuses on the results from the end market survey whilst sections 3.5 and 3.6 presents key findings from veterinary service providers and financial service providers respectively. The last section presents results on household consumer survey.

3.1. Overview of the Ghana's poultry value chain

The poultry value chain in Ghana can be traced from the point of both domestic and international input suppliers (including producers of production inputs and raw materials such as maize, soybean/soybean meal and other input providers such as veterinary drugs ,financial service etc) to producers for the production of poultry products for consumption. The poultry products produced by farmers are sold through multiple channels from the farm gate to the final consumers via intermediaries such as live bird retailers, processors and occasionally regional buyers, particularly the Ivory Coast. Other important actors in the chain include domestic input suppliers such as day old chicks providers (notable among them are hatcheries such as **Akate Farms Limited, Topman Farms Limited** and other international hatcheries mainly from **Reiss and Company Limited of the Netherlands, Ivory Coast**), veterinary service providers (both private and government), feed processors (such as **Koudjis, Boris B, etc.**) who either sell feed inputs and processed feed directly to poultry producers or to retailers, feed providers (either from individual maize and soya farmers, aggregators and associations), financial institutions and other international input service providers particularly from Ivory Coast who provide important support services.

In Dormaa municipal, a major centre of poultry production for the Ghanaian poultry industry, input suppliers such as **Foani Services from Ivory Coast** supply inputs such as DOCs, processed feed, maize, soya and other veterinary inputs to local producers on a contractual basis particularly for broiler production and spent layers. After production these local producers sell their birds to Ivory Coast through **Foani Services** and other like agencies. In general, local producers provide either live birds and/or eggs to the domestic markets through local wholesalers, local retailers, local processors, institutional and commercial consumers (such as schools, hotels and restaurants etc.) and to regional end market through agents to neighbouring countries (Such as Ivory Coast, Lome/ Cotonou). Other wholesale cold chain distributors also import poultry products (such as whole dressed birds, cut portions and eggs) and supply these poultry products to the domestic consumer through other cold chain firms, wholesalers and local processors. Some locally producers, such as **Akate Farms** produces lots of broilers every 2-3 months and process poultry into various forms (such as whole dressed birds and cut portions) and keep in cold storage between lots until sold for consumption.

Figure 1: Poultry Value chain Map and marketing channels for Ghana



Source: Researchers' construct based on Field Data, 2016

3.2. Key findings from poultry producers' survey

3.2.1. Characteristics of producers

3.2.1.1. *Distribution of producers by target region and districts*

Table 1 below presents the distribution of producers by GPP target regions. A majority of responding producers (210, representing 51.22%) were from the Brong-Ahafo region followed by Ashanti region with 37.56%. Greater Accra had the least number of producers (46, representing 11.22%).

In terms of classification of poultry producers into three scales of operation based on the commercial broilers and layer stock for 2015 across the three study regions, it can be seen from Table 1 that poultry producers in Brong Ahafo region have the highest number of farms within the very large and medium scales of operation with Greater Accra region having the least.

Table 1: Distribution of poultry producing enterprises by region

Study region	Frequency/No. of producers	Percentage	Disaggregation scale of operation			
			Very Large	Large and Medium	Small and Very Small	Total
Brong Ahafo	210	51.22%	12	66	132	46
Ashanti	154	37.56%	10	64	80	154
Greater Accra	46	11.22%	2	14	30	210
TOTAL	410	100%	22	144	242	410

Source: Baseline survey, 2016

3.2.1.2. *Distribution of poultry producers by study districts*

In terms of distribution of producers by study districts, presented in Table 2, Dorman in the Brong-Ahafo region had the highest number of producers (71) followed by Atwima Nwabiagya, Sunyani, Atwima Kwanwoma, Wenchi, Techiman, Berekum, Ejisu-Juaben, Ga East, Kumasi Metro, Ofinso South, Ejura-Sekyedumasi, Nkoranza, Ga South, Tema, Accra Metro, Ofinso North, Dangbe East and Ada west with the frequencies presented in the table.

Table 2: Distribution of poultry producers by study districts

Name of District	Frequency/No. of producers	Percentage (Total = 410)
BRONG AHAFO REGION		
Dormaa	74	18.05%
Sunyani	38	9.27%
Techiman	28	6.83%
Berekum	28	6.83%
Wenchi	31	7.56%
Nkoranza	11	2.68%
ASHANTI REGION		
Atwima Nwabiagya	47	11.46%
Atwima Kwanwoma	31	7.56%
Ejisu Juabeng	28	6.83%
Ofinso South	14	3.41%
Kumasi Metro	16	3.9%
Ofinso North	5	1.22%
Ejura Sekyidumasi	13	3.17%
GREATER ACCRA REGION		
Ga East	18	4.39%
Ga South	9	2.2%
Tema	9	2.2%
Accra Metro	7	1.71%
Dangbe East	2	0.49%
Ada West	1	0.24%

Source: Baseline survey, 2016

3.2.1.3. Distribution of current and commercial stock for 2015

Table 3 shows the statistics (arithmetic mean, standard deviation, minimum and maximum) for poultry producing enterprises based on current and last year's commercial flock size which have been disaggregated by the type of poultry produced; broiler, layer, chicks and eggs. The average broiler stock currently is estimated to be 405 whilst the average stock for layer is currently around 8476 birds. This shows that poultry production in the target areas is dominated by layers. This reinforces the assertion made under section 1.1 that poultry production in Ghana has shifted from meat production to eggs. In addition, juxtaposing the current and last year stocks for male-owned and female-owned farms shows that the production levels of male-owned farms are higher than their female counterparts.

Table 3: Distribution of current stock and commercial stock for 2015 by size of poultry producers

Variable	Pooled sample		Very Large		Large and Medium		Small and Very Small	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
	Current (2016) stock							
Current total stock ^a	11074	30886	86965	92538	13365	15252	2186	2770
Current broiler stock	405	2380	2566	6925	521	2538	121	811
Current layer stock	8476	19223	56481	46511	11585	15070	1864	2599
Current Chicks stock (DOC stock for producers)	2193	18672	27917	73499	1258	2976	199	653
	Commercial stock for last year (2015)							
Last year total stock ^b	24331	171419	311454	655643	14222	10425	1869	1269
Last year broiler stock	2333	12681	25295	45026	1846	6143	344	620
Last year layer stock	10262	29565	88658	87686	11910	9824	1505	1303
Last year chicks stock (for hatcheries)	11736	164310	197500	565856	464	2357	20	149
Last year eggs stock (30 eggs crate)	52297	141982	343610	527438	73840	120112	10587	15245

Source: Baseline survey, 2016 ^a represents the sum of current broilers, layers and chicks; ^b represents the sum of commercial stock of broilers, and layers for 2015

3.2.1.4. Size of poultry producers disaggregated by sex of owner

Disaggregating these classes based on the gender of farm owners shows that about 91.7% of very large farms are owned by men while 89.5% (129 out of 144) large and medium poultry farms are owned by men as shown in Table 4. Juxtaposing these 8.3% and 10.4% female ownership of farms between the very large and medium poultry operations with the overall female presence of about 11.5% in the total sample shows that the distribution of farms in terms of scales of operation or production are not equal between male and female.

Table 4: Distribution of poultry producer classes (based on commercial stock for 2015) by gender

Scale of Operation	Total	Male-owned farms	Female-owned farms
Very Large	24	22	2
Large and Medium	144	129	15
Small and Very Small	242	212	30
Total	410	363	47

Source: Baseline survey, 2016

3.2.2. Access to poultry management training and grant by producers

A total of 212 producers (representing 51.7%) responded having access to formal training/education in poultry management. Out of this number, 17 (8%) of those with access to training are female. Comparing training access across the different scales of production, about 79.2% of total tier 1 enterprises, 61.1% of tier 2 and 38.9% of tier 3 enterprises had access. This implies that in general access to training in poultry management appears to increase with scale. However, poultry producers in the Greater Accra region had the highest access to poultry management training.

With reference to poultry producers' access to grant facilities, Table 5 shows that thirteen (13) male-owned producers (representing 3.6% of total males) responded to having accessed grant facilities for the purposes of poultry production. For females, the figure is slightly lower (2.1%). The results of the study also show in Table 14 and Table 15 that producers in Greater Accra region and large scale producers have greater access to grant facilities. Grants facilities received by poultry producers include cash (received by 8 producers), production inputs such as day old chicks (received by 1 producer), feed (received by 3 producers) watering trough (1 producer), and drugs/vaccines (2 producers). Whilst cash grants have mainly been provided by the government, buyers, and international development agencies, others such as day old chicks, watering trough and drugs/vaccines have exclusively come from the government. Also, grants in the form of poultry feed have usually come from input suppliers and individuals producers transact business with. The greater access of Greater Accra farmers to poultry management training programmes and grants may be attributable to the centralized nature of the administrative structure of most training service providers, where programme decisions and implementation are made.

Table 5: Access to poultry management training and grant

		Access to training		
		Access	No access	Total (n)
Total		212 (51.7%)	198 (48.3%)	410
Sex of producer	<i>Male</i>	195 (53.7%)	168 (46.3%)	363
	<i>Female</i>	17 (36.2%)	30 (63.8%)	47
Region	<i>Greater Accra</i>	31 (67.4%)	15 (32.6%)	46
	<i>Ashanti</i>	80 (51.9%)	74 (48.1%)	154
	<i>Brong Ahafo</i>	101(48.1%)	109 (51.9%)	210
Size of producer	<i>Very Large</i>	19 (79.2%)	5 (20.8%)	24
	<i>Large and Medium</i>	88 (60.1%)	56 (38.9%)	144
	<i>Small and Very Small</i>	105(43.4%)	137 (56.6%)	242
		Access to grant		
		Access	No access	Total (n)
Total		14	396	410
Sex of producer	<i>Male</i>	13 (3.6%)	350 (96.4%)	363
	<i>Female</i>	1 (2.1%)	46 (97.9%)	47
Region	<i>Greater Accra</i>	4 (8.7%)	42 (91.3%)	46
	<i>Ashanti</i>	6 (3.9%)	148 (96.1%)	154

	<i>Brong Ahafo</i>	4 (1.9%)	206 (98.1%)	210
Size of producer	<i>Very Large</i>	2 (8.3%)	22 (91.7%)	24
	<i>Large and Medium</i>	3 (2.1%)	141 (97.9%)	144
	<i>Small and Very Small</i>	9 (3.7%)	233 (96.3%)	242

Source: Baseline survey, 2016

3.2.3. Access to and disbursement of credit

From a total of 136 producers who responded to having access to and/or applied for credit, 114 (representing 83.8%) received the credit. This shows that although the percentage of total producers with access is generally low (33.2% - 136 out of the 410), credit approval rate is very high for those applying for credit as represented by the pooled sample, as well as for both sexes, with females having higher access (95.2%).

From the regional perspective, the percentage of applicants receiving credit applied was relatively high with the Brong Ahafo region being the region with the highest number of producers being granted their credit request. Also, large scale poultry producers (tier 1) had the greatest percentage of their credit applications being granted and credit facility subsequently being received. This may be explained by the fact that managers and owners of largest and medium scale enterprises have had some form of formal education. As a result, they are able to keep records and also have a better understanding of credit acquisition procedure and requirements. These factors enhance their chances of getting their applications approved.

Table 6: Access to and disbursement of credit by gender and size of producer

Access to credit	Total		Male-owned farms		Female-owned farms	
	Applied	Received	Applied	Received	Applied	Received
Access	136 ^a	114 (83.8%) ^b	115 ^a	94 (81.7%) ^b	21 ^a	20 (95.2%) ^b
Total	410					
	Greater Accra		Ashanti		BrongAhafo	
	Applied	Received	Applied	Received	Applied	Received
Access	15 ^a	12 (80.0%) ^b	42 ^a	33 (78.6%) ^b	79 ^a	69 (87.3%) ^b
Total	46					
	Very Large scale		Large and Medium scale		Small and Very Small scale	
	Applied	Received	Applied	Received	Applied	Received
Access	11 ^a	10 (90.9) ^b	51 ^a	44 (83.3%) ^b	74 ^a	60 (83.1%) ^b
Total	24					

Source: Baseline survey, 2016; ^a represents number out of total producers who have access to and applied for credit in 2015 whilst ^b shows the number (and percentage) of applicants who ultimately received the credit applied for.

3.2.4. Size of employment by size of firm and sex of owner

Table 7 shows the number of jobs created by poultry producers disaggregated by size and sex of the farm owner. It can be seen from the table that the number of works employed on the farm is expectedly related (positively) with size of the farm. This is because the labour intensive nature of poultry production requires that larger to medium producers employ more hand to execute day-to-day operations of the farm. On the other hand, the results show that male-owned farms are employee more workers than female will. All 24 producers employing more than 20 workers are males although there are 2 female-owned farms that fall under very large scale.

Table 7: Classification of employment size by scale of operation and sex of owner

Employment Group	Pooled	Scale of Operation		
		Very Large	Large and Medium	Small and Very Small
Less than 5 employees	254	0 (0%)	44 (17.68%)	210 (82.68%)
5 – 10 employees	99	3 (3.03%)	67 (67.68%)	29 (29.29%)
11 – 20 employees	33	2 (6.10%)	28 (84.85%)	3 (9.09%)
Greater than 20 employees	24	19 (79.17%)	5 (20.83%)	0 (0%)
Sex of farm owner				
	Pooled	Male	Female	
Less than 5 employees	254	219 (86.22%)	35 (13.78%)	
5 – 10 employees	99	90 (90.91%)	9 (9.09%)	
11 – 20 employees	33	30 (90.91%)	3 (9.09%)	
Greater than 20 employees	24	24 (100%)	0 (0%)	

3.2.5. Delivery of day-old-chicks, feed and vaccines

Table 8 shows the time it takes for farmers to take delivery of their inputs after orders have been placed for day-old-chicks (DOC), poultry feed and vaccines. From the table, the average number of days for DOC, feed and vaccines are 30.01, 0.83 and 0.91 respectively. However, all three inputs can either be obtained on the spot or in less than one day (indicated by a minimum delivery time of 0 day). Comparing the delivery time for male-owned and female-owned farms indicate that females received their orders earlier than their male counterparts. Comparing the delivery time across the three levels of production in Table 8 indicates that it takes relatively longer time for very large scale farms to receive their orders. This may be explained by the fact that supplier(s) needs a relatively longer time to prepare and deliver the quantities or volumes of order that will be placed by larger farms. On the other hand, small farms demanding fewer numbers or volumes of input can sometimes undertake on the spot transaction where orders are paid for and taken delivered on the same day.

Table 8: Delivery time (days) for farm inputs (DOC, feed and vaccines): disaggregated by sex of farm owner

Delivery time	Total				Male-owned farms				Female-owned farms			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
DOC	30.01	21.92	0	180	30.03	22.49	0	180	29.85	17.10	0	90
Feed	0.83	2.97	0	30	0.80	2.93	0	30	1.09	3.31	0	20
Vaccine	0.91	4.62	0	70	0.99	4.90	0	70	0.23	0.48	0	2
Delivery time	Very Large Scale Farms				Large and Medium Scale Farms				Small and Very Small Scale Farms			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
DOC	35.64	26.05	0	90	35.64	27.09	0	180	26.37	17.10	0	120
Feed	1.68	3.15	0	14	0.61	1.13	0	7	0.88	3.59	0	30
Vaccine	3.18	6.93	0	30	0.67	2.65	0	30	0.83	5.16	0	70

3.2.6. Sales of poultry products

Table 9 shows results on quantities of poultry products sold, their unit prices and total value of sales disaggregated by type of product during the 2015 production year. A total of 655,580 broilers were sold in 2015 by 162 producers at a unit an average unit rate of US\$ 6.60, resulting in a total sales value of US\$ 4,328,855.44. In terms of sales volume and revenue from the sale of layers, 2,249,375 birds were sold in 2015 by a total of 299 poultry producers. This quantity resulted in total sales revenue of US\$ 10,248,768.70. Also, the sale of eggs, which constituted the major proportion of total poultry revenue, was US\$ 84707944.30. This figure was realised from the sale of 806,891,730 pieces of eggs sold at a unit rate of US\$ 0.10 by a total of 349 poultry producers. Comparison of quantities and sales revenue of broilers with those from layers and eggs, as well as the number of producers contributing to the sales value, confirms the fact that the poultry industry in Ghana is currently focused on egg production instead of poultry meat.

Table 9: Quantities and revenue of product sold by type of product (broilers, layers and eggs)

Type	Total volume of sale	Unit price (USD)	Total value of sale (USD)
Broiler (number of birds)	655580	6.60	4328855.44
Layer (number of birds)	2249375	4.56	10248768.70
Eggs (number of eggs)	806891730	0.10	84707944.30

Source: Baseline survey, 2016. Note: USD 1=GHS 3.77; N.B: Broiler sales are from 162 producers, layer sales from 299 producers and eggs sales are from 349 producers

3.2.7. Access to current market information and frequency of use of market information

Table 10 presents results on frequency of information usage. The table measures the number of producers who use specific information at least once in a month. Generally, the use of price information and information about buyers by producers across all three regions was higher and more frequent with Greater Accra region having the greatest access (93.33% and 86.67% for price and buyer information respectively). These results on frequency of information usage are consistent with earlier findings on access to poultry management training and grant that suggests that the proximity of the region to source of most information and other resources gives it an advantage over other region. However, the number of producers who used alternative market information and information on consumer behaviour at least once a month were however low and were below 35% across all three regions. Alternative markets channels include all outlets and channels outside the conventional direct wholesaling of live birds and eggs to retailers. These include sale of birds (dressed or live) to schools, colleges, and hospitals, sale of whole dressed, cut parts and other processed poultry products to supermarkets and cold stores. The use of information on these alternative markets broadens the supply outlets and the market base of producers. This in turn increases producers' bargaining power and allows them to effectively negotiate for better prices and terms of transaction instead of being price takers.

Table 10: Frequency of usage of market information

Type of market information	Greater Accra Region (15)	Ashanti Region (49)	Brong Ahafo Region (52)
Price information	14 (93.33%)	44 (89.80%)	47 (90.38%)
Buyer information	13 (86.67%)	34 (69.39%)	42 (80.77%)
Alternative market channel information	5 (33.33%)	16 (32.65%)	8 (15.38%)
Consumer behaviour information	4 (26.67%)	14 (28.57%)	18 (34.62%)

Source: Baseline survey, 2016

3.2.8. Value of private sector investment in poultry production

Table 11 presents findings on value of private sector investment in poultry production. According to the table, a total of US\$ 393,813,285.15 have been invested by responding poultry producers in all three regions. Out of this investment, 99.66% is from the private sector. In all, only 17 of the 410 producers reported ever benefiting from public sector investment. The table also shows that Ashanti regions has the highest investment US\$ 171,546,074.27 (representing 43.56% of total investment). This is followed by the Brong Ahafo region, with the Greater Accra region having the lowest investment as shown in Table 11.

Table 11: Value of private sector investment in poultry production

Indicator	Region	Mean (USD)	Std. Dev. (USD)	Total Investment (USD)	Percentage (%) of total investment
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Total value of private sector investment	Greater Accra (46)	1,499,557.95	8,746,059	68,979,665.78	17.52
	Ashanti (154)	1,113,935.55	8,313,841	171,546,074.27	43.56
	Brong-Ahafo (210)	1,875,301.36	5,542,561	153,287,545.09	38.92
Total		4,488,794.86		393,813,285.15	100

Source: Baseline survey, 2016. Note: USD 1=GHS 3.77

3.2.9. Variable Production Cost per unit of output for egg and poultry

The cost profile of local poultry production is as shown in TableA1 (see appendix). Computation was made possible after data rationalization. Due to varying scales of operation, farms between very large and medium scales were observed to record higher averages on most of the relevant cost items with the former leading.

The variable costs of producing a bird (generic), broiler or layer were also provided in the last three rows of Table with interesting revelations. Though a survey average of about US\$ 12.70 per bird was found, very large farmers had a lower variable production cost per bird (US\$ 9.00) irrespective of the types or birds (broiler or layer) under production compared to large and medium farms (US\$ 12.00) and small and very small (US\$ 13.00) farmers. Variable production cost on broiler only farms followed a similar pattern. Variable cost of production on layer only farms, was however, not observed to follow any specific pattern with the following respective averages for large, large and medium and small and very small scale US\$64.00, US\$ 14.00 and US\$15.00.

Over 75% of all farmers spent at most, USD 0.80 in producing an egg. Analysis was thus restricted to this sub-sample with results in Table 2. Large and medium scale farmers stood out in minimising cost of egg production among the different scales of operations with an average cost of USD 0.03. This average represents almost a third of the cost of producing an egg among Tier 3 farmers and about at least half of the cost among the very large scale poultry farmers.

Table A3 shows that, neither the variable cost of producing a bird nor an egg, varied significantly across farmer locations/regions. This fact is buttressed by the fact that most purchase ingredients, supplements and medication were found to be imported and distributed by large companies; distribution then absorbs the price differences that could have been occasioned by spatial arbitrage.

3.2.10. Contractual issues

Formalization of contracts/agreements in poultry industry is extremely critical for the improved efficiency in the sector. Undertaking such a practice has the potential of reducing the uncertainties associated with most of the business activities in the industry. One of the major actors in the poultry value chain producers often enter into formal contracts or agreements are commercial feed ingredients/raw materials suppliers. Given the irregularities in the cash flow of most poultry

production businesses, a prior supply agreement would be advantageous to ensure continued production.

Table 12: Distribution of the volumes of feed (in MT) sourced with and without agreements/contracts by region

Commodity	Contract	Greater Accra (MT)	Ashanti (MT)	Brong-Ahafo (MT)	Total (MT)
White Maize	Total purchased (MT)	92639.5	27940.3	15924.2	135098.5
	With	430.5	14418.6	1580.1	10124.34
	Without	92058.8	9023.8	8280.2	113647.9
	% with contract	0.01	35.03	7.52	
Yellow maize	Total purchased (MT)	92937.8	25233.0	16927.7	136503.9
	With	12	8839.3	1273.04	16429.24
	Without	92510.5	14721.5	6415.9	109362.8
	% with contract	0.46	51.61	9.92	
Soy bean cake	Total purchased (MT)	2717.975	11309.82	6758.805	20786.6
	With	69.8	6598.7	85.9	6754.4
	Without	2108	3614.947	2783.46	8506.407
	% with contract	2.57	58.34	1.27	
Concentrates	Total purchased (MT)	92152.4	34122.52	3404.49	129679.4
	With	0	12866.7	2.7	12869.4
	Without	117.7	4390.81	1552	6060.51
	% with contract	0.00	37.71	0.08	

In terms of quantity of produce procured with contract, a total of 135098.5 MT of white maize, 136503.9 MT of yellow maize, 20786.6 MT of soy bean cake and was 129679.4 MT of concentrate procured in 2015 as show in Table 13. Out of this number, 430.5 MT of white maize, 12 MT of yellow Mize, 69.8MT of soy bean cake were produced under contract in Greater Accra, 14418.6 MT of white maize, 8839.3 MT of yellow maize, 6598.7 MT of soy bean cake and 12866.7 MT of concentrate were procured through contract in Ashanti and 1580.1 MT of white maize, 1273.04 MT of yellow maize, 85.9 MT of soy bean cake and 2.7 MT of concentrate were procured through contract in Brong

Ahafo respectively. The results indicate that most of the poultry farmers purchase most of their feed ingredients without formal contracts/agreements with feed suppliers, particularly aggregators.

The high volume of feed inputs procured under contract in the Ashanti region is primarily driven by two factors. Firstly, there is the presence of well-structured Farmer Based Organizations (FBOs) in the major maize and soy bean production areas like Ejura-Sekyedumasi municipal. These FBOs have been equipped with the requisite skills to undertake group sales under signed contractual terms, a practice that is not common among crop farmers in Ghana because most producers of maize, soy bean lack the necessary competence. For, instance, the World Food Programme (WFP) and its partner institutions have trained selected FBOs in group sales, contract bidding and negotiation and purchased over 5000MT of maize from these FBOs under its Purchase for Progress (P4P) programme implemented between 2010 and 2015. Secondly, the study found the number of poultry producers that also operate feed mills to be higher in Ashanti region (87) than in Greater Accra (7) and Brong Ahafo (48). Thus, the need for a reliable supply of maize and soy bean to ensure the operational capacity is fully utilized coupled with the presence of organized farmer groups in Ashanti region explains the high volumes contractual sales. This implies that creating awareness and building producers' capacity on need and competence to undertake group/contractual sales will improve the volume of produce procured under contracts.

3.2.11. Average mortality rate

The average mortality rates for Day Old Chicks and broilers and layers are shown in Table 14. The results indicate that the mortality rate among Day Old Chicks is higher (8.58%) than that of broilers and layers combined (5.83%). Also, Ashanti region recorded the lowest mortality rate among both chicks and broilers-layers. Conversely, Greater Accra region witnessed the highest rate of mortality among grown birds in the 2015 production. This is explained by the outbreak of bird flu in the 2015 season in some parts of the Greater Accra region.

Table 13: Average mortality rates for chicks, broilers and layers

	Pooled		Greater Accra		Ashanti		Brong Ahafo	
	Mean (%)	Std. Dev (%)	Mean (%)	Std. Dev (%)	Mean (%)	Std. Dev (%)	Mean (%)	Std. Dev (%)
Chicks	8.58	13.36	8.20	14.02	8.27	10.50	8.92	14.96
Broilers and Layers*	5.83	22.81	7.63	16.49	5.47	17.01	5.71	27.21

Source: Baseline survey, 2016. * represents the rate of mortality for broilers and layers have been combined. This is because most producers were unable to isolate and differentiate between broilers and layers who died in 2015.

3.2.12. Awareness of Government policies in the poultry sector

Despite the dwindling fortunes for domestic poultry production as farmers asserted, knowledge of government interventions aimed at averting the imminent collapse of the industry were rarely known among poultry farmers. Table 14 for instance shows that only a little above a quarter of all surveyed farmers have any knowledge of government policies and interventions in the local poultry sector. The incentives with most prevalent knowledge were the importation of maize for re-sale to local farmers and assisted processing and marketing of broilers with 30% for farmers indicating knowledge of these government interventions. The popularity of the latter emanates from the importance of maize as a cost item on the cost profile in poultry production.

Relatively fewer (27%) farmers expressed any knowledge of the adoption of the 20% common external tariff and even fewer (23%) knew about the existence of the Poultry Development Board. These two policy interventions emerged as the most known among farmers. Government interventions in the poultry sector may thus be considered inadequate. In addition, existing incentives need to be more publicised so as to expand the coverage of potential beneficiaries. On the other hand, the existence of government funded extension services through the Ministry of Food and Agriculture's Veterinary Services Department was not recognised by a majority of poultry farmers as a testimony of government intervention. Farmers had complained about the quality of delivered services from VSD and either self-administered medication or resorted to private service providers, mainly sellers of medications and experienced colleagues for advice on poultry health and diseases.

Table 14: Awareness of Government policies in the poultry sector

Government policy	Number of poultry producers	% of All PFs
Establishment of poultry development board	93	22.68
Importation of maize for resale to Poultry Farmers	124	30.24
Provision of veterinary care (services) and vaccination	120	29.27
Funding to support increased processing and marketing for broiler birds	124	30.24
Liberalization of imports/adoption of the 20% common external tariff	110	26.83
Total	410	100.00

Source: Baseline survey, 2016

From table 15, it may also be said that, poultry farmers across the targeted area of this study felt left out of government interventions in the sector where they are supposed to be key players. Whereas about 50% have no knowledge of any government intervention, an additional 47% did not benefit from any of incentives and policies in place.

Table 15: Distribution of beneficiaries of government policies/incentives

Status	Frequency	Percent
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Benefited	16	3.9
Not Benefitted	191	46.6
Not aware	203	49.5
Total	410	100

Source: Baseline survey, 2016

3.2.13. Training service and periods of receipt to PFs

Another area where local production of poultry is poorly served is in the area of training on improved production practices, marketing and enterprise management. Table 16 reveals that none of the essential training needs of poultry production posed to farmers received even 50% affirmative responses. It also reveals that trainings that most farmers (38-43%) benefited from were primarily on production practices; including training in feed formulation, improved production practices, vaccination and DOC management. Only a fifth of the farmers had any training in maintenance of optimum flock density¹.

Trainings in management and book keeping appeared most in the median range. Organisational record keeping stood out in this range with 30% of farmers reporting having been trained. Other book keeping and management were received by only 5-18% of all poultry farmers with computer and GPS training being in the rear.

Whereas some 22% of farmers reported receipt of training in improved post production practices, the training did not include processing and marketing, and the evidence appears that only 2-9% of all farmers received training in processing and marketing. Training in improved packaging and product labelling, distribution and processing had the lowest training frequency among respondent farmers. The field observations appear to confirm that a majority of commercial producers have neither the knowledge nor the resources and drive to add value and market products efficiently. Whereas this may result from the increasing consumer preference for imported poultry products due to price or other more appealing attributes, they may also have deep seated roots in the nonexistence of coordinated efforts to build the capacity of producers in the area of improved processing and marketing.

This baseline evaluation also implies that training topics and courses surveyed were up-to-date, using current technological best practices since, at the very least, 86% of all beneficiaries report training programs occurring in the past five years.

Table 16: Distribution of training service and periods of receipt to PFs

	Trained Poultry producers	Percent of all PPs	Period of receipt of training

¹ Optimum flock density refers to a housing space when birds are in their thermoneutral zone. That is, when birds are not overcrowded and have minimal stress as possible such that there is absence of panting, pecking, noise making and eating discomfort

Distribution of training service to PFs			1989-2010	% in period	2010-2015	% in period
Feed Formulation	178	43.41	7	3.93	171	96.07
Improved Production Practices	169	41.22	12	7.10	157	92.90
Vaccination	160	39.02	8	5.00	151	94.38
DOC Management	156	38.05	9	5.77	147	94.23
Organisational Record Keeping	125	30.49	9	7.20	116	92.80
Improved Post Production Practices	90	21.95	7	7.78	83	92.22
Flock Density	90	21.95	6	6.67	84	93.33
Financial Planning and Management	76	18.54	7	9.21	69	90.79
Business plan development	47	11.46	3	6.38	44	93.62
Cash Flow preparation	44	10.73	6	13.64	38	86.36
Income statement preparation	40	9.76	4	10.00	36	90.00
Balance Sheet preparation	37	9.02	4	10.81	33	89.19
Egg Packaging	35	8.54	1	2.86	34	97.14
Storage	33	8.05	2	6.06	31	93.94
Price setting	28	6.83	1	3.57	27	96.43
Computer and GPS	23	5.61	1	4.35	22	95.65
Poultry processing	11	2.68	0	0.00	11	100.00
Distribution	11	2.68		0.00	11	100.00
Labelling	10	2.44	0	0.00	10	100.00
Total	410					

3.2.14. Providers of training services to poultry farmers

Table 17 provides a frequency distribution of providers of training. About 70% of the aforementioned trainings were presented by input suppliers and government. This provides a partial explanation for the dominance of production related trainings in the table above. It may be the case that, had buyers with clearly defined tastes and preferences been involved in the trainings, then processing and marketing may have received a more prominent place. NGOs were the other major providers of these trainings, reported to have provided 45% of the farmers with some training programs. The Business Advisory Centres of the local assemblies, local/apex poultry farmers' association and educational/research institutions were among potential training providers least encountered by poultry farmers as training service providers.

Table 17: Providers of training services to poultry farmers across the ZOI

Training Service providers	Freq	Percent of all PFs
Government	285	69.51
International/national NGO	184	44.88

International development agencies (UN, USAID, etc)	42	10.24
Buyers (traders, others)	10	2.44
Input suppliers	288	70.24
Lenders	7	1.71
Total	410	100.00

Poultry farmers mainly assessed training programs as useful on the basis of their relevance to routine production activities. Table 18 provides farmer ratings of various training programs. Generally, practices that were most frequently provided were assessed to mainly be useful or very useful. Very few farmers (less than 12% for each activity) rated trainings as not useful or somewhat useful.

Table 18: Distribution of farmer rating of usefulness of received training services

Training service provided (n = 410)	Not Useful (%)	Somewhat useful (%)	Useful (%)	Very useful (%)	All trained	Non- trained
Feed formulation	0	1.7	46.6	51.7	178	232
Improved production practices	0	3.6	53.3	43.2	169	241
Vaccination	0.6	2.5	48.1	48.8	160	250
Doc management	0	0.6	47.4	51.9	156	254
Organisational record keeping	0	2.4	45.6	52.0	125	285
Improved post production practices	0	0.0	57.8	42.2	90	320
Flock density	1.1	3.3	47.8	47.8	90	320
Financial planning and management	1.3	0.0	56.6	42.1	76	334
Business plan development	0	12.8	29.8	57.4	47	363
Cash Flow preparation	0	4.5	50.0	45.5	44	366
Income statement preparation	2.5	0.0	42.5	55.0	40	370
Balance Sheet preparation	2.7	0.0	56.8	40.5	37	373
Egg packaging	0	8.6	54.3	37.1	35	375
Storage	6.1	6.1	39.4	48.5	33	377
Price setting	10.7	7.1	42.9	39.3	28	382
Computer and GPS	0	0.0	34.8	65.2	23	387
Poultry processing	18.2	0.0	36.4	45.5	11	399
Poultry packaging	0	9.1	27.3	63.6	11	399
Distribution	0	18.2	45.5	36.4	11	399
Labelling	20	0.0	30.0	50.0	10	400

Source: Baseline survey, 2016

3.2.15. Farmers' knowledge of improved practices

Evidence of farmers' knowledge of improved practices was sought by assessing farmer awareness of some improved practices. Table 19 provides a frequency distribution of the number of farmers providing affirmative responses or providing evidence of awareness. The general picture the table provides is that, knowledge of improved practices is generally wide-spread among respondent producers. A minimum of 90% of all farmers recognised or provided evidence that training in best practices provided were beneficial to poultry production. However, field observations revealed that most of these tenets were not adhered to in practice. The issue with lack of adoption of improved practices is therefore the result of either lack of compatibility with local production systems or due to cost implications resulting in "best practices" being viewed as too high a risk in the existing production and marketing environment.

Table 19: Distribution of farmers' knowledge of improved practices

Knowledge statement	N	Percent of Cases
Day old chicks should be the only birds that are introduced onto the farm	390	95.10%
It is necessary to control the movement of staff and equipment around the farm.	394	96.10%
There must be provision of shower facilities and clean clothing for staff and visitors.	372	90.70%
It is important to provide wash facilities for staff, essential visitors and vehicles prior to entry.	379	92.40%
It is important to use of disinfectant foot baths at the entry to each shed.	405	98.80%
It is important to thoroughly clean and disinfect all sheds between flocks.	406	99.00%
Maintaining the flock in a good state of wellbeing by good nutrition and housing.	407	99.30%
There a recommended vaccination protocol for birds	401	97.80%
It is important to practice suitable prevention medication programme	406	99.00%
The ingredients from which the diet is made must be of good quality.	408	99.50%
The weighing or measuring of all ingredients must be accurate.	399	97.30%
The micro-ingredients such as the amino acids, vitamins and other similar material should not be too old and should be stored in cool storage	398	97.10%
Do not use food that is too old or has become mouldy.	407	99.30%
Feed formulation must follow specified ingredient.	390	95.10%
There should be records all business actives and transactions on the farm	397	96.80%
Total	410	100.00%

Source: Baseline survey, 2016

3.2.16. Constraints to local poultry production

Farmer assessment of the major constraints to local poultry production span a wide area, covering constraints relevant to input purchase and usage (physical and financial), production, marketing and policy environment. Table 20 shows the number of farmer falling in discrete categories in terms of their ranking of major and/or often encountered constraints in the local poultry industry. The top 5 major constraints cited by most local poultry farmers were input unfavourable policy environment that does not support the growth of the local poultry sector. Input related constraints include the high cost of feed (by 87% of all PFs), high cost of medication (73%) and high interest rates charged on the limited loans disbursed to the sector (68%). These constraints were first, third and fourth on all respondent poultry farmers' rating scales of major constraints to commercial poultry production. In addition, the lack of direct policy support (79%) and policies adjudged incompatible with local production trends, production systems and farmer interests (67%) were respectively rated as the second and fifth major constraints. These unfavourable policies include the absence of restrictions on the importation of poultry and poultry products, and absence of policy to ensure that a quota of poultry products used in government programmes such as school feeding and by government institutions is given to local producers. These findings appear to be supported by both their frequency of mention in the category of most sever constraints as well as their mean rating scores shown in table 20.

Other constraints cited by about 50% of surveyed poultry farmers included the preponderance of cheap import of chicken product on the domestic market, the operation of a liberalized trade regime, low prices of local chicken products and lack of credit support (cash or in-kind) to the sector.

Inadequate capacity building, lack of adequate infrastructure, high transportation costs for inputs and low domestic demand for local poultry meat were rated respectively as the four major constraints limiting the development and expansion of the local poultry industry. Other important constraints included in Table 21 included low quality feed, lack of quality DOCs, disease outbreaks.

Table 20: Distribution of farmer rating of severity of major constraints to local poultry production

Constraints		Least severe	Severe	Most severe	Total	Mean rating scores	SD
Input							
High cost of DOC	Freq	52	162	196	410	2.35	0.69
	%	12.7	39.5	47.8	100		
Lack quality doc	Freq	154	165	91	410	1.85	0.76
	%	37.6	40.2	22.2	100		
High feed cost	Freq	6	49	355	410	2.85	0.40
	%	1.5	12	86.6	100		
Low quality feed	Freq	203	163	44	410	1.61	0.67
	%	49.5	39.8	10.7	100		
High medication cost	Freq	13	97	300	410	2.70	0.52
	%	3.2	23.7	73.2	100		

Transportation cost input	Freq	139	196	75	410	1.84	0.71
	%	33.9	47.8	18.3	100		
Lack credit	Freq	87	124	199	410	2.27	0.79
	%	21.2	30.2	48.5	100		
High interest	Freq	46	88	276	410	2.56	0.69
	%	11.2	21.5	67.3	100		
Power short	Freq	104	116	190	410	2.21	0.82
Production							
Lack infra tech	Freq	106	218	86	410	1.95	0.68
	%	25.9	53.2	21	100		
Inadequate building capacity	Freq	119	218	73	410	1.89	0.68
	%	29	53.2	17.8	100		
Disease out	Freq	150	165	95	410	1.87	0.76
	%	36.6	40.2	23.2	100		
Market constraint							
Low price of poultry	Freq	41	165	204	410	2.40	0.66
	%	10	40.2	49.8	100		
Cheap import	Freq	57	87	266	410	2.51	0.73
	%	13.9	21.2	64.9	100		
Low demand	Freq	98	167	145	410	2.11	0.76
	%	23.9	40.7	35.4	100		
Policy							
Policies	Freq	29	106	275	410	2.60	0.62
	%	7.1	25.9	67.1	100		
Lack support	Freq	11	76	323	410	2.76	0.49
	%	2.7	18.5	78.8	100		
Trade liberal	Freq	49	141	220	410	2.42	0.70
	%	12	34.4	53.7	100		

Source: Baseline survey, 2016

3.3.Key findings from household consumers' survey

3.3.1. Consumers Personal and Household Characteristics

Table 21 presents the descriptive characteristics of the respondent households according to the survey region. The results show that the mean age of the participants in the Ashanti and Brong-Ahafo regions does not significantly differ, as the mean age was found to be about 35 years in both areas. However, the mean age of participants in the Greater Accra region is higher than that of Ashanti and Brong-Ahafo region, as indicated by a mean age 42.

Table 21: Consumption characteristics of survey participants by region

Variable	Ashanti (n=211)		Brong Ahafo (n=154)		Greater Accra (n=47)	
	Mean	SD	Mean	SD	Mean	SD
Age	35.17	11.24	35.55	11.69	42.00	16.64
Years of formal education	10.23	4.40	10.42	5.05	7.91	5.02
Household size	3.87	2.00	4.97	2.57	5.21	2.28
No. of people below 18 years	1.26	1.46	2.04	1.69	2.28	1.66

No. people above 60 years	0.13	0.41	0.22	0.50	0.34	0.73
Household size employed	1.89	1.07	1.82	0.95	1.74	0.82
Household monthly income	1175.36	1232.10	2062.99	3229.49	1749.15	2065.17
Chicken consumed/week/kg	1.82	1.29	2.14	1.38	2.45	3.83
Amount spent on chicken/week/GH¢	21.09	18.02	23.34	17.45	19.38	20.03
Number of eggs consumed/week	3.87	2.00	4.97	2.57	5.21	2.28

In terms of education, participants in the Ashanti and Brong-Ahafo regions have more years of formal education relative to their counterparts in the Greater Accra region. Households in the Greater Accra and Brong-Ahafo regions had about 1 more household member than those in Ashanti region in terms of number of household members with ages below 18 years. In terms of income, the survey results show that households in Brong-Ahafo region on the average earned about GH¢2062.99, households in the Greater Accra region receive GH¢1749.15 and those in Ashanti region receive GH¢1175.36. The quantity of chicken consumed per week across the regions is higher in Greater Accra region, followed by Brong-Ahafo and Ashanti regions respectively as shown in Table 22. Households in the Brong-Ahafo region spend about GH¢23.34 on chicken products per week, while households in the Ashanti region spend about GH¢21.09 and those in Greater Accra spend about GH¢19.38 on the average. Households in the Greater Accra and Brong-Ahafo regions consume on average about 5 eggs in a week compared to Ashanti region, where about 4 eggs are consumed weekly.

Table 23 shows the consumption characteristics of respondent households based on educational level. The results show that respondent households' consumption of chicken and eggs varies depending on their educational level. Specifically, respondents who have attained tertiary education consume and spend more money on chicken per week compared to the other educational classes. Respondents with no formal education consume the least amount of chicken per week. Respondents with tertiary education were the highest spenders on chicken, followed by secondary, basic and no formal education respectively. This shows that educational level of respondents influences their consumption of chicken. Respondents with no formal education consume more eggs than those with formal education as shown in Table 23. Consumers with basic education consume about 5 eggs in a week whereas those with secondary and basic education consume about 4 eggs per week.

Table 22: Consumption characteristics of survey participants by educational level

Variable	None(n=33)	Basic (n=197)	Secondary (n=118)	Tertiary (n=64)
	Mean (Sd)	Mean (Sd)	Mean (Sd)	Mean (Sd)
Chicken consumed/week/kg	1.79(1.76)	1.96 (2.05)	2.03(1.50)	2.23 (1.51)
Amount spent on chicken/week/GH¢	16.94 (17.29)	20.73 (19.96)	22.49(13.61)	25.95 (18.89)
Number of eggs consumed/week	5.52(3.19)	4.60 (2.20)	3.94 (2.09)	4.27 (2.42)

Source: Baseline survey, 2016; Values in brackets are standard deviations

Table 23 presents consumption characteristics of survey participants by their income levels. The results show that respondent households whose monthly incomes are above GH¢2000 consume more chicken (2.89kg) per week. Households with monthly income between GH¢1000 to GH¢1500 consume about 2.22 kilograms of chicken per week, while households with monthly income less than GH¢500 consume the least quantity of chicken per week. Households with monthly income above

GH¢2000 spend more money on chicken whereas those with monthly income less than GH¢500 spent the least amount of GH¢14.65 per week. The consumption of eggs varies among households depending on their income levels.

Table 23: Consumption characteristics of survey participants by income level

Variable	GH¢0-500 (n=121)	GH¢500-1000 (n=114)	GH¢1000-1500 (n=45)	GH¢1500-2000 (n=48)	Above GH¢2000 (n=84)
	Mean (Sd)	Mean (Sd)	Mean (Sd)	Mean(Sd)	Mean(Sd)
Chicken consumed/week/kg	1.49 (1.02)	1.83 (1.37)	2.22 (1.55)	2.00 (1.47)	2.89 (2.87)
Amount spent on chicken/week/GH¢	14.65 (10.10)	21.83 (22.54)	24.16 (16.94)	22.63 (15.27)	30.02 (18.57)
Number of eggs consumed/week	3.55 (1.88)	4.07 (2.05)	4.56 (1.87)	5.77 (3.07)	5.38 (2.36)

Source: Baseline survey, 2016.; Values in brackets are standard deviations

Figure 2 presents the distribution of the survey participants according to gender. The results show that most of the survey participants were females. Specifically, 77.2% of the respondents were female, while the remaining 22.8% were male. The higher percentage for females is due to the fact that most of the food purchasing decisions are made by women in most Ghanaian households.

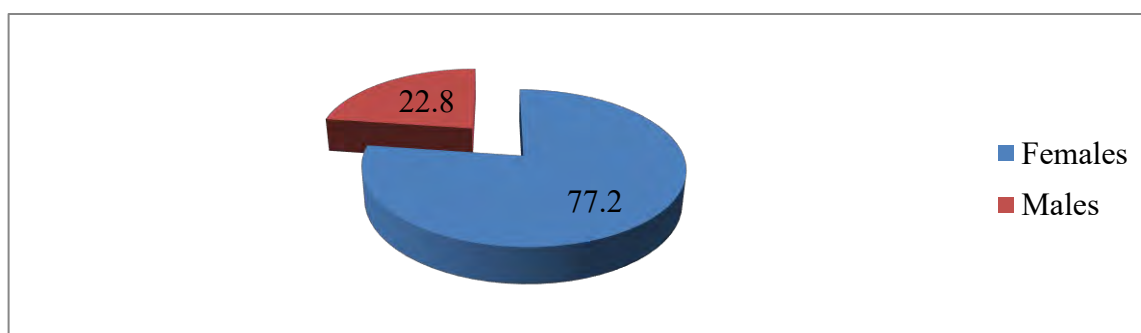


Figure 2: Percentage distribution of survey participants by gender

3.3.2. Consumers Purchasing Behaviour for Poultry Products

The results in Figure 3 show the frequency distribution of households' consumption patterns for chicken products. The results show that most of the respondent households, constituting about 61% consume chicken products semi-annually; 12.4% of them consume chicken monthly; 11.4 % consume chicken quarterly; 7.8% and 7.5% consume chicken weekly and daily respectively. The survey participants attributed the semi-annual consumption pattern to economic recession and high inflation in the country. Some consumers also indicated that they consume chicken in festive seasons like Easter and Christmas which occur once a year.

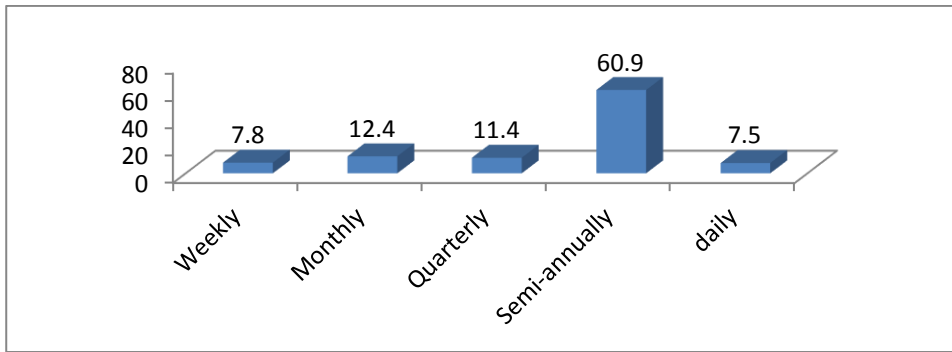


Figure 3: Distribution of household's chicken consumption frequency

Figure 4 presents the frequency of chicken consumption by households. The results show that most of the respondent households consume both local and imported chicken products, 51% of all respondent households, whereas 25% consume only local chicken products and 24% consume foreign products only.

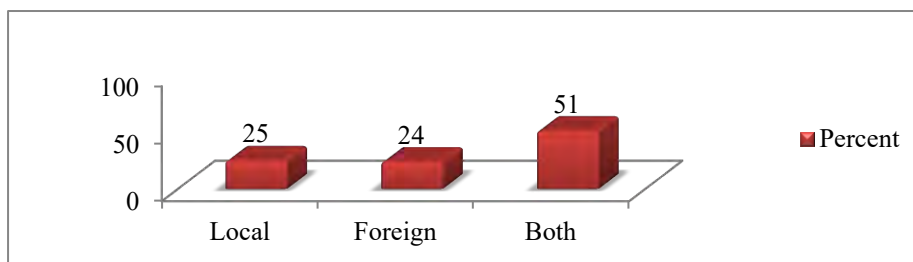


Figure 4: Distribution of the type of chicken consumed by households

Figure 5 shows the distribution of the types of chicken products usually purchased by households. The results show that most of the respondents (244) prefer to buy cut portions while 145 of them usually purchase live birds, and only 23% usually purchase whole dressed birds.

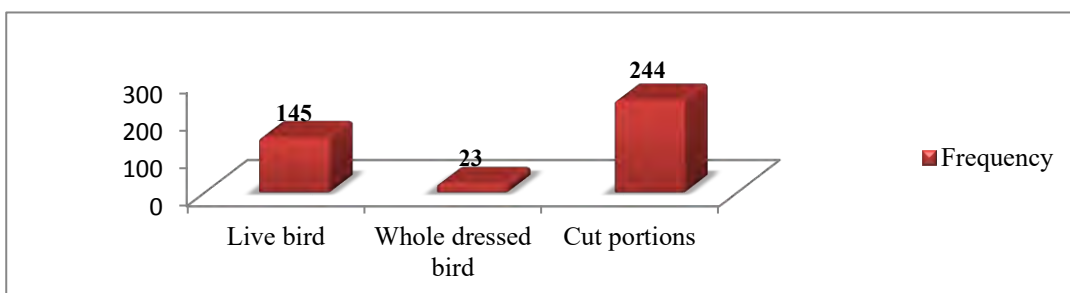


Figure 5: Distribution of the form of chicken product usually purchase by households

3.3.2.1 Relationship between household's characteristics and quantity of chicken consumed

Table 24 shows the regression estimates of the relationship between education, household size, household monthly income and the quantity of chicken consumed per typical week. Out of the three explanatory variables fitted in the regression model, only two came out significant. Household size

had a positive coefficient of 0.1968 which is significant at 1% implying that a unit increase in the number of people living in a particular household exert about 19.7% increase in the quantity of chicken consumed in a typical week. Again, household's monthly income had a positive coefficient of 0.0002 which is also significant at 1% implying that a Cedi increase in the monthly income earned by the household exerts just about 0.02% increase in the quantity of chicken consumed per a typical week. Thus, income has just an infinitesimal influence on the quantity of chicken consumed by a particular household. The F-statistic value (23.66) which significant at 1% level show that the independent variables jointly explain the variations in the dependent variable suggesting the good fitness of the model. However, the R² value of 0.1430 suggests that there is about 14.3% variation in the quantity of chicken consumed by the household in a typical week due to unit change in education of the household head, household size and the monthly income of the household. The result generally suggests that household size and monthly income are highly related to the quantity of chicken consumed by the household in a typical week.

: Regression estimates of determinants of quantity of chicken consumed per week

Variable	Coefficient	Standard Error	t- Value
Education	0.0297	0.0181	1.64
Household size	0.1968	0.0375	5.25***
Monthly income	0.0002	0.0000	4.33***
Constant	0.5762	0.2660	2.17**

No. of obs=412
F-Statistics=23.66
Prob>F=0.0000
R²=0.1430

*** and ** denotes 1% and 5% significance level respectively.

Source: Baseline survey, 2016

This is further explained by the results of Pearson's correlation matrix in table 25. The table shows the association between the quantity of chicken consumed and the education of the household head, household size and the monthly income earned by the household and per the results they all had a positive association with all variables showing a significant relationship. Education, household size and household's monthly income had a positive and strong correlation with the quantity of chicken consumed in a typical week at 5%, 1% and 1% significance level respectively.

3.3.3. Consumer Preferences for Poultry Product Attributes

In order for local poultry producers to produce products that meet the requirements of consumers, there was the need to know which attributes are most preferred by consumers. Table 25 presents the results of consumer's importance ratings of chicken product attributes.

Table 24: Household and individual consumer preferences for chicken product attributes

Attributes	Multi-attribute contingent rating of chicken attributes
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	Ashanti	Brong-Ahafo	Greater Accra	Pooled
Appearance/neatness/skin colour	3.88^{4th}	3.94^{3rd}	3.55	3.86^{5th}
Aroma	3.67	3.36	3.68^{5th}	3.55
Packaging	3.29	2.81	3.32	3.11
Availability	3.57	3.59	3.19	3.53
Convenient (ready for use)	3.87^{5th}	3.47	3.17	3.64
Origin (whether imported or local)	2.81	2.47	2.87	2.69
Existence of expiry date	3.18	2.32	3.09	2.85
Fat content	3.04	3.42	3.43	3.22
FDA certification	2.73	2.46	2.74	2.63
Freshness	4.00 ^{3rd}	3.82	3.81^{3rd}	3.91^{4th}
Halal method of slaughter	2.10	2.34	2.02	2.18
Hygienic shopping environment	4.21^{1st}	4.11^{1st}	3.79^{4th}	4.12^{1st}
Informative product label	2.70	2.40	2.66	2.58
Price	4.04^{2nd}	3.95^{2nd}	3.96^{2nd}	4.00^{2nd}
Proximity	3.34	3.51	3.15	3.38
Taste	4.00^{3rd}	3.90^{4th}	4.02^{1st}	3.97^{3rd}
Tenderness	3.64	3.84^{5th}	3.96^{2nd}	3.75
Texture	3.57	3.17	3.40	3.40
Yield	2.89	3.18	3.04	3.01

Source: Baseline survey, 2016; Scale: 1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important

The results for the pooled sampled reveal that the top five most important attributes that influence consumers' preferences for poultry products are the hygienic shopping environment, price, taste, freshness and appearance/neatness/skin colour respectively. Interestingly the results for the different regions show that there are variations in preferences for the same chicken product attribute across regions. The top five most important attributes influencing consumers' preferences across the regions are highlighted in Table 25. The higher the mean score for an attribute the higher the importance ratings.

Household and individual consumer's preferences for egg attributes were also surveyed. The results are presented in Figure 6. Figure 6 is a spider diagram showing consumers' preferences for egg attributes for the 3 regions. Using the ordinal scale provided under the diagram, it can be said that an attribute like "shell soundness" is an important attribute (score of 4) that consumers in both Ashanti and Brong-Ahafo region consider during purchase whilst consumers from Greater Accra are almost neutral or indifference with respect to the same attribute. Also, labelling of eggs is an attribute that consumers in all three regions consider as not being a very important attribute during purchase.

The pooled sample show that the top five most important egg attributes preferred by the respondents include shell soundness (unbroken), shell cleanliness, size of egg, price and freshness. As shown in figure 8, the preferences for egg attributes vary across the three regions.

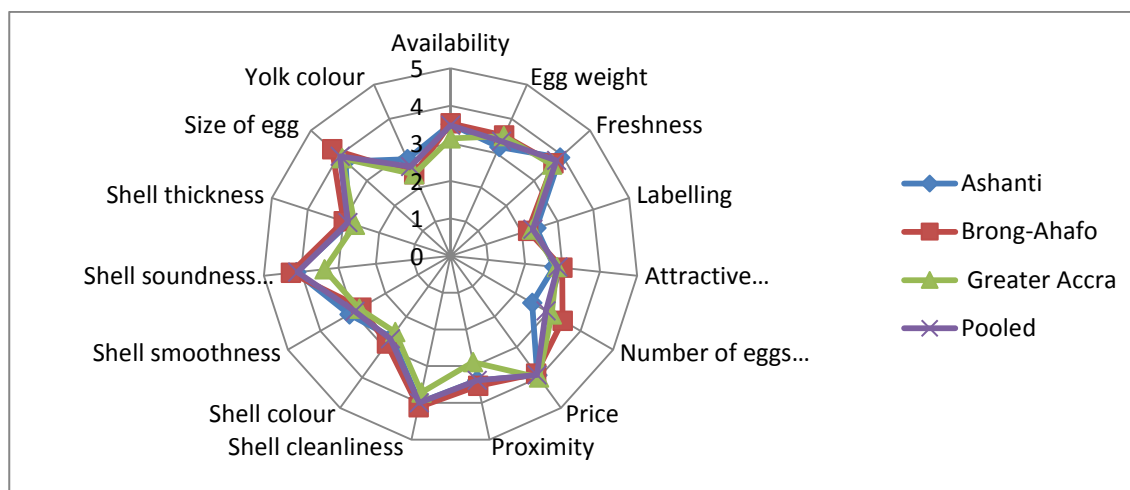


Figure 6: Household and individual consumer's preference for egg attributes

Scale: 1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important

Consumers' preferences for chicken cut portions are presented in Table 26. The results for the pooled sample indicate that, respondents have higher preferences for chicken thighs, chicken wings, gizzards, whole dressed bird and drum sticks, in that order. However, the top four most preferred cut portions across the three regions are highlighted in Table 26.

Table 25: Preferences for chicken cut- portions

Chicken cut- portions	Contingent rating of chicken cut-portions			
	Ashanti	Brong-Ahafo	Greater Accra	Pooled
Whole dressed bird	3.50 ^{4th}	3.40 ^{5th}	3.30	3.44 ^{4th}
Chicken nuggets	2.61	3.03	2.77	2.78
Chicken sausages	2.73	2.38	2.72	2.60
Chicken frankfurters	2.55	3.08	2.72	2.77
Drum sticks	3.10	3.84 ^{2nd}	3.06	3.38 ^{5th}
Chicken thighs	4.65 ^{1st}	4.53 ^{1st}	3.96 ^{1st}	4.52 ^{1st}
Chicken wings	4.04 ^{2nd}	3.82 ^{3rd}	3.47 ^{2nd}	3.89 ^{2nd}
Chicken livers	3.28 ^{5th}	3.05	3.28 ^{5th}	2.95
Chicken feet	2.73	2.51	3.17	2.70
Gizzards	3.81 ^{3rd}	3.64 ^{4th}	3.45 ^{4th}	3.70 ^{3rd}
Chicken neck	2.81	3.01	3.55 ^{3rd}	2.97

Source: Baseline survey, 2016; Scale: 1–not preferred at all, 2–not preferred, 3–neutral, 4–preferred, 5–most preferred

3.3.4. Consumers Perception towards Local Poultry Products

In general all consumers had a positive perception of local poultry products compared to imported poultry products as the perception index of 4.38 suggests in Table 26. Consumers in Ashanti region

had the greatest positive perception on local poultry products compared to imported poultry products followed by consumers in Greater Accra with consumers in Brong Ahafo recording the lowest.

Table 26: Consumer Perception on Local poultry products versus imported products

Consumer perception of quality of national poultry products				
Attribute	Greater Accra	Ashanti Region	Brong-Ahafo	Pooled
Quality	4.25	4.49	4.17	4.33
Taste	4.31	4.66	4.38	4.45
Freshness	4.21	4.53	4.21	4.33
Price	4.36	4.66	4.32	4.47
Availability	4.22	4.49	4.02	4.30
Perception index	4.27	4.57	4.22	4.38

As shown in Table 27, the overall perception regarding the health and safety of local chicken products was found to be 4.28 on a 5-point ordinal scale where 1 represents a very strong negative perception about the health and safety of locally produced poultry produce, and 5 represents a very strong positive perception, with 3 being a neutral or indifferent state. This implies that consumers have positive perception towards the health and safety of local poultry products as illustrated by the fact that health and safety perception had mean scores ranging between 4.13 and 4.39. The results also indicate that the local poultry products can likely be promoted by highlighting their health and safety aspects relative to their imported counterparts.

Regarding nutrition and quality, the sampled consumers agree that the quality of locally produced chicken is higher than frozen imported chicken due to the long period of refrigeration for imported products. They also agree that locally produced chicken tastes better than imported frozen chicken and that locally produced chicken is fresher compared to imported chicken. The overall nutritional and quality perception index was 4.24, suggesting that consumers agree and are positive about the superior nutritional and quality of locally produced chicken products compared to imports.

Regarding perceptions on preferences and purchasing, the results reveal that consumers are willing to buy locally produced poultry meat if it is sold at the same price as imported poultry products; were as available as the imported frozen chicken; and were more available in cut portions as the imported frozen chicken. This is indicated by the positive mean scores 4.47, 4.30 and 4.24 respectively.

Similarly, the consumers prefer to buy locally produced poultry products relative to frozen imported chicken; to pay somewhat more for locally produced poultry meat due to its healthiness; to pay somewhat more for locally produced poultry meat due to its safety and are willing to buy locally produced poultry meat if they are labelled or branded. This means that local chicken producers can obtain some premium for their products are promoted based on health, safety and branded. The amount of premium consumers are willing to pay can be explored in the future.

Additionally, consumers agree that locally produced poultry products are expensive relative to imported frozen chicken and feel that government should subsidize production of local poultry production to make it cheaper for consumers to buy. The consumers agree to buy locally produced

poultry products, with the aim of helping the economy of Ghana. The overall positive preference and purchasing perception index of 4.11, indicates that consumers are ready and willing to patronize locally produced chicken products, if their requirements are met.

Table 27: Household and individual consumer's perceptions on health, safety, quality, and nutritional of local chicken products

Perception statements about health, safety, quality, and nutritional status of local chicken products	Mean scores
a. Health and Safety Statements	
Locally produced chicken is healthier than frozen imported chicken.	4.39
Imported frozen chicken may have health implications due to long period of refrigeration.	4.34
The health status of live birds slaughtered and frozen for export to Ghana cannot be verified by Ghanaian consumers compared to local chicken	4.24
Consumption of imported frozen chicken products are risky since unwholesome products can be smuggled into the Ghanaian market	4.33
A break in cold chains during importation of frozen chicken can lead to a build-up of high microbial infections which are dangerous to human health, making imported chicken riskier compared to local chicken	4.27
The risk of food borne diseases is lesser in locally produced than in imported poultry meat	4.13
Unlike locally produced poultry meat, the imported poultry meat is preserved with chemicals which may have health implications.	4.27
Health and Safety perception index	4.28
b. Nutritional and quality statements.	
The quality of locally produced chicken is higher than frozen imported chicken due to the long period of refrigeration	4.33
Locally produced chicken tastes better than imported frozen chicken	4.45
Imported frozen chicken are very tender compared to local chicken meat	3.86
Locally produced chicken is fresher compared to imported frozen chicken	4.33
Nutritional and quality perception index	4.24
c. Preference and purchasing statements	
I prefer buying locally produced poultry products relative frozen imported chicken	3.89
I am willing to pay somewhat more for locally produced poultry meat due to its healthiness	3.70
I am willing to pay somewhat more for locally produced poultry meat due to its safety	3.69
I would buy locally produced poultry meat if it sells at the same price as imported poultry products	4.47
I would be willing to buy locally produced poultry meat if they were more available like the imported frozen chicken	4.30
I have no problem with buying locally produced poultry products	4.05
I would be willing to buy locally produced poultry meat if there were more available cut portions like the imported frozen chicken	4.24
I would be willing to buy locally produced poultry meat if they are labelled or branded	3.50
Locally produced poultry products are expensive relative to imported frozen chicken	4.37
Government should subsidize production of local poultry production to make it cheaper for consumers to buy	4.53
If I buy locally produced poultry products, it will help the economy of Ghana	4.52
Preference and purchasing perception index	4.11

Source: Baseline survey, 2016

Household and individual consumer's perceptions on preferences, health, cultural and misconceptions about egg consumption were solicited and the results are presented in Table 28. The overall preference and purchasing perception index was 3.30. This implies that most of the sampled

consumers are generally undecided about egg purchases the index falls in the neutral category of the adopted Likert scale. The results in the table below provide the rationale for stakeholders to change or influence the attitude of consumers towards preferences and demand for eggs in Ghana.

In terms of health and misconception about egg, the results reveal that consumers disagree to the statement that they do not consume eggs because of health reasons. They are neutral about the claim that eggs contain excessive cholesterol level; too much egg could block my veins and lead to cardiovascular diseases like stroke. The consumers are also neutral about the perception that dietary or cholesterol from egg does not increase cholesterol levels in humans; eggs are high in dietary cholesterol, so they don't have a place in my healthy diet and that consuming several eggs per week is a very healthy part of a balanced diet. More importantly, the findings show that consumers agree that eggs are high in protein required by the human body system; eggs are perfect foods particularly for young children because it has all the vitamins and minerals for proper growth and development; eggs are perfect foods particularly for pregnant women because it has all the vitamins and minerals for proper growth and development and that egg is critical for their health.

In terms of culture and religion, the results show that consumers disagree to the statements that they do not consume eggs because of their religion and culture. They also disagree that consuming eggs during pregnancy can negatively affect the health of both the pregnant woman and her baby. The overall health, cultural and misconceptions perception index of 3.05 shows that consumers' generally have neutral perceptions of egg consumption. Hence, producers can increase consumers demand for eggs by changing their perceptions.

TabTable 28: Household and individual consumer's perceptions on preferences, health, cultural and misconceptions of egg consumption

Perception statements about eggs	Mean scores
a. Preference and purchasing statements	
I prefer buying eggs with thick and strong shell	3.54
I am willing to pay somewhat more for eggs if they are fresh	3.63
I am willing to pay somewhat more for eggs if I know of their health benefits	3.63
I would be willing to buy eggs if they are labelled with nutritional information	3.39
I do not buy eggs because they are expensive	2.11
The yolk colour of local eggs does not matter to me when am buying eggs	3.51
Preference and purchasing perception index	3.30
b. Health, cultural and misconceptions about egg consumption	
I do not consume eggs because of health reasons	2.34
I have been informed that all eggs contain excessive cholesterol	3.39
Taking too much egg could block my veins and lead to cardiovascular diseases like stroke	3.34
Dietary or cholesterol from egg does not increase cholesterol levels in humans	3.04
Eggs are high in dietary cholesterol, so they don't have a place in my healthy diet	2.58
Consuming several eggs per week is a very healthy part of a balanced diet	3.20
Eggs are high in protein required by the human body system	4.06
Eggs are perfect foods particularly for young children because it has all the vitamins and minerals for proper growth and development	4.37
Eggs are perfect foods particularly for pregnant women because it has all the vitamins and minerals for proper growth and development	3.95

Egg is critical for the health	3.92
Eggs contain the highest-quality protein on the planet, and are loaded with small amounts of vital nutrients	3.25
I do not consume eggs because my religion doesn't permit me	1.55
Consuming eggs during pregnancy can negatively affect the health of both the pregnant woman and her baby	2.19
My culture doesn't permit me to consume eggs	1.58
Health, cultural and misconceptions perception index	3.05

Source: Baseline survey, 2016

3.4.Key findings from end market study

3.4.1. Demand for poultry products among end markets.

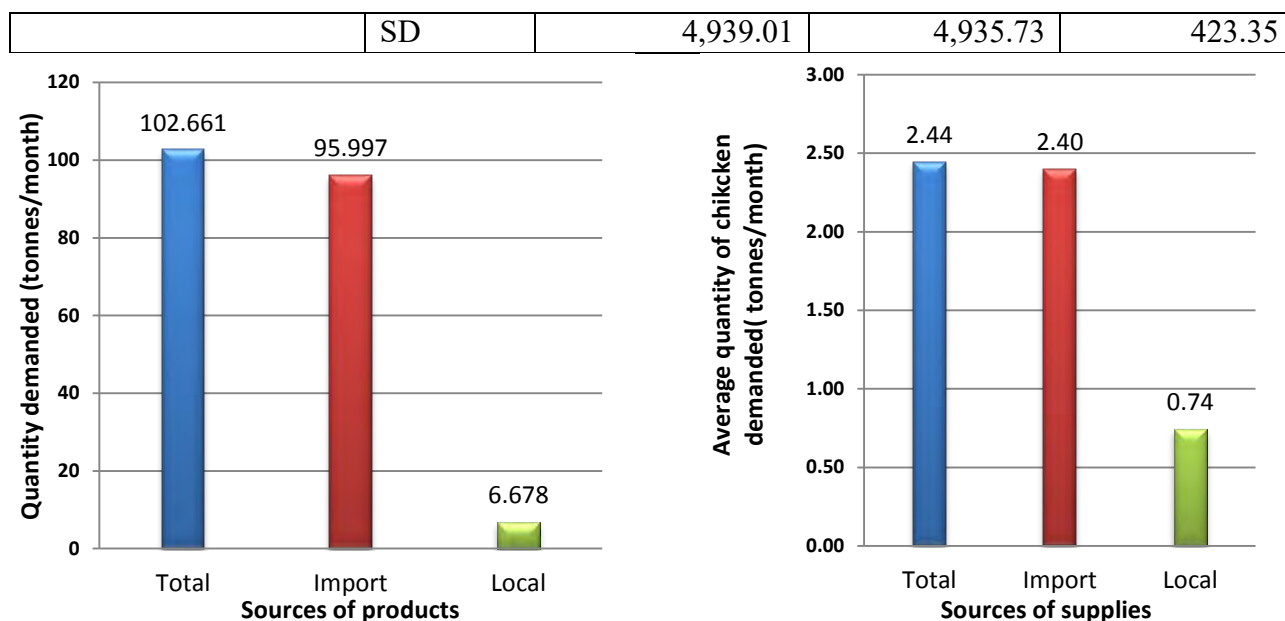
3.4.1.1.Chicken and Egg demand among Educational and hospitality institutions

The dominance of imported chicken over locally sourced products was revealed when quantity demanded was assessed at both total and average levels as shown in table 29. About 103 metric tonnes of chicken products are demanded in a typical month by a total of 42 end-users in the categories of educational (schools and/or colleges) and hospitality institutions (hotels and/or restaurants) alone. Assuming 5 days a week, total tonnage of chicken products demanded among these institutions that emanate from imported sources (75 MT per month) exceeds locally sourced products (4.7MT per month) by 14 fold.

It was further observed from the analysis that restaurants had the largest tonnage of chicken products demanded in a typical month (91MT) relative to educational institutions and hotels, demanding 13 times and 22 times more chicken than schools and hotels respectively.

Table 29: Quantity demanded and sources of chicken among hotels, restaurants and Schools/colleges

User type		Total	Import	Local
Hotel*	N	7	7	3
	Sum (kg)	4,190.00	3,538.00	1,304.00
	Mean(kg)	598.50	505.36	434.67
	SD	730.75	652.14	239.51
Restaurant	N	15	15	4
	Sum (kg)	91,478.00	85,556.00	3,204.00
	Mean(kg)	6,098.53	5,703.73	801.00
	SD	6,987.52	6,990.61	457.94
School/College	N	20	18	2
	Sum (kg)	6,992.00	6,888.00	208.00
	Mean(kg)	349.60	382.67	104.00
	SD	279.35	274.85	79.20
Total	N	42	40	9
	Sum (kg)	102,660.00	95,982.00	4,716.00
	Mean(kg)	2,444.27	2,399.54	524.00



Panel A: Total monthly quantity of chicken demanded

Panel B: Average monthly quantity of chicken demanded

Figure 7: Total and average monthly quantity of chicken demanded among hotels, restaurants and schools/colleges in 2015

Table 30 shows that chicken thighs commanded an unassailable lead in both popularity as a product (used by 33 out of 42 end-users or had 79% prevalence among this end-user category) and total quantity demanded of 2.67 metric tonnes per week with a weekly average of 81 kg. Whole dressed birds and sausages were the next in popularity, with each recording a 24% (or 10 users out of 42) prevalence among the end-users here. In terms of actual quantity demanded, chicken breasts recorded a total demand of 287 kg per week while there was a demand of 243 kg of sausages. Whole dressed birds on the other hand record a weekly demand of 705 kg. Livers, drum sticks and layer meat were not in demand among hotels, restaurants and schools/colleges whereas live broilers, wings, gizzards and necks were rarely demanded or purchased by these end user categories.

Table 30: Quantity demanded of specific chicken products

Product Type	Live Broiler	Dressed	Sausage	Thigh	Wing	Breast	Gizzard	Neck
Number of End Users	3.00	10.00	10.00	33.00	4.00	6.00	6.00	1.00
Total weekly quantity demanded (kg/week)	34.19	705.26	243.00	2670.99	94.05	286.92	65.59	100.00
Average weekly quantity demanded (kg/week)	11.40	70.53	24.30	80.94	23.51	47.82	10.93	100.00
SD	10.18	31.67	31.83	25.50	25.86	43.21	11.40	

Source: Baseline survey, 2016

There were marginally more end-users of eggs relative to chicken products. All demand for eggs across the survey was procured in 30 egg crates. With an arithmetic rule similar to chicken products, total monthly demand for eggs in 2015 was extrapolated to over 9600 crates, averaging 213 crates per month (See table 31). This observation reveals that demand for eggs was very variable among these institutions in the year under evaluation. Table 31 also reveals that in a sharp contrast to chicken, eggs were largely sourced domestically. Total crates of eggs sourced locally were about 66 times those sourced abroad. More interesting is the fact that imports were so unpopular among these end-users of eggs that, only two (2) end users sourced their eggs from outside the country.

Table 31: Monthly quantity demanded of Eggs in 30 Egg Crates among hotel, restaurants and schools/colleges

	Total	Imported	Locally sourced
User	45	2	43
Total	9602	144	9458
Average	213.38	72	219.95

Source: Baseline survey, 2016

3.4.2. Chicken and Egg demand among cold stores and super markets: A market Share analysis.

Table 32 presents results on the ratio of sales of local poultry products to imported poultry products disaggregated by type of poultry product and also by region. The results show that local poultry meat constitutes a very small proportion (1.93%) of the value of meat sold. The percentage of poultry products sold in the Greater Accra region is relatively higher (6.43%), albeit still small when compared to imported. Interesting to note is the fact that only an insignificant 0.02% of the total poultry products sold by supermarkets and cold stores in the Brong Ahafo region are sourced locally. The seemingly higher sales of local poultry products in Greater Accra region may be explained by the presence of high end supermarkets that sell whole dressed birds procured locally. On the contrary, there are very few supermarkets in the Brong Ahafo region that have frozen poultry products as part of items sold. The sale of poultry meat for instance, has almost been the preserve of cold stores in the target districts of the Brong Ahafo region.

The result on the ratio of sale of local eggs to imported eggs is in sharp contrast to that on meat. The table shows that eggs that are sold on the Ghanaian market are primarily from local sources and that importing eggs for sale in Ghana is uncommon. This implies that local egg production faces little competition as compared to the meat, hence an opportunity for local producers to explore. The few imported eggs are mainly sold by high end supermarkets that are usually owned and/or managed by foreigners.

Table 32: Ratio of sales of local poultry products to imported poultry products (USD) by type of product and region

Ratio of sales of local poultry products to imported poultry products (USD) by type of product			
Type	Local	Imported	Ratio (%)
Meat	747088.53	38627349.24	1.93
Egg	216000	1750.66	123.38
Total	963088.53	38629099.90	2.5
Ratio of sales of local poultry products to imported poultry products (USD) by region			
Region	Local	Imported	Ratio (%)
Greater Accra	903023.87	14050153.85	6.43
Ashanti	87565.98	5890999.10	1.49
Brong Ahafo	3055.70	18800600.53	0.02

Source: Baseline survey, 2016

3.5.Key findings from review of veterinary service providers

3.5.1. The status of VSPs in the Ghanaian poultry industry

A total of 30 veterinary service providers were interviewed from the target regions with 7 VSPs from the Greater Accra, 4 from Ashanti and 19 from the Brong Ahafo Regions. Veterinary services were largely provided by the publicly-owned Veterinary Service Departments across the various districts. However, quite a number of private VSPs were available to serve poultry farmers as well. Private VSPs constituted 43% of respondents with most operating in the Brong Ahafo Region. Aside from a few major privately-owned veterinary centres like Veterinary Hospital at La-Accra and Central Veterinary at Tema, a significant number of poultry farmers sourced veterinary assistance mainly from the government-owned VSPs. These major VSPs generally were where poultry farmers resorted to for sophisticated veterinary services like post mortem analysis, diagnosis and treatment of diseases and the control of other production limiting disorders (e.g. leg disorders in broiler chickens, osteoporosis; hypocalcaemia, anorexia and reluctance to drink). Such services were usually not available at the regular (private) VSPs due to limited facilities and the lack of expertise to operate them. The most common service provided to poultry farmers by the regular VSPs was the provision of vaccines and drugs.

Table 33: Locations of Veterinary Services Providers (VSPs) interviewed for GPP baseline survey

VSPs interviewed in target districts (N = 30)		
Greater Accra	Ashanti	Brong Ahafo
Accra Metro	Ejura Sekyedumasi	Dormaa Ahenkro
Ga East	Offinso North	Sunyani
Tema	Kumasi Metro	Techiman
Ada West		Wenchi
Dangme East		Berekum
Total VSPs interviewed = 7	Total VSPs interviewed = 4	Total VSPs interviewed = 19

Source: Baseline survey, 2016

3.5.2. Characteristics of Veterinary Services Providers

Out of the 30 VSP representatives interviewed, 20% were female. Respondents were generally well educated with 70% attaining tertiary level education. However, about 16% of the VSP staff interviewed from the Brong Ahafo region had completed only a basic education. The average respondent was 43 years old, had attained 15.3 years of formal education with 11.3 years in active service. Even though majority of the VSP representatives had the requisite authorization/certification to provide veterinary services, about 20% of them indicated not having the proper license to offer veterinary services. This phenomenon was more common in the Brong Ahafo region and also among female VSP staff that were interviewed.

Table 34: Type of VSPs interviewed disaggregated by region

Type of VSP	Region						Pooled	
	Greater Accra		Ashanti		Brong Ahafo			
	Freq	%	Freq	%	Freq	%	Freq	%
Private	3	42.9	2	50	12	63.2	17	56.7
Public	4	57.1	2	50	7	36.8	13	43.3
Total	7	23.3	4	13.3	19	63.3	30	100
Gender	Region of VSPs						Pooled	
	Greater Accra		Ashanti		Brong Ahafo			
	Freq	%	Freq	%	Freq	%	Freq	%
Female	1	14.3	-		5	26.3	6	20
Male	6	85.7	4	100	14	73.7	24	80
Total	7	23.3	4	13.3	19	63.3	30	100

Source: Baseline survey, 2016

3.5.3. Trainings received by VSPs within the last two years

VSPs and their staff benefited from periodic training often via workshops and seminars organized by government, international/local NGOs, private input (drug and vaccine) suppliers (both local and foreign) as well as the mother association, Veterinary Medical Technical Association of Ghana (VEMTAG). Government was responsible for majority of the training received by VSPs within the last two years although other stakeholders mentioned above also actively provided training opportunities to VSPs. These training programs were generally organized by service providers free of charge. Among the most recent trainings received by respondents were; training on biosecurity, animal health, animal handling, animal production, diagnoses, vaccination, epidemic control and management and disease (*Corynza*, *Infectious Bronchitis*, *Coccidiosis*, *New Castle*, *Avian Influenza* etc.) prevention. VSPs located in Brong Ahafo regularly benefited from such trainings compared with their counterparts elsewhere and this is expected since Brong Ahafo especially the Dormaa area is arguably the most important poultry hub in Ghana.

Table 35: Information on biosecurity training received by VSPs in the last two years (by regions)

	Region						Pooled	
	Greater Accra		Ashanti		Brong Ahafo			
	Freq	%	Freq	%	Freq	%	Freq	%
Biosecurity training received								
No	3	42.9	3	15.8	13	68.4	19	63.3
Yes	4	57.1	1	25	6	31.6	11	36.7
Service provider for biosecurity training								
Government	2	50	1	25	1	25	4	36.4
International/national NGO	1	50	-		1	16.7	2	18.2
International Development Agencies	-		-		1	16.7	1	9.1
World Veterinary Services	1	25	-		-		1	9.1
Other (drugs and chemicals suppliers)	-		-		3	50	3	27.3
Did VSPs staff pay for the biosecurity training								
No	4	100	1	100	6	100	11	100
Most recent training								
2014	2	50	-		-		2	18.2
2016	2	50	1	11.1	6	100	9	81.8

Source: Baseline survey, 2016

It is however worth noting that, even though respondents had received a variety of thematic training over the last 2 years, a large percentage of them had not been trained within the past two years. The majority (63%) of the VSP staff interviewed had not received any form of training specifically on biosecurity over the last two years. Similarly, 57%, 50%, 63.3% and 60% of the respondents had not had any training specific to animal health, animal production, diagnoses and vaccination respectively, within the last two years as at the time of interview. A lot more of the respondents had also not received training on the prevention of a number poultry diseases. With the exception of Coccidiosis and Avian Influenza prevention, a greater share had not had any form of recent training on the prevention of diseases such as Corynza, Infectious Bronchitis, Egg drop Syndrome and New Castle respectively. With 70% of respondents receiving recent training on Coccidiosis prevention, It suggests the significance and prevalence of this disease in local poultry production. The statistics on Avian Influenza prevention training could also be attributed to the recent outbreak of the disease (in 2015) in Ghana. As was observed during the survey, Corynza, Infectious Bronchitis and Egg drop Syndrome were not prevalent poultry diseases in Ghana, hence the relatively low number of recent trainings on their prevention.

3.5.4. Constraints hampering veterinary service delivery within the local poultry industry

Veterinary service delivery within the local poultry industry has a number of constraints, most of which are economic in nature or reflect the existing poor conditions of service for personnel in veterinary service delivery. The lack of financial support was the most significant constraint to veterinary service delivery in Ghana. VSPs, especially the public financed ones, cited insufficient government subventions which gravely affected the effectiveness of their operations. VSPs also considered the high cost of vaccines as the second most constraining issue. Vaccines are procured at high costs hence VSPs have no choice but to pass on the cost to the poultry farmers making it more expensive for the latter to access vaccines.

In addition, the lack of training on evolving skills and competencies regarding new veterinary service practices/technologies and inadequate personnel were considered as the third and fourth most important constraint to veterinary service delivery in Ghana respectively. The lack of frequent training on recent competencies make the field staff rusty and out of touch with modern techniques which otherwise would have improved their work efficiencies. It was not very difficult for one to observe the inadequacy of VSP personnel. There were instances where one veterinary officer was responsible for both livestock and poultry farmers in two districts. This situation made the provision of adequate veterinary service delivery difficult for the VSPs and ineffective for the farmers.

Insufficient supply of inputs (drugs, vaccines) necessary for effective operation was cited by respondents as the fifth most important constraint. Aside from the cost of vaccines and drugs, VSPs suffered inadequate supply of the same. This situation often resulted in frequent shortages hence increase in prices of the drugs and vaccines due to scarcity. On the other hand, respondents ranked smuggling of animals into the country and inaccessible livestock farmers as the least significant constraint hampering veterinary service delivery within the Ghanaian poultry industry.

3.6. Keys findings from study on financial institutions

3.6.1. Description of sampled financial institutions

Out of the fourteen (14) financial institutions interviewed across the study regions, nine (9) representing about 64% of the total sample have credit/loan facility for the agricultural sector. Three (3) of the financial institutions that had loan/credit facility for the agricultural sector interviewed were from the Ashanti region whereas six (6) of them were from the Brong Ahafo region. Three financial institutions in the Brong Ahafo have loan facility for all categories of famers (i.e. food crop, tree crops and livestock farmers). A few in both Ashanti and the Brong Ahafo regions have loan/credit facility for either food crop and/or tree crop and livestock farmers.

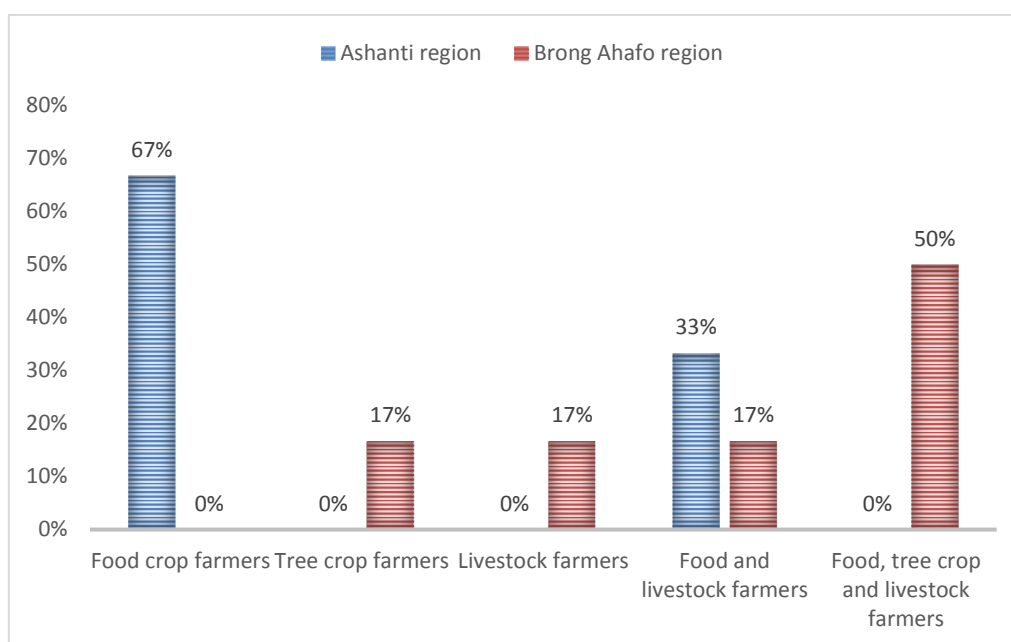


Figure 8: Categories of agricultural loan/credit facilities

Source: Field survey, 2016

3.6.2. Value of loan disbursed and beneficiaries and interest rate by financial institutions

The average amount of loans disbursed by financial institutions in the year 2015 ranged from GHS 197,197.67 (50,050.17 USD) representing 23.3% of total loans which was disbursed to the agricultural sector in Ashanti region to GHS 391,466.67 (99,357.02 USD) representing 22.6% of total loan which was disbursed to the agricultural sector in Brong Ahafo region. Out of these amounts, about GHS 168, 850.67 (42,855.50 USD) representing 32.8% of the total agricultural loans was disbursed to the poultry industry in the Brong Ahafo region whereas none of the beneficiaries of loan/credit facilities was from the poultry sector in the Ashanti region. Average interest rates of 28.7% and 30.3% were charged on loans in Brong Ahafo region and Ashanti region respectively. However, agricultural lending rate stood at 32.3% and 37.7% in Brong Ahafo and Ashanti region respectively. It can therefore be concluded that agricultural lending rate was quite higher compared to other lending rates in 2015. This perhaps is one of the reasons for the low value of loan/credit to the agricultural sector. Most financial institutions are of the view that there is much risk associated with agricultural production in general and this could account for the high interest rate for the sector.

Table 36: Loan disbursed, interest rate and beneficiaries in 2015

Region	Total loan disbursed to agric sector in GHS	Percentage of total loan disbursed	Total amount disbursed to the poultry sector in GHS	Percentage (%) of total agricultural loan	General interest rate charged on loans (%)	Agricultural lending rate (%)
Ashanti	197,197.67 (50,050.17)	23.3	0.00	0.0	30.3	37.7
Brong Ahafo	391,466.67 (99,357.02)	22.6	168,850.67 (42,855.50)	32.8	28.7	32.3

Source: Field survey, 2016; Note: Values in parentheses represent USD equivalent

3.6.3. Value of loan disbursed by gender

In the year 2015, a total of 66 clients applied for loan for agricultural purposes from the 14 financial institutions interviewed across the study regions. Out of the 66 applications for loans for agricultural purposes, only 63 were granted by the financial institutions (comprising 23 males and 14 females from the Ashanti region and 17 males and 9 females in the Brong Ahafo region). Again, out of the 63 loan applications for agricultural purposes that were granted 31 have defaulted in the repayment of the amount received across the study regions. In the Ashanti region, 3 males and 3 female loan receivers had defaulted in the repayment compared to the 9 males and 16 females in the Brong Ahafo region. However, in total only seven (7) out of 63 loans for agricultural purpose granted were for poultry related business (i.e. 4 males and 3 females) all from the Brong Ahafo region. Out of these 7 loans for poultry related businesses granted four (4) have defaulted in the repayment (comprising 3 males and 1 female). The results suggest that males mostly applied for loan for agricultural purposes in general and for poultry related businesses to be precise. However, very few loan beneficiaries were from the poultry sector. The number of loan beneficiaries for poultry businesses in Brong Ahafo region may be attributed to the dominance of poultry production in the region notably the Dormaa areas.

Table 37: Number of loan disbursed by gender in 2015

Region	No. of males applicants for agricultural purposes granted.	No. of females applicants for agricultural purposes granted.	No. of default by male loan receivers for agricultural purposes.	No. of default by female loan receivers for agricultural purposes.	No. of male loan receivers for poultry related business.	No. of female loan receivers for poultry related business.	No. of default by male loan receivers for poultry related business	No. of default by female loan receivers for poultry related business
Ashanti	23	14	3	3	0	0	0	0
Brong Ahafo	17	9	9	16	4	3	3	1
Pooled	40	23	12	19	4	3	3	1

Source: Field survey, 2016

3.6.4. Trainings received by financial institutions

Some of the trainings the financial institutions have received in the past two years include trainings on loan assessment, loan management, risk management, agricultural lending, loan retrieval process and I.T banking which are mostly provided in-house. However, ARB Apex Bank and the Bank of Ghana periodically organize such trainings for the financial institutions. Out of the eleven (11) financial institutions interviewed from the Brong Ahafo region, only four (4) had received training on loan management and eight (8) of them had received training on agricultural lending in the past two years.

Table 38: Number of financial institutions that have received training in the past two years

Training	Ashanti region	Brong Ahafo region
Loan assessment	3	10
Loan management	3	4
Risk management	3	11
Agricultural Lending	3	8
Loan retrieval process	3	10
IT-banking	1	7

Source: Field survey, 2016

3.6.5. Perception of financial institutions on agricultural lending

Most of the financial institutions interviewed share the view that agricultural production is a risky venture, farmers lack proper financial management, farming populace is characterized by high illiteracy rate and they lack the proper documentation for collateral. Also, most of the financial institutions disagree that farmers misappropriate funds (42.9%), have high default rate compared to other loan applicants (35.7%), have low trust issues when it comes to meeting their end of the loan

agreement (35.7%) and farming is not profitable enough to repay loan taken (57.1). However, cumulatively it can be concluded that the financial institutions somewhat agree that farmers misappropriate funds, have high loan default rate, have low trust issues and they have bad loan track record but disagree that farming is not profitable enough to repay loan received as the mean scores suggest.

Table 39: Perception of financial institutions on agricultural lending

Statement	Strongly Agree (1)	Agree (2)	Somewhat agree (3)	Disagree (4)	Strongly Disagree (5)	Mean Score
Agricultural production is risky	6 (42.9)	4 (28.6)	3 (21.4)	0 (0.0)	1 (7.1)	2.0
Farmers lack proper financial management	6 (42.9)	6 (42.9)	2 (14.3)	0 (0.0)	0 (0.0)	1.7
Farmers misappropriate funds	1 (7.1)	4 (28.6)	3 (21.4)	6 (42.9)	0 (0.0)	3.0
Farmers have high loan default rate	3 (21.4)	3 (21.4)	1 (7.1)	5 (35.7)	2 (14.3)	3.0
Farmer population have high illiteracy rate	9 (64.3)	1 (7.1)	2 (14.3)	2 (14.3)	0 (0.0)	1.8
Farmers lack proper documentation for collateral	6 (42.9)	5 (35.7)	1 (7.1)	1 (7.1)	1 (7.1)	2.0
Farmers have low trust issues	1 (7.1)	5 (35.7)	3 (21.4)	5 (35.7)	0 (0.0)	2.9
Farmers have bad loan track	3 (21.4)	3 (21.4)	1 (7.1)	6 (42.9)	1 (7.1)	2.9
Farming is not profitable enough to repay loan	0 (0.0)	1 (7.1)	0 (0.0)	8 (57.1)	5 (35.7)	4.2

Source: Field survey, 2016. Note: Values in parentheses are percentages

3.7. Key findings from Poultry Household survey

3.7.1. Descriptive Characteristics of Poultry Households

The general situation with Poultry Households is that they seem non-existent as most large farms were quite isolated and located away from households. Figure displays the regional distribution of Poultry Households (PHHs) across the survey. Ashanti region showed the most prominent presence of these actors accounting for 64% of all poultry households covered under the survey. The remaining 36% is almost uniformly distributed between Greater Accra and Brong

Ahafo regions. Figure 9 further uncovers the location of these PHHs within the regions. It shows that, whereas Atwima Nwabiagya District hosts a majority of all PHHs under this study, Ga South and Dormaa Ahenkro Districts respectively hosted the largest numbers of PHHs in Greater Accra and Brong Ahafo Regions.

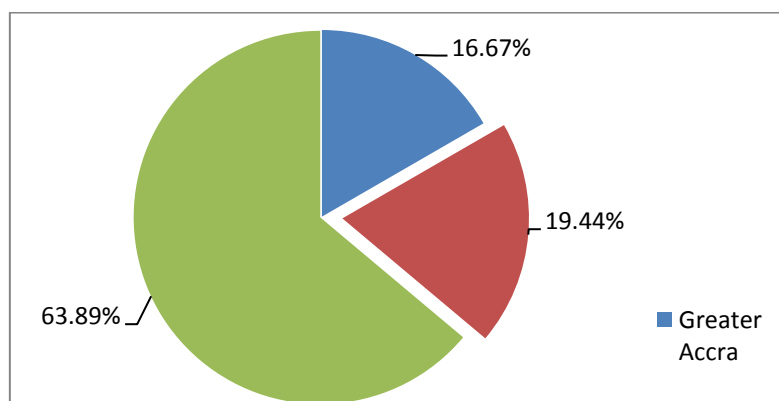


Figure 9: Distribution of Poultry Households (PHH) across surveyed regions

Across the survey regions, female dominated (65%) as respondents for PHHs, a majority of whom (43%) have attained basic education. It is deduced from **Error! Reference source not found.** that an average PHH respondent aged 42 years and had been in formal education for only 6 years (coinciding with attainment of primary education). However, respondents in the Greater Accra Region had an average number of years in school of 10 years which also is correspondent to obtaining Basic School Certificate. The households were comprised of about seven (7) people. Table 40 further provides information to the effect that, a PHH raised about 19 birds in the year under review across the survey. Regionally, however, PHHs in Greater Accra raised twice as many birds (32 birds) relative to either of the other two regions where 16 or 18 birds were handled respectively in Ashanti and Brong Ahafo. Flock sizes were also most variable in Greater Accra given it had the largest standard deviation for number of birds.

Table 40: Descriptive statistics for PHHs farms and respondents

Region	PHH characteristics	N	Mean	SD
Greater Accra	Age	12	42.33	16.27
	Years in school	12	10.33	6.27
	Household size	12	6.17	2.29
	Number of birds raised	12	31.92	24.51
Ashanti	Age	46	41.78	15.15
	Years in school	46	5.89	5.80
	Household size	46	7.74	3.67
	Number of birds raised	46	16.00	11.69
Brong Ahafo	Age	14	53.93	16.82
	Years in school	14	3.71	5.00

	Household size	14	6.79	3.21
	Number of birds raised	14	17.93	17.57

3.7.2. Frequency of loss of birds and causes of loss of birds

A majority of PHHs often lost their birds to variety of causes and reasons as table 42 shows. Bird losses were most widespread in the Ashanti Region, where 72% of PHHs were affected relative to 64% Brong Ahafo and 58% in Greater Accra (see table 41). About 68% of all PHHs lost birds due mainly to disease (67%), Theft (33) and Predators (31%) in descending order of prevalence. Diseases were the commonest cause of bird losses incurred by PHHs in Ashanti (70%) and Brong Ahafo (78%) regions whereas predators were more prominently mentioned in Greater Accra (57%).

Table 41:Frequency of loss of birds and causes of loss of birds

Region	Loss of birds	Frequency	Percent
Greater Accra	Did not loose	5	41.70
	Often lost	7	58.30
	Total	12	100.00
Ashanti	Did not loose	13	28.30
	Often lost	33	71.70
	Total	46	100.00
Brong Ahafo	Did not loose	5	35.70
	Often lost	9	64.30
	Total	14	100.00
Causes of loss of birds			
	Causes of losses	Frequency	Percentage Regional
Greater Accra	Disease	3	42.86
	Predators	4	57.14
	Car Accidents	1	14.29
	Theft	2	28.57
	Total Often lost birds	7	100.00
Ashanti	Disease	23	69.70
	Predators	9	27.27
	Car Accidents	0	0.00
	Theft	12	36.36
	Total Often lost birds	33	100.00
Brong Ahafo	Disease	7	77.78
	Predators	2	22.22
	Car Accidents0		0.00
	Theft	2	22.22

	Total Often lost birds	9	100.00
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3.7.3. Perceived Importance and Practice of Vaccination

The study found although 90% of PHHs are of the opinion that vaccinations are of importance to the health of poultry birds, Table 43 reveals that the practice of vaccination is common among only some 15% of PHHs. The table further reveals that, most episodes of vaccinations among the practitioners occurred at a long time intervals. Majority of PHHs administered vaccines in periods from quarterly, semi-annually and beyond (table 42). All PHHs practicing vaccination (11) declared vaccines were readily accessible and all vaccines used were sourced locally.

Table 42: Distribution of the practice of vaccination

Practices of vaccination			Frequency of vaccination		
	Freq	%		Freq	%
Does not vaccinate	61	84.70	Weekly	1	9.1
			Monthly	4	36.4
Vaccinates	11	15.30	Quarterly	2	18.2
			Semi-annually	1	9.1
			Yearly	1	9.1
			Once in more than a year	2	18.2
Total	72	100.00	Total	11	100

3.7.4. Reasons for non-vaccination among poultry households

Whereas all eleven (11) PHHs cite disease prevention as the sole reason for vaccinating birds, the remaining 85% provided a variety of reasons for non-practice that bordered on knowledge, access and cost of vaccines as well as production motives, applicability to production system and producer perceptions. As shown in Table 44, most commonly advanced reasons for non-practice of vaccination are associated with the material vaccine or the administration of it. A total of 64% of these households either had limited knowledge of vaccines or vaccination services or assessed same to be irrelevant, inaccessible and too expensive. About 10% each revealed that the non-commercial motives of production and perceived adaptability of local breeds to local diseases and climate are the reasons for not vaccinating birds.

Table 43: Distribution of reason for not vaccinating birds among PHHS

Reason for not vaccinating birds	Frequency	Percent
Limited access to vaccines or vaccination	11	18.03
Limited knowledge of relevance of vaccination	11	18.03
High cost of vaccine/vaccination	10	16.39
Limited knowledge vaccines or vaccination	7	11.48

Non-commercial production motives	6	9.84
Perceived local breeds as disease resistant	6	9.84
Not consistent with production system	4	6.56
Small flock size	3	4.92
Limited disease outbreaks	2	3.28
Fear or chemical contamination of home grown foods	1	1.64
Total PHHs not practicing vaccination	61	100.00

3.7.5. Outbreak of poultry diseases amount poultry households

Table 45 presents information about poultry disease outbreaks and the specific diseases encountered by PHHs in the recent past. The majority (58%) reported outbreaks of some form of diseases. These PHHs reporting outbreaks mainly identified Coccidiosis (43%) and Newcastle (33%) diseases to be the often encountered diseased conditions when presented with pictorial symptoms of the conditions. Other disease identified included Gumboro, CRD and Fowl pox among others. The latter, however, came with very low frequencies among the PHHs across the survey.

Table 44: Distribution of incidence of disease out-breaks among PHHs

Disease outbreak?	Frequency	Percent
No	30	41.7
Yes	42	58.3
Total	72	100.0
Specific type of diseases faced by poultry households		
Type of disease	Frequency	Percent
Newcastle	14	33.33
Gumboro	5	11.90
Gout	4	9.52
Coccidiosis	18	42.86
CRD	5	11.90
Fowl Pox	4	9.52
Others	2	4.76
	42	100.00

3.7.6. Veterinary and extension service provision among PHHs

All PHHs across the survey unequivocally, declared complete absence of contact with veterinary service providers. Only 2 reported knowledge of Community Animal Health Workers. Whereas 94% of all PHHs were positive that services of CAHWs will be patronised if offered on free basis, only 50% expressed any desire to patronise such a service at any fee.

4.0. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary and Conclusions

The main objective of the baseline was to assess prevailing situations in the poultry industry with respect to **key GPP output indicators**. The study found the poultry production sector to be dominated by males (363 males against 47 females). In addition, 212 producers (51.7%) had access to formal poultry management training. Also, the sector is dominated by small scale producers in terms. However, the commercial flock size and the value of sales of the few (24) large scale producers is substantially higher than the several medium and small scale enterprises combined. In terms of regional distribution, Brong Ahafo region has the highest number producers with Dormaa leading. From the perspective of labour employed, the sector is dominated by male employees both at the managerial and operational levels. The results indicate that most of the poultry farmers purchase most of their feed ingredients without formal contracts/agreements with feed suppliers, particularly aggregators.

The average number of days for DOC, feed and vaccines are 30.01, 0.83 and 0.91 respectively. However, all three inputs can either be obtained through spot transactions or in less than one day (indicated by a minimum delivery time of 0 day). Comparing the delivery time for male-owned and female-owned farms indicate that females received their orders earlier than their male counterparts. Comparing the delivery time across the three levels of production indicates that it takes relatively longer time for large scale (tier 1) farms to receive their orders.

A total of 655,580 broilers were sold in 2015 by just about 40% of producer (162) whilst total sales volumes from layers and eggs were 2,249,375 birds and 806,891,730 pieces of eggs respectively. These quantities translated into US\$4,328,855.44, US\$10,248,768.70, and US\$84,707,944.30 for broilers, layers and eggs respectively giving an indication that production and sale of eggs constitute a major driver of the overall poultry sector. It can therefore be concluded that current trend of shifting meat production to egg production should be encouraged to exploit the full potential. In term of sales of poultry products by end users such as supermarkets and cold stores, the study found imported products to totally dominate, as shown by very low ratios of sales of local to imported products. The picture is however the opposite when it comes to eggs sales. It can therefore be argued that there is a viable market for local eggs. Efforts should therefore be made by both the public and private to promote and harness the sub-sector's full potential.

Majority of poultry producers (309 out of 410) indicated having access to current market information. Detailed analysis of the type of information used the frequency of information usage revealed that only few (between 29 and 105) use specific information at least once a month with price and buyer information being the most frequently used. It can therefore be concluded that making information about consumers and alternative market avenues easily accessible at the district levels instead of the concentration of these information to the national capital and other major cities will go a long way to assist producer. It will enable producers understand the market trends, consumers needs and expectations so as to produce products that satisfy the customer.

With the exception of few producers (17) who indicated receiving some form of grant or involvement from the public sector, especially, the government, almost all the investment in poultry enterprises surveyed were from private sources. Ashanti region recorded the highest value of private sector investment with the Greater Accra region being the region with the least investment.

The results indicate that the mortality rate among Day Old Chicks is higher (8.58%) than that of broilers and layers combined (5.83%). Several factors may explain the high rate of mortality among Day Old Chicks. Firstly, a number of farmers who procured DOCs locally complained of failure of hatcheries to undertake the compulsory first day vaccination at all or properly which affect their survival ability. Moreover, means and conditions of transportation of DOCs between point of purchase and producers' farm. Lastly, the brooding conditions for some farms do not provide the needed congenial environment for survival of DOCs. In addition to this, the study found that Ashanti region recorded the lowest mortality rate among both chicks and broilers-layers with Greater Accra region having the highest. The high mortality rate in Greater Accra is explained by the outbreak of bird flu in the 2015 season in some parts of the Greater Accra region.

Overall a typical bird costs US\$ 13.00 to produce whereas a layer cost almost twice (US\$14.60) as much to produce relative to a broiler (US\$7.30).

In assessing the percentage of farmers who can identify at least four best husbandry practices, it was realised that all farmers (100%) identified at least four best poultry husbandry practices. However, field observations revealed that most of these tenets were not adhered to in practice. The issue with lack of adoption of improved practices is therefore the result of either lack of compatibility with local production systems or due to cost implications resulting in "best practices" being viewed as too high a risk in the existing production and marketing environment.

In terms of consumers' perception of quality of national poultry produce, the overall perception regarding the health and safety of local chicken products was found to be 4.28. This implies that consumers have positive perception towards the health and safety of local poultry products as illustrated by the fact that health and safety perception had mean scores ranging from 4.13 to 4.39. The results indicate that the local poultry products can likely be promoted by highlighting their health and safety aspects relative to their imported counterparts. Regarding nutrition and quality, the sampled consumers agree that the quality of locally produced chicken is higher than frozen imported chicken due to the long period of refrigeration for imported products. They also agreed that locally produced chicken tastes better than imported frozen chicken and that locally produced chicken is fresher compared to imported chicken. The overall nutritional and quality perception index was 4.28, suggesting that consumers agree and are positive about the superior nutritional and quality of locally produced chicken products compared to imports. The overall preference and purchasing perception index for eggs was 3.30. This implies that most of the sampled consumers are generally undecided about egg purchases as indicated by an index of 3.30 which falls in the neutral category of the adopted Likert scale. The above results provide the rationale for stakeholders to change or influence the attitude of consumers towards preferences and demand for eggs in Ghana.

The top 5 major constraints cited by most local poultry farmers were input and policy environment input related constraints; including the high cost of feed (by 87% of all poultry producers), lack of direct policy support (79%) and policies adjudged incompatible with local production trends, high cost of medication (73%) and high interest rates charged on the limited loans disbursed to the sector (68%). Other constraints cited by about 50% of surveyed poultry farmers included the preponderance of cheap import of chicken product on the domestic market, the operation of a liberalized trade regime, low prices of local chicken products and lack of credit support (cash or in-kind) to the sector.

From the perspective of poultry household, about 68% of all poultry households lost birds due mainly to disease (67%), with diseases being the commonest cause of bird losses incurred by poultry households in Ashanti (70%) and Brong Ahafo (78%) regions. It was also found that although 90% of poultry households are of the opinion that vaccinations are of importance to the health of poultry birds only 15% practice vaccination with most episodes of vaccinations among the practitioners occurring at a long time intervals. When asked about the reasons why they do not practice vaccination, a total of 64% of the households indicated that they either had limited knowledge of vaccines or vaccination services or assessed same to be irrelevant, inaccessible and too expensive. About 10% each revealed that the non-commercial motives of production and perceived adaptability of local breeds to local diseases and climate are the reasons for not vaccinating birds. Regarding poultry households' access to veterinary and extension services, all of them, across the survey regions, unequivocally, declared complete absence of contact with all veterinary service providers. Only 2 reported knowledge of Community Animal Health Workers. Whereas 94% of all PHHs were positive that services of CAHWs will be patronised if offered on free basis, only 50% expressed any desire to patronise such a service at any fee.

4.2. Recommendations

The following recommendations are made based on findings from the study and experiences during the baseline survey. The first set of recommendations aims at addressing constraints to growth of the local poultry sector whilst the second set of recommendations is to inform the implementation of the Ghana Poultry Project.

4.2.1: Constraint Related Recommendations

In order to address constraints to the growth of the local poultry industry, the following recommendations are made:

- a. Provision of support in the form of input subsidies to maize and soy bean producers will help improve the production and productivity of these crops. This, in turn, will help increase the supply of maize and soy bean which will subsequently lead to a reduction in the prices of these commodities.
- b. In addition, waivers/discounts on the import duties on poultry drugs and vaccines should be implemented to help reduce the cost of medication. In addition, provision of agricultural loans

and grants with lower interest rate and flexible repayment terms will further help to reduce the cost of production.

- c. Moreover, policies such as import restrictions on poultry and poultry products should be implemented to reduce the level of competition confronting the local poultry sector. In addition, policies to ensure that a quota of poultry products used in government programmes such as school feeding and by government institutions is given to local producers should be implemented to provide some form of guaranteed market to local producers that are able to meet the terms of such agreements.
- a. 4.2.2: Programme Implementation Related Recommendation The geographical scope of the study should be clearly stipulated by limiting the boundaries of the selected districts to what has been officially defined. This is because the number of poultry farmers between the very large and medium scales of operation available for targeting by the project is partly influenced by the geographical spread of the targeted districts.
- b. Following from the first recommendation of redefinition of the target district, it is recommended that the total number of poultry farms within very large and medium scales of operations targeted by the project should be reviewed downwards from the original 50 and 350 respectively since the original reference data that informed these numbers had enterprises that goes beyond the scope of the current study.
- c. Thirdly, the original assumption 10,000 poultry households available to serve as the population for the intended poultry vaccination intervention should be reconsidered. This is because most farms between the very large and medium scales of operation are found in locations isolated from settlement. This factor, coupled with an inevitable reduction in the number of tier 1 and 2 farms, required that either the population of the poultry households should be revised to a 10% of the original target (that is, 1,000 instead of 10, 000) or the operational definition and target of poultry households should be revised to include households that are located around small and very small poultry farms (especially farms with flock size of above 3,000 but less than 5,000 birds).
- d. As indicated above under the challenges and limitations of the study, most poultry producers, especially small-scale enterprises, have poor record keeping culture. This has the tendency of affecting the accuracy and reliability of production data obtained from respondents. It is therefore recommended that future interventions should consider building the capacity of producers in this regard.
- e. Formalization of contracts/agreements in poultry industry is extremely critical for the improved efficiency in the sector. Undertaking such a practice has the potential of reducing the uncertainties associated with most of the business activities in the industry. An important niche of policy influence will therefore be strengthening the business relationship between

producers and the feed ingredient/raw material suppliers in particular, through the establishment of formal contracts.

- f. Lastly, it is recommended that the implementation of future interventions such as training programmes, grants and credit facilities should be decentralized to ensure that the intended targets at the district and communities levels are reached and the expected impact realised.

5.0. REFERENCES

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1.0. APPENDICES

Table A1: Variable cost profile per tier among poultry farmers across regions

	Tier 1			Tier 2			Tier 3			Pooled		
Cost Item (GH¢)	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Wages (hired labour)	10	9,867.00	9642.32	111	2,537.86	4130.14	215	601.69	2065.56	336	1,517.07	3713.32
Wage (Family labour)	10	250.00	416.33	111	136.58	414.96	215	93.90	204.53	336	112.64	298.16
Processed Feed	10	529,361.79	1095343.32	111	44,138.72	84023.45	215	6,563.90	14402.33	336	34,536.47	206216.53
Feed Supplement	10	18,749.50	39934.38	111	10,758.07	23636.97	215	2,145.72	3940.17	336	5,485.03	16057.37
Newcastle	10	14,048.40	11780.51	111	2,928.77	5113.42	215	427.11	740.66	336	1,658.95	4330.67
Gumboro	10	9,393.00	5462.52	111	1,701.79	2402.83	215	259.03	357.95	336	1,007.50	2323.27
Coccidiosis	10	9,506.60	8469.83	111	3,885.74	7183.48	215	688.28	957.82	336	2,007.03	4839.62
Endo Parasites	10	10,117.20	8147.59	111	2,671.02	3475.32	215	545.73	691.99	336	1,532.70	3051.15
Ecto parasites	10	4,856.00	9001.10	111	1,453.46	3242.39	215	221.27	622.51	336	766.27	2592.81
Antibiotics/	10	15,572.00	15978.59	111	3,306.11	6574.90	215	907.66	1900.46	336	2,136.44	5492.90
Disinfectants	10	28,313.00	79383.68	111	716.14	1568.42	215	130.75	241.26	336	1,162.89	13888.84
Other Medications	10	83,562.60	67813.41	111	14,768.53	19478.02	215	1,634.25	1928.06	336	8,411.60	21493.11
Water	10	31,406.40	59173.40	111	3,158.63	4685.10	215	637.06	1321.25	336	2,385.83	11388.30
Energy	10	1,299.00	1145.93	111	809.86	4198.29	215	139.45	249.12	336	395.43	2446.58
Litter	10	40,855.60	62944.23	111	4,537.10	8596.62	215	804.05	1449.81	336	3,229.30	13366.10
Milling	10	1,574.75	1107.86	111	3,025.03	17362.71	215	417.27	1392.02	336	1,313.21	10086.97
Chick Transportation	10	52,425.88	90299.97	111	9,061.90	16547.32	215	2,707.71	8885.20	336	6,286.57	20826.07
Feed Transportation	10	1,672,658.50	4730543.20	111	285,877.25	732349.08	215	23,703.16	72929.65	336	159,390.30	930689.82
White maize	10	90,708.00	191384.65	111	61,874.49	185905.89	215	8,274.30	21448.81	336	28,434.89	115643.57
Yellow maize	10	230,108.00	359774.61	111	108,490.86	161674.92	215	15,322.60	27529.76	336	52,493.83	124144.67
Soy	10	19,688.00	45738.14	111	9,575.53	23973.94	215	2,169.75	7559.47	336	5,137.68	17318.48
Starter Concentrate	10	125,375.00	225469.53	111	40,241.77	74201.27	215	5,877.23	13412.35	336	20,786.28	62315.03

Grower Concentrate	10	82,212.00	191882.65	111	33,479.17	65175.22	215	6,967.07	20033.67	336	17,964.96	54045.77
Finisher Concentrate	10	4,207.95	4900.14	111	26,550.26	50842.93	215	19,655.73	41140.76	336	21,473.64	44161.41
DOC	10	3,057,803.17	5,316,957.88	111	674,968.51	1,019,020.20	215	100,763.93	121,656.03	336	378,463.64	1,184,412.71
Total variable cost	10	3,057,803.17	5316957.883	111	674,968.51	1019020.204	215	100,763.93	121656.0302	336	378,463.64	1184412.715
Variable cost per Bird (All birds)	10	34.60 (9.18)	58.37	111	44.93 (11.92)	38.33	215	49.91 (13.24)	39.80	336	47.81 (12.68)	39.96
Variable cost per Layer (Layer only farms)	4	63.66 (16.89)	89.94	74	51.69 (13.71)	39.19	116	56.78 (15.06)	41.31	194	54.98 (14.58)	41.61
Variable cost per Broiler (Broiler only farms)	2	5.86 (1.55)	6.79	7	10.46 (2.78)	7.31	35	33.67 (8.93)	30.47	44	28.71 (7.26)	29.00

Exchange rate 1.00 US= 3.77 GH¢

Table A2: Variable cost of egg production across tiers of producers

Variable cost per egg				
Tier	N	Mean GHC	SD	
		(USD)		
1	15	0.29	0.37	
		(0.08)		
2	116	0.13	0.33	
		(0.03)		
3	178	0.36	0.49	
		(0.10)		
Total	309	0.27	0.45	
		(0.07)		

Table A3: Descriptive statistics for variable cost across regions

Variable cost per egg					Variable cost per bird			
region	N	Mean	USD	Std.	N	Mean	USD	Std. Deviation
		(GHC)		Deviation		(GHC)		
Greater Accra	33	0.26	0.07	0.42	38	46.24	12.26	44.16
Ashanti	127	0.27	0.07	0.52	129	47.34	12.56	35.27
Brong Ahafo	149	0.28	0.07	0.38	169	48.52	12.87	42.50
Total	309	0.27	0.07	0.45	336	47.81	12.68	39.96

Appendix 2: Ghana Poultry Project: Baseline Survey Questionnaire For Poultry Producers

GHANA POULTRY PROJECT: BASELINE SURVEY

QUESTIONNAIRE FOR POULTRY PRODUCERS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on poultry production in Ghana with the ultimate aim of helping to improve the local poultry sector. Your business has been selected to be part of this study.

I would therefore, want you to assist me with relevant information about the operations of your business. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other person, producer or institution without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed.

Please, do you have any questions for me?

Identifying information

Region:	1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []
District name.....	
District code.....	
Town/Community/village name.....	Community code.....
Name of poultry farm.....	
Name of farm owner.....	Phone No.....
Popular or nickname of farm owner (if applicable).....	
Name of spouse of farm owner.....	Phone No
Name of Respondent (<i>if different from owner</i>):	
Producer code.....	Questionnaire Number.....
Name of respondent (if different from household farmer/manager).....	
Date of interview (DD/MM/YYYY):	
Time Interview Started:.....	
Team code	

MODULE A: SOCIOECONOMIC CHARACTERISTICS

1. Sex of respondent:
1. Male [] 2. Female []
2. What is your age?..... years
3. Level of formal education: 1. None [] 2. Basic [] 3. Secondary [] 4. Tertiary []
4. How many people have you currently employed in your poultry farm?
Total..... Male: Female:
5. Number of staff in management Total Male: Female:
6. How of your current employees are casual workers? Total Male:
Female:
7. Is poultry enterprise your main source of income? *If Yes, please skip to 9.*
1. Yes [] 2. No []
8. If No, what is your main source of income?
1. Formal government work [] 2. Formal private work [] 3. Artisan (such as carpenter, mason, etc.) 4. Trading/commerce [] 5. Farming [] 6. Pension benefits [] 7. Remittances [] 8. Other (please specify)
9. For how long have you been involved in poultry production?.....years

MODULE B: FARM CHARACTERISTICS

10. What is the distance (km) from your house to the poultry farm?.....
11. What ownership system are you operating? 1. Sole-proprietorship [] 2. Shared Ownership []
3. Limited Liability [] 4. Incorporated []
12. What type of production system are you practicing?
1. Battery cage [] 2. Deep litter system [] 3. Others specify.....
13. What type of roofing materials is your poultry structures mainly made of?
1. Tiles [] 2. Cement/Asbestos Sheet [] 3. Aluminium sheet [] 4. Thatched []
14. What is the average farm structure/unit (square feet)?.....
15. How many birds do you have currently? (Enter 0 if none).....
a. Broilers b. Layers.....
c. Chicks.....
16. What was your commercial flock size for last year? (ie. Quantities handled last year)
a. Broilers c. Layers.....
b. Eggs..... d. Chicks.....
17. Please indicate which of the following structures are available and operational on your farm?
Please tick all the applicable ones
1. Breeder farm [] 2. Hatchery [] 3. Feed mill [] 4. Processing plant []

MODULE C: FARM MANAGEMENT

18. What is your position in this poultry farm? (Skip to 20 if answer is 1 or 4) 1. Owner [] 2. Farm manager [] 3. Employee (excluding manager) 4. Other (specify).....
19. If manager, what kind of manager are you?
1. Production manager [] 2. Sales manager [] 3. Procurement manager []
20. What is the highest qualification of your managers? (*Please use the following codes for a, b, & c: 1. No formal education [] 2. Basic [] 3. Secondary [] 4. Tertiary []*)
a. Production manager.....
b. Sales manager.....
c. Procurement.....
d. Other (Specify).....
21. Have you received any formal education/training in poultry management?
1. Yes [] 2. No []
22. Do you keep records of the activities in the poultry enterprise? (*Note that keeping in memory is not record keeping*) If no skip to 24
1. Yes [] 2. No []
23. What is the main record system use in this farm?
1. Computer [] 2. Bookkeeping

MODULE D: INSTITUTIONAL INFORMATION

D1: Credit

24. Have you ever applied for cash loan in the last two years? 1. Yes [] 2. No []
(*If NO, skip to question 29*)
25. What was the main reason why you needed the loan?
1= To purchase poultry inputs [] 2= To invest in production (buy tools, hatchery, buildings, rent land) [] 3= To start or invest in a non-agricultural business [] 4= To pay school fees [] 5= To purchase staple food for household [] 6= To pay for health care/medical expenses [] 7= To pay for social event (funerals, weddings) [] 8= To build or add on to a house [] 9= To service another loan [] 10. Other (specify)
26. Have you received any cash loan in the last two years? 1. Yes [] 2. No []
(*If YES, skip to 28*)
27. What do you think was the main reason why you did not receive the loan?
1. I didn't have the needed collateral [] 2. I couldn't provide the needed documentation [] 3. The lender was not satisfied with the intended use [] 4. I don't know []
28. What is the current status of the loan repayment? 1= Fully paid; 2= Payments up to date but not fully paid; 3= Payment not yet due; 4= In default

D2: Grants/Assistance

29. Have you received any kind of grant or assistance from government, NGOs, buyers, or others?
(Examples might include subsidized or free inputs, tools or cash)

1. Yes [] 2. No [] (If NO, skip to question 31)

30. Please provide us with information on the last three grants or assistance received

a	b Did you receive the following types of assistance or grant 1= Yes, 2= No Skip to next grant/assistance if NO	c Which year was it received?	D Who provided the assistance? (Code E)
i. Cash			
ii. Subsidized or free feed			
iii. Subsidized or free DOC			
iv. Subsidized or watering trough			
v. Subsidized or free feeding trough			
vi. Subsidized or free drugs/medication			
vii. Subsidized or free feed mill			
viii. Subsidized or free processing plant			
ix. Subsidized or free storage space			
x. Others 1:			
xi. Others 2:			
xii. Others 3:			
Code E: 1= Government; 2= International/national NGO; 3= International development agencies (USDA, UN, USAID, etc); 4= Buyers; 5= Input suppliers; 6= individuals 7=others:			

D3: Association

31. Do you belong to any poultry farmer association? (If No, Please skip to question 36)

1. Yes [] 2. No []

32. What is the name of your association?.....

33. Does your association provide any assistance to its members? (If NO, skip to 35)

1. Yes [] 2. No []

34. If Yes, what services do you receive from your association? (TICK AS MANY AS APPLICABLE) 1. Technical assistance [] 2. Supply of inputs (DOC, Feed, Vaccines) **ON credit** [] 3. Access to cash loans [] 4. Access to market/buyers [] 5. Transporting services [] 6. Veterinary services [] 7. Hatchery services [] 8. Storage facility [] 9. Processing plant []

35. How would you rate the following attributes regarding the group? (Please tick where applicable)

Attribute	1 = Low	2 = Medium	3 = High
i. Trust:			
ii. Commitment:			
iii. Agreement:			
iv. Leadership quality:			
v. Partnership with other organizations:			
vi. Shared rights and responsibilities:			
vii. Assets endowments:			

D4: Extension and veterinary Services

36. Do you receive any extension or veterinary services? *If No please skip to 38*

1. Yes [] 2. No []

37. Please complete this table.

Source of technical advice	Do you pay for the service? 1= YES and 2 = NO	Frequency of visit within last year.
Extension agents		
Veterinary service providers?		
More experienced poultry farmer		
NGO		
Others specify.....		

38. Did you encounter any technical difficulty for which you could not get advice throughout the production cycle? *If No please skip to 40.*

1. Yes [] 2. No []

39. If Yes, please indicate the problem:

.....

MODULE E: PRODUCTION INFORMATION

E1:Day Old Chicks

40. What do you produce currently? 1. Broilers only [] 2. Layers only [] 3. Both []

41. What practices do you undertake before stocking your day old chicks? *Please tick all the applicable ones*

1. Take out litters [] 2. Wash the pen [] 3. Disinfect the pen [] 4. Other Specify

42. What is the main source of supply of day old chicks?

1. Local [] 2. Imported []

43. If **Local**, where do you get the chicks from?.....

44. If **imported**, where do you get the chicks from?.....

45. What is your main source of energy supply for brooding purposes?

1. Charcoal [] 2. Kerosene [] 3. Electricity [] 4. Gas []

46. Please provide us with record on your **DAY OLD CHICKS** for all production batches in 2015

Batch number	Number of chicks	Unit price (GHC)	Days between order the delivery of DOC	No. of birds that died from the stock
Batch 1				
Batch 2				
Batch 3				
Batch 4				

47. What was the average number of days between order and delivery for the day old chicks?.....

E2: Labour Input

48. Do you employ or engage anyone on the farm? 1. Yes [] 0. No [] (*IF no skip 51*)

49. Please provide us with information on permanent and casual **Workers** in 2015

Type of labour	Permanent Workers				Casual workers			
	Males		Females		Males		Females	
	Number	Total Wage (2015)	Number	Total Wage (2015)	Number	Total Wage (2015)	Number	Total Wage (2015)
Administrative staff								
Technical/production staff								
Labourers								
Others								
Total								

50. Please provide us with information of family works engaged on the farm in 2015

Family labour			
Males		Females	
Number	Total Wage (monthly)	Number	Total Wage (monthly)

E3: Feed/Supplements and Vaccines

51. Please provide us with information on feed inputs used in 2015

a Feed	b Quantity purchased (Enter 0 if don't purchase)	c Quantity used	d Unit cost (GHS)	e Total cost (GHS)
i. Layer Starter feed (kg)				
ii. Layer grower feed (kg)				
iii. Layer finisher feed (kg)				
iv. Broiler Starter feed (kg)				
v. Broiler grower feed(kg)				
vi. Broiler finisher feed (kg)				
vii. Supplements (mg)				
viii. Vitamin Premix (mg)				
ix. Mineral (mg)				
x. Other feed supplements				

52. What was the average number of days between order and delivery for the feed inputs?.....

53. Please provide us with information on Vaccines/drugs/chemicals used in 2015

a Vaccines/drugs/chemicals	b Unit	c Quantity purchased	d Quantity used	e Unit cost (GHS)	f Total cost (GHS)
i. Newcastle vaccination/vaccine	dose				
ii. Gumboro vaccination/vaccine					
iii. Coccidiosis vaccination/vaccine					
iv. Other vaccines					

v.	Endo-parasites (worms, liver fluke) control					
vi.	Ecto-parasites (mite, lice) control					
vii.	Antibiotics	Mg				
viii.	Disinfectants					
ix.	Others (specify)					

54. What was the average number of days between order and delivery for the vaccines?.....

55. Other miscellaneous items in 2015

a Item		b Unit cost (GHS)	c Total cost (GHS)
i. Water			
ii. Lightening/energy			
iii. Litter			
iv. Milling of maize			
v. Transportation of chicks			
vi. Transportation of feed			
vii. Cost of hatching			
viii. Maintenance			

56. How much of the feed items (50kg bag) did you purchase during the 2015 production season?

Feed item	Batch 1		Batch 2		Batch3		Batch 4	
	QTY	Unit price	QTY	Unit price	QTY	Unit price	QTY	Unit price
White Maize								
Yellow Maize								
Soy Cake								
Starter concentrate								
Grower concentrate								
Finisher concentrate								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

57. Has there been poultry disease outbreak on the farm during the last production year? (*Please if No skip to 61*) 1. Yes [] 2. No []

58. If **Yes**, indicate the diseases: 1. Newcastle [] 2. Gumboro [] 3. Gout [] 4. Coccidiosis [] 5. Weakness and chronic respiratory disorder (CRD) [] 6. Bird flu [] 7. Others [] specify.....

59. Did you have access to vaccines/drugs for your birds? 1. Yes [] 2. No []

60. What is the main source of vaccine/drugs supply? 1. Local [] 2. Imported []

61. How many birds died during the disease outbreak in the last production year?

.....

MODULE F: SALES OF POULTRY PRODUCTS

62. Please provide us with information on the sales of poultry products in 2015

Item	Quantity Sold	Price/unit	Total sale	Main customer sold to? (Code G)
Broilers				
Spent layers				
Eggs				

MODULE G: MARKET AND GOVERNANCE STRUCTURE

G1: Market Information

63. Do you have access to poultry market information? *If No please skip to 68*

1. Yes [] 2. No []

64. What type of market information do you receive and how frequent do you use market information?

Market information	a Do you use 1=Yes, 0=No (If no, go to next row if No)	c How frequent do you use this information 1= daily, 2 = weekly 3 = monthly, 4= quarterly, 5=semi-annually, 6=annually, 7= other specify
Price information		
Buyer information		

Alternative channel		
Consumer behaviour		
Other (Specify)		

65. What is the main source of market information?

1. MoFA [] 2. Fellow farmers [] 3. Poultry farmer association [] 4. NGOs [] 5. Research institute 6. [] . Others [] specify..... 7. Don't know []

66. How is the poultry market information communicated to you?

1. Personal contact [] 2. Mobile phones [] 3. Internet (email) [] 4. Newsletters/Newspapers [] 5. Seminars/meetings [] 6. TV [] 7. Radio [] Others [] specify.....

67. What is your preferred channel of receiving market information?

1. FM radio station [] 2. TV [] 3. News paper [] 4. Internet [] 5. MoFA [] 6. Fellow farmers [] 7. Poultry farmer association [] 8. Personal contact 9. Others [] specify.....

68. What specific poultry market information do you need for your enterprise?

.....

G2: GOVERNANCE STRUCTURE

G2a: Contract Issues

69. Is there any contract or agreement between you and other value chain actors? *If No, skip to question 72.*

1. Yes [] 2. No []

70. If yes, is this agreement written/formal? 1. Yes [] 2. No []

71. If yes, Please provide us with the contracts information in 2015

a	b Did you sign any contract with.....? 1= Yes; 2= No
i. Input suppliers	
ii. Retailers	
iii. Supermarkets	
iv. Restaurants	

v.	Hotels	
vi.	Chop bars	
vii.	Schools/colleges	
viii.	Hospitals	
ix.	Others 1:	
x.	Others 2:	

72. Please provide information on the following agreement on feed in 2015

a Feed	b. Total quantity purchased	c. Quantity purchased through contract	D Quantity purchased through aggregators		e From whom did you purchase the? (Code I)	f Supplier Name	g Supplier contact
			Through contract	Not through contract			
i. Yellow maize							
ii. White maize							
iii. Soybean Cake							
iv. Processed Feed							
v. Feed additives							
vi. Concentrates							
Code I: 1=Aggregator, 2=Commercial Farmer 3= Soybean Processor, 4=FBO							

G3: INDUSTRY COMPETITION

73. From where do you face tight competition?

1. Local [] 2. International [] 3. Both []

74. How would you rate local and international competition?

Competitor	Very low	Low	Moderate	High	Very high
Local					
International					

75. Have you responded in any way to the competition from imported chicken? *If No, Please skip to question 77*

1. Yes [] 2. No []

76. If **YES** how did you respond to the competition?.....

77. Do you have any knowledge about the characteristics of imported poultry products? 1. Yes

[] 2. No [] *If No, Please skip to question 79*

78. If **Yes**, what are the characteristics? *Please tick all the applicable options*

1. Taste [] 2. Tenderness [] 3. Fatness []

79. Has the knowledge you gathered on characteristics of the imported poultry products

influenced your marketing strategies? 1. Yes [] 2. No [] *If No, Please skip to question 81*

80. If Yes, how?.....

81. Has poultry import competition discouraged you from investing in your poultry production?

1. Yes [] 2. No []

G4: GOVERNMENT POLICIES

82. Are you aware of any government incentive/policy for the poultry industry? *If No please skip to question 85.*

1. Yes [] 2. No []

83. If **YES**, what government incentives/policy for the poultry industry are you aware of?

Government policies	Awareness: 1 = Yes and 2 = No
i. Establishment of Poultry Development Board	
ii. Importation of maize for re-sale to poultry farmers	
iii. Provision of veterinary care (services) and vaccination	
iv. Funding to support increased processing and marketing for broiler birds	
v. Liberalization of imports/	
vi. adoption of the 20% Common External Tariff	
vii. Restriction of imports to 60% of total poultry consumed in Ghana	
viii. Others specify	

84. Have you benefited in any way from this incentive/policy?

1. Yes [] 2. No []

MODULE H: KNOWLEDGE, ATTITUDE AND PRACTICES

85. Please provide us with the information on the training received

a	b Have any of your organisation's management and/or employees received training in.....? 1= Yes, 2= No (If no, skip to next row or training)	c When was the most recent training received? (year)	d Who provided the most recent training? (Code J)	e Was the training useful? (Code K)
i. Improved Production practices				
ii. Improved Post production practices				
iii. Organisational record keeping				
iv. Financial planning and management				
v. Vaccination				
vi. Computer and GPS training				
vii. Business plan development				
viii. Cash Flow preparation				
ix. Balance sheet preparation				
x. Income statement preparation				
xi. Feed formulation				
xii. DOC management				
xiii. Setting of prices				
xiv. Handling of birds and eggs				
xv. Packaging of eggs				
xvi. Poultry processing				
xvii. Packaging of processed poultry				
xviii. Labelling				
xix. Storage				
xx. Distribution				
xxi. Flock Density				

86. Please indicate whether you agree or disagree to the following statements using 1 for agree and 0 for disagree

Management practice	1=agree 0=disagree
i. Day old chicks should be the only birds that are introduced onto the farm	
ii. It is necessary to control of movement of staff and equipment around the farm.	
iii. There must be provision of shower facilities and clean clothing for staff and visitors.	
iv. It is important to provide wash facilities for staff, essential visitors and vehicles prior to entry.	
v. It is not important to use of disinfectant foot baths at the entry to each shed.	
vi. It is important to thoroughly clean and disinfect all sheds between flocks.	
vii. Maintaining the flock in a good state of wellbeing by good nutrition and housing.	
viii. There a recommended vaccination protocol for birds	
ix. It is important to practice suitable prevention medication programme	
x. The ingredients from which the diet is made must be of good quality.	
xi. The weighing or measuring of all ingredients must be accurate.	
xii. The micro-ingredients such as the amino acids, vitamins and other similar materials should not be too old and should be stored in cool storage	
xiii. Do not use food that is too old or has become mouldy.	
xiv. Feed formulation must follow specified ingredient.	
xv. There should be records of all business activities and transactions on the farm	
xvi. It is not important to identify diseases early	
xvii. It is important to practice early treatment of diseases	
xviii. It is important to use monitoring procedures to keep a check on the disease organism status of the farm, to check on the effectiveness of cleaning and sanitation procedures and to test the immunity levels to certain diseases in the stock to check the effectiveness of the vaccination program.	

MODULE I: CONSTRAINTS

87. Please rank the following constraints using the following scale: (0 = not a constraint; 1=least severe constraint; 2 = severe constraint; 3 = most severe constraint)

Constraints	Rank
INPUT	
i. High cost of day old chicks	
ii. Lack of quality day old chicks	
iii. High cost of feed	
iv. Low quality of compounded feed	
v. High cost of medication	
vi. Transportation of inputs (high cost, unavailability of transport)	
vii. Lack of credit facilities	
viii. High interest rate	
ix. High energy cost and power shortages	
x. Inadequate access to veterinary services	
PRODUCTION	
i. Inadequate training	
ii. Lack of infrastructure/processing technology	
iii. Inadequate capacity building	
iv. Disease outbreak	
MARKETING	
i. Low prices of poultry products	
ii. High competition from cheap imported chicken	
iii. Low demand of poultry products	
POLICY CONSTRAINTS	
i. Inconsistent government policies	
ii. Lack of government support or subsidy	
iii. Trade liberalisation	

88. How much will you currently value the total investment of your farm?
GHC.....

89. What percentage of the total investment comes from the private sector (*private sector investment includes those from you, any for profit company, corporate investment banks, etc.*)
.....

90. What percentage of the total investment comes from the public sector (*public sector investment includes those from the Ghana government, governments of other countries, donor agencies, etc.*)
.....

Any other comments

.....
.....
.....

THANK YOU FOR YOUR TIME

Enumerator name
GPS: Latitude..... Longitude
Enumerator code.....
Producer code

Time Interview Ended:.....

Appendix 3: Questionnaire on Consumers' Attitude, Perception and Preferences for Poultry Products

GHANA POULTRY PROJECT: BASELINE SURVEY

QUESTIONNAIRE ON CONSUMERS' ATTITUDE, PERCEPTION AND PREFERENCES FOR POULTRY PRODUCTS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on consumption of local and imported poultry (chicken) products in Ghana with the ultimate aim of helping to improve the poultry sector. Your household has been selected to be part of this study.

I would therefore, want you to assist me with relevant information about your households' consumption of poultry and/or poultry products. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other party without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed. **This questionnaire is to be answered by either the primary shopper or food preparer of the household.**

Please, do you have any questions for me?

Identifying information

Region:	1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []
District name.....	District code.....
Community name.....	Community code.....
Name of household head	Phone No.....
Popular name of household head (if applicable).....	
Name of spouse of household head.....	Phone No
Household code.....	Questionnaire Number.....
Name of respondent (if different from household head & spouse).....	
What is your relationship of household respondent to household head. 1. Child/step child [] 2. Grandparent/grandchild [] 3. Parent 4. In-law [] 5. Other relatives (brother, sister, cousin, etc) [] 6. Other []	
Date of interview (DD/MM/YYYY):	

SCREENING QUESTION

1. Does your household consume poultry products? (This includes poultry meat, eggs, sausage) 1. Yes ☐ 0. No ☐ (*If NO, answer 2 and end interview*)
2. If NO to question 16, please provide 3 reasons why your household does not consume poultry and/or poultry products.....
.....
.....
.....

Section A: Consumers Personal and Household Characteristics

3. Age of respondent (years)
4. Sex of respondent: 1. Male ☐ 0. Female ☐
5. Level of formal education: 1. None ☐ 2. Basic ☐ 3. Secondary ☐ 4. Tertiary ☐
6. Actual number of years of formal education/schooling.....(years)
7. Religion: 1. Christianity ☐ 2. Muslim ☐ 3. Traditional ☐ 4. None ☐
8. Ethnicity
9. Marital status: 1. Single (never married) ☐ 2. Married ☐ 3. Divorced ☐ 4. Widowed ☐
10. What is the total number of people in your household?.....
11. How many people in the household are below 18 years?.....
12. How many people in the household are above 60 years?.....
13. How many people are employed in the household?.....
14. Is the household head employed? 1. Yes ☐ 2. No ☐ (*If No, skip to 16*)
15. If Yes, what is the main source of employment for the household head?
 1. Formal government work ☐ 2. Formal private work ☐ 3. Artisan (such as carpenter, mason, etc.) ☐
 4. Trading/commerce ☐ 5. Farming ☐ 6. Pension benefits ☐
 7. Remittances ☐ 8. Other (please specify)
16. What is your household's main source of income? 1. Formal government work ☐ 2. Formal private work ☐ 3. Artisan (such as carpenter, mason, etc.) ☐ 4. Trading/commerce ☐ 5. Farming ☐ 6. Pension benefits ☐ 7. Remittances ☐ 8. Other (please specify)
.....
17. What is your household's **monthly** income?..... GH¢

Section B: Consumers Purchasing Behaviour on Poultry Products

18. When does your household usually consume chicken?
 1. Weekly ☐ 2. Monthly ☐ 3. Quarterly ☐ 4. Semi-annually ☐ 5. Yearly ☐ 6. At festivities ☐ 7. Other (specify)..... ☐
19. Does your household consume local or foreign chicken or both? 1. Local chicken ☐ 2. Foreign chicken ☐ 3. Both ☐
20. What form of the chicken product do you usually purchase? 1. Live bird ☐ 2. Whole dressed bird ☐ 3. Cut portions ☐ 4. Other Specify.....

21. What quantity of chicken does your household consume in a typical week.....Kg/pound
22. How much (in GH¢) does the household spend on chicken in a typical week? GH¢
(Enter 0 if household does not buy)
23. Where does your household usually purchase your poultry products from? (Please tick the option(s) that is/are applicable to your household)

a Poultry product	b Poultry meat	c Eggs	d Other poultry products such as sausage, gizzard
i. Open market			
ii Supermarket			
iii. Cold stores			
v. Live bird retailers			
vii. Farm gate			

How often does your household consume eggs? 1. Weekly [] 2. Monthly [] 3. Quarterly []
4. Semi-annually [] 5. Yearly [] 6. At festivities [] 7. Other (specify)..... []

25. How many eggs are consumed on an average by individuals in the household?

Please indicate the number of eggs consumed by each member of your household (Enter 0 if member does not consume egg)	
Household Member	No. of eggs consumed per week
Household Member 1	
Household Member 2	
Household Member 3	
Household Member 3	
Household Member 4	
Household Member 5	
Household Member 6	
Household Member 7	
Household Member 8	
Household Member 9	
Household Member 10	
Household Member 11	

Section C: Consumers Awareness and Knowledge of Poultry Products

26. Can you differentiate between local and imported poultry products? 1. Yes [] 0. No []
27. Are you aware of the influx of imported poultry product in Ghana? 1. Yes [] 0. No []
28. If YES to question 27, which imported poultry products are you aware of? (Tick as many as possible) 1. Frozen whole chicken [] 2. Frozen chicken parts [] 3. Eggs [] 4. Processed/canned chicken products [] 5. None []

29. Are you aware that the patronage of locally produced chicken products will boost the Ghanaian economy and the livelihood of local poultry farmers? 1. ☐ 0. No ☐
30. Would you support a campaign promoting the consumption of fresh and healthy local chicken and chicken products? 1. Yes ☐ 0. No ☐ (If NO to 30, skip to 32)
31. If YES to question 30, main medium would you prefer to receive information on campaigns to promote the consumption of locally produced poultry products in Ghana? 1. Radio ☐ 2. Television ☐ 3. Newspapers ☐ 4. Magazines ☐ 5. Internet ☐ 6. Social media ☐ 7. Friends ☐ 8. Others (Please specify)
-

32. Please rate the following product attributes in order of importance when purchasing chicken products (1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important).

Attributes of chicken and chicken products	Please rate using the codes 1-5 above
i. Appearance/neatness/skin colour	
ii. Aroma	
iii. packaging	
iv. Availability	
v. Convenient (ready for use)	
vi. Origin (whether imported or local)	
vii. Existence of expiry date	
viii. Fat content	
ix. FDA certification	
x. Freshness	
xi. Halal method of slaughter	
xii. Hygienic shopping environment	
xiii. Informative product label	
xiv. Price	
xv. Proximity	
xvi. Taste	
xvii. Tenderness	
xviii. Texture	
xix. Yield (shrinking, or expansion after cooking)	

33. Please rate the following product attributes in order of importance when purchasing eggs (1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important).

Attributes of eggs	Please rate using the codes 1-5 above
i. Availability	
ii. Egg weight	
iii. Freshness	
iv. Labelling	
v. Attractive packaging	
vi. Number of eggs per crate or package	

vii.	Price	
viii.	Proximity	
ix.	Shell cleanliness	
x.	Shell colour	
xi.	Shell smoothness	
xii.	Shell soundness (unbroken)	
xiii.	Shell thickness	
xiv.	Size of egg	
xv.	Yolk colour	

Section D: Consumers;’ Attitude and Perception towards Local Poultry Products

34. Do you usually care about the source or origin of the poultry products you purchase?
1. Yes [] 0. No []
35. If YES to question 34, do you bother to find out if it was locally produced or imported? 1. Yes [] 0. No []
36. Between imported and locally produced poultry products, which of them do you prefer more? 1. Locally products [] 2. Imported products []
37. Does your household desire to consume locally produced poultry products? 1. Yes [] 0. No []
38. How often does your household’s desire to consume locally produced poultry products influence your purchasing decision, for example by choosing to buy locally produced chicken products rather than imported chicken? 1. Always [] 2. Frequently [] 3. Sometimes [] 4. Rarely [] 5. Never []
39. Which form of locally produced chicken products do you usually purchase?
1. Live Bird [] 2. Whole Processed Bird [] 3. Cut Portions [] 4. Other Specify.....
40. Please use the following scales (1=strongly disagree, 2= disagree, 3=neutral, 4= agree, 5= strongly agree) to answer the following perception statements regarding chicken and chicken products.

Perception statements about	1	2	3	4	5
d. Health and Safety Statements					
i. Locally produced chicken is healthier than frozen imported chicken.					
ii. Imported frozen chicken may have health implications due to long period of refrigeration.					
iii. The health status of live birds slaughter and frozen for export to Ghana cannot be verified by Ghanaian consumers compared to local chicken					

iv.	Consumption of imported frozen chicken products are risky since unwholesome products can be smuggled into the Ghanaian market					
v.	A break in cold chains during importation of frozen chicken can lead to a build-up of high microbial infections which are dangerous to human health, making imported chicken riskier compared to local chicken					
vi.	The risk of food borne diseases is lesser in locally produced than in imported poultry meat					
vii.	Unlike locally produced poultry meat, the imported poultry meat is preserved with chemicals which may have health implications.					
<i>e. Nutritional and quality statements.</i>						
i.	The quality of locally produced chicken is higher than frozen imported chicken due to the long period of refrigeration,					
ii.	Locally produced chicken tastes better than imported frozen chicken					
iii.	Imported frozen chicken are very tender compared to locally produced chicken meat					
iv.	Locally produced chicken is fresher compared to imported frozen chicken					
<i>f. Preference and purchasing statements</i>						
i.	I prefer buying locally produced poultry products relative frozen imported chicken					
ii.	I am willing to pay somewhat more for locally produced poultry meat due to its healthiness					
iii.	I am willing to pay somewhat more for locally produced poultry meat due to its safety					
iv.	I would buy locally produced poultry meat if it sells at the same price as imported poultry products					
v.	I would be willing to buy locally produced poultry meat if they were more available like the imported frozen chicken					
vi.	I have no problem with buying locally produced poultry products					
vii.	I would be willing to buy locally produced poultry meat if there were more available cut portions like the imported frozen chicken					
viii.	I would be willing to buy locally produced poultry meat if they are labelled or branded					
ix.	Locally produced poultry products are expensive relative to imported frozen chicken					

x.	Government should subsidize production of local poultry production to make it cheaper for consumers to buy					
xi.	If I buy locally produced poultry products, it will help the economy of Ghana					

41. Please use the following scales (1=strongly disagree, 2= disagree, 3=neutral, 4= agree, 5= strongly agree) to answer the following perception statements regarding locally produced eggs.

Perception statements about eggs		1	2	3	4	5
c. Preference and purchasing statements						
i.	I prefer buying eggs with thick and strong shell					
ii.	I am willing to pay somewhat more for eggs if they are fresh					
iii.	I am willing to pay somewhat more for eggs if I know of their health benefits					
iv.	I would be willing to buy eggs if they are labelled with nutritional information					
v.	I do not buy eggs because they are expensive					
vi.	The yolk colour of local eggs does not matter to me when am buying eggs					
d. Health, cultural and misconceptions about egg consumption						
i.	I do not consume eggs because of health reasons					
ii.	I have been informed that all eggs contain excessive cholesterol					
iii.	Taking too much egg could block my veins and lead to cardiovascular diseases like stroke					
iv.	Dietary or cholesterol from egg does not increase cholesterol levels in humans					
v.	Eggs are high in dietary cholesterol, so they don't have a place in my heart-healthy diet					
vi.	Consuming several eggs per week is a very healthy part of a balanced diet					
vii.	Eggs are high in protein required by the human body system					
viii.	Eggs are perfect foods particularly for young children because it has all the vitamins and minerals for proper growth and development					
ix.	Eggs are perfect foods particularly for pregnant women because it has all the vitamins and minerals for proper growth and development					
x.	Egg is critical for the health					

xi.	Eggs contain the highest-quality protein on the planet, and are loaded with small amounts of vital nutrients					
xii.	I do not consume eggs because my religion doesn't permit me					
xiii.	Consuming eggs during pregnancy can negatively affect the health of both the pregnant woman and her baby					
xiv.	My culture doesn't permit me to consume eggs					

Section E: Consumers Preferences for Local Poultry Products

42. Which shell colour of local eggs do you prefer?

1. Brownish [] 2. Whitish [] 3. Both []

43. Which yolk colour do you prefer most? 1. Whitish [] 2. Yellowish [] 3. Both []

44. Which size of eggs do you prefer? 1. Small [] 2. Medium [] 3. Large [] 4. Extra-large []

45. Please indicate your most preferred forms you want local poultry products to be processed into. Please use the preferences scale provided to indicate the form you want local poultry products to be sold in (1–not preferred at all, 2–not preferred, 3–neutral, 4–preferred, 5–most preferred)

Chicken cut- portions preferred	Use scale 1 to 5
i. Whole dressed bird	
ii. Chicken nuggets	
iii. Chicken sausages	
iv. Chicken frankfurters	
v. Drum sticks	
vi. Chicken thighs	
vii. Chicken wings	
viii. Chicken livers	
ix. Chicken feet	
x. Gizzards	
xi. Chicken neck	

GPS: Lat..... Long

Team code

Enumerator name.....Enumerator code.....

Appendix 4: Questionnaire for Poultry Households
GHANA POULTRY PROJECT: BASELINE SURVEY
QUESTIONNAIRE FOR POULTRY HOUSEHOLDS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on poultry production in Ghana with the ultimate aim of helping to improve the local poultry sector. Your household has been selected to be part of this study.

I would therefore, want you to assist me with relevant information about the operations of your business. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other person, producer or institution without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed.

Please, do you have any questions for me?

Identifying information

Team code
Enumerator name..... Enumerator code.....
Signature of supervisor/team leader.....
Region: 1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []
District name..... District code.....
Community name..... Community code.....
Name of household head Phone No.....
Name of spouse of household head..... Phone No
Household code..... Questionnaire Number.....
Name of respondent (if different from household head & spouse).....
What is the relationship of household respondent to household head. 1. Child/step child [] 2. Grandparent/grandchild [] 3. Parent 4. In-law [] 5. Other relatives (brother, sister, cousin, etc) [] 6. Other []
Date of interview (DD/MM/YYYY):
Time interview started

Section A: Personal and Household Characteristics

24. Age of respondent (years)
25. Sex of respondent: 1. Male [] 0. Female []
26. Level of formal education: 1. None [] 2. Basic [] 3. Secondary [] 4. Tertiary []
27. Actual number of years of formal education/schooling.....(years)
28. Religion: 1. Christianity [] 2. Muslim [] 3. Traditional [] 4. None []
29. Ethnicity
30. Marital status: 1. Single (never married) [] 2. Married [] 3. Divorced [] 4. Widowed []
31. What is the total number of people in your household?.....
32. What is your household's main source of income? 1. Formal government work [] 2. Formal private work [] 3. Artisan (such as carpenter, mason, etc.) 4. Trading/commerce [] 5. Farming [] 6. Pension benefits [] 7. Other (please specify)
33. What type of production system are you practicing?
1. Battery cage [] 2. Deep litter system [] 3. Free range [] 4. Semi-intensive Others specify..... (*Skip to 12 if answer to 10 is 3 (free range)*)
34. What type of structure are you using?
1. Tiles shed [] 2. Cement/Asbestos Sheet [] 3. Thatched sheds/hut [] 4. Wooden structure [] None []
35. How many birds do you have currently?.....

Disease Control

36. Do you lose your birds often? 1. Yes [] 0. No [] (*If NO, Skip to 16*)
37. If YES, what do you lose your birds to? 1. Diseases [] 2. Predators [] 3. Car/lorry accidents [] 4. Theft [] 5. Others [] (*Skip to 16 if answer is not 1 (disease)*)
38. If diseases, what disease do you suspect? 1. Newcastle [] 2. Gumboro [] 3. Gout [] 4. Coccidiosis [] 5. Weakness and chronic respiratory disorder (CRD) [] 6. Fowl Pox [] 6. Others [] specify..... 7. Don't know []
39. Do you think it's important to vaccinate your birds? 1. Yes [] 0. No []
40. Do you vaccinate your birds? 1. Yes [] 0. No [] (*If No, skip to 23*)
41. If YES, why do you vaccinate your birds?.....
.....
42. If NO, why don't you vaccinate your birds?
43. How often do you vaccinate your birds? 1. Weekly [] 2. Monthly [] 3. Quarterly [] 4. Semi-annually [] 5. Yearly [] 6. Once in more than a year []
44. Do you vaccinate your birds against Newcastle disease? 1. Yes [] 0. No [] (*If No, skip to 22*)
45. What vaccine do you use?
46. Do you deworm your birds? 1. Yes [] 0. No [] (*If No, skip to 25*)
47. If yes, why do you deworm your birds?.....

Disease Outbreak and control

48. Has there been poultry disease outbreak among your birds during the last production year? (*If No skip to 29*) 1. Yes [] 2. No []
49. If **Yes**, indicate the diseases: 1. Newcastle [] 2. Gumboro [] 3. Gout [] 4. Coccidiosis [] 5. Weakness and chronic respiratory disorder (CRD) [] 6. Fowl Pox []
6. Others [] specify.....
50. Did you have access to vaccines/drugs for your birds during this outbreak? 1.
Yes [] 2. No [] (*If No, skip to 29*)
51. What was the main source of vaccine/drugs supply during this outbreak? 1.
Local [] 2. Imported [] 3. Traditional method []
52. How many birds died during the disease outbreak in the last production year?.....

Extension Services

53. Do you receive any extension or veterinary services? (*If No, skip to 32*)
1. Yes [] 2. No []
54. Please complete this table.

Source of technical advice	Did you receive extension or veterinary service from this source? 1=Yes, 2=No (<i>If no skip to next service</i>)	Do you pay for the service? 1= YES and 2 = NO	Frequency of visit within last year.
i. Extension agents			
ii. Veterinary service providers			
iii. More experienced poultry farmer			
iv. NGO			
v. Others specify.....			

55. Do you know of the existence of Community Animal Health Workers (CAHW) in your community? 1. Yes [] 0. No []
56. If Community Animal Health Workers (CAHW) are trained to provide vaccination services to poultry households in your community, would you patronise their services if they are free? 1.
Yes [] 0. No []
57. If Community Animal Health Workers (CAHW) are trained to provide vaccination services to poultry households in your community, would you patronise their services for a small fee? 1.
Yes [] 0. No []

Any other comments

.....

.....

.....

.....

.....

GPS: Lat.....	Long

Time interview ended

Appendix 5: Interview Guide for End Market Users of Poultry Products

GPP GHANA POULTRY PROJECT: BASELINE SURVEY

INTERVIEW GUIDE FOR END MARKET USERS OF POULTRY PRODUCTS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on consumption of local and imported poultry (chicken) products in Ghana with the ultimate aim of helping to improve the poultry sector. Your firm/business/institution has randomly been selected to be part of this study.

I would therefore, want you to assist me with relevant information about your firm/business/institution's consumption, demand and preferences for poultry and/or poultry products. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other party without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed. **Preferably, the instrument is to be answered by either the procurement manager or the one in charge of purchasing poultry products.**

Please, do you have any questions for me?

Screening question

a. Does your firm/business/institution PURCHASE/USE/SELL poultry products (This includes poultry meat, eggs, sausage etc.)? 1. Yes [] 0. No [] (*If NO, ask b and end the interview*).

b. If NO to question 2, please provide reasons why your firm/business/institution does not purchase poultry and/or poultry products

.....
.....
.....

Identifying information

Team code	
Region:	1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []
District name.....	District code.....
Community name.....	Community code.....
End user	1. Hotel [] 2. Restaurants [] 3. School/College [] 4. Super Market [] 5. Cold store [] 6. Other (specify) []
Name of firm/business/institution.....	Phone No.....
Firm/business/institution code.....	Questionnaire Number.....

Name of respondent	Position of respondent.....
Phone No of respondent.....	Phone No of institution
Date of interview (DD/MM/YYYY):	
Time interview started.....	

SECTION A. END-USER BACKGROUND AND PREFERENCES

- How old is your firm/business/institution? (years)
- How often does your firm/business/institution purchase or utilize chicken or chicken products?
1. Daily [] 2. Weekly [] 3. Monthly [] 4. Quarterly [] 5. Semi-annually [] 6. Yearly []
7. At festivities [] 8. Other (specify) []
- Does your firm/business/institution purchase/use/sell local or foreign chicken or both? 1. Local chicken [] 2. Foreign chicken [] 3. Both []
- In which form do you usually purchase poultry meat? 1. Live bird [] 2. Whole dressed bird []
3. Cut portions [] 4. Other Specify.....
- Where does your firm/business/institution usually purchase your poultry products from? (Please tick the option(s) that is/are applicable to your firm/business/institution)

a Source of product	b Poultry meat	c Eggs	d Other poultry products such as sausage, gizzard
i. Open (traditional) market			
ii Supermarket			
iii. Cold stores			
iv. Live bird or egg retailers (not in open markets)			
v. From poultry farms			

- Please indicate the quantities of chicken and chicken products demanded or utilized by your firm/business/institution per a **typical week**. *(Should be asked if end user type is hotel, restaurant, school/college, hospital or other).*

a Chicken products	b Quantities (enter 0 if NONE and skip to next product)	c Units	d Qty of total being	
			imported	local
i. Live bird (Broiler)		Number of birds		
ii. Live bird (Spent layer)		Number of birds		
iii. Whole dressed bird		Kilograms		
iv. Eggs (30 pieces per crate)		Crates		
v. Eggs (18 pieces per crate)		Crates		
vi. Eggs (12 pieces per crate)		Crates		
vii. Eggs (6 pieces per crate)		Crates		
viii. Chicken sausage		Kilograms		
ix. Drum sticks		Kilograms		
x. Chicken thighs		Kilograms		

xi. Chicken wings		Kilograms		
xii. Chicken livers		Kilograms		
xiii. Chicken breast		Kilograms		
xiv. Gizzards		Kilograms		
xv. Chicken neck		Kilograms		

7. Please indicate the quantities of chicken and chicken products demanded or utilized by your firm/business/institution per a **typical week**. *(Should be answered if end user type is supermarket or cold store).*

a Chicken products	b Quantities (enter 0 if NONE and skip to next product)	c Units	d Qty of total being				e Qty SOLD per typical week	How much of..... sold is			
			imported	Unit price	local	Unit price		import ed	Unit price	local	Unit price
i. Live bird (Broiler)		Number of birds									
ii. Live bird (Spent layer)		Number of birds									
iii. Whole dressed bird		Kilograms									
iv. Eggs (30 pieces per crate)		Crates									
v. Eggs (18 pieces per crate)		Crates									
vi. Eggs (12 pieces per crate)		Crates									
vii. Eggs (6 pieces per crate)		Crates									
viii. Chicken sausage		Kilograms									
ix. Drum sticks		Kilograms									
x. Chicken thighs		Kilograms									
xi. Chicken wings		Kilograms									
xii. Chicken livers		Kilograms									
xiii. Chicken breast		Kilograms									
xiv. Gizzards		Kilograms									
xv. Chicken neck		Kilograms									

8. When your firm/business/institution is **purchasing chicken and chicken products** how important are these attributes? Please use the scales provided below to rate the following the attributes (1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important).

Attributes of chicken and chicken products	Please rate using the codes 1-5 above
xx. Appearance/neatness/skin colour	
xxi. Aroma	
xxii. Attractive packaging	
xxiii. Availability	
xxiv. Convenient (ready for use)	
xxv. Origin (whether imported or local)	
xxvi. Existence of expiry date	
xxvii. Fat content	
xviii. FDA certification	

xxix. Freshness	
xxx. Halal method of slaughter	
xxxi. Hygienic shopping environment	
xxxii. Informative product label	
xxiii. Price	
xxiv. Proximity	
xxxv. Taste	
xxvi. Tenderness	
xxvii. Texture	
xviii. Yield (shrinking, or expansion after cooking)	

9. When your firm/business/institution is **purchasing eggs** how important are these attributes? Please use the scales provided below to rate the following the attributes (1=not important at all, 2=not very important, 3=neutral, 4=important, 5=extremely important).

Attributes of eggs	Please rate using the codes 1-5 above
xvi. Availability	
xvii. Egg weight	
xviii. Freshness	
xix. Labelling	
xx. Origin (whether imported or local)	
xxi. Attractive packaging	
xxii. Number of eggs per crate or package	
xxiii. Price	
xxiv. Proximity	
xxv. Shell cleanliness	
xxvi. Shell colour	
xxvii. Shell smoothness	
xviii. Shell soundness (unbroken)	
xxix. Shell thickness	
xxx. Size of egg	
xxxi. Yolk colour	

Section B: End Users Marketing Channels and Linkages

10. Does your firm/business/institution have any agreement or long-term business relationships with poultry producers or farmers to supply poultry products? 1. Yes [] 0. No [] (*If NO, skip to 14*)
11. If YES to question 10, is there a written contract between you and the poultry producers? 1. Yes [] 0. No []
12. If YES to question 11, was the contract based on quality or quantity of chicken products? 1. Quality [] 2. Quantity [] 3. Both []
13. Was the poultry producer able to meet the product specification in the contract? 1. Yes [] 0. No []
14. If NO to question 9, is your firm/business/institution willing to link up with local poultry producers to meet your demand for poultry products? 1. Yes [] 0. No []
15. Please outline the key factors that you think are most likely to lead to success of market linkage or agreement.

.....
.....
.....
.....
.....

16. Which of the following marketing linkages will your firm/business/institution prefer to have with actors along the poultry value chain? Use the scale below (1–not preferred at all, 2–not preferred, 3–neutral, 4–preferred, 5–most preferred)

1. Direct linkage to poultry farmers []
2. Poultry farmers through retailers []
3. Linkage through a leading poultry farmer []
4. Linkages through poultry farmer associations or cooperatives []
5. Linkage through poultry farmers to processors of chicken products []

17. Please outline the key barriers that you think are most likely to hinder the success of this linkage.

.....
.....
.....
.....
.....

GPS: Lat.....	Long
---------------	------------

Time interview ended

Enumerator name	Enumerator code.....
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Firm/business/institution code:.....

Appendix 6: Interview Guide for Financial Institutions

GHANA POULTRY PROJECT: BASELINE SURVEY

INTERVIEW GUIDE FOR FINANCIAL INSTITUTIONS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on poultry production in Ghana with the ultimate aim of helping to improve the local poultry sector. Your institution has been selected to be part of this study because you are an important stakeholder towards the realization of this aim.

I would therefore, want you to assist me with relevant information about the operations of your business. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other person, producer or institution without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed.

Please, do you have any questions for me?

Identifying information

Region:	1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []	
District name.....	District code.....	
Community name.....	Community code.....	
Name of financial institution	Phone No.....	
Name of respondent.....	Phone No	
Financial institution code.....	Interview Guide Number.....	
Contact number of respondent.....		
GPS: Lat.....	Long.....	
Date of interview (DD/MM/YYYY):		
Team code		
Supervisor name.....	Supervisor code.....	

SECTION A: Loan/credit disbursed

1. Do you have any loan/credit facility for the agricultural sector?

1. Yes [] 2. No []

2. If yes, which group of farmers do you offer this facility to? (Please tick all that apply)

1. Food crop farmers [] 2. Tree crop farmers [] 3. Livestock farmers []

3. If livestock farmers, which group do you offer loan/credit facility to?

1. Cattle farmers [] 2. Small ruminants farmers [] 3. Poultry farmers []

4. What percentage of your total loan/credit disbursed last year went to the agricultural sector?
.....%

5. What was the value of loan disbursed to the agricultural sector last year?.....GHS

6. What percentage of your total loan/credit disbursed to the agricultural sector was given to the poultry farmers last year?%

7. What was the value of loan disbursed to the agricultural sector was given to the poultry sector last year?.....GHS

8. What was the interest rate on general loans disbursed last year?.....%

9. What was the interest rate on agricultural loans disbursed last year?.....%

10. How many clients/businesses applied for loan/credit for agricultural purposes?

a. Total.....b. Male-owned.....c. Female
owned.....

11. How many of these loan/credit applications for agricultural purpose was granted?

a. Total.....b. Male-owned.....c. Female
owned.....

12. Was all the amount requested granted to those who applied for loan/credit for agricultural purpose? 1. Yes [] 2. No []

13. Has any of these applicants defaulted in the repayment of loan/credit granted for agricultural purpose? 1. Yes [] 2. No []

14. If yes, how many of the applicants have defaulted?

a. Total.....b. Male-owned.....c. Female
owned.....

15. How many of these applicants were from the poultry sector?

a. Total.....b. Male-owned.....c. Female
owned.....

16. How many of these loan/credit applications for poultry production was granted?

a. Total.....b. Male-owned..... c. Female

owned..... 17. Was all the amount requested granted to those who applied for loan/credit for poultry production? 1. Yes [] 2. No []

18. Have any of these applicants defaulted in the repayment of loan/credit granted for poultry production? 1. Yes [] 2. No []

19. If yes, how many of the applicants have defaulted?

a. Total.....b. Male-owned..... c. Female

owned..... 20. Have there been any loan applications for poultry production this year?

1. Yes [] 2. No []

21. If yes, have all the applications been granted? 1. Yes [] 2. No []

22. If no, how many of these loan applications have not been granted? 1. Yes [] 2. No []

23. If no, why were the loans not granted?

.....

SECTION B: Training

24. Please provide us with the information on training received for the past two years

	Have any of your staff members received training on the following.....? 1= Yes, 2= No	Which year was it done?	Who provided the training? (Code A)	Did you have to pay for the training? 1=Yes 2= No	How many of your staff members received the training?	Which of your staff members received the training? (Code B)	Was the training useful? 1=Yes 2=No
Loan assessment							
Loan management							
Risk management							
Agricultural Lending							
Loan retrieval process							
IT-banking							
Other 1:							
Other 2:							
Other 3:							

Other 4:							
Other 5:							
Code A: 1= Government; 2= International/national NGO; 3= International development agencies (USDA, UN,USAID, etc);4= Bank of Ghana; 5= In-house; 6= Other,specify. Code B: 1= Branch manager; 2= Credit officers/department; 3= Risk manager/department; 4= All Staff members; 5= Others,specify							

SECTION C: Perception on Agricultural lending

25. Please indicate your level of agreement to the following statements regarding agricultural lending

Statement	Strongly Agree (1)	Agree (2)	Somewhat agree (3)	Disagree (4)	Strongly Disagree (5)
Agricultural production is risky					
Farmers lack proper financial management					
Farmers misappropriate funds					
Farmers have high loan default rate					
Farmer population have high illiteracy rate					
Farmers lack proper documentation for collateral					
Farmers have low trust issues					
Farmers have bad loan track					
Farming is not profitable enough to repay loan					

Thank you for your time

Appendix 7: Interview Guide for Veterinary Service Providers

GHANA POULTRY PROJECT: BASELINE SURVEY

INTERVIEW GUIDE FOR VETERINARY SERVICE PROVIDERS

Introduction

My name is I am currently working for the Department of Agricultural Economics, Agribusiness and Extension of KNUST-Kumasi. We are conducting survey on consumption of local and imported poultry (chicken) products in Ghana with the ultimate aim of helping to improve the poultry sector. Your firm/business/institution has randomly been selected to be part of this study.

I would therefore, want you to assist me with relevant information about your firm/business/institution's consumption, demand and preferences for poultry and/or poultry products. **I assure you that any information given to me and the research team will be treated with utmost confidentiality.** At no point will I or any member of the team discuss your identity or the information given with any other party without your consent. Participation is voluntary. However, I will appreciate it very much if you could assist me with the relevant information needed. **Preferably, the instrument is to be answered by either the procurement manager or the one in charge of purchasing poultry products.**

Please, do you have any questions for me?

Identifying information		
Region:	1. Ashanti [] 2. Brong Ahafo [] 3. Greater Accra []	
District name.....	District code.....	
Community name.....	Community code.....	
Name of veterinary service provider	Phone No.....	
Veterinary service provider code.....	Interview Guide Number.....	
Type of veterinary: Private []	Government []	Community based []
Date of interview (DD/MM/YYYY):		
Time Interview Started:.....		
Team code		

SECTION A: Demographic characteristics

58. Age of respondent (years)
59. Gender: 1. Male [] 0. Female []
60. Level of formal education: 1. None [] 2. Basic [] 3. Secondary [] 4. Tertiary []
61. Actual number of years of formal education/schooling.....(years)
62. How long have you been in the veterinary services?.....years.
63. How long have you been providing services to farmers in this community/district?.....years.
64. Do you have license to operate as a veterinary service provider? 1. Yes []
2. No []

SECTION B: Training

Please provide us with information on the training you have received for the past two years

	Have you received training on.....? 1= Yes 2= No	Which year was it organised?	Who provided the training? (Code A)	Did you have to pay for the training? 1= Yes 2= No	If Yes, how much did you pay? (GHS)
Biosecurity					
Animal health					
Animal production					
Animal diseases diagnosis					
Vaccination					
Epidemic control and management					
Animal welfare					
Animal handling					
Prevention of the following diseases					
<i>Corynza</i>					
<i>Infectious Bronchitis</i>					
<i>Coccidiosis</i>					

<i>Egg drop Syndrom</i>					
<i>Avian Influenza</i>					
<i>New Castle</i>					
Other 1					
Other 2					
Other 3					
Code A: 1= Government; 2= International/national NGO; 3= International development agencies (USDA, UN, USAID, etc); 4= World veterinary services; 5= Others, specify					

SECTION C: Constraints

Please rank the following constraints using the following scale: (0 = not a constraint; 1=least severe constraint; 2 = severe constraint; 3 = most severe constraint)

Constraints	Rank
Lack of financial support (eg, subvention, from the GOG	
Insufficient supply of inputs (such drugs, vaccines etc.) necessary for effective operation	
Lack of training on evolving skills and competencies regarding veterinary service	
Inadequate personnel	
Inaccessible livestock farmers	
Lack of transportation system to visits farms	
Frequent disease break out	
Farmers not reporting disease outbreak to VSD/private veterinary service providers	
Inefficient quarantine system	
Smuggling of animals into the country	
High cost of vaccines	
Inadequate supply of vaccines	
Untimely delivery of vaccines	
Inefficient disease management system	
Insufficient cold chain management equipment	
Other 1:	
Other 2:	
Other 3:	

Thank you for your time

GPS: Lat..... Long

Time Interview Ended:.....

Enumerator name Enumerator code.....

Signature of supervisor/team leader.....

Appendix 8: Syntaxes

SYNTAX FOR VARIABLE COST OF PRODUCTS (EGGS AND BIRDS)

USE ALL.

COMPUTE filter_\$=(CostBird_Adjusted > 0).

VARIABLE LABELS filter_\$ 'CostBird_Adjusted > 0 (FILTER)'.
/

VALUE LABELS filter_\$ 0 'Not Selected' 1 'Selected'.
/

FORMATS filter_\$ (f1.0).

FILTER BY filter_\$.

EXECUTE.

MEANS TABLES=HiredWages WageFam TotalProessed_Feed FeedSupplement NC_Medic GUM_Medic
Coc_Medic Endo_Medic Ecto_Medic Anti_Dis_Medic Other_Medic Water Energy Litter Milling ChickTrans
FeedTrans Wmaize Ymaize Soy StarterConc Grow_Conc Fininsher_Conc DOC totalCost CostBird BY Tier

/CELLS COUNT MEAN STDDEV

USE ALL.

COMPUTE filter_\$=(CommStock_Broiler = 0).

VARIABLE LABELS filter_\$ 'CommStock_Broiler = 0 (FILTER)'.
/

VALUE LABELS filter_\$ 0 'Not Selected' 1 'Selected'.
/

FORMATS filter_\$ (f1.0).

FILTER BY filter_\$.

EXECUTE.

MEANS TABLES=CostBird_Adjusted BY Tier

/CELLS COUNT MEAN STDDEV

USE ALL.

COMPUTE filter_\$=(ComStock_Layer = 0).

VARIABLE LABELS filter_\$ 'ComStock_Layer = 0 (FILTER)'.
/

VALUE LABELS filter_\$ 0 'Not Selected' 1 'Selected'.
/

```
FORMATS filter_$ (f1.0).
```

```
FILTER BY filter_$.
```

```
EXECUTE.
```

```
MEANS TABLES=CostBird_Adjusted BY Tier
```

```
/CELLS COUNT MEAN STDDEV
```

```
COMPUTE VC_Egg=CostBird / (CommStock_Eggs*30).  
VARIABLE LABELS VC_Egg 'Variable cost per egg'.  
EXECUTE.
```

```
USE ALL.
```

```
COMPUTE filter_$=(VC_Egg <= 3).  
VARIABLE LABELS filter_$ 'VC_Egg <= 3 (FILTER)'.  
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.  
FORMATS filter_$ (f1.0).  
FILTER BY filter_$.  
EXECUTE.  
MEANS TABLES=VC_Egg BY Tier  
/CELLS MEAN COUNT STDDEV.
```

```
MEANS TABLES= VC_Egg CostBird_Adjusted BY region  
/CELLS MEAN COUNT STDDEV.
```

```
GET
```

```
FILE='C:\Users\Desktop\GPP\Supper markets and cold  
stores.sav'.
```

**## Refer to "Demand and Market Share Data
Extracts.xlsx" columns "KA-KP" of Sheet "MKtShare"
and Columns "AZ-BB" of sheet "Demand" for data
aggregation and extrapolation to monthly figures**

##Demand

```
RECODE Total Import Local (0=SYSMIS).  
EXECUTE.  
MEANS TABLES=Total Import Local BY UserType  
/CELLS COUNT SUM MEAN STDDEV.
```

```
GET
```

```
FILE='C:\Users\Desktop\GPP\Supper markets and cold  
stores.sav'.
```

##Market Share

```
RECODE TotalQuantityPurc QtyIMP PurcPriceIMP QtyLoc PurcPriceLoc QtySold  
QtySoldImport Sales_PriceIMP QtySoldLOCort Sales_PriceLOC PurchCostIMP  
PurcCOSTLOC Sales_ValIMP Sales_ValLoc Products (0=SYSMIS).  
EXECUTE.
```

```
MEANS TABLES=TotalQuantityPurc QtyIMP QtyLoc QtySold QtySoldImport QtySoldLOCort  
BY UserType  
/CELLS MEAN COUNT STDDEV.
```

```
MEANS TABLES=TotalQuantityPurc QtyIMP QtyLoc QtySold QtySoldImport QtySoldLOCort  
BY UserType  
/CELLS MEAN COUNT STDDEV.
```

```
MEANS TABLES=PurchCostIMP Sales_ValIMP PurcCOSTLOC Sales_ValLoc BY UserType  
/CELLS COUNT SUM MEAN STDDEV.
```

##Policy interventions

```
GET  
FILE='C:\Users\Desktop\GPP\GPP_Gov Policy_Knowledge_Practs and  
Contraints.sav'.
```

```
MULT RESPONSE GROUPS=$Govt_Policy_Interventions 'Government and Policy  
interventions' (dev_board maize_resale vet_care funding ext_tarrif (1))  
/FREQUENCIES=$Govt_Policy_Interventions.
```

##Trainings Received

```
MULT RESPONSE GROUPS=$UsefulnessTranining 'Usefulness of training received'  
(ipp_useful ippps_useful financialplanningandmanagement_useful  
cashflowpreparation_useful balancesheetpreparation_useful  
incomestatementpreparation_useful feedformulation_useful docmanagement_useful  
pricesetting_useful eggpackaging_useful poultryprocessing_useful  
poultrypackaging_useful labelling_useful storage_useful distribution_useful  
flockdensity_useful (1,5))  
/FREQUENCIES=$UsefulnessTranining.
```

```
RECODE IPP_Useful (1=1) INTO NotUsefulIPP.  
VARIABLE LABELS NotUsefulIPP 'Not useful'.  
EXECUTE.  
RECODE IPP_Useful (1=1) INTO NotUsefulIPP.  
VARIABLE LABELS NotUsefulIPP 'Not useful'.  
RECODE IPP_Useful (2=1) INTO SomeUsefulIPP.  
VARIABLE LABELS SomeUsefulIPP 'Somewhat useful'.  
RECODE IPP_Useful (3=1) INTO UsefulIPP.  
VARIABLE LABELS UsefulIPP 'Useful'.  
RECODE IPP_Useful (1=1) INTO VeryUsefulIPP.  
VARIABLE LABELS VeryUsefulIPP 'Very useful'.  
EXECUTE.
```

```

DESCRIPTIVES VARIABLES=IPP_Useful IPPPs_Useful
FINANCIALPLANNINGANDMANAGEMENT_Useful Vaccination_Useful ComputerGPS_Useful
BussinessPlanDev_Useful CashFlowPreparation_Useful
BalanceSheetPreparation_Useful IncomeStatementPreparation_Useful
FeedFormulation_Useful DOCmanagement_Useful PriceSetting_Useful
EggPackaging_Useful PoultryProcessing_Useful PoultryPackaging_Useful
Labelling_Useful Storage_Useful Distribution_Useful FlockDensity_Useful
/STATISTICS=MEAN STDDEV MIN MAX.

```

```

FREQUENCIES VARIABLES=IPP_Useful IPPPs_Useful OrgRecKeeps_Useful
FINANCIALPLANNINGANDMANAGEMENT_Useful Vaccination_Useful ComputerGPS_Useful
BussinessPlanDev_Useful CashFlowPreparation_Useful
BalanceSheetPreparation_Useful IncomeStatementPreparation_Useful
FeedFormulation_Useful DOCmanagement_Useful PriceSetting_Useful
EggPackaging_Useful PoultryProcessing_Useful PoultryPackaging_Useful
Labelling_Useful Storage_Useful Distribution_Useful FlockDensity_Useful
/ORDER=ANALYSIS.

```

Knowledge of improved practices

```

MULT RESPONSE GROUPS=$KnowledgeImproved "Farmers' knowledge if improved
practices" (doc_only control_movmnt provide_shower provide_wash disinfectant
thorough_clean good_nutrition rec_vaccine suitable_prevent good_quality_diet
accurate_weighing fresh_ingredients no_mouldy_food specific_ingredient
record_activities (0))
/FREQUENCIES=$KnowledgeImproved.

```

##Severity of constraints (Frequency distribution)

```

FREQUENCIES VARIABLES=constraints_input_constraints_doc_high_cost
constraints_input_constraints_lack_quality_doc
constraints_input_constraints_high_feed_cost
constraints_input_constraints_low_quality_feed
constraints_input_constraints_high_medication
constraints_input_constraints_transp_input
constraints_input_constraints_lack_credit
constraints_input_constraints_high_interest
constraints_input_constraints_power_short
constraints_prod_constraints_inad_training
constraints_prod_constraints_lack_infra_tech
constraints_prod_constraints_inad_capa_build
constraints_prod_constraints_disease_out
constraints_market_constraints_low_price_poult
constraints_market_constraints_cheap_import
constraints_market_constraints_low_demand
constraints_policy_constraints_incon_policies
constraints_policy_constraints_lack_support
constraints_policy_constraints_trade_liberal
/ORDER=ANALYSIS.

```

##Severity of constraints (Mean scores)

```

DESCRIPTIVES VARIABLES=constraints_input_constraints_doc_high_cost
constraints_input_constraints_lack_quality_doc
constraints_input_constraints_high_feed_cost
constraints_input_constraints_low_quality_feed
constraints_input_constraints_high_medication

```

constraints_input_constraints_transp_input
constraints_input_constraints_lack_credit
constraints_input_constraints_high_interest
constraints_input_constraints_power_short
constraints_prod_constraints_inad_training
constraints_prod_constraints_lack_infra_tech
constraints_prod_constraints_inad_capa_build
constraints_prod_constraints_disease_out
constraints_market_constraints_low_price_poult
constraints_market_constraints_cheap_import
constraints_market_constraints_low_demand
constraints_policy_constraints_incon_policies
constraints_policy_constraints_lack_support
constraints_policy_constraints_trade_liberal
/STATISTICS=MEAN STDDEV MIN MAX.

Appendix 9: Map of poultry farms visited

POULTRY PRODUCERS BY REGION

2015 Stock by farmname, and Region Name

