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Ghana's Poultry Sector Value Chains and the Impacts of HPAI

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PREFACE

Since its re-emergence, highly pathogenic avian influenza (HPAI) H5N1 has attracted considerable public and media attention because the viruses involved have been shown to be capable of producing fatal disease in humans. While there is fear that the virus may mutate into a strain capable of sustained human-to-human transmission, the greatest impact to date has been on the highly diverse poultry industries in affected countries. In response to this, HPAI control measures have so far focused on implementing prevention and eradication measures in poultry populations, with more than 175 million birds culled in Southeast Asia alone.

Until now, significantly less emphasis has been placed on assessing the efficacy of risk reduction measures, including their effects on the livelihoods of smallholder farmers and their families. In order to improve local and global capacity for evidence-based decision-making on the control of HPAI (and other diseases with epidemic potential), which inevitably has major social and economic impacts, the UK Department for International Development (DFID) has agreed to fund a collaborative, multidisciplinary HPAI research project for Southeast Asia and Africa.

The specific purpose of the project is to aid decision-makers in developing evidence-based, pro-poor HPAI control measures at national and international levels. These control measures should not only be cost-effective and efficient in reducing disease risk, but also protect and enhance livelihoods, particularly those of smallholder producers in developing countries, who are and will remain the majority of livestock producers in these countries for some time to come.

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More information

For more information about the project please refer to www.hpai-research.net.

ABBREVIATIONS

ARI	Animal Research Institute
DFID	Department for International Development
DOC	Day-old chicks
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
FASDEP	Food and Agricultural Sector Development Programme
FGD	Focus group discussion
GAPFA	Greater Accra Poultry Farmers Association
GFP	Gees Fresh Point Ltd.
GHS	Ghanaian Cedi
GTZ	German Technical Cooperation
HPAI	Highly pathogenic avian influenza
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
KMA	Kumasi Metropolitan Assembly
MoFA	Ministry of Food and Agriculture
MT	Metric tonne
NGO	Non-governmental organization
USAID	United States Agency for International Development
VAT	Value-added tax
VSD	Veterinary Services Department

EXECUTIVE SUMMARY

Outbreaks of HPAI in poultry have serious implications for food security, employment, and cash income for farmers including smallholders and other stakeholders. The 2007 outbreak of HPAI in Ghana had a multitude of impacts on the livelihoods of poultry farmers and other actors in the poultry sector that have not been fully analyzed. Moreover, the socio-economic dimensions of the marketing and distributional channels for poultry that potentially influence risk and disease spread have not been fully examined as well. In this context, the structure of the various poultry value chains present in Ghana were analysed so as to better understand the different impacts of the disease, identify potential bottlenecks in the chain that might prevent effective HPAI control efforts, assess incentives different actors have to control (or not to control) HPAI, and constraints and opportunities that might enable better HPAI-related management or policy change. Four sites, Accra/Tema (Greater Accra region), Kumasi (Ashanti region), Dormaa Ahenkro/Sunyani (Brong-Ahafo region), and Tamale (Northern region) were selected for the study. Accra/Tema, Kumasi and Dormaa-Ahenkro/Sunyani are the major centres for commercial poultry production in Ghana that depend on exotic breeds of chickens to meet urban demand, while Kumasi accounts for the largest stock of industrial poultry production in the country.

Value chains for poultry products in Ghana have a distinct regional dimension. In Kumasi, layer chains are relatively short, with limited roles for intermediaries such as traders and brokers. Rather, here there is significantly more vertical organization among large-scale producers, not surprisingly given the greater emphasis on industrial production in this region. In Dormaa/Sunyani, by contrast, collectors play a more important role. Governance relationships are largely a mix of *ad hoc* and relational forms of transaction, though some informal forms of contracting exist, particularly in Kumasi and Dormaa/Sunyani layer chains and often at specific times of the year. Associations exist in many of the different chains at different nodes (e.g. among producers and traders), but play a relatively limited coordinating role in terms of marketing, and their ability to be usefully leveraged in the wake of HPAI outbreaks is unclear. An overarching characteristic in all of the value chains selected was the extreme seasonality exhibited in terms of volumes traded. During festive periods (e.g. Eid, Christmas, and Easter), traded volumes are often 6 to 10 times greater than normal, suggesting that the timing of an outbreak can have critical effects on its impacts. In the case of the 2007 outbreak, the fact that it occurred after Easter when prices and volumes were beginning to decline likely mitigated its overall impact somewhat.

The main critical control point for HPAI risk along the poultry value chain was identified by respondents as being at the farm level, although this varies considerably depending on the system examined. Most commercial poultry producers in Ghana use a deep litter production system, obtain their feed supply from feed millers and other poultry producers who operate their own feed mills, and receive a number of traders who are the major purchasers of the products (eggs, broilers and spent layers) on the farms. In such systems, biosecurity tends to be much higher and incentives among actors in this type of chain more aligned towards protecting investments made in their poultry investments. As part of their biosecurity measures, commercial operators may have baths for disinfecting the feet of people entering the facility and, in some cases, vehicles entering the poultry houses. There are considerable variations in the management of the waste from the commercial poultry houses: the wastes may be released (sold) to crop farmers, used on their own crop fields,

dumped outside the poultry farm or burnt. At the same time, while biosecurity at the commercial producer level is often quite high, risks for disease spread increase downstream. Collectors of birds from commercial farms are known to sometimes mix the same species of birds from different farms, while bio-secure storage at the retail level is generally unknown. Incursions of disease in the distribution side of the chain could have important ramifications on the commercial sector in spite of heightened biosecurity efforts from their side.

By contrast, producers of traditional birds (backyard poultry) practice a free-range system, whereby the birds are housed in pens (brooder hens are kept in locally made cages) and are released to scavenge for food; their diets are supplemented with cereals purchased from the market. Further downstream in the chain, the management practices of traders of live birds at the market place play a role in the risk of HPAI disease outbreak in Ghana. When they are constrained by the number of cages available, traders mix the birds at purchasing and selling points. Their biosecurity measures taken include culling out of sick birds and cleaning each morning before the business begins. Some traders empty the waste from the birds into dustbin located in the market or send it to a refuse dump.

The HPAI outbreak had sharp effects on markets for poultry products. In live-bird markets, prices fell around 20% in Kumasi to around 30% in Dormaa-Ahenkro/Sunyani, with prices in Tamale falling within that range. Sales volumes fell by significantly more, with producers in Kumasi experiencing a 50% reduction in sales and collectors a reduction of 60–70%. In Dormaa-Ahenkro/Sunyani, retailers reported a decline in live-bird sales of over 30%. In the egg sector, price effects were more muted in Kumasi, where prices did not change much, while in the Dormaa-Ahenkro/Sunyani study area, prices for eggs fell by around 20%. At the same time, sales volumes for eggs plummeted by 50% in Kumasi and from 25–80% in Dormaa depending on the actor involved. Interregional trade restrictions and movement permit requirements made the trade in eggs particularly difficult.

The HPAI outbreak had some negative effects on livelihoods of most actors. Farmers in the Dormaa-Ahenkro/Sunyani and Accra/Tema/Ashiaman study areas experienced the temporary suspension of their poultry business, forcing them to temporarily idle some of their farm workers and reduce household expenditure. Retailers of live birds in the Dormaa-Ahenkro/Sunyani, Kumasi, and Accra/Tema/Ashiaman study areas temporarily ceased operations and shifted to other businesses in order to survive the effects of the outbreak. Retailers of live birds in the Kumasi study area also relied on their savings and assistance from others (friends, spouse, and relatives) to survive. Poultry traders in the Dormaa-Ahenkro/Sunyani study area sold some assets and reduced household expenditures on food, reduced their attendance in social events (and therefore reduced social expenditures), delayed payments of school fees for their children, and relied on remittances in order to survive the effects of the HPAI outbreak. Retailers of eggs and dressed (frozen) birds in the Tamale study area were compensated with increased sales incomes from frozen fish, demand for which increased during the outbreak. Similarly, processors (e.g. kebab sellers) and poultry shop operators coped with the effects of the outbreak by selling more roasted beef, mutton, and frozen fish.

Recognizing the importance of the poultry sector to the Ghanaian economy, measures had been put in place prior to the outbreak of the disease in 2007 by the Ministry of Food and Agriculture (MoFA) and other stakeholders to prevent and then contain an outbreak. In 2005, a National Avian Influenza Surveillance Team had already been formed and a public education programme implemented. Bans

were placed on imports of poultry and its products from countries where known HPAI outbreaks had been reported. In 2006, the task force for the Dormaa-Ahenkro District in Brong-Ahafo, a major poultry production centre, seized and destroyed 4326 crates of eggs believed to have been smuggled in from neighbouring Côte d'Ivoire.

When the outbreak occurred, officials from the Veterinary Services Department (VSD) educated stakeholders on safety and biosecurity measures to prevent the spread of HPAI. Public education was provided by the state authorities through the media and through the printing of literature, hand bills and fact sheets on the disease, its effects, causes, and prevention, and how to handle poultry products safely before consuming. Farmers and traders were educated on the causes, the effects, and how to deal with the disease. Biosecurity practices were established and enforced during the outbreak period, but these were not accompanied by other incentives for the farms. According to commercial poultry producers interviewed, the measures were supposed to be part of normal operational practices which were not being followed by the farms. However, their enforcement had implications for the farms' operational costs, but had little tangible impact on the perceived added benefits received from such measures.

The nature of response needs to more adequately address the chain as an entity rather than specific nodes within it. Compensation was an important part of the response during the 2007 outbreak, but was targeted solely at the producer level, despite widespread market dislocations occurring among traders, processors, and retailers as well. As such actors can further accentuate disease spread (and be active participants in its control), addressing the negative impacts on downstream actors is of prime importance. In addition, greater streamlining of the implementation of biosecurity measures across the different chains needs to be addressed. While in-depth assessment of these costs was not available in this study, anecdotal evidence suggests these could impose significant burdens on some chain actors, particularly in the traditional sector. Addressing these constraints will be important, particularly given the potential risks emerging from this sector.

1. INTRODUCTION

1.1 Study motivation

The livestock/poultry component of Ghana's agricultural sector serves as a safety net, providing an important source of ready cash for emergency needs (MoFA/DFID 2002). Even though livestock and poultry contribute only 7% to the agricultural gross national product (Food and Agricultural Sector Development Programme [FASDEP] 2002), their role in rural livelihoods and food and nutrition security is much larger (Aning et al. 2008). The poultry sector provides substantial support to rural households (Aboe et al. 2006b), creating employment opportunities for a large number of households. The average number of labourers employed (including family, permanent and casual labour) by a commercial poultry farm included in a study by Mensah-Bonsu (2008) was about 7 persons in 2006 and 2007 and 8 persons in 2008. The poultry sector is an important domestic source of meat, contributing 25% (same as cattle) of the total domestic meat production between 2000 and 2004 (Aning et al. 2008). Even though there has not been an accurate poultry census in the country since 1996, the estimated population at risk for HPAI H5N1 infection is about 35 million birds combined from both the traditional and commercial poultry sectors (Akunzule 2008).

Outbreaks of HPAI H5N1 in poultry have serious implications for food security, employment, and cash income for farmers, including smallholders, as well as other stakeholders. The outbreak of HPAI in 2007 affected the livelihoods of poultry farmers (both large and smallholders) and other stakeholders of the industry in Ghana. Recognizing the importance of the poultry sector to the Ghanaian economy, measures were put in place prior to the outbreak of the disease in 2007 by the MoFA and other stakeholders to prevent and then contain an eventual outbreak. In 2005, a National Avian Influenza Surveillance Team was formed and a public education programme implemented. Bans were placed on imports of poultry and its products from countries where known cases of HPAI outbreaks had been reported. In 2006, the task force for the Dormaa-Ahenkro District in Brong-Ahafo, a major poultry production centre, seized and destroyed 4326 crates of eggs believed to have been smuggled in from neighbouring Côte d'Ivoire.

The aim of the present study is to conduct a qualitative value chain analysis to support the qualitative risk assessment of the introduction and/or transmission of HPAI in Ghana and thereby provide recommendations on chain-level interventions for HPAI.

1.2 Methodology and approach

The study identifies specific value chains and describes for each chain the sourcing of inputs, technologies used, market agents, value-adding opportunities, mechanisms for information flow within the value chain, key supporting services (transportation etc.), transaction and payment mechanisms used, and the importance of each segment to the local economy.

The project report outlines the structure of the value chain and identifies potential bottlenecks in the chain that might militate against HPAI control efforts. Basic analyses of costs and margins are undertaken as indicators of value addition. The constraints and opportunities that might enable HPAI-related management or policy change are identified. The value chain study further highlights the key risk pathways and their relevant socio-economic context for HPAI in Ghana. The study also

attempts to estimate the cost of control and prevention measures used by key actors to mitigate the risk of HPAI (for example, cost of biosecurity measures).

The value chain study conducted a qualitative value chain analysis, using existing secondary data as well as targeted primary data obtained from the administration of semi-structured survey instruments to characterize the poultry value chain. The value chain analysis was closely associated with a companion risk assessment being implemented in parallel, to jointly identify the interactions between risk pathways and the socio-economic linkages that may accentuate risk in Ghana.

1.3 Data

Survey instruments used in primary data collection were designed and finalized in collaboration with the project team and adapted as needed to suit the context of Ghana. Semi-structured questions were developed for the different actors of the poultry sector, including producers, traders, transporters, processors, and feed millers. Four sites—Accra Accra/Tema (Greater Accra region), Kumasi (Ashanti region), Dormaa Ahenkro/Sunyani (Brong-Ahafo region) and Tamale (Northern region)—were selected for the study. Accra/Tema, Kumasi and Dormaa-Ahenkro/Sunyani are the major commercial poultry production centres in Ghana that depend on exotic breed chickens to supply the larger urban markets. Historically, Kumasi accounts for the largest stock of industrial poultry production in the country (Akunzule 2008). These areas therefore provide collection points where agents stockpile poultry products for distribution throughout the country and for export. According to Akunzule (2008), egg collection points in Kumasi and Accra have existed for over 25 years and there are women egg seller associations at these two markets. The production and distribution of local poultry (e.g. local chicken and guinea fowl) are concentrated in the three regions in the north, namely Northern, Upper East and Upper West Regions. Tamale, which is the capital for the Northern Region, is a major production and market centre for local poultry, hence its selection. The actors included in the survey and how they were selected from each of the four different sites are presented in Table 1.1.

Table 1.1. Actors interviewed and sampling techniques

a. Dormaa/Sunyani Site

Actors interviewed	Sampling technique	Number of actors interviewed		
		Dormaa Ahenkro	Sunyani	Total
Feed millers	Purposive	2		2
Poultry shop	Availability		1	1
Traditional (traders)	Purposive		2	2
Transporters	Availability	2		2
Retailers (live-bird)	Purposive	1	5	6
Commercial layer	Simple random	6		6
Wholesalers in eggs	Simple random		3	3
Egg collectors	Simple random	2		2
Focus group discussion	Group	1 (6 in a group)		1
Transborder risk assessment	Availability	1		1
TOTAL				26

b. Kumasi Site

Actors interviewed	Method of sampling	Number of actors interviewed
Feed millers	Purposive	1
Poultry shop	Available	1
Traditional (traders)	Purposive	2
Transporters	Available	4
Retailers (live-bird)	Simple random	6
Commercial layer	Simple random	3
Wholesalers of live birds	Simple random	2
Collectors	Available	2
Focus group discussion	Group	1 (8 in a group)
Hatchery operator	Available	1
Commercial broiler	Available	2
Processors	Available	Market place (6) Outside market place (2)
Transborder risk assessment	Availability	1
Total		34

c. Accra/Ashiaman/Tema Site

Actors interviewed	Sampling technique	Number of actors interviewed		
		Accra	Ashiaman/Tema	TOTAL
Breeders/hatchery	Availability		1	1
Feed millers	Purposive	2		2
Poultry shop	Availability		1	1
Transporters	Availability	2		2
Retailers (live-bird)/processors	Simple random		2	2
Commercial layer farmers	Simple random	2	4	6
Commercial broiler farmers	Purposive	1	2	3
Egg retailers	Simple random	2	3	5
TOTAL				22

d. Tamale Site

Actors interviewed	Method of sampling	Number of actors interviewed
Hatchery operator	Purposive	1
Feed millers		
Poultry shop	Availability	1
Traditional (traders)	Simple random	3
Transporters		
Retailers	Simple random	4
Commercial layer/broiler farmers	Purposive	3
Local poultry producers		
Traders/wholesalers		
Itinerant traders	Availability	1
Collectors	Simple random	2
Focus group discussion	Small-scale producer groups (10, 15 and 12)	3
Processors	Purposive	4
Total		22

2. SECTOR-LEVEL POULTRY CHAINS

2.1 Identification of actors

The major actors in the poultry sector in Ghana include importers, breeders and hatchery operators, support service providers, producers, traders, and users of poultry products. Also, local government authorities (i.e. district assemblies) serve as an actor. Figure 2.1 illustrates linkages between actors in the poultry sector.

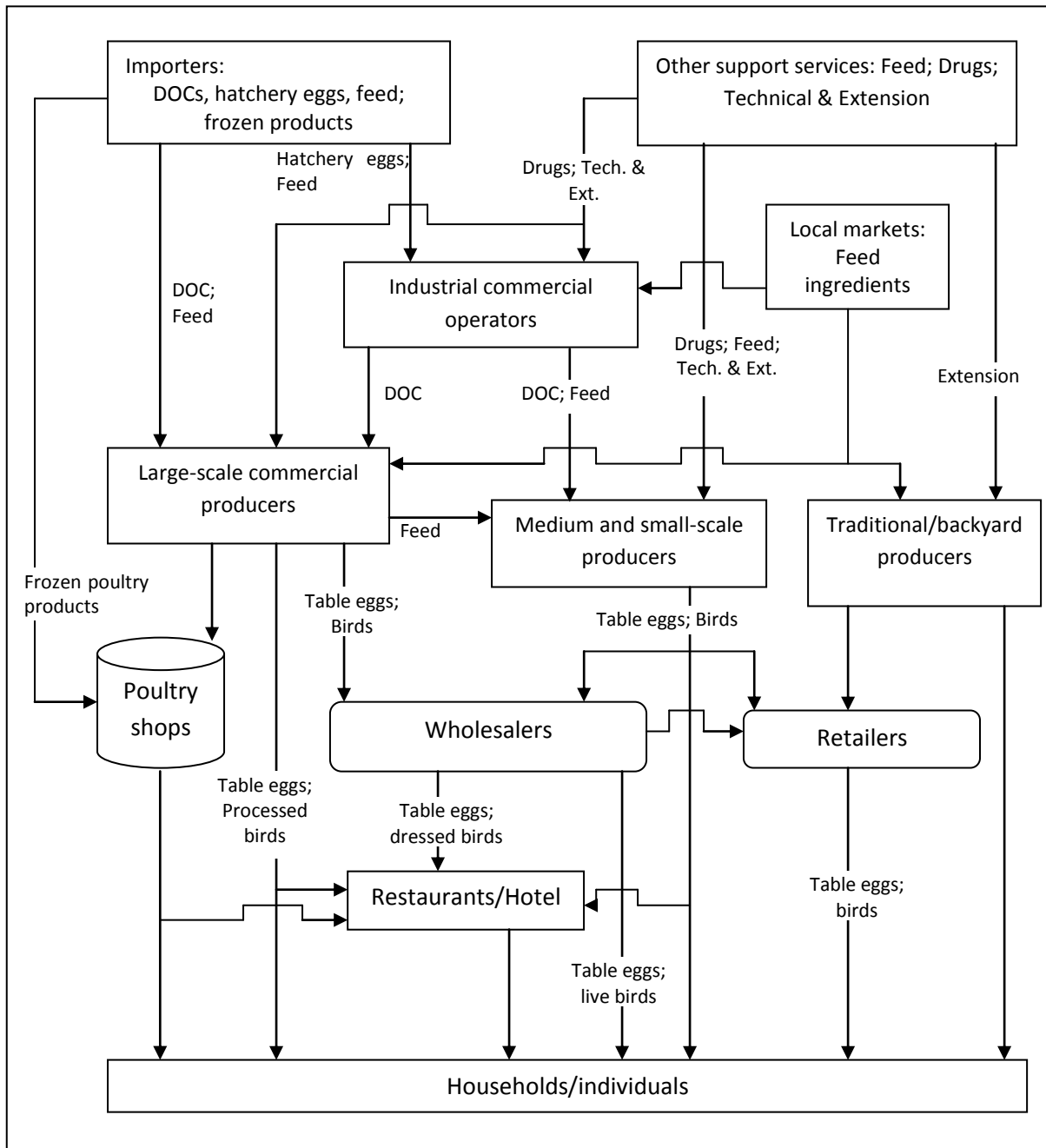


Figure 2.1. Linkages between poultry sector actors in Ghana

Importers

Importers consist of three categories: live-bird (broiler, layer and parent stock day-old chicks [DOC]), hatching-egg, and frozen-chicken-meat and poultry-product importers. Imports of DOC and hatching eggs come by air from the European Union and the United States of America through the Kotoka International Airport in Accra and are sold mainly to commercial poultry farmers. Poultry products imported are distributed nationwide through well organized cold chains in the cities and larger towns.

Breeders and hatchery operators

Available records suggest that eight (8) large industrial commercial units (six in Ashanti Region and two in Greater Accra Region) keep parent stock (Akunzule 2008; Aning et al. 2008). Breeding farms are limited to parent stock for both layer and broiler chickens. There is one site for turkey parent stock which is located in Ashanti Region (Aning et al. 2008).

The main hatcheries in operation are located in Accra and Kumasi. According to Aning et al. (2008), due to low demand, only six operators were active in 2008 out of 17 hatchery operators that had been active in 2005. The active ones in 2008 are those that operate parent stock farms and produce at between 10 and 25% of their installed capacity for the hatchery.

Support services providers

Support service providers include feed millers, poultry drug sellers and Veterinary Officers. Feed millers are concentrated in the Greater Accra, Brong-Ahafo and Ashanti Regions, where most of the commercial poultry production occurs. About 65% of the commercial feed mills are integrated, producing for their own farms. Commercial feed mill operators produce at between 13 to 90% of their installed capacity (*ibid.*) Only one actor (Akate Farms) produced at 100% of its 5.90 metric ton (MT) capacity and a total of 62,325 MT of all types of poultry feed was prepared by 16 operators in 2006, an average of 3895 MT per operator, according to Aning et al. (2008). Commercial feed millers number less than 100.

The main input providers for veterinary drugs are Multivet Ltd, Frankatson Ltd, Reisis and Co. Ltd and Agrovets Ltd. DOC were also imported into the country by these companies. Veterinary officers (in both the private and public sectors) provide regulatory, technical, and extension services to the poultry sector. Veterinarians in the poultry-producing areas of the country have considerable experience in the diagnosis and control of poultry diseases (*ibid.*). Input providers for feed, DOC, drugs and equipment play an insignificant role in the value chain for local poultry and eggs (Akunzule 2008). Most producers and marketers depend on transporters to transport their poultry items. Larger commercial farms have vehicles for the transportation of feed, birds and other items.

Producers

Domestic producers of poultry products include commercial and backyard poultry keepers. Commercial poultry producers can be classified into three categories: large-scale, medium-scale, and small-scale farms according to installed capacity, marketing system and level of integration of operations. Large-scale farms are those with an installed capacity of over 10,000 birds, operating their own feed mills with at least a one-ton mixer and hammer mill, and maintaining at least 5 permanent workers registered with the Social Security and National Insurance Trust of Ghana (Aning et al. 2008). Medium-scale commercial poultry farmers have installed capacities of between 1000

and 5000 birds, while small-scale farms have less than 500 birds. Both medium- and small-scale producers rely on large-scale integrated farms for their DOC and feed, though they also obtain feed from other sources. Commercial producers produce largely table eggs and meat (from broilers and spent layers) for the market. Some small-scale and most medium- and large-scale broiler producers process their birds for sale as frozen whole birds. Also, some producers, particularly small- and medium-scale producers, retail part of the products directly to users (consumers). Commercial poultry (broiler and layer) producers number less than 10,000.

Backyard poultry keepers comprise traditional village poultry producers of chickens, guinea fowl, ducks, turkeys, and doves that are raised mainly to supplement incomes and for meat and eggs. The backyard system of poultry production is characterized by low levels of feeding and housing inputs. The birds are mainly scavengers, but are sometimes given supplementary feed. The average flock size of birds kept by backyard producers is about 17, with a range of 17–54, but may be as high as 100 birds (Aboe et al. 2006a).

Traders

Traders in poultry products, namely live birds and table eggs, can be categorized into wholesalers and retailers. Wholesalers gather table eggs from the main producing centres and distribute them across the country. Retailers buy from wholesalers and farmers and sell in smaller quantities. Some wholesalers also act as retailers and sell in small quantities (e.g. one crate of table eggs).

The main retailers of eggs to consumers, according to Akunzule (2008) are:

- Tea sellers, whose locations are in all lorry parks and business centres of the cities;
- Boiled egg sellers, who boil eggs and sell at lorry parks and along busy roads;
- Grocery shops, which sell fresh eggs in crates or individually to consumers;
- Market women, who buy from wholesalers, and sell products to tea sellers, boiled egg sellers, grocery shops, and consumers.

Consumers of poultry products

Consumers of poultry products include industrial consumers (chop bars/hotels/restaurants/khebab operators) and individual household consumers. The industrial consumer, depending on the size of the business, purchases either table eggs or birds in larger quantities (about 5 or more crate of eggs; and 3 or more birds) mostly from wholesalers, and in other cases from a major retailer and the farm directly. Individual household consumers normally purchase in smaller units, about a crate or less than a crate of eggs and 1 to 3 birds, mostly from retailers, but in a few cases from either a wholesaler or the farm directly.

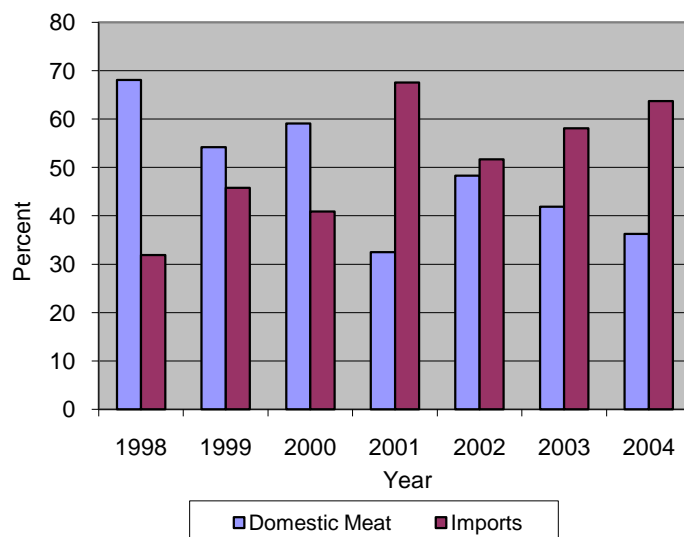
Ghanaians generally prefer their chicken fresh (slaughtered and eaten the same day), preferably slaughtered in the home. This is mostly the case during festivities such as at Christmas and Easter as well as at funerals and child-naming ceremonies. The bird(s) purchased by a consumer may be slaughtered and dressed for them at the market or taken home and slaughtered later. The types of birds sold in live-bird markets depend on their location and nature. For instance, while urban live-bird markets sell predominantly spent layers, broilers, and cockerels to consumers, markets at the village level sell mainly local birds and guinea fowl to consumers. Limited quantities of local birds are sold in urban live-bird markets. Consumers of frozen imported chicken are mainly city dwellers (*ibid.*), who generally fall in higher income brackets than rural dwellers.

2.2 Identification of product flows

Trade in poultry and poultry products

Local and international trade in poultry and poultry products are major economic activities in Ghana. Akunzule (2008) describes the flow of poultry and poultry products in Ghana. Local trade in poultry and poultry products are mainly in live birds and table eggs. Live-bird trade is conducted largely through live-bird markets located in rural and urban cities. Limited quantities of live birds are imported into Ghana from Burkina Faso through the cities of Paga, Bongo and Bolgatanga (*ibid.*). The trade in eggs takes place in all shopping centres, with main collection points from poultry farms at railway or lorry parks in Accra, Kumasi, Cape Coast, Takoradi, Koforidua and Sunyani. Taxis, vans and pick-up trucks are the main transport systems for movement of eggs and live birds within and from market to market (*ibid.*). These types of transport have no cold storage systems. Live birds and table eggs are transported from producers to live-bird markets by road.

International trade in poultry products is mainly in the form of imports of DOC, hatching eggs, and frozen poultry meat from the European Union and the United States of America. A total of 66,791 tonnes of poultry meat was imported into Ghana in 2007 (*ibid.*). DOC and hatching eggs are imported by air through the international airport in Accra, while frozen poultry products are imported by sea through the Tema and Takoradi harbours. Over the period 1998–2004, the imported supply of poultry products generally increased while the domestic supply decreased (Figure 2.2). The import volume of poultry products was about 52% of domestic supply in 2002, increased to 58% in 2003 and 64% in 2004, and averaged about 56% of the total poultry meat supplied in the Ghanaian economy over the period 2000–2004.



Source: Mensah-Bonsu, 2005

Figure 2.2. Supply of poultry (exotic breeds) products (percent)

Parent stock/hatchery

Eight of the large industrial commercial units (only 2% of 380 farms) keep parent stock and import parent DOC or hatching eggs. Those farms that keep parent stock include Darko Farms Ltd, Akate Farms Ltd, Mfum Farms Ltd, Topman Farms Ltd, Besease Farms Ltd and Jerusalem Investments Ltd in

Kumasi and Afariwa Farms and Livestock Ltd and Afrigem Consult Ltd in Accra. A number of hatcheries exist in Ghana, producing and distributing layer and broiler DOC to poultry farms.

Table 2.1 presents volumes of DOC and hatching eggs imported between 2005 and 2007. Imports of hatching eggs increased markedly from 131,736 eggs in 2005 to 784,620 eggs in 2007. The quantities of DOC also increased to a less degree between 2005 and 2007, though the imported quantity of layer DOC dropped sharply, by nearly 73%, in 2006.

Table 2.1. Importation of DOC and hatching eggs, 2005–2007

Year	Day-old Chicks			Hatching Eggs	
	Broiler	Layer	Parent Stock	Broiler	Layer
2005	247,116	2,467,283	5,960	110,136	21,600
2006	286,402	669,661	69,067	239,160	191,160
2007	490,405	2,469,537	27,696	574,080	210,540

Source: Veterinary Services Directorate (2007), adapted from Akunzule (2008)

Markets exist for each of the two main products in the poultry sector: the live-bird market and the egg market.

Live-bird markets

There are a number of live-bird markets in major cities and towns in the country. Live-bird markets handle between 10 and 500 birds in a day (Akunzule 2008). Each regional capital has a large live-bird market which operates daily. Live-bird traders buy directly from large-scale farmers and they operate on a daily basis at designated points, while small-scale poultry farmers may take their birds to sell in the markets, particularly on market days and during festive periods (e.g. Christmas and Easter seasons).

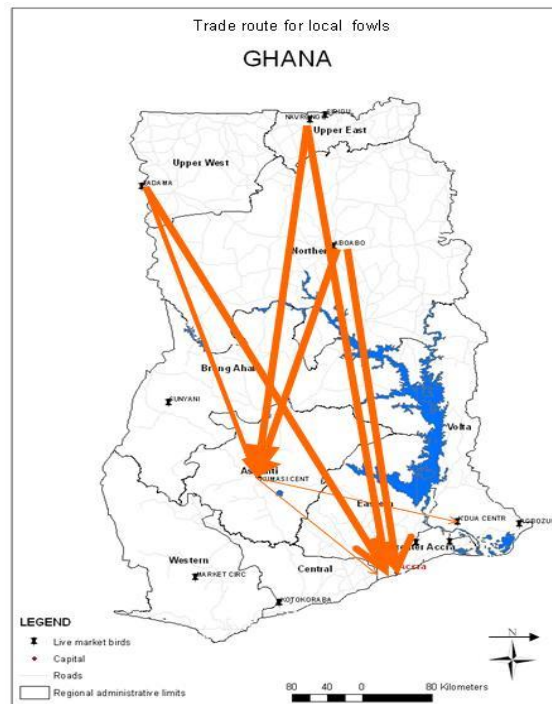
Local poultry

Local markets exist in most towns and villages, particularly on market days, for local fowl. Trade in local poultry, particularly guinea fowl, is a common business in the three regions in the north (Upper West, Upper East and Northern Regions). Inter-regional trade in local poultry occurs mainly between the northern and southern parts of Ghana. Figure 2.3 shows the inter-regional trade routes for local poultry in Ghana.

Major destinations of local fowl from the three regions in the north are Ashanti Region (Kumasi) and Greater Accra Region (Accra and Tema), represented by the thick arrows in Figure 2.3.

Broiler and spent layers

Broilers are raised mainly for meat and are sold from 6–8 weeks of age. The main consumers of broiler meat in the country are hotels, restaurants, institutions located in cities such as Accra, Kumasi, Takoradi, Cape Coast, Sekondi, Koforidua, and Ho, and individual consumers. Spent layers are normally sold for consumption after the birds have completed their laying. Traders in live birds buy spent layers from poultry farms in Kumasi, Sunyani or Tema/Accra in wholesale and sell directly to restaurants, hotels, individual households, chop bars, kebab operators and to other retailers in Accra, Kumasi and Tema.



Source: Akunzule (2008)

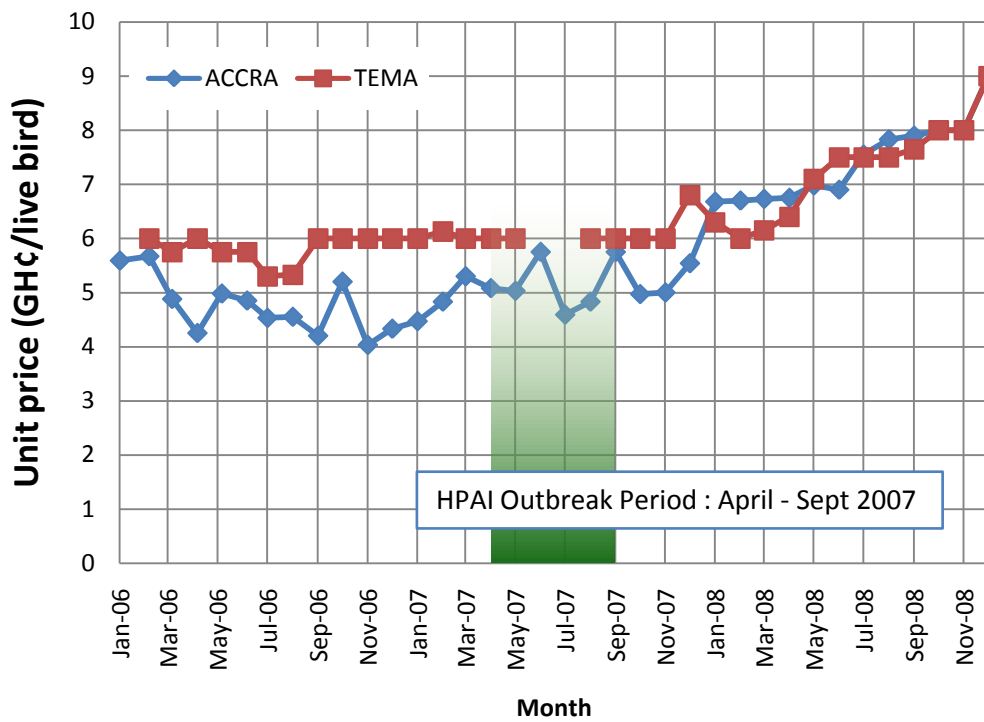
Figure 2.3. Inter-regional trade routes for local poultry in Ghana

Price of live birds

Trends in the average prices of live birds in selected regional markets are presented in Figures 2.4 and 2.5.¹ The average monthly retail price of live birds is generally higher but more stable in Tema than in the other selected markets. Prices follow very roughly a seasonal pattern, with (in most cases) higher prices around Christmas and Easter. The entry of HPAI affected regional markets in markedly different ways. Even after the first outbreak of HPAI in the country was reported on 11 April 2007 at a farm near Tema, the average prices of live birds at Tema market remained stable until the live-bird market was closed during the months of June and July 2007. The retail price of live birds in the Accra market was already falling (following normal post-Easter patterns) when the HPAI first broke and it declined between March and May 2007. The price there then rose between May and June 2007 (possibly because of sharp declines in inventories from the initial disease shock), but fell sharply again between June and July 2007.

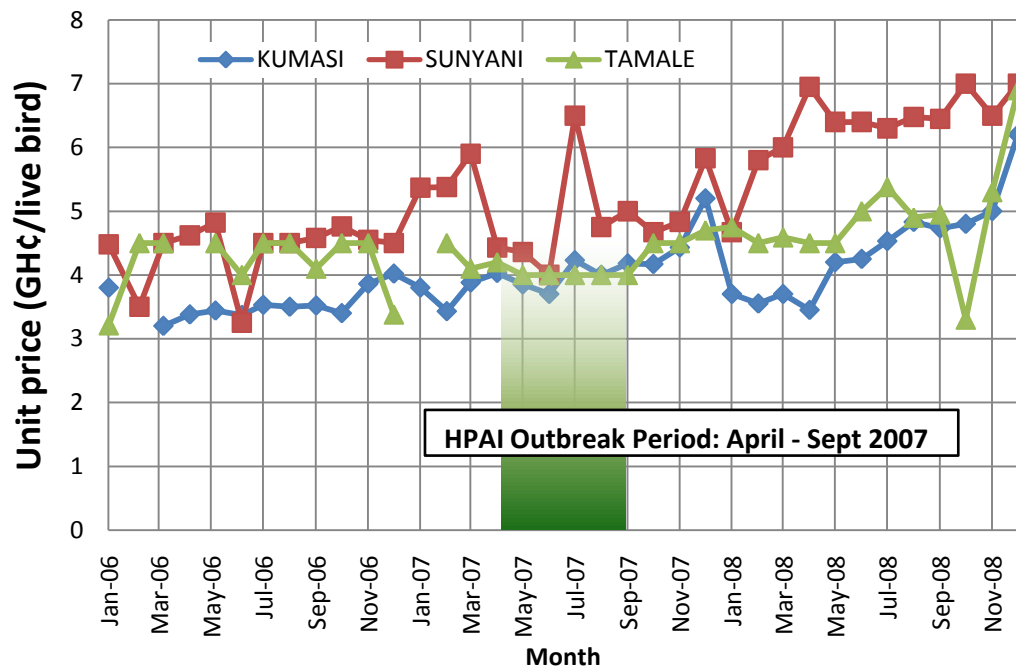
Similarly, by the time the second case of the HPAI in Ghana was reported on 13 May 2007 on a farm near Sunyani, the average monthly retail price of live birds for Sunyani market was declining. Prices declined quite sharply between March and June 2007, and then rose very sharply between June and July 2007 before falling again between July and August 2007. The average monthly retail prices of live birds are generally lower in Kumasi market compared with the other selected markets. After the HPAI outbreak, the average retail price of live birds generally rose in 2008, particularly during the second half of 2008 for the selected markets, namely Accra, Tema, Kumasi, Sunyani and Tamale markets.

¹. The exchange rate for the currency of Ghana, the Ghanaian Cedi (GHS), ranged between GHS 0.75 and GHS 0.70 per US Dollar over the period March-September 2007.



Source: Compiled from Statistics Research and Information Directorate, MoFA, Accra

Figure 2.4. Average monthly retail price of live birds (GHS/bird), Accra and Tema markets



Source: Compiled from Statistics Research and Information Directorate, MoFA, Accra

Figure 2.5. Average monthly retail price of live birds (GHS/bird): Kumasi, Sunyani and Tamale markets

Egg markets

Table eggs from commercial farms

There are egg collection points in Kumasi, Accra, Sunyani and Dormaa Ahenkro where egg sellers stockpile eggs from poultry farms for distribution throughout the country and for export to neighbouring countries (Togo, Mali and Burkina Faso). There are also inflows of eggs from Côte d'Ivoire through unapproved routes to Dormaa Ahenkro for redistribution (Akunzule 2008). Trade in eggs is mainly done by women. The egg collection points in Kumasi and Accra have existed for over 25 years and there is a Women Egg Sellers Association at these two markets (*ibid.*).

Local eggs

Local eggs may be obtained in the various markets in Ghana from local producers and retailers, particularly on market days. Trade in guinea fowl eggs are mainly from the three regions in the North (Upper East, Upper West and Northern).

Price of Table eggs

Trends in the average prices of table eggs in selected regional markets are presented in Figures 2.6 and 2.7. Unlike poultry, there is much less fluctuation over the year for average prices in 2006 or 2007, though prices surged wildly (and higher) in 2008. The average monthly retail prices for table eggs were generally stable for Kumasi, Tema and Tamale markets between March 2006 and April 2007. The retail prices of table eggs for Tema market and Accra market rose between April and May 2007, and between November 2006 and May 2007, respectively. But the retail prices for Tema market and Accra market fell between May and July 2007, suggesting that adverse price effect of the HPAI outbreak in April 2007 was felt over two months, through July 2007. The average retail prices of table eggs are generally lower in Kumasi and Sunyani markets compared with the other three markets. As for live birds, the average retail price of table eggs generally rose in 2008 for the five selected markets.

Other product market: manure

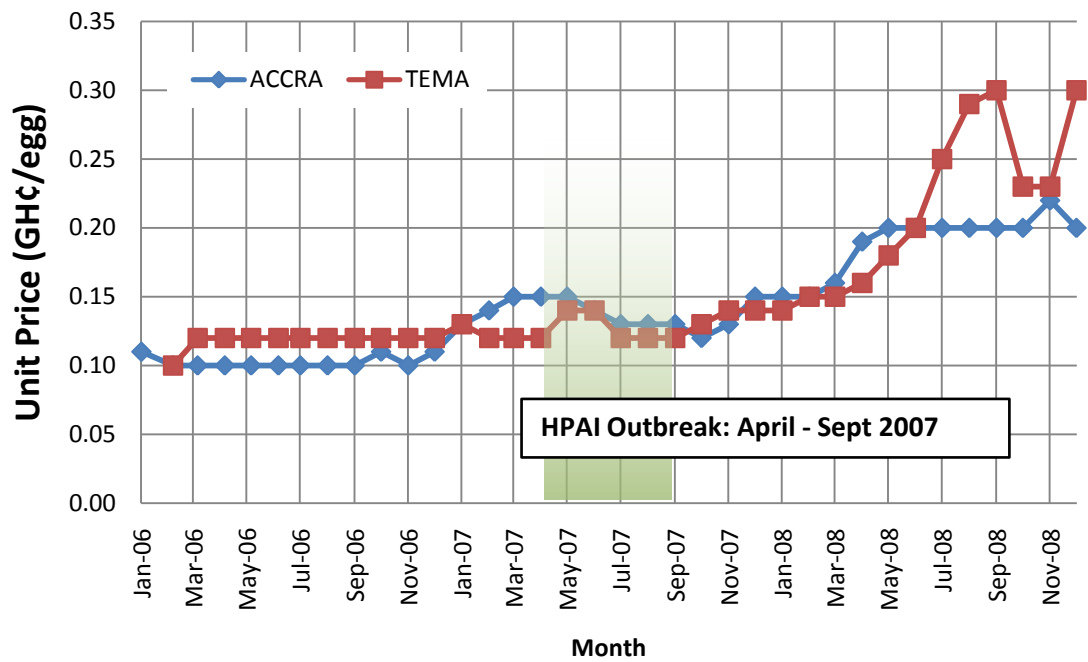
Poultry manure is used in vegetable and fruit (mango, plantains) farming in the country. According to Akunzule (2008), vegetable farmers from the Volta Region travel to Ashanti Region and Greater Accra Region to collect poultry manure from poultry farms for use in vegetable and onion farming, while some mango-growing companies collect poultry manure and use it for organic growing of mangoes in Tamale (Northern Region).

Exports

Ghana exports DOC to neighbouring countries, namely Benin and Liberia (*ibid.*). Hatchery companies such as Afariwa Livestock Ltd export DOC to Liberia and Benin. Poultry manure is also exported to Togo for vegetable farming.

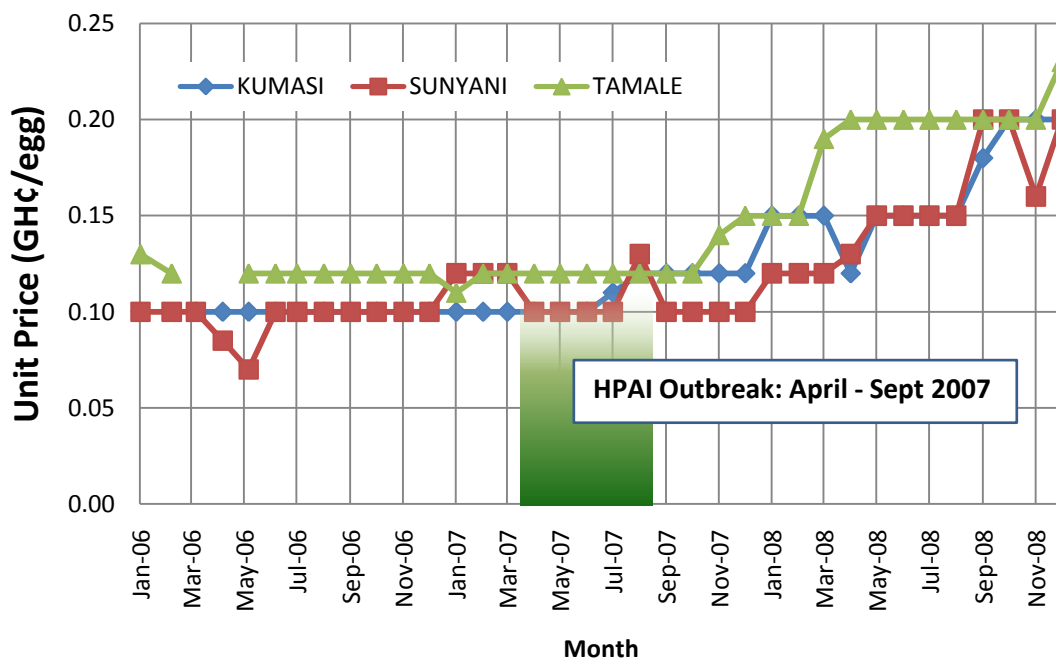
Transport for poultry products

In Ghana, the main methods of transport for live birds include taxis, passenger vehicles, bicycles, pick-up trucks, and cargo trucks. Most producers and marketers depend on the public transportation system, while the large commercial farms have vehicles for the transportation of feed, eggs, birds, and other items (Aning et al. 2008). Birds are carried in baskets and cages made from stalks or wire mesh. Bicycles are the main transport systems for carrying live birds from the household to the markets in rural areas and district capitals, particularly in the north, covering a distance of about 5 to



Source: Compiled from Statistics Research and Information Directorate, MoFA, Accra

Figure 2.6. Average monthly retail price of table egg (GHS/egg): Accra and Tema markets



Source: Compiled from Statistics Research and Information Directorate, MoFA, Accra

Figure 2.7. Average monthly retail price of table egg (GHS/egg): Kumasi, Sunyani and Tamale markets

10 km. A common practice in the rural (village) live-bird trade is to carry live birds by hand or head loads of baskets to local live-bird markets located between 2 and 5 km away.

Different types of cages are used in transporting birds from producers to markets and this influences biosecurity levels in live-bird markets. Local birds moving from the three regions in the north to southern Ghana are kept in cages made from millet stalks and transported in articulated vehicles. Sometimes, local birds are conveyed in buses or tied in the top carriers on passenger buses. To avoid high mortality, local birds are normally transported at night.

Some of the cages are also used for holding live birds in the markets. Other small cages may be used to carry live birds to sell around the township or from village to village or from house to house. The majority of cages are made from millet stalks, raffia and metal wire mesh, which makes cleaning and disinfection very difficult to carry out, hence posing a biosecurity problem for avian flu control, as the cages are used a number of times until they are worn out and discarded. Live birds are transported long distances (e.g. from Tamale to Kumasi, a distance of about 500 km) in cages of varying holding capacities of between 20–100 birds per cage, and short distances (e.g. 2 to 10 km) in cages of 5–10 bird per cage. The routes for transporting poultry products between two typical locations are presented in Table 2.2.

Eggs are packed in paper crates and transported in similar vehicles that transport live birds. Eggs taken from Kumasi and Dormaa Ahenkro to Accra are normally conveyed in cargo trucks. Crates are normally re-used around two or three times to pack and transport eggs. Other trade routes for eggs and birds are along the Volta Lake, using canoes and air transport (international airport in Accra) for imports of DOC and hatching eggs (Akunzule 2008). Frozen chicken is imported by sea through the Tema and Takoradi harbours.

Trade routes for table eggs are from the poultry-producing areas in Kumasi, Tema, Accra and Dormaa-Ahenkro to all parts of the country. Table eggs are transported by all types of vehicles to their final destinations for consumers. The main trade routes for table eggs are from Sunyani and Dormaa Ahenkro to Accra, Tamale, Wa and Bolgatanga, and from Kumasi to Accra, Koforidua, Takoradi and Cape Coast. Figure 2.8 shows the trade routes for table eggs in Ghana where the thickness of the arrows indicates the importance of the route in terms of volume traded.

2.3 Identification of governance and coordination mechanisms between actors

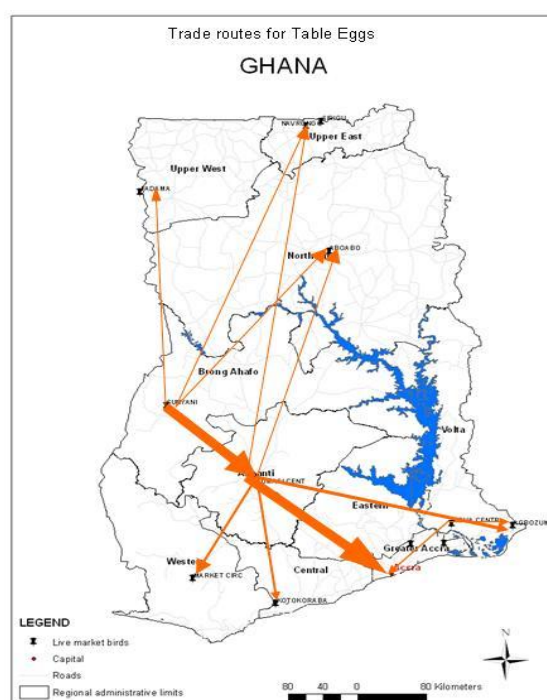
In general, governance within the poultry sector relies on *ad hoc* methods of coordination between different actors. While relationships between different sector actors may be long standing, there is limited coordination in terms of contract farming or vertical coordination, although there are a few examples of such arrangements, particularly within the layer sector among commercialized farms in Kumasi (see next section). Nonetheless, linkages between different nodes within the value chain are generally arms-length and devoid of coordination mechanisms related to quality, specifications, or other formal trading mechanisms.

At the same time, we do observe greater coordination within value chain nodes. For example, poultry farmers have organized themselves into producer associations which operate in various

Table 2.2. Trade routes for transport of live birds and frozen poultry products

Nature of Route	Source of birds	Type of birds	From	To
Foot path	Traditional farmer	Local birds (traditional)	Village	Village market (< 2 km)
Feeder roads	Traditional farmer	Local birds (traditional)	Village	Town market (2–10 km)
Truck roads		Local birds (traditional)	Bolgatanga	Kumasi Market (608 km)
Truck	Traditional farmer	Local birds (traditional)	Bolgatanga	Accra Market (878 km)
Truck roads	Traditional farmer	Local birds (traditional)	Sandema	Accra Market (925 km)
Water (Volta Lake)	Traditional farmer	Local birds (traditional)	Afram Plains	Dzemini Market
Truck roads	Commercial farmers	Layer, broiler, cockerels (Industrial)	Accra	Country-wide
Airport (Kotoka International Airport)	Imports	DOC and eggs (industrial)	European Union	Accra (33 km), Cape Coast, Kumasi (270 km), Tema (33 km)
Seaports (Tema and Takoradi)	Imports	Frozen poultry products (imported frozen poultry meat)	European Union, Brazil, USA	Country-wide

Source: Akunzule (2008)



Source: Akunzule 2008

Figure 2.8. Trade routes for table eggs

production centres providing members with production information and pricing guidelines. The producers have an umbrella body known as the Ghana National Association of Poultry Farmers. Similarly, traders—particularly wholesalers in table eggs—have organized associations in Accra, Kumasi, and Sunyani.

Akunzule (2008) observed that there are trader associations operating in 75% of the live-bird markets and their primary objective is to build business relations between the association, producers, and buyers. These associations operate through the holding of meetings and payment of membership dues. Markets with traders associations are located in urban cities. Kantamanto (in Accra) and Kumasi Central markets traders associations have registered with the Registrar General's Department. Kantamanto Market Traders Association has a membership of about 200.

2.4 Government regulations and public policy in the poultry value chain

District assemblies control the markets and regulate the activities of traders in the markets and in their districts in general. The district assemblies and veterinary services also collaborate to regulate the movements of birds and the activities of other actors in the district. Farmers expect good prices from traders, while consumers generally expect affordable prices from traders. The traders also expect district assemblies to improve sanitation and hygiene in live-bird markets since they pay levy to the district assemblies.

There is no illegal point of importation of DOC into the country (*ibid.*). It is mandatory for importers to obtain VSD-issued import permits to import poultry and poultry products into the country. The import permit requires that poultry and poultry products are free of particular poultry diseases, particularly HPAI during the threat and actual outbreaks of HPAI around the world.

There is an operating protocol from the Economic Community of West African States (ECOWAS) for the movement of cattle within the West African sub-region, but there is currently no corresponding ECOWAS regulation for the movement of poultry and poultry products. Currently, Ghana is participating in a study on the harmonization of pharmaceutical legislation and a coordination program to control trans-boundary animal diseases in the ECOWAS region. The study started in Ghana in November 2008.

With the outbreaks of HPAI in 2007, VSD instituted movement permits for poultry and eggs being transported from one part of the country to another. The cost of movement permits (about GHS 7) increased marketing costs for traders, who are the main actors in moving poultry products to markets, temporarily during the control period. Metropolitan, municipal, and district assemblies who own and manage the market infrastructure in their area also charge a levy to all fowl dealers. Traders pay GHS 2 per cage at the Kantamanto Market as a levy to the Accra Metropolitan Assembly, and traders in the Sirigu and Navrongo live-bird markets pay GHS 0.20 per bird on each market day of the week as a levy to the Kassena-Nankani District Assembly.

3. INDUSTRY SPECIFIC VALUE CHAINS

3.1 Introduction

The main products for Ghana's commercial poultry sector include table eggs, broilers and spent layers. The local poultry system also produces birds for various markets. The production and distribution mechanisms for these poultry products may be different and therefore could be affected differently by HPAI. This section presents results and discussion regarding the commercial layer, commercial broiler and local poultry value chains for selected study areas. The next section looks the impact of HPAI on each of the specific chains.

3.2 Commercial layers

A number of actors participate in the commercial egg value chain. These actors include breeders, feed millers, producers, traders, and the end users of the products from the commercial poultry farms. The operations and linkages of these actors along the chain are important in the prevention and management of disease outbreak and spread within the poultry sector. The findings of the present study on the operation and linkages of some key actors along the commercial egg value chain are discussed for the different regions of study in the following sub-sections.

3.2.1 Kumasi study area

3.2.1.1 Characteristics of major actors interviewed

Breeders/hatchery

The hatchery operator, Darko Farms, which was interviewed in the Kumasi study area named other operators in the study area as Topman Farms, Mfum Farms, Asamoah and Yamoah Farms, Akate Farms and Jerusalem Farms. The relative sizes of all the listed farms could not be given by the informant, but it was noted that Akate Farm has the biggest capacity of hatchery space, about 550,000, and thus can produce the largest amount of DOC per day. It is followed by Darko Farms with a capacity of about 270,500. From his point of view, Akate is the market leader. In addition to having the largest capacity, Akate Farms uses an automated hatchery system which is faster and more efficient compared to other hatchery systems. In addition, Akate Farms hatches both broilers and layers, while Darko Farms does only layers currently. Darko Farms used to produce broilers but stopped when it closed down its broiler farms. The focus of the farm has shifted more towards egg production than meat production. In terms of DOC production, Jerusalem Farms is next to Akate Farms. Darko Farms uses eggs from their breeding farm at Manhyia to feed the hatchery and therefore they do not buy or import from other sources.

Feed millers

The feed millers include commercial poultry farms that formulate various feeds for their farms and for sale to other poultry farms, as well as sole feed producers like AGRICARE. Raw materials used in the preparation of poultry feed as listed by the informant include: soya, wheat bran, fish meal, synthetic amino acids, di-calcium phosphate, and cotton seed cake. Fish meal, synthetic amino acids and di-calcium phosphate are mostly imported. Poultry feeds produced include layer mash, broiler mash, and chick mash.

Customers are not allowed into the feed outlet section of the farm. According to the feed miller, Darko Farms, internal bags could be re-used but those that went out were not re-used at all. There is

a disinfection dip at the entrance to the farm for disinfecting individuals and vehicles that enter the farm. These biosecurity measures have been practised since the establishment of the farm in 1969. The disinfection dip could cost about GHS 500 per month. Fumigation of the whole farm could also cost about GHS 2000 per month. Raw materials like maize are obtained from Techiman in the Brong-Ahafo region. Others are imported from Germany, Holland, China, and sometimes Argentina.

Producers

Five layer producers—Mfum Farms, Akate Farms, Topman Farms, Asamoah and Yamoah Farms and Vex Farms — were interviewed in the Kumasi study area. Two of them (i.e. Akate Farms and Asamoah and Yamoah Farms) are also broiler producers. The production levels of the producers in Kumasi are presented in Table 3.1. Based on our earlier classification, the layer producers here, other than Vex Farms, would mostly fall into the category of large producers (i.e. with installed capacity of over 10,000 birds). It is estimated that a layer, depending on management practices, would produce between 265 and 285 eggs/complete 80-week cycle, with an average of 270 for Ghana (personal communication, manager, Sydal Farms, Accra). This gives a yield of 9 crates of table eggs per layer. The large producers utilize between 78% and 93% of their installed capacity (Table 3.1).

Table 3.1. Output of selected poultry producers in Kumasi

Farm	Capacity	Production level				Capacity utilization (percent)
		Layer birds/year	Crates of eggs/day	Broiler birds/year	Total birds/year	
Mfum		60,000	900	–	60,000	–
Topman	78,000	–	1000–1800	–	–	–
Vex	6,000	650	–	–	650	10.8
Akate	450,000	300,000	Was not disclosed	50,000	350,000	77.8
Asamoah and Yamoah	180,000	108,000	1600	60,000	168,000	93.3

Note: – data not obtained or made available

The specific feed used by the producers in Kumasi includes chick mash, layer mash, and grower mash. Pre layer, layer 1 and layer 2 mashes are also used by Mfum Farms. The major ingredients used to prepare these feeds include maize, soyabeans, oyster shell, Russia fish, copra cake, wheat bran, cottonseed cake, synthetic amino acid and fish meal. All the farms interviewed in Kumasi with the exception of Vex Farms own their own hatchery and therefore produce their own DOC. Vex Farms gets its DOC from Akate Farms. The price for DOC ranges between GHS 0.85 and GHS 1.00. Akate Farms has a labour force of about 50 casual workers and 300 permanent workers. The labour force for the other farms also ranges from 10 to 40 casual workers and 5 to 25 permanent workers.

The major production system used by the interviewed farms is the deep-litter system, where a cemented floor of a pen is covered with wood shavings, with feeding and watering troughs positioned at vantage points to provide even feeding opportunities for the birds. Picture 3.1 shows birds under a deep-litter management system. In the deep-litter system, bird waste is either given to crop farmers free of charge or disposed of. However, Asamoah and Yamoah Farms sells the waste to crop farmers. There is a disinfection bath (vehicle and foot baths) at the entrance to all the farms which is used to disinfect both vehicles and individuals entering the farm. At the entrance to all pens in all the farms there are footbaths for disinfecting the feet of workers. Movements are also restricted on all farms, with the exception of Vex Farms, where certain areas of the farms are strictly

out of bounds to customers or buyers. At Topman Farms, workers change into prescribed work clothes at the beginning of work. Mfum Farms spend on average about GHS 30 on disinfectants weekly.



Photo 3.1. Deep-litter system for poultry keeping

The specific output from these farms includes eggs, meat (spent layers), and sometimes cockerels. The farms, except for Vex Farms, also produce and sell DOC. Akate Farms and Topman Farms are involved in other non-poultry activities; Akate Farms does livestock production (pigs, sheep etc.) while Topman Farms does piggery production, shoes, fish rearing and hostels. The other producers are solely into poultry production. According to the informant interviewed at Topman Farms, the income generated from the other non-poultry activities is relatively higher than from poultry. This has contributed to a shift in management's attention to the other non-poultry activities causing a decline in the output (income) from the poultry business. For him, the poultry income has become less important in the past few years. Akate Farms, on the other hand, indicated the poultry business as the major income earning activity compared to the other non-poultry activities.

Collectors

The collectors in Kumasi trade in broilers, spent layers, parent birds and eggs. They obtain their birds and eggs from farms around Kumasi and its environments such as Darko, Topman, Nfum, Asamoah and Yamoah, Akate, Dandark, Jerusalem, Nkatia, and Vex Farms, among others. Most of the time, the collectors go around the various farms and verify whether the farmers are ready to sell some birds. The collectors buy the birds and sell them to market women, who in turn retail to their customers. Those collectors who double as retailers at the various markets give some of the birds to their fellow traders and keep some to sell to their customers. The collectors obtain a higher number of their bird supplies from the named farms above (about 60%) and the rest from small-scale and backyard

farmers. Collectors do not mix broilers, layers, parent stock, cockerels, as each type is kept in different cages. But most of the collectors mix birds of the same species obtained from the various farms when they do not get all their birds from a single farm. The collectors interviewed are not in any other businesses apart from the poultry business. Thus, their main source of income is from the poultry business.

The collectors do not put the birds in cages when transporting them but rather leave them in the vehicles for air to circulate so that the casualty rate for the birds is reduced. The vehicle is then washed and disinfected after delivery and the waste disposed of by the collectors. None of these practices changed during the HPAI outbreak. Collectors interviewed indicated that they were concerned about minimizing the risk of spread of HPAI to protect their business.

Transporters

Transporters do business with feed millers, egg traders and live-bird traders, with the traders accounting for most of their business dealings. Transporters were unable to give the proportion for the different actors by volume of transaction because they do not keep records. Four festive seasons and one non-festive season per year were identified by the transporters interviewed in the Kumasi study area. The festive seasons include Easter (April), Christmas (December), Eid ul-Fitr (shifting; follows a lunar calendar) and Eid al-Ahdr (also shifts from year to year). The largest quantity of products is transported during the Christmas festive season. Again, due to the lack of records, the transporters were unable to provide the relative volume of trade in each of the products they transport.

Most of the transporters interviewed were drivers and do not own the vehicles. There was only one owner amongst them. The only asset owned and used for the trade was the vehicle or truck. The transport business is the sole business transporters are involved in. They do no non-transport activities.

Vehicles for carrying live birds are different from those used for carrying eggs. Vehicles used in carrying live birds have numerous openings to allow fresh air into the vehicle, while those for transporting eggs are enclosed in order to prevent rains from spoiling eggs during transport. There has not been any significant improvement in the practices for transporting live birds (during and after the HPAI outbreak). Transporters reported cleaning their vehicle with kerosene and Dettol after every trip.

Retailers

The poultry species sold at the various markets by the retailers include spent layers, broilers, cocks, and parent birds. However, all the retailers sold broilers and parent birds only during festive periods such as Christmas and Easter. Due to high cost of broilers and parent birds, customers purchase them mostly during festive occasions as gifts for relations and for home consumption, according to the respondents. Also according to the retailers, farmers sell these broilers and parent birds during festive occasions when the market price is good.

All the retailers interviewed in the Kumasi study area kept their birds in wooden cages in an open space in the market area. The cost for these wooden cages ranged from GHS 60–70, according to the retailers. The retailers located at the Roman Hill Market use cardboard to line the base of the wooden cages. Each morning, the birds are driven to one side of the cage, and then the cardboard is gently taken out, cleaned and replaced. Feed and water bowls are emptied and refilled. In the case of

the retailers located at the Railway Market, the cardboard lining the base of the wooden cages is not removed each morning, but rather the birds are transferred to another cage and the droppings are swept using a hard broom. The wastes collected using the different practises are emptied daily into dustbins located in the market. These dustbins are subsequently emptied by the Kumasi Metropolitan Assembly (KMA) or Zoomlion Ltd, according to the retailers.

All retailers had no storage facilities. They sold their birds either live or dressed based on request with no additional cost. They have no biosecurity measures in place. Retailers in the Railway Market, however, give their birds some form of medication when they detect any sickness.

Most retailers are not engaged in other non-poultry activities. Nevertheless, the retailers strongly affirm the poultry business as their major and sole source of income even if involved in other activities.

Processors

Birds are processed by market retailers upon request from customers. The processing service provided by the market retailers is not paid for by the customers. According to retailers, it is a form of incentive they give to their customers. It was observed that all retailers in the two markets provide processing services. However, processing services provided by commercial farmers is factored into the cost of the bird. When birds are processed, they are priced based on their weight.

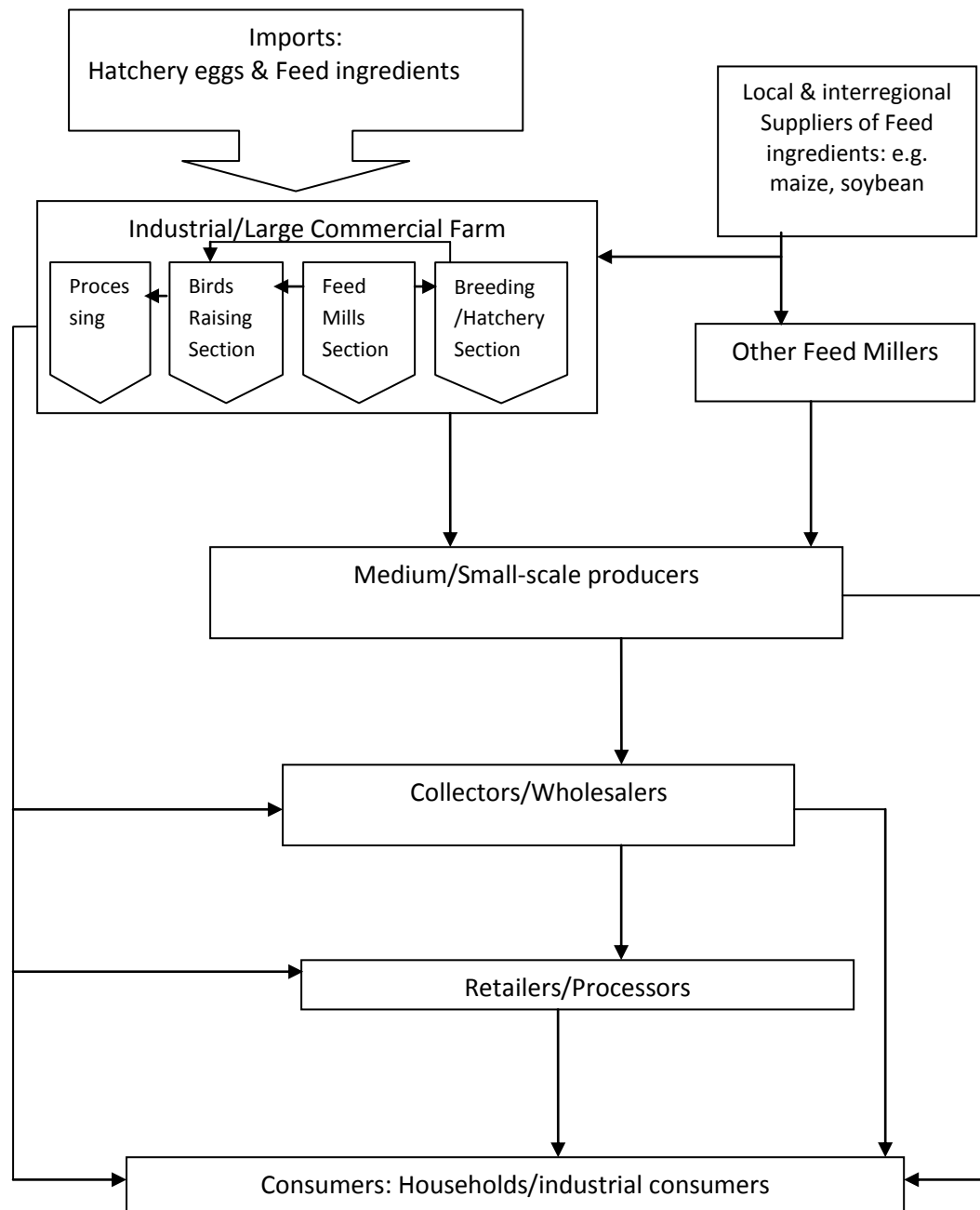
The Darko Farms processing unit is linked to its layer farm. The Darko Farms processing plant is partially automated; at several sections in the processing chain, manual labour is used. Market retailers use boiled water to process the birds and the whole process is manual. Market retailers have no biosecurity measures in place. For the commercial farmer-processor, workers in the processing plant change into factory clothes before starting work.

3.2.1.2 Product flows and values

Figure 3.1 illustrates the linkages along the layer chain in the Kumasi study area. Starting from the breeder/hatchery part of the chain, DOC from Darko Farms are sold to Asature Farms, with about 30,000 chicks transported every 3 months, valued at about GHS 9300 per month. The rest are sent to their sales offices in Kumasi and Accra. DOC from Darko Farms are also exported to Cameroon and Liberia, while other traders for Burkina Faso and Togo come to buy DOC as well. The various prices charged for DOC are as follows: Darko Farms—GHS 0.85, Akate Farms—GHS 0.90, Jerusalem Farms—GHS 1.00, Chicks and Chicken—GHS 0.95. According to the informant, Darko Farms had no price variations. DOC are then purchased by producers and reared for production.

Production and distribution shares were difficult to estimate, but informant interviews revealed some information in this regard. Akate Farms was unanimously singled out as the major producer of layers and hence eggs in the Ashanti Region and Ghana as a whole, followed by Topman, Asamoah and Yamoah and then Darko Farms. Asamoah and Yamoah Farms claims to produce the largest number of broiler birds at about 65,000 in the Ashanti Region and the country. Mfum Farms have about 15,000 breeder birds currently, with about 240 breeder birds that could be sold out on a daily basis. The respondents (producers in Kumasi) perceived Ashanti Region (Kumasi) and Brong Ahafo Region (Dormaa Ahenkro) as the major origins of poultry products in the country. They also perceived the major destinations to be Kumasi, Accra, and Tema. Most of the spent layers from Topman Farms are sold to wholesalers and retailers from Dormaa, Accra, and Kumasi. They also sell

to traders from Côte d'Ivoire and Togo. Asamoah and Yamoah Farms also produce (and therefore sell) about 48,000 eggs daily (thus, about 1600 crates).



Notes: Collectors indicated that they obtain 70% of products from large farms and 30% from other farms. The study assumes that about 90% of collectors' products are sold to retailers.

Figure 3.1. Layer value chain, Kumasi study area

Prices of table eggs from the farms are presented in Table 3.2. Average prices of eggs are GHS 4.50 per crate for large-size eggs, GHS 4.20 per crate for medium-size eggs and GHS 3.60 per crate for small-size eggs. Some of the farms complained that when the association agrees on the prices per

crate, members still sell at different prices. Average production of the interviewed large layer farms include about 35,010 crates of table eggs per month and 13,000 spent layers per month, valued at GHS 157,545 and GHS 71,500, respectively.

Table 3.2. Farm prices of table eggs in Kumasi study area (GHS per crate)

	Farm prices (GHS/Crate)		
	Large-size egg	Medium-size egg	Small-size egg
Darko Farms	4.20		3.20
Mfum Farms	4.50		
Akate Farms	4.50	4.20	
Asamoah & Yamoah Farms	4.80		4.00
Average price	4.50	4.20	3.60

Collectors and transporters are the main intermediaries between producers and retailers. They buy birds from producers at GHS 5.0–6.0 and sell to retailers and consumers at GHS 6.5–8.0 depending on the weight of the bird and the type. The selling price for a crate of eggs ranges between GHS 4.7–4.8. During festive seasons, birds are relatively cheaper due to increased production (supply), with additional small-scale producers adding to seasonal supplies to meet the high demand. By contrast, in the lean season, most farmers would have sold all their matured stock and restock for the next season(s). Larger farms also reduce their bird capacity after festive seasons and instead produce broilers on demand which reduces the supply of birds and increases prices during the non-festive periods. The collectors who responded get about 70% of their birds from Akate, Nfum, Topman, and Asamoah & Yamoah Farms and about 30% from Vex, Dandark, Fumesa and Anuafofomensa Farms. Most of the birds are sold in Kumasi Central Market, the Adum Railways, and surrounding markets.

Collectors obtain, on average, about 1400 crates of eggs and 420 spent layers per month from large farms and about 600 crates of eggs and 180 spent layers per month from medium- and small-scale farms. The values of eggs purchased from large farms and medium/small farms are estimated as GHS 6300 and GHS 2700, respectively, while those of spent layers are estimated as GHS 2310 and GHS 990, respectively. Collectors distribute these products to major markets in Kumasi, Accra and Tema. The average volumes of transactions between collectors and retailers are estimated at about 540 spent birds and 1800 crates of eggs per month, and their estimated values are GHS 3375 and GHS 8550, respectively. Also, on average, collectors sell about an addition 60 spent birds and 200 crates of eggs per month, which are worth GHS 435 and GHS 950, respectively.

Live birds (i.e. spent layers in this case) are mostly transported from Akate, Mfum, Topman and Asamoah and Yamoah Farms. The interviewed transporters could not give the proportion of broilers and layers they transport. The major destinations for most of the products transported by transporters are Tema and Accra. In Accra, most products are offloaded at Kantamanto Market, La, Accra railways, Mallam Atta Market and Teshie Market. Apart from eggs and birds, they sometimes transport feed (maize) from Dormaa-Ahenkro to Accra. The transporters only send products to the main destination points. They are not involved in the redistribution of the products.

The number of times per week that they transport poultry items varies depending on the season. During Christmas, they could transport either birds or feed every day of the week. During the off season, it could take about two weeks before being hired for transport of poultry items. Transporters could engage in the transport of eggs daily irrespective of the season for different groups of traders. Between 200 and 400 live birds (i.e. spent layer, among other live birds) could be transported on

each trip and the charges for the transportation of birds and feed ranges from GHS 180–200 per trip. For eggs, transporters charge between GHS 200–300 per trip for large vehicles, while the use of a smaller vehicle incurs a charge of between GHS 180–200 per trip. The charges depend on the size of the vehicle and are fixed for each size. Small vehicles can carry between 1500 crates (for LT cargo bus) and 2000 crates (for Benz cargo bus) per trip, while the large vehicles (truck) could carry about 3000 crates of eggs per trip for about 5 traders. In cases of losses in transit, transporters are not affected or do not pay for any losses during transit.

Retailers in Kumasi reported that their birds come from farms within Kumasi and its surroundings (Akropong, Ejisu, Fumesua, Konongo, Obuasi, and Nkawie) and sometimes Sunyani. These include Topman, Akate, Dandark, Asamoah and Yamoah, Darko and Enuafomiensa Farms. During festive periods like Christmas and Easter, retailers obtain an average of about 5600 spent layers per month from large farms valued at GHS 33,600. Currently, most retailers obtain the bulk of their produce from collectors and sometimes small-scale farms during festive occasions.

Retailers from the two markets surveyed indicated significant seasonal variation in the volume of business. This is clearly evident from the volume of sales reported during and after festive occasions. During Christmas, Easter, and other festive periods (like traditional festive days), between 200 and 300 birds could be sold in a day by retailers in the Roman Hill Market, while between 20 and 30 are sold during other periods. Retailers from the Roman Hill Market interviewed said they could purchase about 1400 birds during festive periods and sell them within four days. Retailers in the Railway Market could sell between 100 and 150 birds per day during festive periods and between 10 to 15 birds per day on other days. There are also seasonal variations in the bird price. The price for spent layers is between GHS 6.0–7.0 during festive occasions and between GHS 5.0–6.0 during other periods. Average volumes of transactions between retailers and consumers (households and industrial consumers) are about 480 live birds per month during non-festive periods and about 5600 live birds per month during festive periods, which are valued at GHS 2640 and GHS 36,400, respectively.

Processing in Kumasi takes place either at the farm level, in the case of larger, more integrated farms, or at retail. In the former, farms such as Akate Farms process about 8400 spent layers (weighing 12,600 kg) per month with estimated value of GHS 44,100. The processed birds are sold to households and industrial consumers. The processing section of Akate Farms was started about 6 months ago and has been gaining new customers. Likewise, the quantity of birds processed by Darko Farms depends on requests from its poultry shops in Kumasi and Accra. At the retail side of the chain, between 5 and 10 birds could be dressed daily by a market retailer for individual purchasers. Also, some market retailers have customers, mostly chop-bar operators, to whom they supply 10–20 birds processed birds daily. There are seasonal variations in the volumes of birds processed. During festive periods such as Christmas, large volumes of birds are processed by processors, while a decline is experienced during non-festive periods. During festive periods, the number of birds processed by market retailers could increase to between 20 and 50 daily. On average, the volumes of transactions in dressed birds between retailers and consumers (households and industrial consumers) were estimated as 540 dressed birds per month during non-festive periods and 840 dressed birds per month during festive periods. The estimated values of these transactions are about GHS 2970 per month during non-festive periods and GHS 5460 per month during festive periods.

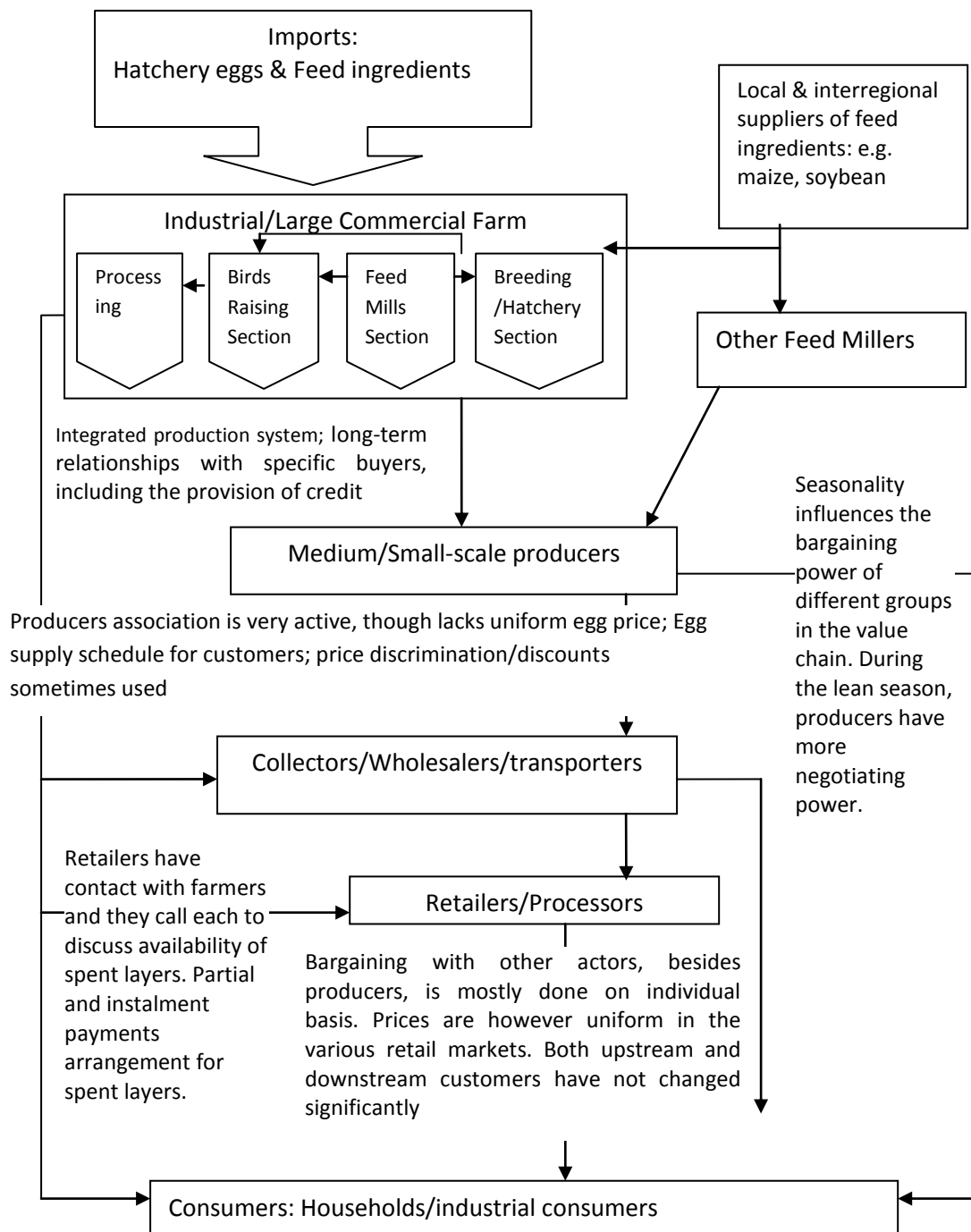


Figure 3.2. Layer value chain, Kumasi study area: Governance

The association helps its members obtain access to feed through an arrangement it has made with UT Financial Services. Some members, however, see this arrangement to be improper and to their disadvantage. Fees charged by UT are extremely high according to some members. They are of the view that the association, as a collective body, could import its own feed to minimize the operational costs.

Likewise, transporters also have an association in the form of the Cargo Transporters cooperative, located at Fanti-Newtown, Kumasi. The association has a total of about 30 members. To become a member of the association, one needs to pay an initial amount of GHS 20 as a registration fee.

Transporters pay GHS 2 for each trip and a commission of 10% on the amount charged per trip to the station and association, respectively. The association helps its members in times of need. When a member is ill, they go to the aid of the person by paying for the hospital bill. When a relative of a member dies, they mourn with the person.

Further down the chain, focus group discussions (FGD) with retailers revealed that retailers often do not purchase their birds from a particular farm, but from any farm that has spent layers or other types of birds to sell. The retailers have the contact numbers of most of the farmers. When birds are ready for sale, the farmers contact the retailers. Occasionally, these retailers would also contact farmers directly. Some retailers have a type of contractual arrangement with farmers whereby they make a deposit for a specific volume of birds, which are subsequently delivered to them. The rest of the money is paid after all the birds are sold. Another form of contractual arrangement is that the retailers make down payment for all the birds in a particular pen. The retailers take the birds incrementally until the down payment made is paid. Refusal to take the birds to meet the amount paid gives the farm an advantage to hold on to the money paid. This kind of arrangement is typically made during periods where the birds are scarce. The down payment binds the farmer to reserve all the birds in the pen for the retailer. The major customers of the retailers include chop bar operators and individual consumers (household). There has not been any significant change in customers (both upstream and downstream customers) of the retailers. Bargaining with other actors in the chain is mostly done on individual basis, though prices are generally uniform in the various markets.

Seasonality influences the bargaining power of different groups in the value chain. During festive seasons, when both production and demand are at their highest, consumers typically have much more leverage with retailers in terms of obtaining favourable prices. During the lean season, producers have more negotiating power, particularly in insisting that larger volumes of products be purchased at this time.

3.2.1.4 Public policy and regulation

There are no strict government regulations related to the poultry sector. Inspections are conducted on farms once in a while by the VSD, MoFA and KMA. According to Akate Farms, KMA inspectors visit their farm twice a year to screen their workers in sensitive areas like the canteen and those with direct contact with the birds. All of the producers interviewed said they pay some form of taxes to the government. Currently, no permit is required for transporting birds or eggs. However, permits were required during the HPAI outbreak period when transporting birds or eggs out of the region. None of the respondents experience roadblocks in any of their business dealings. Occasionally, inspectors would come from the Ministry of Health to issue health certificates for a period for DOC. Routine checks are made by VSD on the DOC exported. According to a hatchery operator interviewed, the farm sometimes requests a check on their DOC to enable them to obtain a certificate to trace back products should any problem be encountered.

According to interviewed collectors, there are no formal government regulations in the poultry sector that relate directly to them, except the payment of a levy which costs GHS 0.10 a day to KMA. Likewise, retailers located at the Railway Market pay fees of about GHS 0.50 to KMA every 3 months and occupancy rent to the Railway Authority at GHS 0.10 per day. No formal government regulations are known to the retailers interviewed. Movement permits are not required when transporting birds and the retailers have not experienced any form of roadblocks when transporting the birds. No

health certificates are provided to them. Periodically, KMA comes to inspect and advise them on how to keep the market environment clean and healthy. Retailers who keep their places untidy are summoned and fined. None of the retailers interviewed have ever fallen foul of this rule.

3.2.2 Dormaa-Ahenkro/Sunyani study area

3.2.2.1 Characteristics of major interviewed actors

Feed millers

Two feed millers located in Dormaa-Ahenkro were interviewed. One of the feed mills is owned by a poultry farmer. The poultry feeds produced by the millers interviewed include layer mash, broiler mash, grower mash, and chick mash. The millers mill the feed for farmers and other clients. The farmers normally source their raw materials themselves and then mill the materials themselves. Sometimes, the farmer also buys materials from other millers. There are dealers in poultry feeds, whose prime objective is to seek raw materials for feed production, including the sourcing of maize from Côte d'Ivoire, and the milling and formulating of different feeds for distribution to poultry farmers.

Millers do not allow farmers to enter operational areas with their own bags or untreated bags. They keep containers with disinfectants where a customer deposits his/her bags so that they can be disinfected. These millers then grant the customer other disinfected bags (same number as what is deposited) for use. There are also chemical baths for people and trucks. The interviewed millers have recently fenced their structures to prevent unauthorized entry by animals and humans as part of the biosecurity measures. The cost involved in constructing the fence is about GHS 1500.

Producers

Six layer producers were interviewed in the Dormaa-Ahenkro/Sunyani study area. The feed ingredients used by farmers are fish meals, wheat bran, shell and maize, and vaccines used include Amploclox, Norx and Coccidiostat. These farms employ both permanent and casual labourers. The sources of their DOC include Kumasi (57%), with around 15% each from Sunyani, Dormaa, and imports from Israel. The farms use the deep-litter system and each pen can hold 1000 birds. These farms conduct fumigation every two weeks. The removal of the litter (waste) is also done periodically. They have a chemical bath for the entry and exit of both humans and trucks (vehicles). The specific output from these farms includes eggs, meat (spent layers), and manure. Five (71%) of the producers interviewed are involved in other non-poultry activities such as being a civil servant (33%), cocoa farmer (33%), teacher (17%) and businessman (17%). But their income from poultry is the major income-earning activity. The different economic activities undertaken by the producers and their contributions to income are presented in Table 3.3.

Table egg collectors

Two egg collectors were interviewed in the Dormaa-Ahenkro/Sunyani study area. They collect eggs from producers and redistribute them to other actors in the chain. While one of the two collectors does other business, selling fried eggs in the evening, the other collector is not involved in any other business activity. As part of measures against disease outbreak and spread, the collectors do not move from one farm to the other with materials. They do not take crates along for egg collection and make sure to comply with the farms' biosecurity measures. Both collectors interviewed agree that the production point is the most critical control point for HPAI risk.

Table 3.3. Producer economic activities and their share of income earned

Producer	Activity	
	Poultry income (%)	Non-Poultry Income (%)
1	90	Civil Servant (10)
2	60	Civil Servant (40)
3	50	Teaching (40) Cocoa Production (10)
4	100	–
5	80	Cocoa Farming (20)
6	70	Business Men (30)

Table egg wholesalers

Three wholesalers located in Sunyani, a secondary market, were interviewed for the Dormaa-Ahenkro study area. The wholesalers trade mainly in eggs. The wholesalers sort and grade eggs according to size at both purchase and sales points. Two (67%) of the wholesalers have other sources of income, but the egg trade is their major income activity. The proportions of the traders' income from poultry trade and other economic activities are presented in Table 3.4.

Table 3.4. Share of income from poultry and non-poultry economic activities

Table Egg Wholesaler	Poultry Income (%)	Non-Poultry Income (%)
1	90	10
2	60	40
3	100	0

Transporters

Two transporters were interviewed in Dormaa-Ahenkro for the Dormaa-Ahenkro/Sunyani study area. The major stakeholders that the transporters do business with are feed millers (transporting wheat bran) and egg traders. The transporters do not engage in other business activities.

The main asset of the transporters for the transport business is the truck. There are no special vehicles constructed for transporting poultry products and cargo trucks are usually used. Following the outbreak of HPAI, the transporters began to spray and clean the trucks before loading. Also, members of the association are not permitted to load eggs from Côte d'Ivoire to bring to Ghana. These measures have been instituted by their association and the association ensures that members comply with them.

Live-bird (spent-layer) retailers

Six retailers, five located in Sunyani and one located at Dormaa-Ahenkro, were interviewed from the Dormaa-Ahenkro/Sunyani study area. The retailers sell spent layers, cockerels and broilers, but they deal more in spent layers. Sales normally take place at the roadside where birds are displayed in cages. They provide the birds with feed and water daily and periodic drugs as well. They remove litter (waste) from the cages daily and undertake periodic spraying of the cages to control pests. Three (50%) of the retailers engage in other non-poultry activities. Table 3.5 presents the income sources for the retailers of live birds who were interviewed. Poultry income constitutes the major source of income for the retailers, about 75% on the average.

Table 3.5. Sources of income for interviewed live bird retailers

Live-bird Retailer	Source of Income (%)	
	Poultry	Non-Poultry
1	100	–
2	80	Vegetable farming: 20
3	40	Business (feed): 60
4	30	Business (guns): 70
5	100	–
6	100	–

3.2.2.2 Product flows and values

Figure 3.3 presents the commercial layer chain for the Dormaa-Ahenkro/Sunyani study area. The major destinations of the eggs produced in this region are Accra, Kumasi, Takoradi and Togo, while spent layers are exported (taken across the border) to Côte d'Ivoire. The selling price for eggs is GHS 3.50 per crate, while the minimum selling price agreed among the members of the producers association for spent layers is GHS 4.50 per bird. But a producer could bargain and receive a higher price for spent layers.

From the farm-gate, products either go to collectors or wholesalers. For the former part of the chain, the primary (collection) market for the interviewed collectors is Dormaa-Ahenkro. The collectors would normally go directly to different poultry farms known to them and pick up their stock. The sales markets for collectors are mainly Accra (75% of the volume of eggs), with smaller levels of sales to Kumasi (10%), Techiman (7.5%) and Sefwi (7.5%). The average volume of eggs traded by collectors is about 4668 crates per month, comprising 3268 crates obtained from large farms and 1400 crates from medium/small farms. The estimated value of eggs handled by collectors is about GHS 16,338 per month.

The average volume of eggs purchased by wholesalers from poultry farms is about 2012 crates per month, with an estimated value of GHS 7042. The Dormaa-Ahenkro market for eggs is the major primary market for wholesalers located in Sunyani, while Tamale market (retailers), with a 60% share of the eggs sold by wholesalers, is their major sales destination. All primary markets for wholesalers (located at Sunyani, the regional capital) are intra-regional markets, while major sales destinations are primarily interregional markets in Tamale, Accra and Bolga, constituting almost 82% of sales (Table 3.6).

According to the transporters interviewed in the Dormaa-Ahenkro/Sunyani study area, the volume of trade in eggs and feed is higher during festive periods, particularly between October and December, with about 63% of annual trade volumes compared to about 37% during non-festive periods. The majority of products transported are offloaded directly at the final sales destination. From the destination point in Accra, the owners redistribute the eggs to different customers located at places such as Dansoman, Kasoa and Agbogbloshie, while in Takoradi, eggs are redistributed to places like

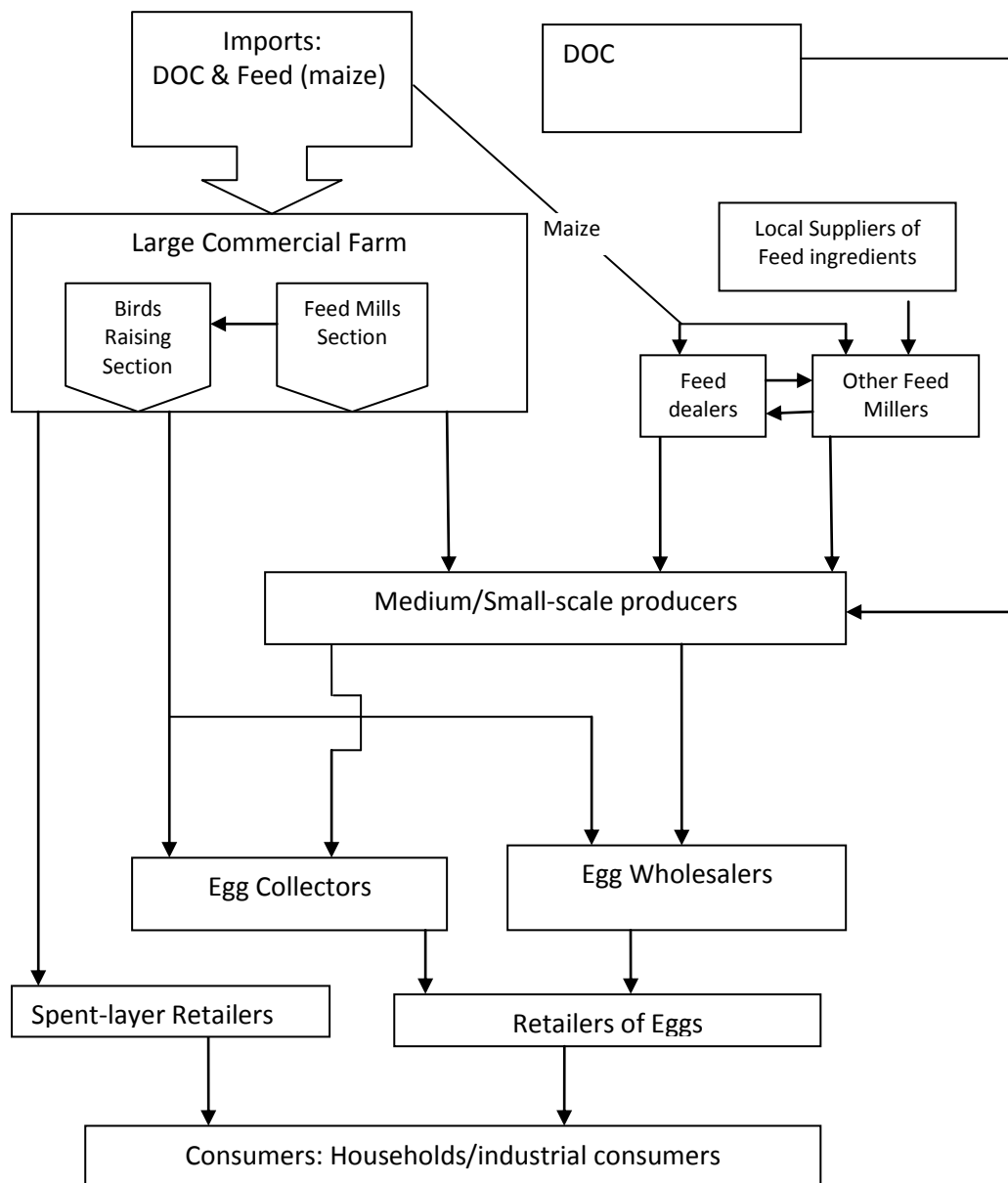


Figure 3.3. Layer value chain, Dormaa/Sunyani study area

Sekondi, Twaban and Shama and Cape Coast (in the Central Region). Transporters load and transport poultry items once a week and it is usually a full truck load, but sometimes about 75% full.

At retail, the average volume of spent layers sold by retailers ranges from 6 to 25 birds per day and the modal unit selling price ranges from GHS 6.00–8.00 at Sunyani. On average, about 312 birds are sold per month, valued at GHS 2,184, by retailers. The supply of birds comes from a number of large-scale farms, including those located at Sunyani and Chiraa. The sources, destination, prices and sales volumes of the retailers interviewed are presented in Table 3.7.

Table 3.6. Primary and destination markets shares of eggs trade by wholesalers in Sunyani

Trader	Primary Market	Market Share (%)	Destination Market	Market Share (%)
1	Dormaa	60.0	Tamale	50.0
	Sunyani	20.0	Bolga	30.0
	Berekum	20.0	Accra	20.0
2	Dormaa	60.0	Tamale	80.0
	Sunyani	30.0	Accra	15.0
	Berekum	10.0	Bechem	5.0
3	Chiraa	50.0	Tamale	50.0
	Dormaa	30.0	Kintampo	25.0
	Nsuatare	20.0	Wenchi	25.0
Mean	Dormaa	50.0	Tamale	60.0
	Sunyani	16.7	Accra	11.7
	Chiraa	16.7	Bolga	10.0
	Berekum	10.0	Kintampo	8.3
	Nsuatare	6.7	Wenchi	8.3
				Bechem

Table 3.7. Sources, destination and selling price of retail birds, Dormaa-Ahenkro/Sunyani study area

Retailer	Supplier markets	Selling price (GHS)	Volume of sales per day (birds)	Buyer markets
1	Dormaa Ahenkro	5.00–7.00	6–10	Accra
2	Sunyani, Fiapre Dumasua	6.00–8.00	20	Sunyani and its environs
3	Fiapre, Chiraa, Domasi	6.00–7.00 (layers) 6.00–8.00 (broilers)	20–25	Abesim, Bechem and Sunyani
4	Fiapre, Sunyani	6.00–8.00	8–10	Sunyani and its environs
5	Sunyani, Chiraa, Fiapre	6.00–8.00	10–15	Sunyani and its environs
6	Sunyani, Nsuatare, Chiraa, Wawaso	6.00–8.00	9–12	Sunyani and its environs

3.2.2.3 Governance and coordination mechanisms

Relationships between some of the actors are summarized in Figure 3.4. Like the layer sector in Kumasi, market coordination in Dormaa Ahenkro/Sunyani is relational based. For instance, feed millers have long lasting relationships with input dealers and farmers, despite not maintaining any formal contractual arrangements with their clients. Interviewed producers in this region have contractual agreements with buyers and the agreement indicates the terms for selling the eggs. The producers have been selling to largely the same buyers and have relationships that have lasted for about 7–8 years on average with the traders.

Some degree of market conflicts was reported among intermediaries and producers in the layer chain. Interviewed producers noted that middlemen are the most powerful, with producers always relying on them for money to pre-finance production. In addition, traders often complain of the quality of products and ask for price discounts for lower quality while insisting on large volumes of

eggs, and this affects the flow and price of the eggs. One collector reported that wholesalers are powerful actors in the chain because wholesalers have capital, insist on large volumes, ask for discounts on low quality eggs, and sometimes delay payments. Conversely, traders noted that producers often demand advance deposits to guarantee supplies of eggs, which is done sometimes about six (6) months prior to egg production and also before the beginning of the production cycle. Farmers sometimes collect several deposits from other wholesalers and sometimes cannot meet the quantities that have been guaranteed.

Associations exist among producers, collectors, wholesalers, and transporters in the Dormaa Ahenkro/Sunyani study area. However, with the exception of the farmers association, most associations at different nodes of the chain have little influence on bargaining or marketing of products. Retailers interviewed noted that the farmer association allows them to set the minimum price for their birds and to normally insist on the purchase of large volumes of birds. During the outbreak, however, they were not insisting on the purchase of large volumes. While retailers do not belong to any poultry association, they attempted to form an association during the last HPAI outbreak to enable them to share market information and identify new opportunities; previous attempts at creating an association had largely failed, however.

3.2.2.4 Public policy and regulation

Public policy does not play a major role in this sector in Dormaa Ahenkro/Sunyani. Poultry producers must pay and receive movement permits for their products from the local veterinary office, while collectors, transporters, and wholesalers pay taxes to the district assembly and obtain waybills for the movement of eggs to the various destination markets. For transporters, waybills are paid at a value of GHS 8 to the district assembly. Informally, a transporter may pay about 2 crates of eggs and GHS 3 at checkpoints during transit. At the retail level, retailers pay daily fees to the Sunyani Municipal Assembly and also pay separate fees for waste management as well. The retailers noted that during the HPAI outbreak, veterinary officers once came to inspect their birds and cages, but have not visited since.

3.2.3 Accra/Ashiaman/Tema study area

3.2.3.1 Characteristics of major actors interviewed

Breeders/hatchery

The hatchery/breeder, Afariwa Farms, which was interviewed in the Accra/Ashiaman/Tema study area also named other known breeder farms as Darko, Akate and Asamoah and Yamoah Farms which are located in the Kumasi study area. Afariwa Farms sells DOC to a number of customers and has been a breeder for at least 18 years.

Feed millers

Two feed mills, the Central Feed Mills located at Oyarifa and another owned by the Greater Accra Poultry Farmers Association (GAPFA) located at Sakaman near Dansoman were interviewed in the Accra/Ashiaman/Tema study area. Central Feed Mills manufactures poultry and livestock feed.

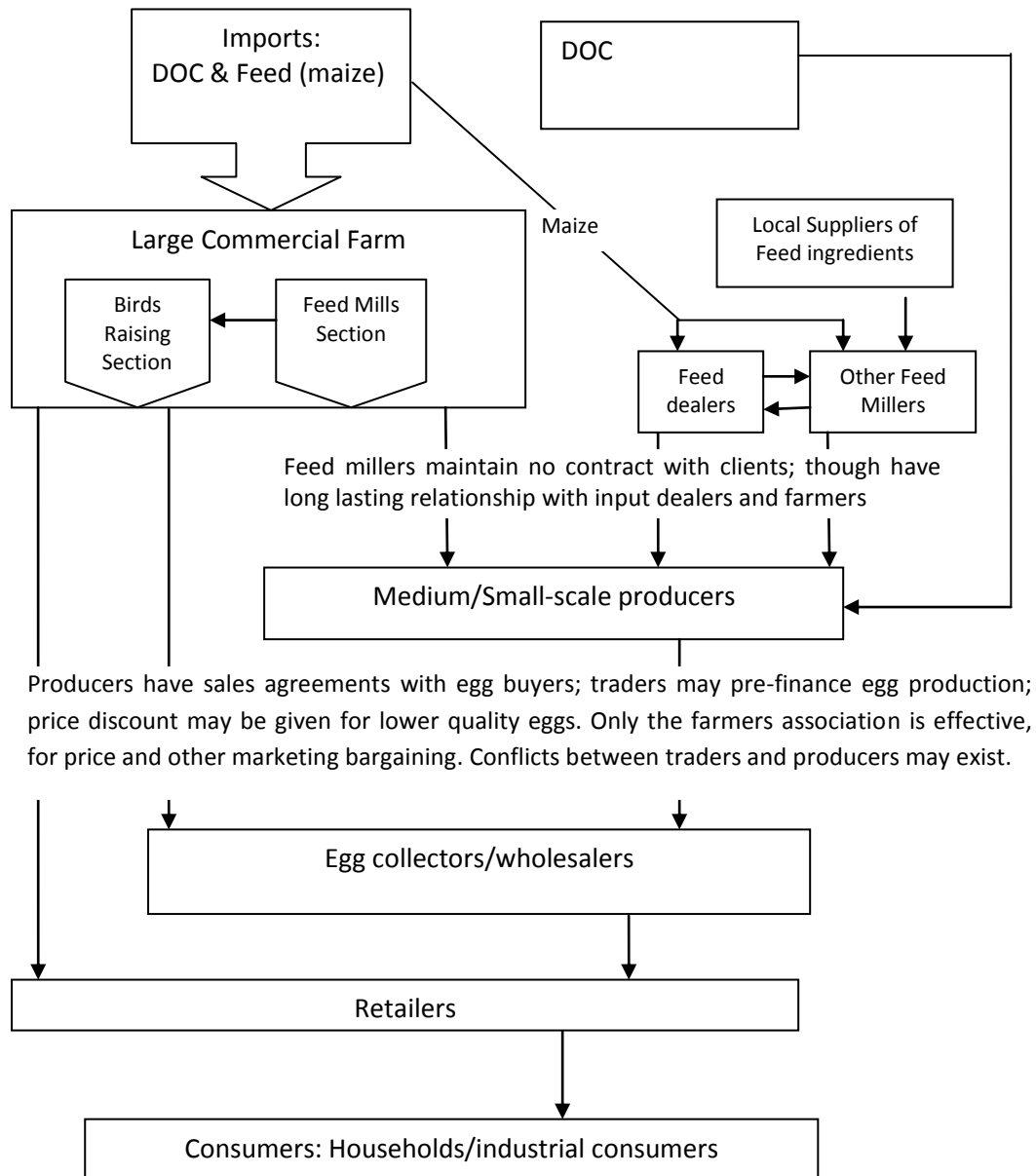


Figure 3.4. Layer value chain, Dormaa/Sunyani study area: Governance

Practices in the feed distribution system that may be linked to the risk of HPAI disease spread include unregulated circulation of ingredients such as maize, fish meal, and soybean meal used in the production of feed, an absence of safety measures such as disinfection, and transportation of infected products. The free movement of vehicles and humans could also be a link to the risk of HPAI. Some of the raw materials used for poultry feed are imported. Some specific biosecurity measures enforced by the Central Feed Mills in their daily operations include: (i) routine disinfection of the factory (every three months); (ii) disinfection of transport vans; (iii) feet spray to kill foreign pathogens; and (iv) no re-use of bags used to package feed. The associated costs for biosecurity measures include the chemicals and sprayers. In addition, testing for the moisture content of maize also comes at a cost. The representatives of the GAPFA identified no special biosecurity measures in place, but indicated that they do not re-use bags.

Producers

Three layer producers were interviewed in the Accra/Ashiaman/Tema study area. One of the layer (eggs) producers, Amas Poultry Farms, also produces broilers, feed and undertakes processing of birds. The main inputs used are DOC, feed, cages for the birds and medicines, while the main outputs of economic value are eggs and the spent birds. Cages are used to house laying birds and the deep-litter system for the broilers. In terms of waste management, the bird droppings (waste) are sent outside the poultry house and burnt in a dug-out pit in a field. Biosecurity measures include the use of disinfectants and preventing livestock from outside from contaminating the feed.

Transporters

There are currently 3 transporters located at the GAPFA premises (feed mills). Two drivers (transporters) were interviewed. Feed transportation is a vital part of poultry production and could have a link in the risk of HPAI disease spread. The major stakeholder groups that do business with transporters are poultry farmers and feed mills. Transporters move feed from feed mills to depots and to the farms of individual farmers. They also transport raw materials from the point of purchase to the feed mills. They own Kia and Daewoo mini trucks that are used in transporting feed. Trucks are cleaned and kept neat all the time. There are no disinfecting structures at the feed mill, though the farms they deliver to have some forms of disinfecting baths. Bags used for delivering feed are not re-used.

Retailers (spent layers and broilers)

The retailers interviewed in the Accra/Ashiaman/Tema study area participate mainly in the sale of broilers and spent layers. The birds are housed in cages at the market. Birds are either sold live or dressed on request from customers. The retailers have no cold storage facilities so the birds are kept and sold live, except when slaughtered and dressed upon request from customers. In terms of waste management, sand is spread on the droppings of birds and swept from the cages. The waste is then sent to a refuse dump situated some meters away from the market. Currently there are no explicit costs associated with such practices.

Egg retailers

Retailers purchase their eggs from wholesalers who bring the eggs mainly from Dormaa-Ahenkro, Sunyani and Kumasi. The retailers either resell eggs in bulk to those who cook the eggs for sale, to food vendors (those who cook and sell rice) and tea sellers who fry the eggs, or to individual consumers who come to buy directly from them.

3.2.3.2 Product flows and values

In terms of inputs, poultry producers normally come to Central Feed Mill to purchase poultry feed. In 2008, GAPFA produced and sold 280,000 bags (approximately 14,000 tonnes) of poultry feed, nearly all (99%) to its members at subsidized prices (price per bag GHS 9, i.e. GHS 180/ton). The feed is purchased on the premises of the association by members. The remaining feed is sold to non-members at a slightly different price, about 5% more.

Products (table eggs and spent layers) of the farms are sold to hotels, restaurants and the local market. Spent birds are sold to individuals through retailers at the local market. Transporters in this chain mostly transport feed to farmers at Kasoa, Mallam, Gbewae, Zero and around Dansoman. They transport between 30–50 bags (1.5–2.5 tonnes) of feed a day and work 6 days per week. The fare ranges between GHS 2–15 depending on the distance. To help farmers minimize the costs of

transporting feed, they combine the transport of feed to groups of small-scale farmers whose farms are located around the same vicinity. Usually groups of 3 to 5 farmers would receive their feed from the feed mill together.

3.2.3.3 Governance and coordination mechanisms

Coordination of production in this layer chain was not as prevalent as in the other two chains, though limited information on this was reported during informant interviews. Issues with input suppliers, particularly feed, influence the cost structure for breeders, hatcheries, and producers. Associations exist at the input (feed) and producer level, with the latter serving to provide subsidized feed to its members.

3.2.3.4 Public policy and regulation

Most reported public policies concern taxes paid by actors within the sector. The feed sector reports that there is a tax paid to the local council for its operational license and another paid to the Internal Revenue Service for operational purposes. These costs are not exorbitant for feed millers. There are also some regulations which are enforceable by the Ghana Standards Board. According to the interviewed millers, officials of MoFA and Ghana Standard Board do random checks on feed to ensure safety and conformity with production standards set by the government. According to GAPFA, high corporate taxes are paid every year. For instance, about GHS 100,000 was paid as corporate tax in 2008. There have not been any major changes in government regulations, actions by powerful actors, or in the functions of the Feed Millers Association over the past three years since the first HPAI outbreak. Trade policies that restrict the import of maize and the import/export of live birds impact the hatchery/breeding sector as well.

3.2.4 Tamale study area

3.2.4.1 Characteristics of major actors interviewed

Producers

From the survey, inputs identified as used by commercial farmers are concentrates (i.e. formulated feeds), vitamins and labour. The main products of the commercial poultry farms interviewed include eggs (and spent layers), broilers for the Christmas season and manure.

The farmers interviewed practice an intensive system where the birds are housed and fed (deep-litter system). The housing structure in the farms interviewed basically consists of two parts: a base and a top. The base is made up of either concrete or wooden walls about 50 metres in length and the top is made of wire mesh up to the roofing level. The poultry house is roofed with zinc sheets. According to the farmers, wire mesh is provided to prevent wild birds from entering the farms. Footbaths are also located at the entrance of poultry houses for visitors to step in before entering the house to prevent them from introducing micro organisms into the poultry houses. DOC are purchased in Kumasi and transported to Tamale usually in the evenings. The purchase price for DOC is GHS 0.95 per chick. Formulated feeds are purchased from an Agricare sales outlet in Tamale. Purchase prices of feeds are: layer concentrate—GHS 1300 per tonne, grower concentrate—GHS 920 per tonne, chick growers concentrate—GHS 1360 per tonne, broiler concentrate—GHS 1610 per tonne, chick mash—GHS 1060 per tonne and broiler mash—GHS 1040 per tonne. Bird waste such as manure is used on crop fields, while feathers are burnt.

The following actors were identified by the farmers interviewed to be participants in the poultry industry: breeder/hatchery, farmers, traders and consumers. According to the respondents, farmers and traders have a major role in minimizing poultry diseases. The study revealed that dead birds are usually taken by the farmers for post-mortem inspection and veterinary officers also come around to vaccinate the birds. For post-mortem inspections, the VSD charges GHS 1.20 per bird.

Apart from raising poultry, commercial farmers also cultivate crops, especially maize for both home consumption and feed for livestock. The commercial farmers interviewed noted that about 50% of their income comes from the poultry business and is seasonal in nature. During festive occasions such as Christmas, they receive more income from the poultry business. Most of the commercial farmers (67%) said poultry income is very important to them since their families rely on it.

Retailers

Retailers in Tamale sell dressed birds (thighs and wings) and eggs. The major sources of supply of dressed birds include wholesalers in Accra, Tema, and Kumasi, or stock is taken from Sunyani. On the other hand, about 85% of the supply of eggs is from Sunyani. Egg sellers in Tamale comprise three groups which are based on the days that they receive their supply of eggs. Egg consignments usually arrive in Tamale on Mondays, Tuesdays and Thursdays from wholesalers in Sunyani for the different groups. The major upstream customers of retailers are producers, collectors and wholesalers, while downstream customers include other retailers and consumers.

Retailers rent shops in the market. Deep freezers are mostly used for storing dressed birds, while eggs are kept in crates and stored in the shops. The operational costs to the retailers include electricity bills, costs of crates, rent for the shop and payment for security.

Apart from dealing in poultry products, the retailers interviewed are also engaged in the sale of frozen fish and petty trading. The shares of income derived from these activities are: petty trade, 30%; frozen fish, 50%; and poultry products, 20%. According to these retailers, their income from poultry has fallen in the last 3 years because most people consume more fish than poultry now.

The transport charge for transporting eggs from Sunyani to Tamale is GHS 1.30 for a pack of 10 crates. When the eggs arrive, truck boys who do the offloading and move the eggs to the stores also charge GHS 0.15 for every 10 crates. The respondents complained of breakage in the course of egg transportation and retailers have to bear that cost. Retailers interviewed indicated that for every 10 crates of eggs consigned to them they lose about two crates, representing 20% losses.

3.2.4.2 Product flows and values

Figure 3.5 presents the commercial layer value chain for the Tamale study area. The producer sale price of eggs to traders is GHS 4.00/crate for small eggs, GHS 4.50/crate for medium-sized eggs and GHS 5.00/crate for large eggs. The average price for spent layers sold by producers to consumers is about GHS 6.50 per bird. During the Christmas period, producers sold broilers at prices ranging between GHS 8–9. Retailers record good sales during December and January and during this period, they can sell about 80–100 crates per week (estimated to be about 390 crates or GHS 2,250 per month). However, sales of eggs drop to about 120 crates per month, valued at GHS 750, from March onwards. The drop in sales is a result of the hot season (i.e. changes in the weather). According to retailers interviewed, during this time (March), many people do not take tea which is normally accompanied by egg bread as a meal; also, due to heat stress, the birds do not lay many eggs. In addition, eggs cannot be stored for a long time during this period because of the higher

temperatures. Hence, stock and sales volumes are both low. As with producers, the prices of eggs sold by retailers depend on the grade (size) of the eggs. The price for larger eggs ranges from GHS 6.00–6.50 per crate, while the price for smaller eggs ranges from GHS 4.50–5.50 per crate. For dressed birds, about 1200 birds are sold in a month, but this figure could rise to more than 7200 birds during festive periods.

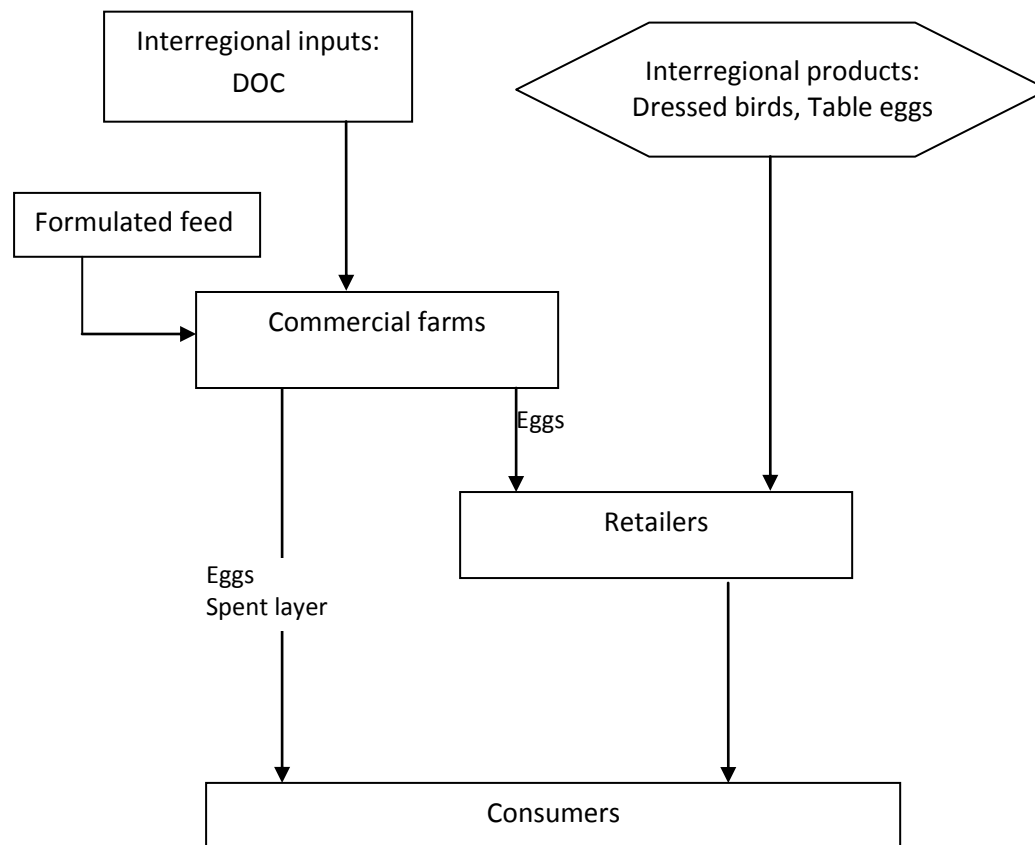


Figure 3.5. Layer value chain, Tamale study area

3.2.4.3 Governance and coordination mechanisms

Governance in the layer chain in Tamale is a mix of ad hoc and relational coordination. According to producers, some customers are regular buyers while others are occasional buyers. In addition, producers will often sell eggs on credit to their customers because of long-term relationships and trust. Informant interviews revealed the existence of contract arrangements (based on quantity) further downstream between the retailers and wholesalers of eggs who are based in Sunyani. Normally retailers request for a certain quantity (number of crates) of eggs that the wholesalers should supply to them. There is, however, no arrangement on prices and payments. Prices are charged based on current market prices. The retailers interviewed said that as a result of these contracts, they had problems with their wholesalers during the outbreak of HPAI because they could no longer take all of their supplies, while wholesalers also complained that they could not return the eggs since an arrangement was made on the number of crates the wholesalers were to supply. Therefore retailers were compelled to receive all of the contracted eggs. Also, wholesalers maintained the selling price of the eggs to the retailers, but retailers had to reduce their market price

during the outbreak. Associations were reported at producer level but not among retailers or other actors in the chain.

3.2.4.4 Public policy and regulation

The main public policy reported in this chain relates to taxes. The following payments are made by retailers: yearly property rate—GHS 40; income tax—GHS 1 per month; value-added tax (VAT)—GHS 10 every 3 months. During the HPAI outbreak, the retailers also paid for movement permits of GHS 7 before eggs could be transported to Tamale. There have not been major changes in the activities that affect the operations of the retailers except for the changes in the amount retailers pay as VAT. In 2006, GHS 5 was paid as VAT, which was increased to GHS 8 in 2007. In 2008, the VAT was increased again to GHS 10.

3.3 Commercial broilers

Most of the characterizations of the actors under the commercial layer chain are applicable to the characterization of the actors under the commercial broiler chain for the different study areas.

3.3.1 Kumasi study area

3.3.1.1 Characteristics of major actors interviewed

Breeders/hatchery

The operators of hatcheries in the Kumasi study area include Darko, Topman, Mfum, Asamoah and Yamoah, Akate and Jerusalem Farms. According to the hatchery operator interviewed, Akate Farms has the largest capacity of hatchery space—about 550,000 eggs—and produces the largest number of DOC per day. Also, Akate Farms hatches both broilers and layers, while Darko Farm produces only layers currently. Darko Farms used to hatch broiler DOC, but stopped when it closed down its broiler farms. Otherwise, characterization of the hatchery operators interviewed for the present study is described under the commercial layer chain above.

Feed millers

The broiler feeds produced by feed millers in the study area include broiler mash and chick mash. The raw materials used in the preparation of broiler feed include soya, wheat bran, fish meal, synthetic amino acids, di-calcium phosphate and cottonseed cake. Fish meal, synthetic amino acids and di-calcium phosphate are mostly imported. The prices for broiler feed are as follows: broiler mash—GHS 41 per 50 kg; chick mash—GHS 41 per 50 kg. According to the informant from Darko Farms, prices charged by feed mills change frequently, almost every two months. Price changes result from variability in the prices of raw materials. A proximate analysis of feed nutrient content is carried out to ascertain its nutritional value before the feed is sold. GHAFCO used to be the leader in the feed milling industry. Currently, Agricare is the leader in Ashanti Region, followed by GHAFCO and then Darko Farms.

Producers

Two firms, namely Akate Farms and Asamoah and Yamoah Farms, which produce broilers for sale (among other poultry products), were interviewed in the Kumasi study area. Topman and Darko Farms stopped broiler production since the marketing of broilers was not profitable. The two farms

interviewed have their own hatcheries and therefore produce their own DOC. The major production system used by the farms is the deep-litter system. However, Asamoah and Yamoah Farms uses a tunnel-ventilated system to house its broilers.

Collectors

Collectors in Kumasi trade in broilers in addition to other poultry products. They obtain their broiler birds from farms around Kumasi and its environs such as Asamoah and Yamoah Farms and Akate Farms. On most occasions, the collectors go around the various farms and verify whether the farmers have birds for sale, after which they go to buy the birds to sell to market women, who in turn retail them to their customers. Those collectors who double as retailers at the various markets give some of the birds to their fellow traders and keep some for themselves to sell to their customers. The collectors do not mix broilers, layers, parent stock, cockerels, as each type is kept in a different cage.

Transporters

Transporters do business with live-bird traders, among other actors. The vehicles used in carrying live birds have numerous openings to allow fresh air into the vehicle during transport. There has not been any significant improvement in the practices of transporters in transporting live birds (during versus after the HPAI outbreak). They clean their vehicle with kerosene and Dettol after every trip.

Retailers

Retailers sell broilers along with other poultry like spent layers, cocks and parent birds. However, all the retailers sell broilers and parent birds only during festive periods such as Christmas and Easter. Due to the high cost of broilers and parent birds, customers purchase them mostly during these festive occasions as gifts for relatives and for home consumption, according to the respondents. Also according to the retailers interviewed, farmers sell these broilers and parent birds directly to consumers during festive occasions.

Processors

Processing services provided by market retailers is a form of incentive they offer to their customers. It was observed that all retailers in the two markets provide these processing services free of charge. Birds such as broilers are dressed upon request by customers. However, the processing service provided by Akate Farms (commercial farmer) is factored into the cost of the bird. When birds are dressed, they are priced based on their weight. At Akate Farms, dressed birds are sold for GHS 3.50 per kg. The processing unit of Akate Farms is closely linked to its broiler production unit.

The processing plant at Akate Farms is fully automated. Market retailers use boiled water to process the birds and the whole process is manual. Market retailers have no biosecurity measures in place. For the commercial farmer-processor, workers in the processing plant change into factory clothes at the beginning of their work shift.

3.3.1.2 Product flows and values

Figure 3.6 presents the value chain map for the commercial broiler chain for the Kumasi study area. The flow of broiler DOC and matured broilers is similar to the flow of layer DOC and spent layers; agents dealing in commercial poultry birds in most instances handle both layers and broilers. Breeders produce DOC which are sold to large farms. According to the hatchery operator interviewed, there is seasonality in broiler production. Between August and October, demand for broiler DOC goes up as farmers begin to rear broilers for Christmas. Production slows down in November and December and starts rising again from January. This is to cater for demand during

Easter. The major broiler DOC production period is between August and February. The price charged for DOC at Akate Farms is GHS 0.90. Akate Farms supplies its DOC to certain agents. These agents could take some of the DOC to Togo and Benin. Akate Farms plans to export to D. R. Congo, Senegal, and Côte d'Ivoire. They can produce about 20,000 DOC a day, but production is based on request or market demand.

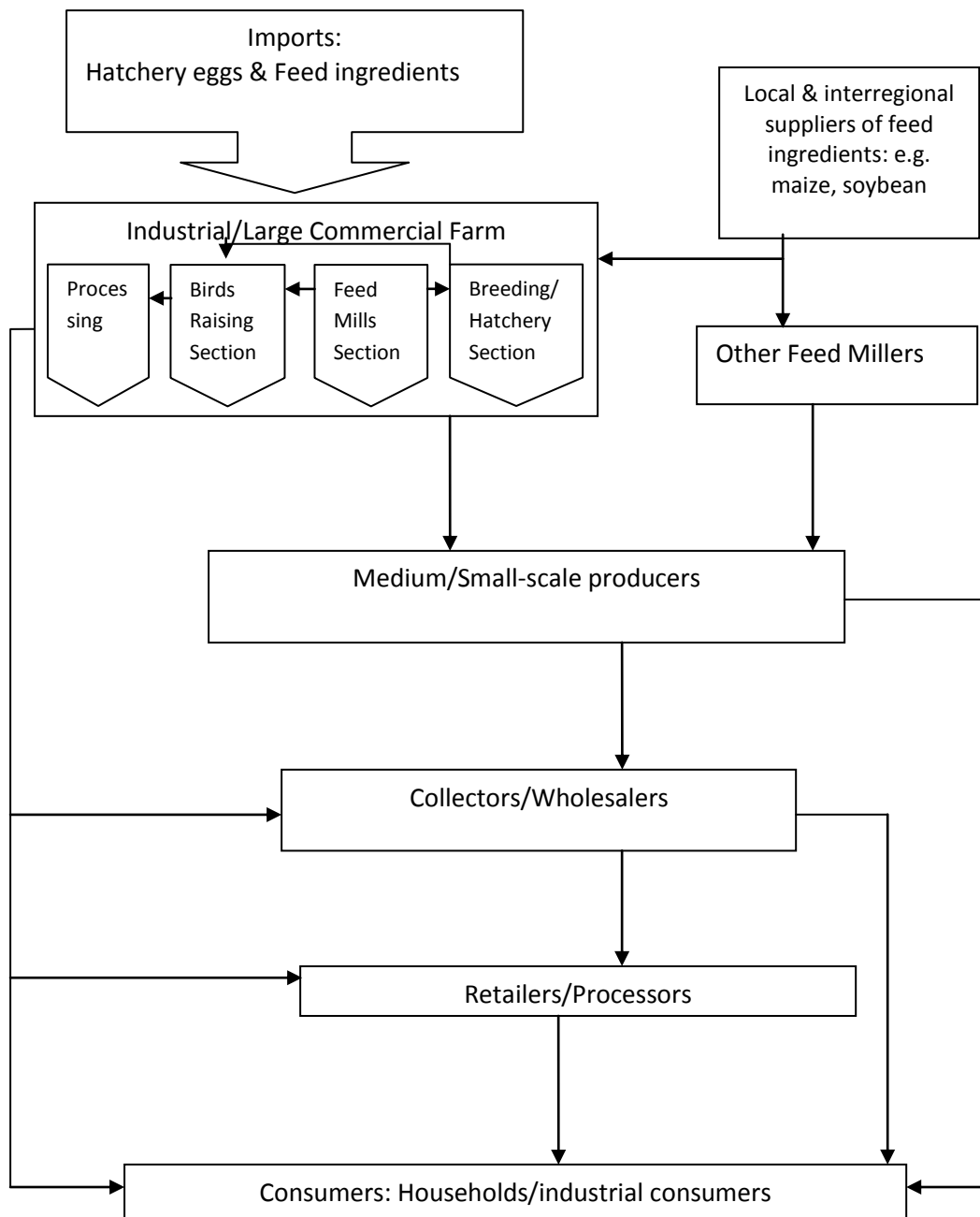


Figure 3.6. Broiler value chain, Kumasi study area

Producers sell their broilers to different end-destinations via collectors and other traders. For instance, Akate Farms supplies its broilers to certain institutions, hotels, and restaurants and sells about 200 or more broilers a week, which is estimated to be about 800 birds (or 1600 kg) per month and worth about GHS 5600. Asamoah and Yamoah Farms produce about 25,000 to 30,000 broiler birds for the market during Christmas. The estimated average production of broilers by farms is about 4583 birds per month, valued at GHS 27,498.

Collectors buy the birds from GHS 5.0–6.0 and sell them at GHS 6.5–8.0 depending on the weight of the bird and the type. Similar to layers, during the festive seasons, birds are relatively cheaper due to increased production by farmers to meet higher demand. Respondents (collectors) obtain about 70% of their birds from Akate, Nfum, Topman, Asamoah & Yamoah Farms and about 30% from Vex, Dandark, Fumesa and Anuafofomensa Farms. Most birds are sold in Kumasi Central Market, the Adum Railways and surrounding markets. The volumes of birds purchased by collectors from large farms and medium/small-scale farms in a month are 420 birds and 180 birds, respectively, and their estimated monetary values are GHS 2520 and GHS 1080. Collectors then sell about 540 birds with estimated value of GHS 4320 to retailers and about 60 birds with estimated value of GHS 480 to consumers.

Live birds (broilers) are transported from Akate Farms and Asamoah and Yamoah Farms, among other poultry products from these two and other poultry farms. The volume of trade depends on the season. Transporters could not give the proportion of broilers and other poultry products they transport. The major destinations for the products shipped by transporters are Tema and Accra. In Accra, most of the products are discharged at Kantamanto Market, La, Accra Railways, Mallam Atta Market, and Teshie Market.

The number of trips per week varies seasonally. During Christmas, they could transport either birds or feed every day of the week. Between 200 and 400 live birds could be transported on each trip and the charges for the transportation of birds ranges from GHS 180–200 per trip. Transporters are not responsible in case of any losses of stock in transit.

Most retailers receive their birds from farms within Kumasi and its environment (Akropong, Ejisu, Fumesua, Konongo, Obuasi and Nkawie) and sometimes Sunyani. On average, retailers receive about 5600 birds in a month during the festive period, with an estimated value of GHS 33,600.

Picture 3.3 shows birds offered for sale at the retail level in Kumasi. Retailers from both markets surveyed indicated seasonal variation in the volume of business. During Christmas, Easter and other festive periods, 200–300 birds could be sold in a day by retailers in the Roman Hill Market, while 20–30 are sold during other days. Retailers from the Roman Hill Market interviewed said they could purchase about 1400 birds during festive periods and sell them within four days. Retailers in the Railway Market could sell 100–150 birds a day during festive periods and 10–15 birds per day during other periods. There are seasonal variations in the price of the birds, too. The price for broilers is GHS 8–10 during festive seasons and GHS 9. The monthly sales volumes of birds by retailers to consumers, during the non-festive period, averaged about 480 for live birds and 540 for dressed birds, and these are have estimated sales values of GHS 4560 and GHS 5130, respectively. For the festive period, the monthly sales volumes of retailers were estimated at about 5600 live birds (with estimated sales value of GHS 50,400) and 840 dressed birds (with estimated sales value of GHS 5460).



Photo 3.3. Broilers being retailed at a live-bird market in Kumasi.

3.3.1.3 Governance and coordination mechanisms

Similar to the layer sector, the broiler chain in Kumasi is fairly integrated. Most of the hatcheries are owned by large farms and these farms are integrated with their own feed mills, processors, DOC and rearing farms. For example, Akate Farms and Asamoah and Yamoah Farms that do broiler production have an integrated production system. Relations between actors are summarized in Figure 3.7. In addition, there are some forms of payment arrangements between collectors and producers who will take partial payment for the birds and allow the collectors to take the birds to their various destinations and pay in instalments until all of the birds are sold. Further downstream, retailers do not purchase their birds from a particular farm but from any farm that is ready to sell its broilers. The retailers have contacts with most of the farmers and when the birds are ready for sale, the farmers would contact the retailers. Occasionally, these retailers would also contact the farmers. Prices are uniform in the various retail markets. Association relationships in the broiler chain are similar to those in the layer chain in Kumasi.

3.3.1.4 Public policy and regulation

In addition to what is already described in section 3.2.1.4 above for the layer chain, it is noted that collectors dispose of waste (feed, faeces and feathers) at the public refuse dump. Like retailers, collectors do not face roadblocks or require movement permits or health permits when transporting poultry, and do not follow any inspection procedure.

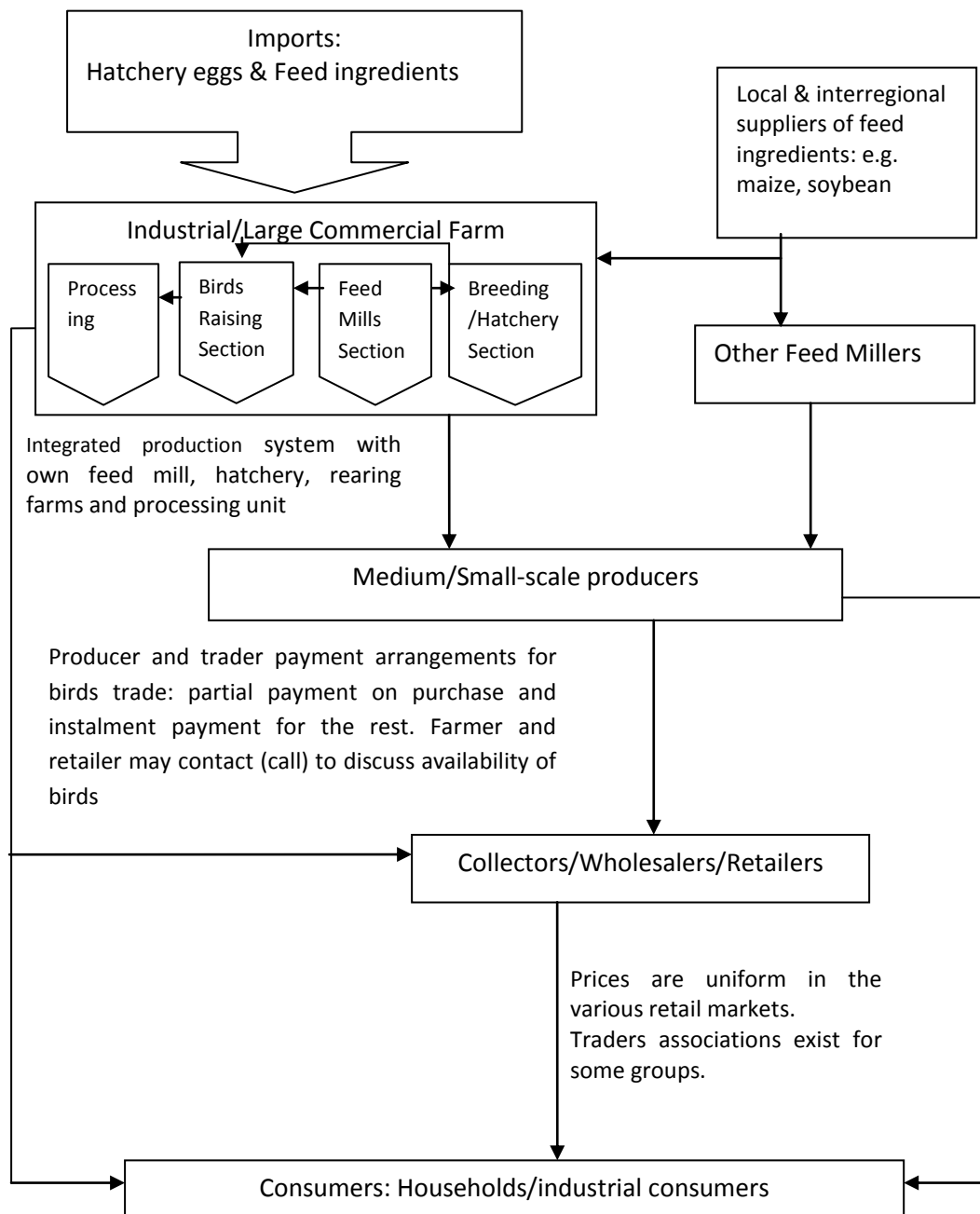


Figure 3.7: Broiler value chain, Kumasi study area: Governance.

3.3.2 Dormaa-Ahenkro/Sunyani study area

3.3.2.1 Characteristics of major actors interviewed

Feed millers

As described in 3.2.2.1 above.

Producers

According to the broiler producer interviewed, the major sources of DOC in Ghana include Darko, Afariwa and Akate Farms. The producer houses broiler DOC in an enclosed area. According to the

producer interviewed, the waste cleared from the poultry farm is sent to a refuse area. The waste is sometimes collected by nearby vegetable farmers to be used as manure. There is regular disinfection of the pen. In addition, the farmer wears specific clothes to work in the pen in order to prevent infection from clothing that has been worn outside.

Traders

Six retailers, five located in Sunyani and one located at Dormaa-Ahenkro, were interviewed from the Dormaa-Ahenkro/Sunyani study area. The retailers sell broilers in addition to layers (spent layers) and cockerels, but they deal more in spent layers.

Poultry shops

The poultry shop is a cold store that sells imported poultry products such as chicken, turkey, and pig feet as well as beef. The shop has a large cold storage facility and the products are well packaged and stored for the customer to buy. They make sure the products are certified from the importing country. The Food and Drugs Board in Ghana also certifies the products before sale to the public. There are costs associated with the current measures to provide safe products to customers. Sales from livestock products and fish account for 70% of the shop's income, while income from poultry products accounts for 30%.

3.3.2.2 Product flows and values, including seasonality issues

Destinations for broiler products include hotels and restaurants, and the local market. The supply of broilers is geared towards occasions such as Christmas and Easter. The majority of customers for broilers are market women and individuals. Broilers are sold directly to retailers, with the volume of birds sold by a retailer ranging from 144–600 birds per month and the unit selling price ranging from GHS 6–8. Broilers come from a number of sources including Sunyani and Chiraa. The poultry shopkeeper interviewed imports broilers from countries such as Argentina, Holland, India and Denmark. About six containers arrive in every consignment. When HPAI was reported, imports were restricted to Brazil and Argentina only. Brazil and Argentina are the current suppliers and there is a contract agreement with exporters there. The current customers of the shop include households, restaurant operators, food vendors from and around the Sunyani municipality and nearby districts such as Dormaa, Sampa and Techiman. There is no contract agreement with any of the customers.

3.3.2.3 Governance and coordination mechanisms

Governance relationships in the broiler chain in Dormaa Ahenkro/Sunyani are mainly relationship-based in nature. Interviewed millers have long lasting relationships with their clients. They normally do not have any contract arrangements with the clients, but they sometimes provide credit to their customers. It is expected that governance relationships here are similar to those found in the layer sector.

3.3.2.4 Public policy and regulation

Taxes and inspections are the main form of public policy affecting this chain. Millers are registered and taxed annually. They have permits to operate from the district assembly. Sanitation inspections are normally conducted by veterinary officers on the premises. The tax and waybill elements are the most important items that affect the livelihoods of the interviewed millers. The frequent increases in the taxes and rapid fuel price increases experienced last year (2008) are of concern to the millers.

Retailers pay daily fees to the Sunyani Municipal Assembly and also pay separate fees for waste management. The retailers interviewed noted that during the HPAI outbreak, veterinary officers once

came to inspect their birds and cages, but since then, they have not returned. The poultry shop pays import duties on the poultry products it imports and obtains a permit from the quarantine service and certificate from the Food and Drug Board before transporting the products to Sunyani. The taxes affect the operations (and therefore the income and livelihood) of the operator more than the permit and the certification costs do.

3.4 Traditional (local) poultry

3.4.1 Tamale study area

3.4.1.1 Characteristics of major actors interviewed

Breeders/Hatcheries

One individual operator and two institutions, Animal Research Institute (ARI) and Pong Tamale Veterinary College, were identified to examine breeding/hatchery operations in the Tamale study area. After interactions with ARI and Pong Tamale Veterinary College, it was realized that they do not engage in breeding. They hatch guinea fowl eggs using incubators. The individual operator was interviewed for information on hatchery operations. This farmer (who is also a carpenter/saw miller) made his own incubator with a capacity of 10,000 eggs. He hatches only guinea fowl eggs gathered from other farmers, raises the keets until they are 6 weeks old, and then sells to other farmers and non-governmental organizations (NGOs) (e.g. CARE International). The hatchery operator interviewed indicated that the major problem for farmers rearing guinea fowls is raising the keets past the six-week critical period into growers and that is what the hatchery operator specializes in.

He has a brooder house built with mud to the knee level and net from the knee level to the roof level, and roofed with zinc. The floor of the brooder house is cement and covered with wood shavings. He uses feed and water troughs which were purchased from veterinary drug stores. He uses concentrates formulated with crushed maize and follows a recommended medication regime for raising guinea fowl.

According to the hatchery operator, the other non-poultry activities he engages in include the construction of incubators for sale to NGOs and other farmers, other wood furniture, and sawmilling. The hatchery operation, which was established two years ago, is a fairly new enterprise for him, and he is investing because there appears to be high demand for guinea fowl. The percentage contributions of income derived from the various activities are: hatchery and guinea fowl rearing—about 40%, construction of furniture and wood products 30%, and sawmilling 30%.

Producers

The farmers interviewed in the Tamale study area revealed that producers of local birds rear the following birds: local chickens, guinea fowl, ducks, turkeys and doves. Among these birds, chickens and guinea fowl are kept by most farmers in relatively larger numbers than the other types of poultry.

Inputs used by farmers in the production process include cereals such as millet, sorghum, and maize. Other inputs include the chaff by-products from the processing of cereals into other products. Protein sources of feed are mainly from termites, fed by the farmers mostly to starters (growers). A

farmer starting poultry may purchase a number of growers from the market or other farmers. Other new entrants get their starter stock by managing the breeding birds of other persons or through gifts.

The interviews revealed that most of the farmers (producers) in this sector of the poultry industry practice a free-range system: the birds are housed in pens, with brooder hens kept in locally made cages, with the other stock in the pen or isolated during the night. During daytime, the birds are released to scavenge for food, with their diet supplemented with cereals. The different types of poultry are raised in the same way. Farmers depend heavily on herbs (bark of mahogany, "*gbaric*", pepper etc.) as sources of medicine for preventing and treating most poultry diseases. Medicines such as vaccines and dewormers are purchased from veterinary drug stores. Labour is mostly provided by the farmer and members of his family. Most farmers clean their pens when they feel the pens are dirty enough. Water troughs (*nosaya*) are mostly made of clay. Other farmers use broken pots as water troughs. A '*no Sali*' costs about GHS 2. Feeding troughs are not common and farmers feed their birds on the floor.

In the north, the pens are constructed as part of the farmer's house. The cages (*nosugu*) have three main uses: (i) as a nest for hens to lay and incubate; (ii) as a nest for housing brooding hens and their chicks overnight; and (iii) for transporting birds from one place to another. They are of varying sizes for various purposes. The cost ranges from GHS 2–7 depending on the size.

Farmers indicated that there is currently growing interest of farmers and other stakeholders in the production of guinea fowl. This has required farmers to improve upon their management practices and to form associations. New innovations being practiced by these farmers include: the development of a guinea fowl farmers association that provides them a forum to discuss and solve problems confronting them; confinement of keets for at least the first 8 weeks after hatching since this period is a delicate period for guinea fowl; the use of incubators to hatch keets in large numbers; the practice of routine medication (including vaccines, dewormers, antibiotics etc.); and adoption of improved feeds of varying composition such as crushed maize with concentrate or crushed maize and soyabeans.

Farm households are involved in other livelihood activities including the cultivation of crops, petty trading, rearing of other livestock, sheabutter processing, rice parboiling, and as private security men (watchmen). They indicated that the social aspects of poultry rearing are far more important than the economic ones. Economically, the poultry industry contributes about 10–50% to their livelihoods, depending on the size of the flock. Farmers who are members of poultry producers associations, which are fast catching up with farmers in the northern region and which emphasize guinea fowl production, noted that they could make 50–70% of their income from the sale of guinea fowl (both eggs and birds).

Farmers said that birds are used for other varied purposes, such as for sacrifices, resolving other social issues and for meat (food). The quality or value of birds is judged by their colour combinations, size and health status. Those who buy for meat will consider the size and weight of the birds, judging the weight by hand. Exclusion from the market based on quality of poultry birds does not exist in the local poultry market. Farmers noted that birds with some unique traditional colour combinations are not sent to the market, but kept instead for cultural and customary purposes.

Collectors

The major products handled by collectors include chickens, guinea fowl, ducks, turkeys etc. Chickens and guinea fowl are the most common. The collectors interviewed said that if they buy different types of birds, they normally keep the different types in separate cages. Birds of the same type but from different farmers can be mixed in the same cage. Sometimes they mix the different types of birds in one cage if they do not have enough cages. According to the collectors interviewed, when they are constrained by the number of cages available, they mix the birds, though they know it is not the best practice. According to them, they have observed over time that when they mix the birds, they register more deaths. The birds are fed on cereals including maize, sorghum and millets.

The collectors are also farmers themselves, cultivating crops and rearing poultry and other livestock, while a few take up non-farm jobs like watchmen. About 60% of their income comes from the sale of birds and the rest (40%) is contributed from rearing activities.

Wholesalers

According to the wholesalers interviewed (Photo 3.4), the following poultry products are available at the market: local chickens, guinea fowl, small chicks, local eggs, ducks, doves and turkeys. A few exotic birds and eggs were also sold in the market. Wooden and metallic cages are used to house birds in the market. It costs about GHS 50 to make a cage that can hold about 100–200 birds depending on the type and size of birds. Birds are also kept in woven basket cages. A big woven basket cage costs GHS 10, while medium-size cages cost GHS 6 and smaller ones GHS 2.



Photo 3.4. Interview session with local poultry sellers in Tamale.

Initially, chickens were brought from the village by farmers to wholesalers in the market, but over time it became difficult to obtain sufficient supplies this way, so wholesalers began to travel to the villages to buy the chickens themselves. Traders usually travel to the following village markets to purchase birds: Katindaa, Nyankpaladaa, and Savelugu markets.

The survey revealed that wholesalers mixed different species of birds at purchase and selling points. Also, birds from different farms are mixed together. According to the wholesalers, they had been

educated on the signs of HPAI and therefore looked out for those signs before they bought their birds.

With respect to issues of biosecurity, the measures taken are culling out of sick birds and cleaning each morning before business begins. The wholesalers also added that during the bird flu outbreak, the veterinary officers asked them to report any suspected cases based on the signs they had educated traders on.

Apart from trading in poultry, the wholesalers are also engaged in other income generating activities such as farming (5%), petty trading (3%) and casual labour as security men (2%). The proportion of wholesalers engaged in poultry activity only is about 90%. Income from the poultry business is more important to the traders since according to them poultry is their major source of daily income for their livelihoods. Besides this, wholesalers also said that farming is seasonal and as such not very lucrative, adding that they often use the income obtained from the sale of the poultry to finance their farming activities such as payment for labour and buying fertilizer.

Itinerant traders

Itinerant traders of local poultry birds were interviewed in the Tamale Study area. They were identified as traders whose main activity is to buy live birds and transport them across regions for sale. The itinerant traders said that they transport live local birds especially chickens and guinea fowl. They transport different sizes of chickens, from growers to fully grown birds, and the guinea fowl transported are mostly grown birds. The supply of the local chickens is all year round, but that of guinea fowl has major and lean seasons. The season of high supply of guinea fowl is from May when farmers are preparing to farm and peaks at Christmas and New Year, and then falls off again.

The itinerant traders said that in their view, the farmers have the responsibility of ensuring that healthy poultry are raised. Then collectors and traders must also ensure that they buy healthy birds from farmers. The time that the birds are under the care of these traders, they need to ensure that the birds remain healthy. Then, when the birds are finally purchased by the itinerant traders, the risk of diseases is also transferred to them. They also mentioned that they know of MoFA and other service providers who are in direct contact with producers, helping them in several ways, including disease management.

Itinerant traders said that the cost for transport is largely vehicle fares. The empty cages are paid for when transporting them to market places. An empty cage, depending on its size and distance of travel, costs GHS 0.20–0.70. Cages filled with live birds, depending on the size of the cage and distance of travel, can attract fares between GHS 2–7. Other charges include fees for a movement permit and market fees collected by the district, municipal and metropolitan assemblies.

The itinerant traders indicated that apart from the transportation of birds across regions, they also sell birds in their local market, do crop farming, rear some poultry at home, rear some sheep and goats and a few have some cattle with Fulani herders or friends and relations in villages. These itinerant traders noted that all the activities contribute to their livelihoods, especially crop cultivation. The other livestock serve as a buffer, which they fall back on to sell in order to buy foodstuff and meet social obligations such as funerals, marriages, sacrifices, children school fees and related expenses. They also rely on livestock on rare occasions to solve difficult and expensive problems. They indicated that their major source of food stuff is from the crop cultivation. Running

of commercial transport services and sales of birds are the main source of income to meet daily expenses.

Processors

Two major processing groups were identified in the study area. These processors are kebab (roasted poultry) sellers (Photo 3.5) and processing firms (Gees Fresh Point Ltd [GFP] and UDS Meats Company Ltd). The processors identified mainly processed guinea fowl. UDS Meats Company Ltd is the only processing firm engaged in processing of fowl, which are obtained mostly from the University poultry farm. UDS Meats Company Ltd is also involved in processing beef and pork to make sausages and hamburgers. Apart from the processing of guinea fowl, GFP also acts as a wholesaler of imported chicken products such as wings, thighs and gizzards. These products are stored in the cold room and distributed to cold stores and other retailers based on demand (Photo 3.6). The kebab sellers also trade in other non-poultry products such as beef, chevron, mutton and pork. According to the processors their main sources of live birds are from either the farmers directly or the live-bird markets.



Photo 3.5. Processing of guinea fowl by a kebab operator.

However, the kebab sellers also purchase some of the birds from GFP on days that demand for roasted birds exceeds their supply.

The current situation in the study area is that birds are bought from traders and producers and are transported in cages to sites where processing takes place. For GFP and UDS Meats Company Ltd, housing facilities are available for birds to be kept for at least a night before they are slaughtered. If there is a need for birds to be kept for more than a night, more feed and water are provided. Occasionally, the poultry house is swept and the faeces taken out. Feathers left from processing the birds are dumped in a dustbin which is later sent to a refuse dump.

According to respondents, guinea fowl do not survive for more than a day when attacked by any serious disease. Therefore, to ascertain whether guinea fowl are healthy or not, the birds are left overnight before slaughtering. Birds that die before they are slaughtered are disposed of. Responses from processors interviewed indicated that veterinary officers visit these processing firms at least



Photo 3.6. Cold store facility and product of GFP

once every week to ensure that they are purchasing healthy birds for processing and are also following the necessary standards. However, kebab sellers said that they are experienced enough to distinguish between a sick and a healthy bird, since they have been in the business for a very long time.

Apart from processing poultry, GFP is involved in other businesses such as wholesalers of exotic poultry products and distribution of margarine. In addition, they have storage facilities where they store meat from butchers at a fee.

From the kebab sellers' point of view, the income from poultry products and that of other non-products are important for them, providing their source of livelihood; they therefore rank them equally. They added that the poultry business usually booms up during festive occasions.

3.4.1.2 Product flows and values

Figure 3.8 presents the local poultry value chain for Tamale study area. In this chain, hatcheries sell 6-week-old keets (i.e. growers) at GHS 2.50, but keep some of the birds until maturity to be sold during Christmas to processors, e.g. GFP. The growers are sold to CARE International which distributes them to farmers. The hatchery operator sells fully matured guinea fowl to GFP at GHS 6 per bird and individual consumers at GHS 7 per bird; during Christmas, guinea fowl sell for GHS 8 per bird. The hatchery operator mostly buys eggs from good guinea-fowl farmers, hatches them, and sells to CARE International before considering requests from other guinea-fowl farmer groups and individual farmers.

At the same time, some birds are produced by local farmers, either from own stock or purchased from the hatchery. The products of their production process are mainly the birds, eggs, and their droppings (manure). Feathers are not considered to have any economic value. Fowl are sold as and when the farmer has a need for money and decides to sell. The eggs of local fowl are hardly ever sold; they are mainly used for hatching DOC to increase one's flock. The eggs of guinea fowl are sold

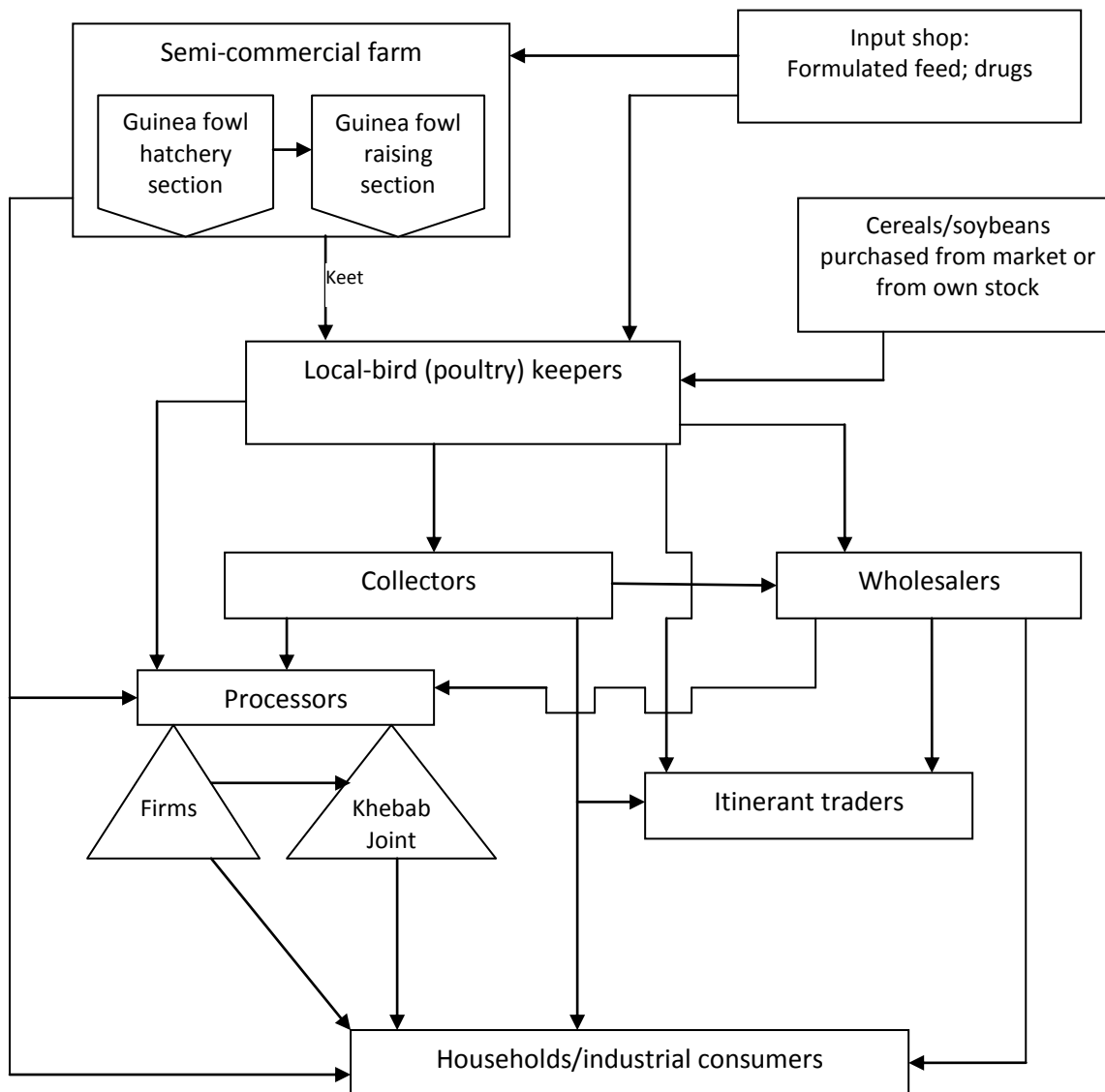


Figure 3.8: Traditional poultry value chain, Tamale study area

to other farmers and other egg sellers. Bird droppings are collected and used on the farmer's backyard gardens or other fields. Producers can also sell to traders in the market (*daabihi*) and collectors (*sochandiba*).

Prices are seasonally influenced in this chain, with festive occasions such as Christmas and New Year increasing local prices due to spikes in demand, particularly for guinea fowl. Disease outbreaks also negatively influence prices, particularly during periods of Newcastle Disease outbreaks. In such cases, prices are usually very low for fowl.

Collectors (*tinkpandabihi*) buy birds from farmers in village markets or from farmers' homes upon invitation when farmers wish to sell. The collectors gather guinea fowl at the main market in Tamale where other traders will buy from them. Apart from selling to other traders, collectors also sell to individual consumers and GFP, a processing company. About 90% of purchases by collectors are from community (village) markets, with the remainder direct from producer households. Processors buy in

equal amounts of birds from either collectors or live-bird markets, while live-bird markets obtain about 95% of their birds from collectors. The identified primary markets, with the proportions of birds coming from each market, are Katindaa (50%), Savelugu Market (20%), and Nyankpala Market (15%). The major secondary market identified is the Tamale market.

According to traders interviewed, the current purchase price for birds sold at community markets is GHS 6 for a normal-size bird, which they re-sell at the live-bird market for GHS 7. Prices also depend on the weight, maturity and size of the bird. During festive occasions however, prices usually go up, but the increase in prices also depends on the supply. Respondents said that prices are lower during the rainy season. Traders explained that during the rainy season, farmers need cash for their farming activities and other home expenses and consequently put more birds on the market.

Itinerant traders collect birds from wholesalers and farmers for long-distance trade (Photo 3.7). Major buyers from itinerant traders include retailers in other regions such as Brong Ahafo, Ashanti, and Accra, among others, as well as kebab processors and other consumers. Itinerant traders interviewed indicated that upon arrival at their destination, retailers purchase the bulk of birds from them and also send them to other markets in the region or other sheds in the same markets. Some processors such as kebab sellers and other food sellers also buy especially guinea fowl from them. Those birds that are left are kept and sold to other consumers.



Photo 3.7. Different types of local birds being prepared for transportation from Tamale to Kumasi

Processors buy local birds from different sources. Live guinea fowl are sold to processors for GHS 6, while consumers purchase roasted (grilled) guinea fowl from processors at GHS 8. Photo 3.8 shows the processing of guinea fowl at a kebab spot. During periods of high demand such as weekends, the end of the month and festive occasions, over 100 roasted birds per day are sold by a kebab seller.

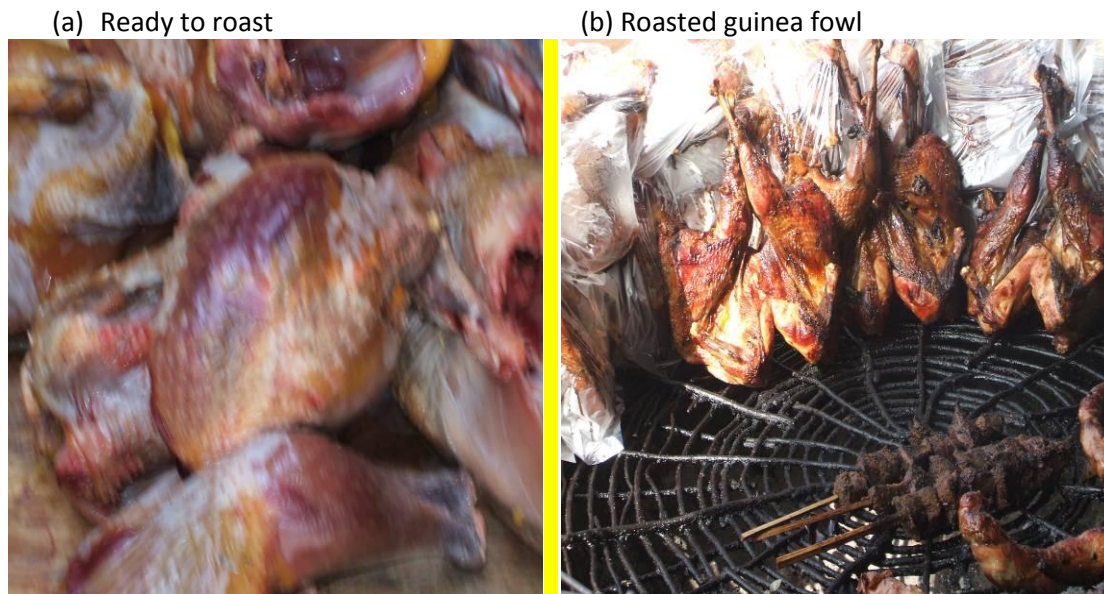


Photo 3.8. Guinea fowl processing at a kebab spot.

GFP supplies 50 kg of processed guinea fowl valued at GHS 550 on a monthly basis to La Palm Royal Beach Hotel, Accra under a special contract. According to GFP, a guinea fowl is sold between GHS 10–12, depending on the weight of the bird, to other hotels and shops.

3.4.1.3 Governance and coordination mechanisms

Governance in traditional poultry chains in Tamale exhibits hybrid forms of coordination (Figure 3.9). In the upstream parts in the chain, farmers indicated that they do not have to sell exclusively to the same buyers any time they have birds to sell. However, relationships matter and those middlemen perceived as more ‘kind’ will be more likely to engage in repeat sales. In describing actions by powerful actors in the chain that affect product flows or prices, producers (farmers) indicated that there is no observed monopoly by traders in the local-bird market. It is the decision of the farmer to sell fowl by inviting a buyer to his farm, sending the birds to the local market, or sending the birds to a bigger market in the city, e.g. Tamale. While in the market, the farmer can bargain with as many traders as possible for each bird that he/she wants to sell until getting a satisfactory price. Therefore in the local-bird market, farmers said that issues of volumes demanded by traders or other actors are not important.

At the same time, contracts based on trust and established relations exist among actors in the chain, particularly downstream. Traders sell on credit to their regular customers and payment is done within 3–4 days of receiving the birds. Delays in payment slow down their businesses according to the traders, since they have to recoup their money before going for another stock. Additionally, most collectors take birds on credit from the local community markets based on certain agreements between farmers and the agents. Delay in payments sometimes result in conflicts between producers and collectors, and also between traders and processors. However, while traders indicated the importance of credit sales, farmers indicated that credit sales are not commonly offered, and the birds are normally paid for at time of purchase. They added that in a few cases where a farmer invites a buyer to the house to purchase many birds, agreement is made for payment to be effected at a later date. Farmers said that in such an arrangement, payments could be delayed by the customer and this can affect other plans of the farmer, but not the production of birds.

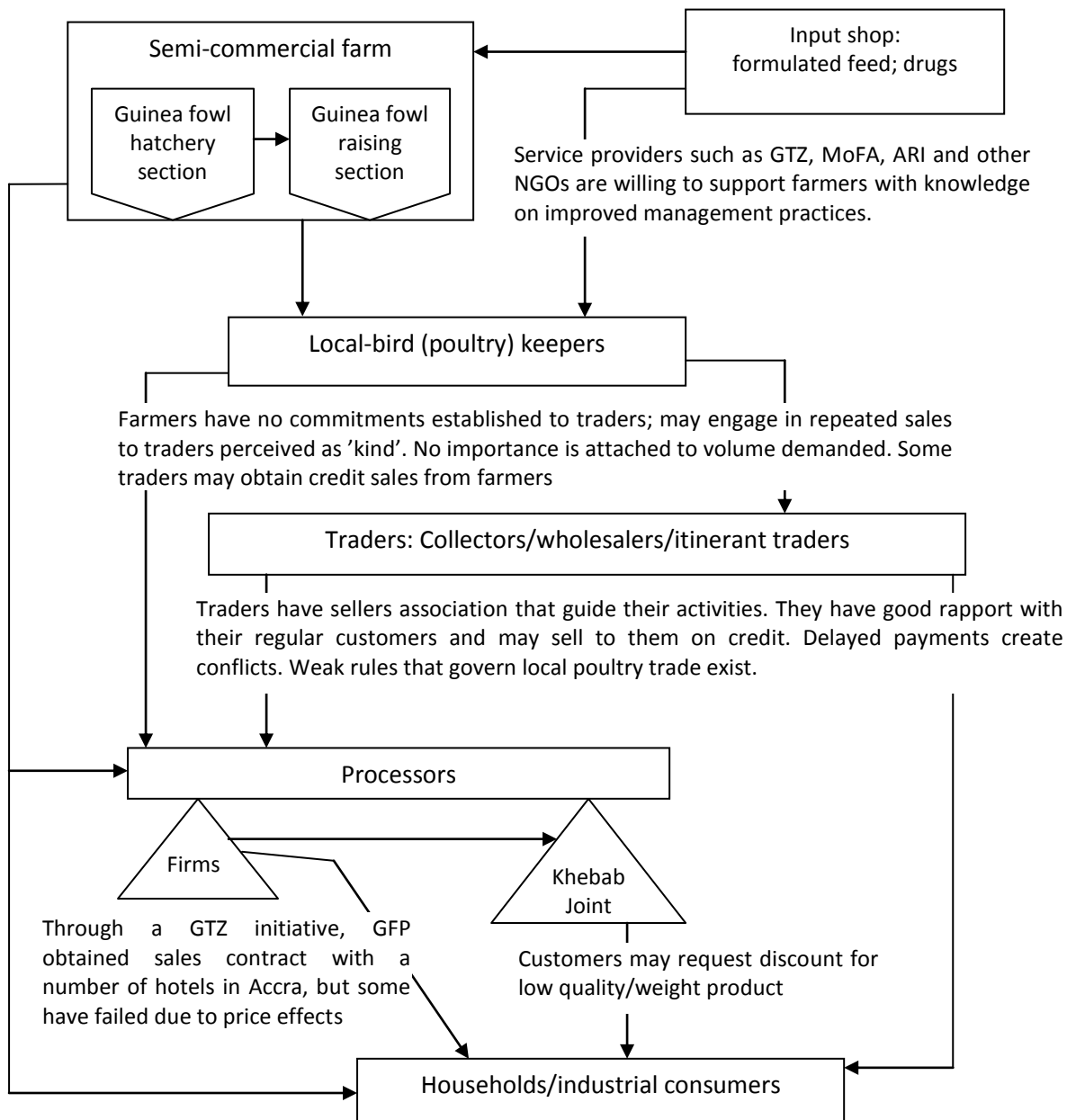


Figure 3.9: Traditional poultry value chain, Tamale study area: Governance.

Informant interviews further revealed contractual arrangements by processors. For example, when processors do not have enough money to take stock, an agreement is made with traders and producers to purchase the birds on credit and payments are made within a week. Currently, GFP has a special arrangement (contract) with La Palm Royal Beach Hotel to supply dressed guinea fowl on a monthly basis to the hotel. GFP had similar arrangements with other hotels (Golden Tulip, African Regency and Wangara Hotel in Accra, and Teco Restaurant in Sunyani) and shops (Shoprite in Accra), but these contracts have broken down because of complaints of the high prices of guinea fowl compared to the price of chicken. These arrangements with the hotels and shops were made possible with the help of GTZ. They also helped the firm to showcase their products at trade fairs.

According to the wholesalers interviewed, customers usually use the weight of the bird to bargain for its price. Birds weighing less than the normally accepted weight of a bird usually attract a price

discount. At present, a normal guinea fowl sells for GHS 7.00, while those weighing less than the normal weight sell for either GHS 6.00 or GHS 6.50. The prices of birds are determined mostly by the collectors. For processed products, the quality of the processed birds was identified as one of the key factors for purchase, with customers requesting discounts when they feel processed birds are of low quality or low weight.

Associations play some important roles in this chain, particularly in terms of providing market information and services. For instance, guinea fowl farmers associations are in their development stages and are about 2 years old. At the group level, they pay dues to help run the association. Members of the association are men and women who are interested in improving the rearing of guinea fowl as a main livelihood activity. The motivation of members to form the association arose from increased demand for guinea fowl. Farmers indicate this is enhanced by the willingness of service providers such as GTZ, MoFA, ARI, and other NGOs to support farmers with knowledge on improved management practices. Farmers said that the association has enabled them to receive increased recognition from other actors such as processors and middlemen. They also have recognition and easy access to service providers such as MoFA, ARI, GTZ, VSD etc. As an association, farmers said that they have an advantage in getting relevant information on poultry compared to individual farmers. For example, members are given training on improved poultry management, invited to participate in workshops, and identified and given support in the form of incubators, cages, improved feed, and medications as a means to improve guinea fowl management practices. Farmers in this association indicated that the improved management practices have led to an increase in the number of guinea fowl per farmer and affected their income levels positively.

Trader groups had an association called the Tamale Fowl Sellers Association, also known as 'Timtoon' Fowl Sellers Association. This association has an executive elected by members to serve for a number of years, after which they elect a new executive. The association holds meetings weekly. An amount of GHS 0.50 is paid as dues every week by each member. During meetings, veterinary officers usually come and participate and use the time to educate and advise traders on how to handle the birds. They also educate members on the signs of sick birds. Traders also educate their clients (farmers and village agents) on some of the things learned from the veterinary officers. Traders, however, said that most consumers do not know much about poultry diseases.

According to traders, rules exist regarding poultry trade in the market. The respondents said that trader associations could control the movement of poultry in the market. For instance, one of the rules prevents the purchase of live birds by traders from the south directly from the village markets and from the farmers. The rule made it mandatory for southern traders to buy live birds from them (i.e. from traders in the Tamale market). Presently these rules are weak and hence traders from the south usually ignore them and buy birds from the village markets and farmers directly. This act has affected local business since the cost of birds from farmers is rising as a result of high demand by these traders. According to local traders, they are trying, gradually, to enforce most of their rules.

The itinerant traders interviewed belong to the traders association in Tamale. The association is said to be quite new. The association has acquired a piece of land in the market and is preparing to build their offices. The itinerant traders said that the target is to get all traders of local poultry to be members of the association, but for now they have a membership base that is far below the expected level. An association exists for khebab sellers, but the sellers do not perceive the

association as being effective, and most of them do not know what the association does. GFP and UDS Meat Company Ltd do not belong to any association.

3.4.1.4 Public policy and regulation

Discussions with producer groups reveal that there are no known formal regulations imposed on the production of local birds. No government official or radio or television announcement has ever asked for taxes or fees to be paid for keeping local chickens, guinea fowl etc. The survey also revealed that when farmers take their birds to the market to sell, government officials take a market fee from them, but farmers indicated that the effect of the paying the market fee is not significant. Other times, middlemen who buy their birds from home explain to them that they will pay the market fee per bird and therefore use it as a bargaining point.

Market fees and movement permit charges impact various actors downstream. Collectors remarked that on market days, they pay market tolls at GHS 0.10 on each bird. While such market tolls increase the cost of their business, its effect on their income is insignificant. The following were identified as fees paid by traders: market facility user fee of GHS 1.20, which is payable every month; fees paid at the village market: GHS 1.00 as market toll and GHS 0.10 for each bird bought by traders before birds are allowed out of the market; and a yearly fee of GHS 7 was also paid to the town council (i.e. Metropolitan Assembly). Itinerant traders pay movement permit charges of GHS 0.10 per bird and market fees which range from GHS 0.20–0.50 per bird, depending on the size and the ages of the birds. Itinerant traders interviewed said that during the bird flu outbreak, they obtained poultry movement permits before they could move birds from one location to another. Before the permit was issued, the birds were inspected for diseases, especially bird flu. Taxes paid by kebab sellers include the quarterly income tax of GHS 20 and the Metropolitan Assembly levy of GHS 16 per year. GFP complained of difficulties involved in obtaining a registered permit to operate as a processing firm due to long bureaucratic procedures. However, they have been able to register as a processing company and pay operating taxes. Income tax is also charged on worker salaries according to the amount of their monthly wages. Respondents revealed that there have not been major changes in the poultry chain linkages except for the increment in income tax from GHS 12 to the current GHS 20, and in the assembly levy from GHS 8 to GHS 16.

During the outbreak of bird flu, the traders made an additional fee payment of GHS 0.10 per bird for movement permits before birds could be transported from one location to another. A trader was issued a movement permit after a veterinary officer examined the birds and confirmed that the birds were healthy. According to traders, road blocks (barriers) at various locations such as the Savelugu and Yapei barriers checked for movement permits during the outbreak period. Any trader without a valid permit for transporting birds had the birds intercepted by security officers and destroyed. According to the traders, the permit price was excessive given the monetary losses normally faced when birds die in transit.

3.4.2 Kumasi study area

3.4.2.1 *Characteristics of major actors interviewed*

Wholesalers

The wholesalers in traditional poultry interviewed in the Kumasi study area sell guinea fowl, turkeys, local chickens, ducks, and sparrows. The wholesalers also double as retailers at the market place. They get their poultry products from collectors who travel to the northern part of Ghana, such as Bolgatanga, Navrongo, Sandema, Sumbise, Singo, Tamale, Zoko, Zabala, and Yalwango, to purchase birds from small-scale producers and households. Collectors transport birds to the south and to Kumasi Central Market, where a number of wholesalers are located. Most collectors look out for particular features of the birds before buying from individuals and backyard farmers. These include clear eyes, brown faeces, and signs of activity. Veterinary officers randomly perform checks on the birds to be sure there are no sick birds transported to the south.

Most of the bird species are kept in different cages and baskets which can hold up to 50 live birds in medium baskets and cages, and 100 birds for the large baskets and cages. The baskets are in rectangular forms and made of wire mesh or bamboo with enough openings to allow for good ventilation. Cage prices range from GHS 10–15. None of the wholesalers or collectors reported mixing the various species of live birds; they have different cages for each species.

Traders dispose of the feathers and faeces of the birds at a common refuse dump or leave it for those who do the cleaning to clear them, after which they pay for their services. They clean the cages with disinfectants once in a while to keep them clean and free of diseases. They isolate sick birds from the main flock. According to traders interviewed, they are more concerned with protecting their business as it is their main source of income rather than minimizing the risk of HPAI spread.

None of the wholesalers interviewed are involved in other businesses besides the poultry business. For the traders, income from indigenous chickens and other poultry serve as the main income for their households. Income earnings were especially high during festive seasons such as Christmas, Easter, New Year and Eid ul-Fitr. During ordinary days, sales are low and stable with high prices compared to the festive season where prices are relatively low. This is because the lean season sets in immediately after the festive seasons when farmers clear their stock and start with low numbers or mostly produce for festive seasons.

3.4.2.2 *Product flows and values*

Based on partial information collected on this chain, we found that wholesalers sell the birds to households, other traders and chop-bar operators and restaurants. The wholesalers get about 30% of their birds from backyard farmers in Bolgatanga, 25% from Navrongo, 15% from Sumbise, 10% from Sandema, 5% from Tamale and 15% from other towns such as Singo, Zoko, Zabala and Yalwango. According to the wholesalers interviewed in the Kumasi study area, the three most important destinations are the Kumasi Central Market in the Ashanti Region and Kaneshie and Makola in the Greater Accra Region. Turkey is bought by wholesalers from collectors for GHS 40–50 and sold at GHS 50–60. The purchase price for duck ranges from GHS 4–5, while selling price ranges from GHS 9–10. Guinea fowl purchase prices range from GHS 4–5, and when sold by wholesalers between GHS 6–7. The purchase price for local chickens ranges from GHS 6–8 and is sold at the market for GHS 7–10.

3.4.2.3 Governance and coordination mechanisms

According to traditional poultry wholesalers interviewed, the most powerful actors in the chain are the small-scale and backyard farmers who produce poultry for collectors and other wholesalers who double as collectors. Without the farmers producing, there would be no birds for the market and they would not be in business. According to the wholesalers of traditional birds, there is no monopoly by traders as no one person goes for the birds. Market information is not limited in the chain as what goes on from the collection point to the market trader is known. Collectors who sell to wholesalers do not actually insist on large volumes, rather whatever number one wants to purchase is served. There are no quality requirements as such for traditional birds. Wholesalers do not sell sick or low-quality birds to buyers. There are no credit arrangements with buyers so they do not have the problem of delay in payment and do not experience any exclusion from certain markets.

Wholesalers at the Central Market are in an association, Kumasi Central Market Traditional Poultry Sellers Association, which was formed in 2002 to aid with the flow of market information to wholesalers, as well as from wholesalers to collectors. The association also functions as a body that tries to regulate the price of birds for the traders. It functions as a mouthpiece and has a bargaining power with the actors in the chain. The association cannot influence or control the trade or movement of poultry products produced and marketed in Ghana because it is a localized association for traders only at the market and not for all traditional poultry traders in Ghana.

3.4.2.4 Public policy and regulation

Market fees were the main regulation reported; wholesalers pay GHS 0.10 per bird as tax to veterinary officers when they come for inspection and pay taxes at the market daily. There are no fees or charges paid to the government except to the veterinary services as well as the Metropolitan Assembly before transporting the birds from their various destinations to the market place. Veterinary officers randomly perform checks on the birds to be sure there are no sick birds being transported to the south.

3.4.3 Dormaa-Ahenkro/Sunyani study area

3.4.3.1 Characteristics of major actors interviewed

Retailers

There are only two poultry traders in the Sunyani Municipality that deal in the sale of guinea fowl, local chickens, ducks, turkeys, and doves. The traders mix the different species of live birds at purchase and sales points and from all farms. Traditional-poultry traders undertake regular (every 2 weeks) fumigation of the cages and occasionally vaccinate the birds. According to the interviewed traders, protecting their business from HPAI is important to them. Poultry income has always been their main source of income, though they are engaged in other economic activities. About 95% of their income comes from the sale of traditional birds.

3.4.3.2 Product flows and values

The primary sources of traditional birds include Sunyani and Bolgatanga, Tamale, Bawku, Navrongo, and Chiraa in northern Ghana. The sales markets for traditional-poultry traders in the Dormaa-Ahenkro/Sunyani study area include Sunyani, Bomaa and Anyankumasi.

3.4.3.3 Governance and coordination mechanisms

According to traders, the most powerful actor in the chain is the consumer since they have the strongest bargaining power. There is also limited market information in the chain. Consumers always ask for discounts on low-quality birds. There is no association of traditional-bird traders.

3.4.3.4 Public policy and regulation

Traders pay a daily tax levied by the Sunyani Municipal Assembly and a permit from the VSD when moving birds. Traders also pay GHS 8 for every 100 birds as a market toll to the Municipal Assembly.

3.4.4 Accra/Tema/Ashiaman study area**3.4.4.1 Characteristics of major actors interviewed****Retailers**

Poultry sold by the interviewed traditional poultry sellers include local chickens, ducks, guinea fowl, turkeys, and doves. Local birds are normally purchased from Bolgatanga in the Upper East Region and from Ada in the Greater Accra Region. Traditional-poultry sellers use cages with two or three floors to house the birds. Trays are put under each floor to collect the bird droppings. Waste collected is burnt outside the structure, and some is sold to farmers.

3.4.4.2 Governance and coordination mechanisms

Local poultry, feed, and drug suppliers are perceived by sellers to be powerful. Supplies of the products are always reliable. There is no monopoly and poultry transactions are bargained at prices favourable to all parties.

3.4.4.3 Public policy and regulation

Traditional-poultry sellers pay taxes to the Tema Metropolitan Assembly. The Assembly monitors the operations of the sellers to ensure cleanliness of their environment.

4. IMPACTS OF HPAI BY SPECIFIC CHAINS AND REGIONS

4.1 Introduction

On April 14, 2007, the VSD detected a potential incursion of HPAI H5N1 virus infection on a small-scale poultry farm located at Kakasunanka within the Tema Metropolitan Assembly of the Greater Accra Region. The diagnosis was later confirmed by national and international reference laboratories. Bans were placed on movement of poultry and poultry products in the outbreak area. VSD destroyed all poultry in a focal radius around the outbreak, resulting in the culling of 1944 poultry including 4 ducks (Aning et al. 2008). An active search for HPAI in the Tema area was undertaken and a total of 64 farms were inspected and sampled for the detection of the presence of the HPAI virus. In May 2007, four more positive cases were detected on farms in the Tema area and an additional 29,621 birds were destroyed. The ban on the movement of poultry and poultry products in the Tema Metropolitan Area was extended to a ban on their sale as well. Another outbreak was detected on a small-scale poultry farm at Asuokwa, New Dormaa in Sunyani in the Brong-Ahafo Region on May 11, 2007. A total of 2629 birds and eggs and feed in the affected premises were destroyed. On June 13, 2007 another outbreak occurred on a small-scale farm at Aflao in the Ketu District of the Volta Region. A total of 1357 birds, together with eggs and feed, were destroyed on the affected premises (Aning et al. 2008). Also, birds in the culling zone were destroyed and restrictions put on the movement of poultry products.

The source of HPAI infection in Ghana could not be traced. According to VSD, there is a close resemblance (96%) between the virus circulating in Ghana and other HPAI viruses causing outbreaks in the West African region (Aning et al. 2008). Also, Mabbett (2007) reported that the virus strain in Ghana was between 98.8-99.6% similar to other isolates from Côte d'Ivoire, Burkina Faso, Nigeria and Sudan. HPAI could have been carried to Ghana by wild birds that had introduced the virus in the other countries or introduced through trade. Emergency actions taken during the outbreak were buoyed by government funding and additional support from the United States Agency for International Development (USAID), Food and Agriculture Organization of the United Nations (FAO) and World Health Organization. In September 2007, MoFA lifted the quarantine measures and restrictions established on the movement of poultry products in the Tema, Sunyani and Ketu areas. The present section looks at the impact of the HPAI outbreak on actors in the specific poultry chains.

4.2 Impacts in the Kumasi study area

According to producers, there was no incident of HPAI in the Ashanti Region. They were therefore not affected by the outbreak itself but rather the scare that was propagated by the media which affected the level of their sales. Similarly, the livelihoods of broiler producers (Akate Farms and Asamoah and Yamoah Farms) were affected in a similar fashion. All the retailers practically stayed out of business. Those who had other non-poultry activities concentrated on those businesses like selling ice water and popcorn, but received less income from them. Those without other businesses relied on their own savings and assistance from their spouse, friends and other relatives.

Farms in the region (e.g. Akate Farms) reduced the prices for all poultry products to maintain or get more customers. Also, the time for payment for creditors was extended. Production of some farms (e.g. Mfum Farms) was scaled down as demand from buyers fell. There were, however, no reductions in stock levels, but rather a drastic reduction in sales volumes.

FGD revealed that the impact of the scare lasted for between 10 months and 2 years, with respondents noting the influence of the media in perpetuating fear more than from any occurrence of disease in the region. Volumes of sales went down drastically, but prices did not change significantly. According to interviewed medium- and small-scale producers, the price of live birds decreased on average from GHS 5.50 to GHS 4.50 per bird during the HPAI outbreak period, representing a decline of about 18%, while the volume sold per week during the festive season decreased by more than 50% from 120 to 50 birds per week and during the non-festive season from 70 to 35 birds per week (Table 4.1). However, prices of table eggs remained largely unchanged (with a marginal 3% increment), while sales volumes decreased by about 46% due to the HPAI outbreak (Table 4.2). Producers were unable to supply their customers from neighbouring countries due to movement controls. FGD further revealed farmer perceptions that their customers outside the country think the disease still exists in Ghana.

Table 4.1. Impacts of the HPAI outbreak on medium/small-scale producer prices and sales volumes of poultry in Kumasi

HPAI period	Festive season				Non-festive season			
	Price per bird (GHS/bird)			Volume per week	Price per bird (GHS/bird)			Volume per week
	Min	Max	Ave		Min	Max	Ave	
Before	5.00	6.00	5.50	120	5.00	6.00	5.50	70
During	4.00	5.00	4.50	50	4.00	5.00	4.50	35
After	6.00	8.00	7.00	160	6.00	8.00	7.00	80

Table 4.2. Impacts of the HPAI outbreak on medium/small-scale producer prices and sales volumes of table eggs

HPAI period	Both festive and non-festive seasons					
	Price per crate (GHS/crate)			Volume per week (crates)		
	Min	Max	Avg	Min	Max	Avg
Before	2.80	3.20	3.00	50	70	60
During	3.00	3.20	3.10	30	45	37.5
After	3.50	4.50	4.00	70	90	80

The outbreak of HPAI caused sales of commercial birds to fall drastically as most consumers and retailers were afraid to buy birds; this resulted in losses among unsold birds kept at the market for extended periods under stressful conditions. Collectors/wholesalers interviewed indicated that the volume of birds sold in the festive season decreased from about 200 birds per week to about 55, a fall of over 70% attributed to the HPAI outbreak. For the non-festive season, the volume of birds sold declined from 100 birds per week to about 40, a 60% reduction. Prices fell by much less, from GHS 6 per crate to about GHS 5 per crate on average. On the other hand, prices of table eggs did not decline during the outbreak, remaining at GHS 3.25 on average, but sales volumes fell by over half. Collectors interviewed are not in any other businesses apart from the sale of birds and eggs, and did not venture into alternatives during the outbreak.

All the retailers/processors interviewed in the Kumasi study area strongly affirmed that although poultry farms in the Ashanti Region did not experience any incidence of the HPAI, they still experienced the high adverse impact from the scare. For some of the retailers/processors, the negative impact lasted about 3–4 months, while for others it lasted over a year. All the processors in the market place essentially stayed out of business.

As a result of the HPAI outbreak, production of the hatchery operators went down drastically. Buyers were not purchasing DOC. This did not affect their production practices, however. According to the feed miller interviewed in the Kumasi study area, feed production declined markedly, with producers no longer supplying feed to their buyers and instead using feed in their own farms only. The impact of the HPAI outbreak on poultry transportation lasted for about 4 months. All transporters interviewed engage in other transport activities and during the outbreak they only transported non-poultry products. Transporters interviewed indicated that they were not aware of any government efforts to stop the spread of HPAI.

4.3 Impacts in the Dormaa-Ahenkro/Sunyani study area

Commercial layer producers interviewed noted that they experienced reductions in their household expenditure as the HPAI outbreak reduced their income from poultry. Some of their poultry farm workers were laid off for some weeks due to the slow-down in the poultry business. The outbreak negatively affected incomes of wholesalers of eggs as well, with some wholesalers idling their business. Some wholesalers temporarily reduced the amount of social fees paid and delayed payment of their children's school fees. Likewise, according to traders interviewed, the outbreak and the subsequent shut down of poultry trading activities by the government resulted in the idling of labour, reduced expenditure on food, delayed payment of school fees, and lowered attendance in social events. Some traders entered into other business ventures, but they lost their capital.

Commercial layer producers interviewed reported a slowdown in poultry business activities during the outbreak. Prices of table eggs fell from GHS 2.50 per crate to GHS 2.00, representing a 20% decline. Producers further experienced a reduction in egg sales volume for about 3 months. The sales volumes of egg producers decreased by about 40% during the outbreak period and increased by 20% after the outbreak.

According to wholesalers, egg prices (both purchase and selling prices) fell during the outbreak period. Most traders did not attempt to collect eggs from farmers, with farmers instead giving the eggs out on credit. Their sales volume declined, on average, from 517 crates per week before the HPAI outbreak to about 103 crates per week during the outbreak, an 80% decline. After the outbreak, sales recovered to an average of 467 crates per week. Furthermore, wholesalers were prevented from exporting supplies due to movement controls. According to wholesalers, the outbreak led to the temporary introduction of movement permits by the government before travelling and the current use of new crates for every transaction. These changes increased their operational costs.

According to egg collectors, the HPAI outbreak led to a loss of customers, reductions in sales volume, and losses in capital. Their sales volumes decreased by 25% during the outbreak, and recovered by 20% after the outbreak. According to collectors interviewed, a lot of people disengaged from the business but are now back.

In terms of effects on retailers, the outbreak led to declines in sales volumes of 33% and in prices of live birds of 30%. Retailers of live birds saw reduced business for about 4.2 months and experienced an approximate 54% decline in their capital. During the outbreak, traditional-poultry traders initially experienced roughly a 60% decrease in sales volumes and their businesses were then shut down for about 3 months.

The feed millers interviewed in the Dormaa-Ahenkro/Sunyani study area indicated that their sales volumes of feed declined by 50% during the outbreak, and that after the outbreak it recovered by 20%. The outbreak led to idling of labour and moving of workers to other activities. As a result of the outbreak, they began to introduce the disinfection process at the mill. The disinfection is costly; they buy a gallon of disinfectant at a price of GHS 18 every week, adding to their production costs.

Transport activities of one of the two millers interviewed were affected, because due to the outbreak they could not travel to the Tema port for supplies. They were also not able to transport eggs to Tema and Accra. The capital base of the operations of the other miller interviewed fell drastically. The transporters interviewed experienced reductions in the frequency of loading eggs to different sales destinations in a month. As a result, they shifted to transporting foodstuffs from nearby villages, but this led to the breakdown of their trucks due to bad roads linking the villages. According to the transporters interviewed, some members have stopped transporting poultry products due to the HPAI outbreak.

4.4 Impacts in the Accra/Tema/Ashiaman study area

According to producers interviewed in the Accra area, the last outbreak of HPAI did not affect their operations because there were no cases reported on their farms. There were no changes in prices or volumes as a result of the outbreak. On the other hand, commercial producers interviewed in the Tema/Ashiaman area indicated that the incidence of HPAI impacted negatively on their production. Some of them went out of production (business) for about a year.

Feed millers interviewed noted that the last outbreak of HPAI did not significantly affect the activities of their factory. According to one miller, there is a high cost of implementing the government regulations, though the miller acknowledged that these regulations were very useful to the operations of the factory. The last outbreak of bird flu affected the hatchery business. The birds were destroyed and compensation paid. Goodwill of the hatchery operator vis-à-vis customers was damaged due to the scare. This resulted in reduced sales and income was ultimately affected.

4.5 Impacts in the Tamale study area

Local-poultry collectors interviewed said that during the outbreak, some people returned guinea fowl bought from them. Sales volumes were very low. The HPAI outbreak affected bird prices, which fell from GHS 7 to between GHS 5–6.

According to kebab sellers interviewed, business continued, though sales were lower. Their sales volumes dropped from about 100 birds per day to about 70, though prices were not affected. Most of the kebab sellers diverted product offerings to the sale of more beef and mutton, since the demand for these products was higher. This diversion compensated for the income lost from the poultry side.

An interviewed poultry shop operator revealed that when the news of HPAI broke out, the importers stopped importing from countries suspected to have experienced outbreaks and they all turned to imports from Brazil. The respondent noted that chicken products in stock at the time moved very slowly. People switched to the consumption of frozen fish which enjoyed higher prices due to the high demand during the period.

Wholesalers remarked that they had to undergo strict scrutiny by police and veterinary officers. Prices of birds during the period were stable. Some guinea fowl were returned to traders by customers because the way in which news about the HPAI outbreak in Ghana was presented on the radio scared many people. Volumes of live birds sold reportedly decreased by 60–70%. Due to low demand, wholesalers also reduced their intake of stock.

Retailers noted that consumer demand fell drastically, with most people shifting to fish consumption. The average sales volume of eggs for a retailer during the outbreak period fell from about 10 crates per day to about 3, while that of dressed birds fell from 50 birds per day to 10. On the other hand, frozen fish sales for a retailer surged from 5 cartons per day to 15. However, since the outbreak, the sales volumes of eggs and dressed birds have recovered strongly, increasing by 167% and 200%, respectively, relative to their lows, while frozen fish sales fell marginally by 13% relative to its peak during the outbreak.

4.6 Response mechanisms (particularly production practices), incentives, and costs of compliance

The government took a number of actions in response to HPAI. First, raising awareness among consumers was done through the media and through the printing of several publications on the disease, its effects, causes, and prevention. Some of the actions the government took during the outbreak were also to educate farmers on the causes, the effects, and how to deal with the disease. For instance, wholesalers and retailers of local birds in the Kumasi study area were trained on how to identify sick birds by the veterinary services. Some of the symptoms they were told to look out for included dull eyes of the birds, green faecal waste from the birds, as well as inactiveness of the birds. Similarly, small-scale farmers in Dormaa-Ahenkro/Sunyani noted their participation in a USAID workshop on managing HPAI. Commercial poultry producers in Accra/Tema/Ashiaman recalled that government officials conducted workshops and provided education on the outbreak, while safety measures were put in place to ensure control of the disease. Likewise, according to retailers of broilers and spent layers, there were various educational programmes to sensitize them about the outbreak. While useful, many other respondents from the FGD noted that the initial scare created by the media when the HPAI outbreak started led to a reduction in the demand for birds.

In addition, VSD staff inspected most farms and biosecurity practices were enforced/introduced. There were regular inspections of premises. According to production actors (i.e. producers, hatchery operators) interviewed in the Kumasi study area, for example, there was no change in production practices, but there was greater enforcement of existing biosecurity practices: farms were quarantined; workers were not allowed to move from one farm to another; certain areas were restricted and only operators were allowed to be there; and the use of disinfectants was mandated at the entrance to the farm to disinfect both vehicles and individuals. These were supposed to be normal operating practices which were not being followed by the farms. Their enforcement therefore had implications for the farmer's operational costs. In Dormaa-Ahenkro/Sunyani,

wholesalers of eggs now use new crates provided by farmers during each transaction. This is being done as a biosecurity measure to minimize the risk of disease, but it has indirectly increased the operational cost of the wholesalers because the cost of the crates is reflected in the egg purchase price. Wholesalers noted that minimizing risk is more important to them since this measure will eventually protect their business in the long run. Likewise, commercial layer producers in Dormaa-Ahenkro/Sunyani noted the construction and implementation of chemical baths for trucks and people were enforced by government officials and farms incurred some cost to comply with the directives. The operational cost for disinfection dips (baths) ranges between GHS 30–125 per week for some farms. Layer producers interviewed were also concerned about the cost of spraying pens on a monthly basis. They agreed, though, that it was reasonable to undertake these measures since it was meant to protect their birds.

Enforcement with the new regulations was not universal, however. According to transporters interviewed in the Kumasi study area, there has not been any significant improvement in the practices of transporters when transporting live birds (both during and after the HPAI outbreak); they still clean their vehicle with kerosene and Dettol disinfectant after every trip.

Farms affected by the HPAI outbreak in Ghana were duly compensated for the estimated value of goods destroyed by veterinary officials. The government paid monetary compensation to all affected farmers whose birds were culled during the outbreak in 2007. Compensation paid was based on a percentage of the prevailing price in 2007 (see Table 4.3). Payment was made for culled birds and not for reporting the disease or for dead birds. At the same time, interviews with other downstream chain respondents indicated that compensation was not directed towards them, despite often severe market disruptions associated with market closures, movement controls, and so on. For instance, traditional-poultry retailers in Dormaa-Ahenkro/Sunyani noted that apart from the introduction of permits, the government did not do anything for them. The government asked them to close down their poultry businesses, which according to them was not reasonable as they were not affected by the HPAI outbreak. Furthermore, they received no compensation from the private sector or NGOs.

Table 4.3. Compensation scheme for destruction of poultry and poultry products in HPAI outbreaks in Ghana

Class of birds	Market price GHS/item	Compensation (percentage of market price)
Parents		
Broiler	12.0	90%
Layer	9.0	90%
Commercial		
Layer	5.0	85%
Broiler	5.5	80%
Turkey	50.0	80%
Duck	3.0	70%
Cockerels	3.0	70%
Table eggs	0.1 per egg	50%
Fertile eggs	0.3 per egg	60%
Day-old chicks (broiler)	0.7	90%
Day-old chicks (layer)	1.1	90%
Guinea fowl	3.0	70%

Source: Adapted from Aning et al. (2008).

1 USD = 0.95 GHS as at July 2007

A general ban was also placed on the interregional movement of poultry and poultry products. Movement permits were required during the outbreak when transporting birds or eggs out of a given location. During the HPAI outbreak period, traders in particular, among other actors, obtained movement permits for eggs and live birds from state authorities at a cost, added to their other production costs. The unit cost for the permit varied across some of the concerned districts. Traders in Tamale paid GHS 0.10 per bird and GHS 7.00 per consignment of eggs as movement permit charges. It was also possible for the cost of the movement permit to have been paid more than once for the same consignment, one by the consignee and the other by the consigner. This was experienced by some table egg wholesalers located in Sunyani that sell eggs to Tamale market. The payment of movement permits, if any, should be streamlined to avoid double payments across district assemblies. In addition, transporters in Dormaa-Ahenkro/Sunyani noted that introduction of movement permits during the outbreak also created a new avenue for 'social fees' (petty bribery) at security check points. The movement permit increased operating costs for traders.

Most of the feed mills interviewed put in place a number of bio-security measures to help prevent and minimize the impact of disease spread. The bio-security measures include the use of disinfectants to disinfect vehicles, bags and people's feet and non-re-use of bags from outside. These bio-security measures have associated costs and these are of great concern to the feed mills. Feed mills in Dormaa-Ahenkro/Sunyani constructed fence walls around the mills at a cost of GHS 1500 and spent GHS 18 per gallon per week on disinfectants. Representatives of the GAPFA feed mill did not identify any special biosecurity measures in place, but indicated that they do not re-use bags.

5. POLICY IMPLICATIONS AND CONCLUSIONS

Results of the value chain analysis provide an indication of the complexity of the various poultry value chains in Ghana and the regional dimension inherent within them. While this product and regional heterogeneity potentially complicate mitigation strategies, a number of common themes emerge from each of the chains that provide guidance on the direction for policy in the future.

First, we note that in spite of regional differences on the relative importance of chain intermediaries and the length of the chains themselves, governance in most cases remains largely loose and uncoordinated. There is some evidence of more vertical organization and contracting among large-scale producers in regions such as Kumasi, but generally speaking, price and/or relational forms of uncoordinated transactions predominate. Within each chain node, some associations exist, but play a relatively limited coordinating role in terms of marketing, and their ability to be usefully leveraged in the wake of HPAI outbreaks is unclear. Indeed, the experience of the 2007 outbreak was that the government played a pivotal role in managing the outbreak and coordinating control efforts across the chain. This included significant investments in education, enforcement of biosecurity practices, and strict adherence to movement controls. This public sector-led approach was effective in combating this particular outbreak, and it is apparent that the diffuse nature of poultry value chains across different products and regions limits an indigenous, bottom-up private sector-led response to future HPAI incursions. The lack of “champions” to manage HPAI control efforts puts added pressure on government to have effective, transparent, and efficient means of combating the disease should it arise in the future.

A second issue concerns specific risk points that might modulate disease entry and spread in the future. The main perceived hotspot for HPAI risk along the poultry value chain was identified at farm level, though this varies in terms of whether commercial or traditional systems are being considered. Most commercial poultry producers in Ghana use a deep-litter production system, obtain their feed supply from feed millers and other poultry producers who operate their own feed mills, and receive a number of traders who are the major purchasers of the products (eggs, broilers and spent layers) on their farms. In such systems, biosecurity tends to be much higher and incentives among actors in this type of chain more aligned towards protecting investments made in the poultry sector. At the same time, while biosecurity at the commercial producer level is often quite high, risks for disease spread increase downstream. Collectors of birds from commercial farms are known to sometimes mix the same types of poultry from different farms, while bio-secure storage at the retail level is generally unknown. Incursions of disease in the distribution side of the chain could have important ramifications on the commercial sector in spite of heightened biosecurity efforts from their side, if birds or egg crates from the markets (and distributors) are allowed to make their way back to the farms without proper monitoring.

By contrast, producers of traditional birds (backyard poultry) practice a free-range system whereby poultry are housed in pens (brooder hens are kept in locally made cages) and are released to scavenge for food; their diets are supplemented with cereals purchased from the market. In the north, the pens are constructed as part of the farmer’s house. In such chains, intermediaries such as traders will travel to the villages of traditional-poultry keepers to purchase local birds; in other cases, producers may also sell (eggs, broilers, spent layers, local birds) directly to consumers or to markets. The combination of limited coordination, low incentives and capacity for biosecurity, and (for

producers) a limited contribution of poultry to overall livelihoods, makes disease management in traditional channels more challenging.

Related to this point is the seasonal nature of risk present in poultry value chains in Ghana. An overarching characteristic of all of the value chains selected was the extreme seasonality exhibited in terms of volumes traded. During festive periods, e.g. Eid, Christmas, and Easter, traded volumes are often 6–10 times more than normal, suggesting that the timing of an outbreak can have critical effects on its impacts. In the case of the 2007 outbreak, the fact that it occurred after Easter likely mitigated its overall impact. Policy makers should be sensitive to when an outbreak occurs, as well as develop systems that monitor the sector more closely at specific periods when trade volumes (and possible disease entry) increase.

Finally, the nature of response needs to more adequately address the chain as an entity rather than as the specific nodes within it. Compensation was an important part of response during the 2007 outbreak, but was targeted solely at the producer level, despite widespread market dislocations occurring among traders, processors and retailers as well. As such actors can further accentuate disease spread (or be active participants in its control), addressing the negative impacts of downstream actors is of prime importance. In addition, greater streamlining of the implementation of biosecurity measures across the different chains needs to be addressed. While in-depth assessment of these costs was beyond the scope of this study, anecdotal evidence suggests these costs could impose significant burdens on some chain actors, particularly in the traditional sector. Addressing these constraints will be important, especially given the potential risks emerging from this sector.

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