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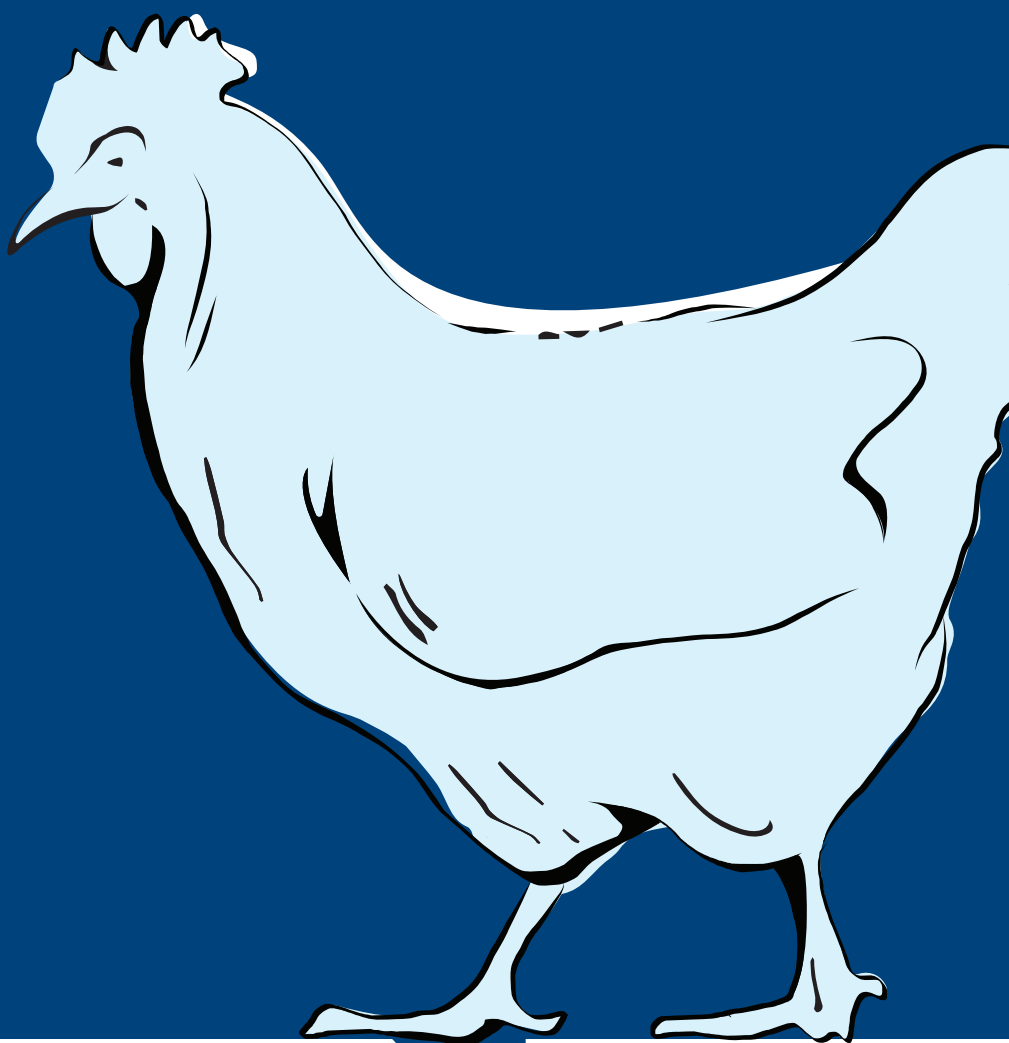
AFRICA  
SUSTAINABLE  
LIVESTOCK  
2050



Business models along the  
poultry value chain

**KENYA**

*Evidence from Kiambu and  
Nairobi City Counties*



**Strathmore**  
UNIVERSITY  
BUSINESS SCHOOL



**USAID**  
FROM THE AMERICAN PEOPLE

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## Contents

Acknowledgements.....	iv
Executive summary .....	v
Introduction .....	1
Actors in Kenya's poultry value chains .....	1
Producers .....	2
Traders of indigenous live birds.....	3
Processors .....	3
Transporters.....	3
Retailers .....	4
Methodology.....	4
Approach.....	4
Sample and scope .....	4
Data collection .....	5
Data analysis .....	5
Findings .....	6
Broiler producers .....	6
Poultry traders .....	12
Poultry slaughter on farm (broilers) and at market ( <i>kienyeji</i> ) .....	17
Poultry transport.....	23
Poultry retail (dressed birds) .....	28
Vertically integrated business of <i>kienyeji</i> chicken .....	31
Slaughterhouse in retail market .....	36
Discussion and conclusion .....	39
References .....	42
Annexes.....	43
Annex 1: The Business model canvas and process modelling .....	43
Annex 2: Enterprise budgeting .....	44

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## Executive summary

The economy of Kenya is in the midst of a transition in the urban, socioeconomic, policy and technological spheres, which is projected to have major implications for the agricultural sector. In this context, the livestock sector is anticipated to rapidly transform to supply cheap, nutritious and safe food to an increasingly affluent and urbanized population. While growth and transformation of the livestock sector will produce positive impacts, its anticipated growth also presents significant risks for livelihoods, the environment, and public health. Low adoption of biosecurity and food safety practices along the various livestock value chains have been documented. Consultations among stakeholders in the livestock sector have provided evidence that the growth and transformation of the livestock sector may present an increased risk of outbreaks of emerging zoonotic diseases (EZDs) and emergence of antimicrobial resistance (AMR) along rapidly evolving urban and peri-urban livestock value chains.

The Africa Sustainable Livestock 2050 of the Food and Agriculture Organization of the United Nations (FAO) is currently supporting a One Health policy dialogue in Kiambu and Nairobi City counties. The focus of the dialogue is on actors at all nodes of the poultry value chain – from producers to traders to retailers – and on implementation of good practices that could minimize livestock-related public health threats arising from zoonotic diseases and antimicrobial resistance. Stakeholder willingness to adopt good practices depends on how changes in their business model could impact the profitability of their enterprises.

As an initial step to assess how adoption of good practices might impact on the business models of various livestock sector stakeholders, FAO and Strathmore University Business School conducted a study between October and December 2020 to document and characterize the business models of the various enterprises along the poultry value chain in Kiambu and Nairobi City Counties. The study focused on the poultry meat (broiler, indigenous chicken, and ex- layer) value chain and addressed the following four key research questions:

- To what extent are the poultry businesses profitable?
- Do the poultry value chain actors have the capacity to adopt good practices?
- Do poultry value chain actors have the resources to adopt good practices?
- Can poultry businesses access finance to adopt good practices?

The data was collected through 15 focus group discussions and 17 in-depth interviews covering the two counties.

In terms of profitability, traders and broiler retailers make the highest net profit, with a monthly profit of over KES 280 000. Traders and broiler retailers deal in large volumes (300 birds and 300 kg per day, respectively). Traders purchasing live broilers and selling dressed birds make a net margin of KES 42.5 per bird, while retailers make a net margin of KES 36/kg (app. KES 43/bird at 1.2 kg dressed weight). The sale of entrails, such as gizzards, livers and other parts, makes a significant contribution to the profits of broiler traders as they fetch KES 32 per bird.

Based on contemporary business thinking, the market rewards those entrepreneurs who take up large risks and expend most effort in their business endeavours. This is, however, not the case for broiler producers. Producers managing eight cycles of 2 500 birds per cycle achieve a monthly revenue of KES 40 000 to 60 000 at high up-front costs (e.g. KES 300 000 for the bird house) and lower margins per bird (KES 30 to 40) compared to traders and retailers.

Producers of broilers are willing to adopt good practices, especially those bio-security requirements that increase profitability, but investment in good practices remains a challenge for many of them. Small and medium level farmers, in fact, are forced to slaughter at the farms because they have no

alternative for processing, while large producers have access to proper abattoirs where they can deliver live chicken for processing. In many cases this leads to the sale of uninspected poultry meat to consumers.

Among the other actors, chicken transporters and slaughterers/processors have the lowest revenues (below the minimum wage). Motorcycles are the preferred means of commercially transporting chickens. If transporters use their motorcycle exclusively to transport chickens, they earn less than KES 30,000 per month, making the business unprofitable, especially for those owning a single motorcycle.

Some transporters obtain certificates of transport (COT) documents, but mainly obtain COTs as a formality to avoid arrest by law enforcement rather than compliance with biosecurity regulations. COTs are obtained from licensed slaughterhouses, while the chickens are slaughtered elsewhere (usually farms).

Slaughterers who process broiler chicken at the farms are paid KES 10 per bird and achieve a monthly income of around KES 20 000. In contrast, their counterparts, who slaughter indigenous chicken at Maziwa slaughterhouse, are paid KES 25 per bird, but throughput is currently very low.

The model for slaughtering indigenous (*kienyeji*) chicken is different. Customers at the open market choose the live chicken they wish to purchase, which is then slaughtered at the nearby slaughterhouse (for example, *Maziwa* slaughterhouse along Jogoo road) where a meat inspector certifies the meat as fit for human consumption. However, some indigenous chicken traders sell birds to consumers and slaughtering is done at the business premises with little compliance with biosecurity measures.

Some actors have integrated vertically, and this has led to significant increases in their profits. For example, transporters who also dabble in trading and selling of cooked chicken parts, or traders who also farm and have their own transport vehicles. Some integrated actors (trading, transporting, processing and retailing) are able to make more than KES 60.8 profit per bird because of savings arising from the vertical integration.

There are concerns by some actors that a move to the guidelines of the World Organization for Animal Health (OIE) would leave them without a role to play, such as for the slaughterers who slaughter at the farms. The actors opine that they do not get adequate financial support and many perceive that the financial institutions charge exorbitant rates though most of them are not aware of the requirements as well as the interest calculations. They also perceived that adoption of good practices require significant financial resources that reduce their profits, though many were not aware of the actual cost for the requirements.

As businesses along the value chain are profitable, actors have got often sufficient resources to invest to start regularly adopting biosecurity practices. However, actors noted that the market does not reward compliance with food practices and that the informal nature of the value chain can, in many cases, make it challenging to adopt good practices. For example, meat inspectors are willing to inspect only birds that are slaughtered in licensed facilities, while in most cases birds are slaughtered at the farm. There are also economies of scale at work: farmers raising over 1 000 birds per cycle can easily service a loan, while smaller ones have insufficient resources to access formal finance, which makes it challenging for them to implement some of the investments necessary to adopt good practices.

Traders and retailers have sufficient cash flow to access loans, although many contend that interest rates are too high and, therefore, they shy away from bank loans. The transporters' profits, instead, are too low to service a loan.

While there are several bottlenecks along the poultry value chain, the good news is that most operators are running profitable businesses and are open to improve their business, to start adopting practices that both increase their profitability and reduce public health risks along the poultry value chain. Tapping into this opportunity, however, is not straightforward because of the complexity of the chain and the heterogeneity of actors. In these circumstances, an evidence-based multi-stakeholder dialogue, involving both private businesses and local authorities, is the most promising way to identify actionable options to enhance the profitability and the sustainability of the poultry value chain.

The public-private sector dialogue should be action-oriented and target specific private and public sector actions that, jointly, could ensure the adoption of selected good practices by poultry operators and promote its sustainability. The objective of this public-private sector dialogue should not to revolutionize the entire poultry value chain, which would be unfeasible and unreasonable, but to ensure small and critical changes on the ground – such as the adoption of one or two good practices – thereby creating mutual trust and a spirit of collaboration between the public and private sector, which is essential, in the long-term, to steer the development of the poultry sector on a sustainable development path both from a business and societal perspective.

## **1. Introduction**

Kenya is in the midst of simultaneously unfolding and substantial, unprecedented, urban, socio-economic, policy and technological transitions. These transitions will have major implications for the agricultural sector, and especially for the livestock sector that is anticipated to rapidly transform to supply affordably-priced, nutritious and safe food to an increasingly affluent and urbanized population. While growth and transformation of the livestock sector may have positive impacts, it also presents significant risks for livelihoods, the environment, and public health. In particular, low adoption of biosecurity and food safety practices along the various livestock value chains has been documented and poses major public health threats. Consultations among the livestock sector stakeholders have provided evidence associating the growth and transformation of the livestock sector in Kenya with increased risk of outbreaks and spread of emerging zoonotic diseases (EZDs) and livestock-driven antimicrobial resistance (AMR) along evolving urban and peri-urban livestock value chains (FAO, 2020).

The Africa Sustainable Livestock 2050 of Food and Agriculture Organization of the United Nations (FAO) is supporting a One Health policy dialogue in Kiambu and Nairobi counties. The policy dialogue aims to identify public sector procedures (working modalities of public sector officers) that facilitate the adoption of good practices by private sector stakeholders along the poultry value chain. The focus is on actors at all nodes of the livestock value chain – from producers to traders to retailers – and on good practices that minimize livestock-related public health threats associated with zoonotic diseases and antimicrobial resistance.

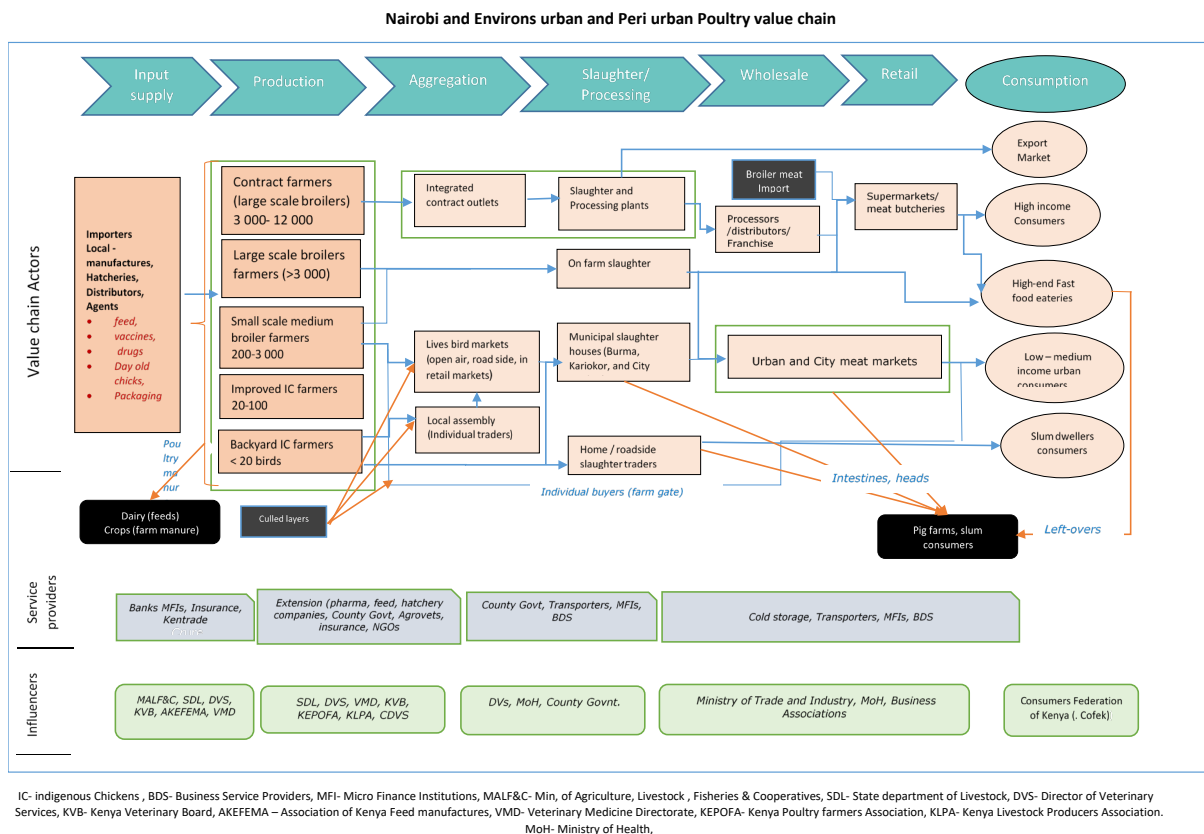
Stakeholders' adoption of good practices involves some change – from minor to major – in their business model. Stakeholders' willingness to adopt good practices, therefore, also depends on how changes in the business model affect the profitability of the enterprise. This report presents the business models of the different private actors operating along the poultry value chain, including an assessment of the cost structure and profitability of their business.

The report attempts to answer four key research questions:

- To what extent are the poultry businesses profitable?
- Do the poultry value chain actors have the capacity to adopt good practices?
- Do they have resources to adopt them?
- Can poultry businesses access finance to adopt good practices?

## **2. Actors in Kenya's poultry value chains**

The poultry value chain in Kenya comprises a variety of players, including producers, traders, processors, transporters, and retailers (FAO, 2008; Carron et al., 2017)



**Figure 1:** The Kenya poultry value chain: a snapshot (Adopted from FAO,2008 & Carron et al, 2017)

## 2.1. Producers

FAO (2008) identifies four chicken production systems in Kenya, which it dubs as “sectors”.

### Sector 1: Large commercial producers

This sector is characterized by highly structured operating procedures much akin to the farming practices of the developed countries. Production is capital intensive and integrated, from grandparent and parent stock to processing, with a high level of biosecurity (Bergevoet & van Engelen, 2014).

Kenchic, a sector 1 player, engages farmers in contracting arrangements based on stringent requirements. For example, contract farmers (CFs) should keep flocks of 3 000 birds per house or multiples of 3 000 with a maximum of 12 000 birds per farm. Kenchic also requires the farms be located no more than 50 kilometers from the city centre.

CFs are notified 3 weeks before they receive the day-old chicks (DOCs). They then clean and decontaminate the flock houses. Kenchic supports them with feed, drugs, and veterinary services. When the broilers are ready for slaughter they are transported to the company’s abattoir located in Tigoni, where they are slaughtered in one all-in all-out operation. Kenchic then packages the meat and sells to the market outlets.

The company does not produce its own feed, but contracts feed producers (like Unga Ltd). The miller supplies both the company’s main breeding farms and the CFs.

### Sectors 2 and 3: Medium and small commercial producers

Poultry farms in these sectors keep between 300 to 3 000 broilers for commercial purposes. They source DOCs, feed as well as drugs from local hatcheries, feed companies and “agrovet”. The quality

of the feed varies from source to source and some farmers add other ingredients like maize, wheat bran or fish meal in a bid to hasten the growth process. There are allegations of unscrupulous farmers injecting the birds with growth hormones, which might have negative impacts on human health (Otieno & Ogutu, 2019).

Marketing of broilers is done on individual basis and preferences. The birds are typically slaughtered at the farm where a government meat inspector comes to inspect the birds and issues a certificate and permit for movement to the market. Birds are then packed and transported to the market. The broilers are always sold in the dressed state rather than alive, largely to avoid weight loss should the birds remain unsold for two or three days in the market. Some farmers refrigerate the dressed carcasses awaiting the delivery to the market; some also slaughter broilers from neighbouring farms both to make a margin and to meet their orders.

#### **Sector 4: Village and backyard farming producers**

This sector is characterized by extensive farming methods. These farmers typically source their stock from their own birds, from local live bird markets, from neighbours and, sometimes, receive them as gifts. The birds are mostly indigenous chicken, though there are a few cases of “improved” breed variety. The birds scavenge for feed around the farmers’ homes and sometimes the farmers give them leftover food. In some cases the birds are provided with maize, cassava, sweet potatoes and even commercial feed, depending on the economic ability of the farmer. Sale is usually at the farm gate or at the local markets. At primary markets the birds are aggregated and then transported to major urban markets, which is their final destination.

#### **2.2. Traders of indigenous live birds**

Traders of live birds mainly operate in Sector 4, purchasing live chicken from small farmers but more frequently from primary markets and reselling them in Nairobi. Traders who can ensure a constant supply of chicken directly sell to supermarkets. There is a tall order for indigenous chicken considering the nature of Sector 4 characterized by slow chicken growth, poor feed conversion and high mortality, which makes it difficult to ensure a sufficient quantity to constantly fill supermarket cold bins. However, this ensures a price premium for indigenous chicken over broilers.

#### **2.3. Processors**

Poultry slaughterhouses are the main processors in the poultry sector. Large poultry farms (Sector 1 and 2) have their own slaughter facilities. Independent slaughterhouses exist in urban areas, usually owned by the municipalities (local councils), to cater to Sector 3 farmers. Some Sector 3 farms have traders come with people to conduct the slaughtering before transport to the market outlets while other Sector 3 farmers slaughter the birds themselves. There are some private slaughterhouses, mostly put up by associations of chicken farmers, which cater to smallholder farmers, but these struggle to make a profit. Improving poultry processing is essential if sector 3 farmers are to upgrade to sector 2 or 1, processing (DFID, 2019).

#### **2.4. Transporters**

The large farms in sectors 1 and 2 transport their own broilers to the market. Farmers in Sectors 3 and 4 rely on external transporters to market their live chicken and dressed broilers. These transport the indigenous chicken in open carriers on or inside passenger vehicles, often against the existing legislation. Some transporters use hand or ox-carts, in many cases without having any government movement permit; others transport the birds using bicycles or motor cycles. Some transporters source birds from multiple farms (Okello *et al.*, 2010).

## **2.5. Retailers**

Retailers sell the final product to the consumers. Okello *et al.* (2010) distinguish between two types of retailers by location, the rural retailers and the urban retailers. Rural retailers obtain their products directly from farmers and sell them to rural consumers. Urban retailers, instead, source their birds from a variety of sources, such as directly from the farmer, through traders (both rural and urban) or through processors.

## **3. Methodology**

### **3.1. Approach**

The study used the Business Model Canvas (BMC) (e.g. BMI, 2020) and Business Process Modelling (BPM) to analyse the business models of selected actors of the poultry value chain. (Details of the BMC and BPM are provided in Annex 1).

The study was carried out in Nairobi city and Kiambu counties, which have both high human and poultry densities (KNBS, 2019). Poultry value chains in these counties are expected to rapidly transform and an increased number of market-oriented urban and peri-urban livestock operators are expected to emerge (FAO, 2019). This may contribute to increased risk of outbreak and spread of EZDs and livestock-driven AMR and calls for an effective system of animal health services serving in urban and peri-urban areas.

In order to gather information on the business canvass, business process and the enterprise budget of poultry operators along the value chain, we had consultations with: (i) poultry producers, (ii) traders, (iii) slaughterers/processors; (iv) transporters; and (v) retailers.

We used a mixed approach to elicit information from stakeholders, using focus group discussions, semi-structured interviews, and in-depth on-site interviews. For the in-depth interviews, efforts were made to target at least one women and youth at each node of the value chain.

### **3.2. Sample and scope**

To generate an appropriate sample, we contacted the county veterinary department in both Kiambu and Nairobi City counties to acquire all data available to them on poultry stakeholders, including their names and contact. Where it was not possible to get a sufficient list of names from the county government, we used snowballing sampling starting with the actors at the extremes of the value chain, i.e. farmers and retailers. Where possible, efforts were made to ensure that half of the sample comprised women and youths at the different nodes of the poultry value chain. The total sample included 110 participants in representation of all nodes of the poultry value chain.

For each node of the poultry value chain, we organized three focus group discussions (FGDs). The FGDs involved a target of five actors at each the transport, slaughter/processing and retail node of the value chain and ten actors each at the production and trading node. The actual numbers are displayed in Table 1.

**Table 1:** Number of focus group discussions and in-depth interviews by value chain actor group in Kiambu and Nairobi City counties and total number of FGD participants

Chain actor	Kiambu county	Nairobi city county	N° FGD participants
Producer	2	1	38
Trader (live & dressed birds)	1	2	26
Transporter	1	2	13
Slaughterer/processor	1	2	20
Retailer	1	2	13
<b>Total</b>	<b>6</b>	<b>9</b>	<b>110</b>

Three in-depth interviews were conducted at each node of the value chain. For the in-depth interviews, we selected the actors who seemed to have most understanding of their business during the FGDs. In addition, an integrated business that covered three nodes of the value chain was also selected for an in-depth interview. Lastly, a trader-owned slaughter slab at Maziwa market along Jogoo road, Nairobi County was visited, and one of the management official was interviewed.

### 3.3. Data collection

Semi-structured survey tools containing both closed-ended and open-ended questions were utilized to elicit information from stakeholders. Data gathered was both quantitative and qualitative in nature. The data collection tools were tested prior to their utilization to ensure that they achieved the set objectives in the best way possible. The FGD interview guides were presented to experts to get their inputs and subsequently amended accordingly.

The surveys were administered via focus group discussions (FGDs) and at each node of the poultry value chain. Visits were made to three businesses (of owners keeping records) for the in-depth interviews. Research assistants were utilized to support the administration of the site visits and FGDs in the two counties. The lead researcher/ principal investigator led the research teams and provided day-to-day coordination of the study up to its conclusion, supported by the project coordinator on the logistical aspects. Where necessary, follow-up sessions were organized with the respondents to ensure that the responses were clear, complete and accurate.

The gender of study participants by value chain node is displayed in Table 2.

**Table 2:** Gender distribution of study participants by value chain actor group in Kiambu and Nairobi counties

FGD/Rapid survey Node	Kiambu		Nairobi City	
	Male	Female	Male	Female
Production	54%	46%	7%	93%
Traders	38%	63%	41%	59%
Transporting	100%	0%	100%	0%
Processing/Slaughtering	86%	14%	31%	69%
Retailers	67%	33%	100%	0%

### 3.4. Data analysis

After the data collection through FGDs, the research team developed the BMC and BPM for each node of the value chain. We also visited farmers and other actors who keep good records to develop the enterprise budget for their enterprises (Annex 2). The revenue data was calculated using input and output prices provided by the actors themselves.

## 4. Findings

### 4.1. Broiler producers

Poultry farmers in Kiambu and Nairobi City Counties mainly belong to Sectors 2 and 3, albeit a few are in Sector 4. Kenchic and Muguku farms, which are Sector 1 players, are also present in Nairobi and Kiambu.

#### Business model canvas

**Customer segments:** Farmers mainly sell their chicken to traders; however, some sell directly to hotels, fast food restaurants, and butcheries. All the commercial agreements are informal (oral contracts based on phone call orders) with no written agreements. Most farmers also sell birds at the farm gate to consumers in their neighbourhood. However, these sales are a tiny percentage (less than 5%) of their total sales.

Traders are the most critical customers for farmers and, most importantly, they pay cash. Farmers accept that traders market their birds with other traders, which allows clearing a batch of up to 2,500 birds within a week. However, while farmers value the role played by traders, they feel that the traders drive hard bargains and there is little room for negotiation.

**Value propositions:** The value proposition is the delivery of “quality” meat. “Quality chicken” are considered those that have a large body mass (above 1.2 kg). Market preference is for birds of around 1.2 kg dressed weight, mainly due to the size of grilling oven skewers of fast-food restaurants, who are the primary buyers of broilers. Underweight was identified as the main reasons for rejections. Quality also includes characteristics like the hue, with preferences towards whitish over red meat, the main reason being that red meat is associated with poor slaughtering technique (strangling the birds in a bag) and with water belly disease. Consumers have a high preference for fresh meat (hot chain) as opposed to chilled meat (cold chain).

**Customer relationships:** Most customer interactions are transaction-based and on the spot. A few traders have become friends of farmers and farmers accept being paid with some delay. Customers, such as hotels, typically take longer to pay their debts. Due to Covid-19, some hotels stopped operation and farmers do not know if and when pending debts will be serviced.

**Channels:** Farmers reach their customers mainly through word-of-mouth. Due to the high penetration of internet, some farmers use social media platforms like WhatsApp. Traders usually interact with farmers at the farm gate, although some farmers transport their chicken to the city market.

**Key resources:** All the interviewed farmers own the land on which they have constructed their poultry house(s). For the majority, this is also where their family lives. The majority of producers started poultry farming drawing on their savings and continually re-invest any profit to expand their business. Only large farmers have accessed loans to scale up their enterprise: it was not difficult for them to get credit once the bank officials visited their farm and scrutinized their bank account, that is the frequency and size of their deposits.

Most poultry producers are sole proprietors and have not registered their businesses. They have an average of 3-5 years’ experience in commercial production of broilers, with some having over 20 years’ experience. The majority work on the farm together with hired workers. A number of medium-scale producers (producing more than 1,000 birds/batch) have invested in technology, for example in automatic drinkers and gas heaters for maintaining the right temperatures during the brooding period. Small scale producers use charcoal *jikos* (burners) to maintain the temperature of the brooding house

but, given the high cost of maintaining charcoal *jiko*, many farmers would be willing to find cheaper source of energy.

Many farmers have access to credit, particularly medium-scale producers (over 1 000 birds per cycle). However, they would prefer softer credit terms as they feel the prevailing interest rates are on the high side and that requirements for loan applications are quite stringent. Many, therefore, prefer to seek financing from other sources, like their own savings or table banking.

Producers obtain information for improving their farming enterprises from various sources, such as seminars organized by various non-state actors (e.g. NGOs) and millers. Farmers also learn from fellow farmers whenever they visit each other or in fora. A number of farmers who are digitally savvy access information from the internet.

Although contract farming provides several advantages to farmers, including provision of inputs and technical advice, few have established agreements with large processors. Most feel that the requirements by contracting firms are way above their capacity, that is owning / renting at least a quarter acre land and producing no less than 5 000 birds per cycle.

### Key activities of poultry producers

Activity	Frequency
Preparing the chicken houses for the arrival of the DOCs	Once per cycle
Purchasing the DOCs	Once per cycle
Purchasing feed and vaccines	Usually once a week or fortnightly
Arranging feed in the storage area	Whenever feed arrives
Feeding the birds	Daily
Checking the growth of the birds	Daily (but more intensely in the first week)
Monitoring the temperature in the chicken house	Daily (but more intensely in the first week)
Weighing the birds	Periodically
Slaughtering	Once (at the end of the cycle)
Loading into gunny bags	Once (at the end of the cycle)
Transporting (feed, vaccines, DOCs and dressed birds)	Whenever required
Transacting with customers and vendors	Whenever required

Farmers are aware of some aspects of biosecurity. Some of the biosecurity measures they practice include cleaning and disinfecting the poultry houses before they receive consignments of day-old chicks (DOCs), adhering to vaccination programmes, using dry sawdust or rice husk and having a footbath with disinfectants. They view the costs associated with these measures as investments as they enhance the quality of their chickens.

Slaughtering is done at the premises, though not always following good practices. Usually, the trader comes with people who slaughter and charge a standard fee per bird (usually KES 10). Farmers provide water, a place for heating the water as well as a table for slaughter. Some have a shed to protect the people performing the slaughtering. Some farmers properly dispose of waste such as blood, offals, intestines, and heads, but the majority do not have invested in any biosecurity equipment at the slaughtering site. In case of impromptu orders (which are common), farmers cannot ensure feed withdrawal (at least 8 hours before slaughter). In general, birds are slaughtered very early in the morning (between 1 and 4 am) and delivered to the outlets before the sun rises so as to avoid the

meat spoils (and becomes smelly) with the rise in temperatures. Consumers have a high preference for fresh meat (hot chain) as opposed to frozen meat (cold chain).

Farmers would be willing to improve their slaughtering practices through setting up proper mini slaughter in their farms on condition that the government provides clear regulations both for slaughtering and the subsequent transport of the dressed birds. Currently, it is too cumbersome for a farmer to comply with all rules and regulations and, in many cases, finding ways to bypass the law is sustainably cheaper compared to compliance costs.

Indigenous chickens are sold as live birds. While they fetch higher prices, they take longer to achieve the weight demanded by consumers (above one kg). Indigenous chicken takes between 5-6 months to grow as compared to 4-6 weeks for broilers. The market of indigenous chickens is prime but limited in size.

**Key partners:** Key partners of broiler farmers are veterinary officers based at the county offices, who provide extension services. However, most farmers claim that these officials rarely came to the farms.

Millers organize seminars to advise farmers on feeding and the quality of their feeds; some agro-vet shops cooperate with veterinarians who provide advice to farmers.

Farmers also interact with meat inspectors and county officials, especially those who deliver dressed and live birds to the city market in the central business district (CBD). Farmers would like that the government prevent foreign producers to supply the market with often cheaper chicken. Chickens from Uganda, for example, are typically on sale at lower prices than local ones.

**Cost structure:** The cost of setting up the chicken house depends on farmer's own preferences and finance. For a flock size of 2 500 birds, the cost of putting up the poultry house is around KES 300 000 to KES 500 000, depending on materials used. On average, one poultry house can be used to produce 6-8 cycles per year.

The cost of the DOCs varies between KES 60-75 depending on the hatchery and the terms of agreement. Farmers agree that Kenchic DOCs are expensive (KES 70), though they are vaccinated against some diseases. Cheaper DOCs are usually not vaccinated.

Producers complain that feed is quite expensive, with the cost of a bag (50kg) ranging from KES 2,700 to KES 3,200 depending on type (starter crump, growers mash or finisher pellet). Feed costs vary depending on the miller and the agro-vets or distributors. The table below presents the agro-vet prices for Isinya brand, a highly popular poultry feed.

Feed type	Cost (KES/50 kg bag)
Starter crumbs	3 200
Growers pellets	3 150
Finisher pellets	2 710

One sampled farmer deals with a vendor who sells starter crumbs feed at KES 3 900 per 70 kg. The low prices have made a tremendous impact on his profits as he incurs in a lower per-unit cost than a typical farmer (KES 55.71 per kg of feed as opposed to KES 64 per kg of feed).

Assuming a scale of production of between 1 000 and 25 000 birds, for the typical cycle of 42 days, a bird will consume 1 kg of starter crumbs (in 21 days) at KES 55.71 and 2.5 kg of finisher pellets (in 21 days) at KES 135.75 (these costs assume the farmer sources feeds from the miller or distributor, and therefore pays the wholesale price). Farmers approximate that antibiotics, vaccinations, vitamins cost around KES 10 per bird. In a cycle, electricity, gas, water, labour, rice husk and fixed costs (e.g.

depreciation of feeders and drinkers) amount to KES 15.84 per bird. Energy costs, however, vary widely depending on the method of heating, e.g. charcoal burners (*jikos*); gas burners; or heat-emitting electric bulbs. *Jikos*, which are not very efficient and lead to higher costs per bird, are used by farmers, which are financially constrained. Heating costs, however, are incurred only for the first two weeks when the chicks are still at the brooder stage. Overall, the total cost of production per bird per cycle is estimated at around KES 287.30.

Fixed costs include, beyond the construction of the broiler house, purchasing of equipment such as feeders, drinkers, clothes, boots, etc. The recommended number of feeders is 1 per 50 birds. A typical feeder costs KES 800. Drinkers' costs vary and depend on the type (basic plastic drinkers vs. automated drinkers). Automatic drinkers (nipple-based) cost KES between KES 70 and KES 100 per nipple, while the manual drinkers cost KES 550 for the typical 10-litre capacity.

**Revenue streams:** Farmers obtain income from the sale of chicken as well as from the sale of manure. The price for broilers ranges from KES 330 to KES 400 per bird depending on the buyer. Consumers who buy at the farm gate pay KES 400, while traders pay KES 330 to 350 per bird.

Indigenous birds attract higher prices, ranging from KES 800 to KES 1 200 depending on the weight. However, their price depends on the market availability of their substitutes: when ex-layers birds are available on the market, price of indigenous birds is on the low side, as both types of bird are used by hotels for cooking soup.

Farmers charge between KES 150 to KES 200 per bag of manure (they usually use the empty 50 or 70 kg feed bags to sell manure). A flock of 1 000 birds produces on average 7 to 10 bags of manure per cycle.

Some farmers are innovators and have enlarged their business in original ways. Some provide trainers to potential poultry farmers charging KES 500 per person per day. One farmer has come up with an innovative way to provide water to the chicken – he has modified traditional drinkers – and he charges fellow farmers to install them. He charges KES 25 per bird rather than per nozzle.

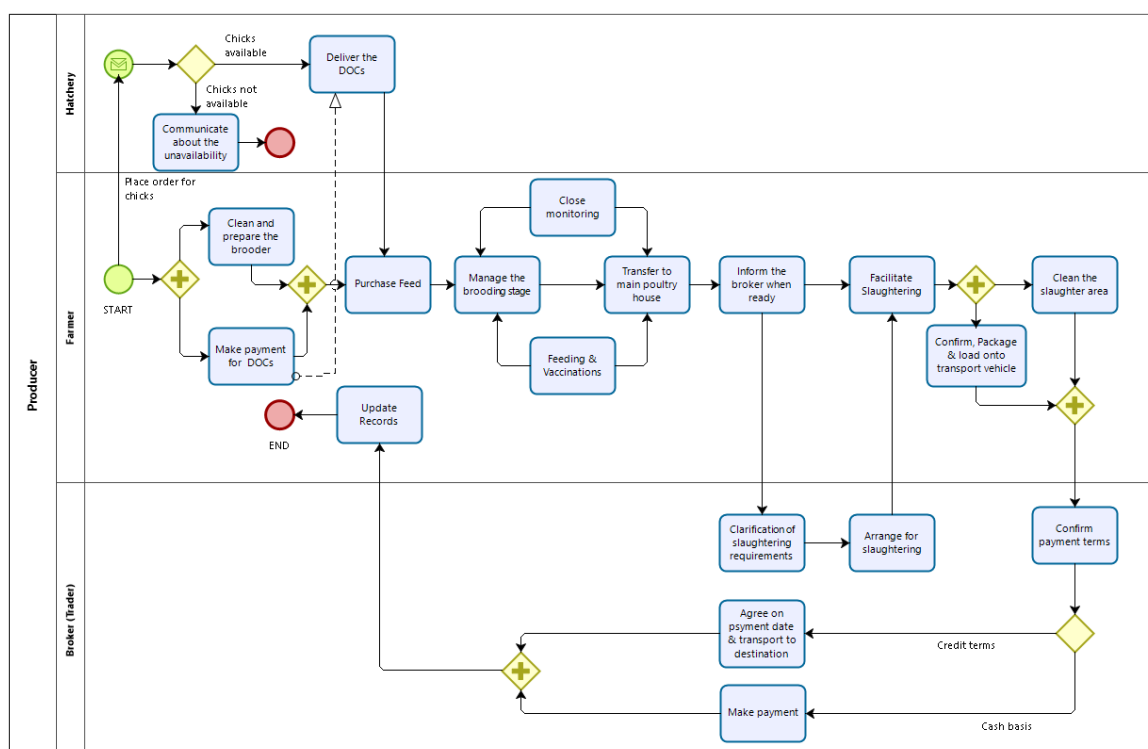
Although there is a significant variation in the scale of production per batch (ranging from 200 to 3 000 birds), all farmers agree that the poultry business is bankable only for those who raise over 1 000 birds per cycle of 42 days, which generates a minimum profit of KES 44 900 per cycle. Once one gets into this medium scale, the millers deliver the feed at the farm and charge the wholesale price, which is lower than that charged by agro-vets. In addition, vaccines are sold in quantities of 500 or 1 000 doses, and hence any producer with less than 500 birds ends up purchasing doses that will go waste. Economies of scale are thus a game-changer in the profitability of broiler farming. However, the increase in scale comes with the challenge of marketing the birds.

### **Business process**

The business process of poultry production is detailed in Figure 2. The process starts with the producer placing an order for day-old chicks (DOCs) from the hatchery of choice. This is done well in advance as DOCs are not necessarily readily available. As the farmer is waiting for DOCs to be delivered, he cleans and disinfects the poultry house. Once the hatchery is ready to deliver, the farmer pays for the DOCs and purchases the feed. As soon as the DOCs arrive, the farmer places them in the brooder and monitors their growth closely as they are fed and given water. The vaccination programme is followed strictly. After about two weeks, the farmer transfers the bird to the main poultry house.

The feeding, drinking and vaccination programmes are continued until the birds are ready for slaughter. At this point the farmer informs the trader. The trader arranges for slaughtering by contacting the slaughterer and they will travel together to the farm. The farmer facilitates slaughtering

by providing space and equipment, like drums, basins, knives and a firewood to heat water for scalding and defeathering. After slaughter, the dressed birds are counted and packed into either gunny bags or buckets and loaded onto the transport vehicle. The farmer cleans the processing area.



**Figure 2:** Business process model of poultry production

The farmer reaches an agreement with the trader on mode of payment. Some farmers don't accept purchase on credit terms while others do. If the farmer requires payment immediately then the trader pays and leaves, but the majority allow for the traders to deliver the consignment, being paid and then pay the farmer. The farmer updates his/her records. A new production cycle can start.

### Enterprise budgets

The enterprise budget varies by farm typology. All farmers face the same type of costs, such as purchasing DOCs, feed and vaccine, heating the brooder and paying for slaughtering. The flock size, however, influences both production practices and the overall cost structure. In general, large flock sizes (about 2 500 birds per batch) are associated with advanced production methods, such as the use of electric bulbs for heating the brooders, while smaller flock sizes (about 500 birds per batch) use traditional production practices, such charcoal burners for brooding, which are more expensive per bird than electric heating.

We developed therefore three enterprise budgets, for a modern, an innovative and a local broiler farm. The modern farm is located far from the living quarter of the farmers' family; has several structures to house birds at different growth stages, managing a production level of 2 500 birds per cycle; utilizes modern equipment, including feeders and drinkers, and has adequate supply of water, gas and electricity. The innovative farmer has the same capacity in terms of production volume, but makes use of cheaper feeds and has fabricated an innovative automatic drinker enabling to use less water and increasing the profitability. The local "improved *kienyeji*" farm keeps the chicks for one month and then sells them to other farmers who do not want to deal with the inconveniences of brooding from DOC stage. The farm incurs minimal feed, water and energy costs.

**Table 3:** Monthly enterprise budgets for three types of broiler farms (in KES, 110KES = 1USD) each producing 8 cycles a year

Item	Modern Farm	Innovative Farm	Local Farm
<b>Revenue</b>			
Broiler sales	600 000	550 000	100 000
Husks/manure	2 667	3 800	1 333
<b>Total revenue</b>	<b>602 667</b>	<b>553 800</b>	<b>101 333</b>
<b>Variable/operational costs</b>			
Birds (DOCs)	116 667	116 667	33 333
Feed	399 400	319 100	6 400
Medication	6 000	16 667	1 333
Litter	3 200	1 350	600
Energy	12 250	15 500	1 800
Water	5 000	2 500	240
<b>Total operating costs</b>	<b>542 517</b>	<b>471 783</b>	<b>43 707</b>
<b>Returns over operating costs</b>	<b>60 150</b>	<b>82 017</b>	<b>57 627</b>
<b>Fixed costs</b>			
Labour (permanent)	10 000	15 000	0
Miscellaneous	5 000	0	667
Depreciation (poultry house/equipment)	5 167	3 500	667
<b>Total fixed costs</b>	<b>20 167</b>	<b>18 500</b>	<b>1 333</b>
<b>Overall total costs</b>	<b>562 683</b>	<b>490 283</b>	<b>45 040</b>
<b>Indicators</b>			
<b>Returns over total costs</b>	<b>39 983</b>	<b>63 517</b>	<b>56 293</b>
<b>Net profit margin (%)</b>	<b>6.6</b>	<b>11.5</b>	<b>55.6</b>
<b>Fixed costs/revenue (%)</b>	<b>50.4</b>	<b>29.1</b>	<b>2.4</b>
<b>Profit/bird</b>	<b>24.0</b>	<b>38.1</b>	<b>168.9</b>
<b>Volumes and prices</b>			
<b>Birds/cycle</b>	<b>2 500</b>	<b>2 500</b>	<b>500</b>
<b>Birds/month</b>	<b>1 667</b>	<b>1 667</b>	<b>333</b>
<b>Cost of DOCs</b>	<b>70</b>	<b>70</b>	<b>100</b>
<b>Price of birds sold</b>	<b>360</b>	<b>330</b>	<b>300</b>

Modern broiler farm: The sale price for chicken is KES 360. The figures given for feed is from the farmer's records and reported: "as is". The farmer's records also indicate the miller/feed brand, including Isinya (miller) and Fugo (from Unga Ltd). The amortization figures are based on the assumption that the poultry house (KES 500 000) and the equipment (KES 120 000) can be used for ten years, with eight production cycles per year.

Innovative broiler farm: The farmer raises three batches of chicken, comprising 2 500 birds. The enterprise budget is based on one of the batches. At the time of the study each bird was sold at KES 330. Each batch produced 38 bags of manure, each sold at KES 150. Each bird consumes 1 kg of starter

mash and 2.5 kg of finisher pellets from arrival at the farm to maturity. Starter mash and finisher pellets are from Belfast feed and paid KES 55.71 and KES 54.29 per kg, respectively. The cost of medications and vitamins are estimated to be KES 10 per bird. The amortization figures are based on the assumptions that the poultry house (KES 300 000) and the equipment (KES 120 000) can be used for ten years with eight production cycles in a year.

Local improved indigenous farm: The farm sells each 1-month-old chick at KES 300. The batch of 500 chicks produces four bags of manure, which are sold at KES 500 each. Indigenous chicks are more expensive than exotic broilers, with each DOC costing KES 100. The farm uses three bags of starter crumbs (Pembe brand) per month. The amortization figures are based on the assumption that the poultry house (KES 100 000) and the equipment (KES 20 000) can be used for ten years with eight production cycles in a year.

## 4.2. Poultry traders

Poultry traders engage in two distinct poultry value chains: they either purchase (i) broilers or (ii) ex-layers (spent hens) and indigenous (*kienyeji*) chickens. The major difference is that broilers are slaughtered at the farms, while ex-layers and *kienyeji* chicken are transported live to the points of sale. Twice a year (also depending on the demand for eggs) major hatcheries sell their mother-breeder birds (*mfalme*). Traders look forward to purchase them as they ensure large profits as each bird weighs around 4kg.

Ex-layers and *kienyeji* birds are treated as substitutes since they are both used to make soups (ex-layers take a shorter time to cook); they also have a unique taste that is valued by consumers. Ex-layer birds are mostly sourced from Thika, Kiambu, Muranga and Kajiado, but also from far-flung towns like Kitale in Trans-Nzoia sub-County. Indigenous (*kienyeji*) chickens are mainly sourced from Bomet County. The ex-layers have a higher volume of trade compared with the *kienyeji* birds. These are used mainly for grilled or fried dishes (for example, what Kenyans dub *wet-fry* and *dry-fry*). The wet fry is a popular dish in hotels, restaurants and bars in urban areas.

### Business model canvas

**Customer segments:** Traders purchase broilers, ex-layers and indigenous chickens at the farmers' premises. They sell dressed chicken to hotels, restaurants and butcheries; they sell indigenous chickens to retail consumers as well as to other traders, who slaughter them upon the request of their customers.

A typical broiler trader serves 3 to 5 hotels and 4 to 6 butcheries weekly. To this end, s/he sources birds from different farmers and other traders. S/he sells the offal (gizzards, liver, neck and legs) to traders in informal settlements who roast and sell them as snacks.

The ex-layers and *kienyeji* birds are sold either as live birds or slaughtered depending on the customer's requirements. The ex-layers and *kienyeji* traders in Nairobi have pulled-together and established a slaughterhouse. *Kienyeji* bird customers are mainly walk in customers while hotels are the main customers for ex-layers.

**Value propositions:** The value proposition is the delivery of "quality" meat. "Quality chicken" is defined by traders as a bird that has a large body mass (above 1.2 kg) and looks healthy. Another fundamental value proposition is to ensure a consistent supply throughout the year.

Customers in Kenya prefer fresh products (hot chain), so the traders do not see the need for refrigerated trucks. This makes the market supply a daily activity with no attached storage cost for the traders.

**Customer relationships:** Most interactions with customers are transaction-based and based on trust. A few customers, such as hotels, have developed long-term relationships with the traders, who thus accept being paid late.

Some customers, such as hotels, typically take longer to pay their debts (some hotels closed down due to Covid-19 and have yet to pay the traders who supplied on credit). To reduce the risk of bad debts, therefore, some traders deliver a maximum of two times to a client and wait for the first delivery to be paid before agreeing on a third consignment. Casual arrangements can also cause massive losses, for example when the deal is agreed upon with a hotel manager rather than the owner: if the hotel manager is sacked, the trader will lose his money.

**Channels:** Traders reach their customers mainly through mobile phones. For bird sourcing, brokers act as intermediaries. They not only make the contact with the farmers but also agree upon the number and maturity date for birds.

**Key resources:** In most cases, traders lease vehicles to transport the birds, for which they pay a weekly fee. Few traders have their own vehicles. The vehicles have been modified to accommodate either a bucket or a bag of dressed birds, usually with little attention to biosecurity measures. Lack of proper packaging materials during the transportation of dressed birds is a challenge for broiler traders. Consignments of ex-layers are usually between 300 to 700 birds per trip, ferried in pick-ups fitted with cages. The *kienyeji* chickens are generally transported in empty lorry trailers returning to the city after offloading their cargo. About 40 to 70 birds are transported per consignment. Most of the ex-layer and *kineyeji* traders offload the birds at their customers' premises in the market. Some, however, also operate retail "stalls" in the market and rent premises to keep unsold birds.

When we probed traders on the possibility of transporting broilers to a slaughterhouse, they were sceptical of the idea for various reasons. First, according to them, farmers are not willing to cater for the transport costs and mortality due to transport. Second, a typical truck with proper cages that can successfully transport broilers is able to accommodate 2 800 birds per trip, but both most broiler producers are small scale as markets require small supplies per day (around 500 birds).

Traders have access to credit through pooled funds. They would appreciate softer credit terms from financial institutions, from which they would be willing to take loans to expand their business, but consider the prevailing interest rates too high.

**Key activities:** Key activities of a poultry trader and their frequency are listed below.

Activity	Frequency
Arranging for transport	Per trip
Travelling to purchase the birds	Per trip
Transacting with farmers	Per trip
Loading	Per trip
Transporting the birds	Per trip
Paying cess	Per trip
Paying market fees	Per week
Slaughtering	When necessary
Transacting with customers	Daily

The traders' knowledge of biosecurity and good practices is limited to the provision of adequate spacing (depending on the capacity of the transport vehicle) and protecting the birds from rainfall and

other external perils. The transportation of *kiyenyeji* chicken has little to no regard for biosecurity aspects.

**Key partners:** Key partners include veterinary officers in markets and slaughterhouses, who are request to inspect the birds to ensure they are safe for human consumption. Traders who supply institutions (e.g., government agencies, hospitals, etc) also interact with public health officers.

Traders interact with county officials, who charge the county levies at designated locations along the roads, mainly at entry or exit points of the county boundaries. At the same time, policemen are mandated to enforce regulations for transporting birds, and hence can inspect vehicles and check whether transport permits have been obtained.

**Cost structure:** The cost of starting-up a trading business is dependent on the type of chicken one decides to trade in. For ex-layer traders, the typical amount of capital required is around KES 500 000, while the capital required to start trading in *kiyenyeji* is between KES 70 000 to KES 80 000.

The cost of buying birds depends on the variety and changes by season. When there is a good market for eggs, ex-layers are scarce on the market and farmers who sell their birds ask for higher prices. Prices of ex-layers rage from KES 350 to KES 450, the *mfalme* variety are sold at about KES 500 per bird, while the *kiyenyeji* chicken goes for around KES 800. For ex-layers there is usually a "broker" who groups farmers in a bid to "aggregate" orders and charges KES 5-10 per bird for his services.

The cost of hiring a transport vehicle is in the range of KES 15 000 per week. The fuel cost depends on the distance covered. On average, a pick-up with a full tank of fuel of KES 7 000 can be used to make 3 trips to Thika to source birds. Transportation costs also depend on the distance covered as well as the county levies, which vary from county to county. Below is a table showing the fees charged at some cess paying points.

County	Cess fee (in KES)
Nyahururu	1 000
Mai Mahiu	500
Burma market	1 000
Kajiado	5 000

Traders assert that the cess costs, especially in Kajiado county, are higher for them than for transporters of other items, such as oranges and onions from Tanzania. Traders propose the cess be replaced by an annual or monthly license, which is how it works for other market operators.

Labour costs include the salary of the driver, who is paid around KES 25 000 per month, as well as the casual labour of off-loaders who are paid KES 600 per day.

The traders sometimes feed the unsold birds at the cost of KES 50 per kilogram of feed. The monthly cost structure of a broiler and an ex-layer trader is presented in the enterprise budget section.

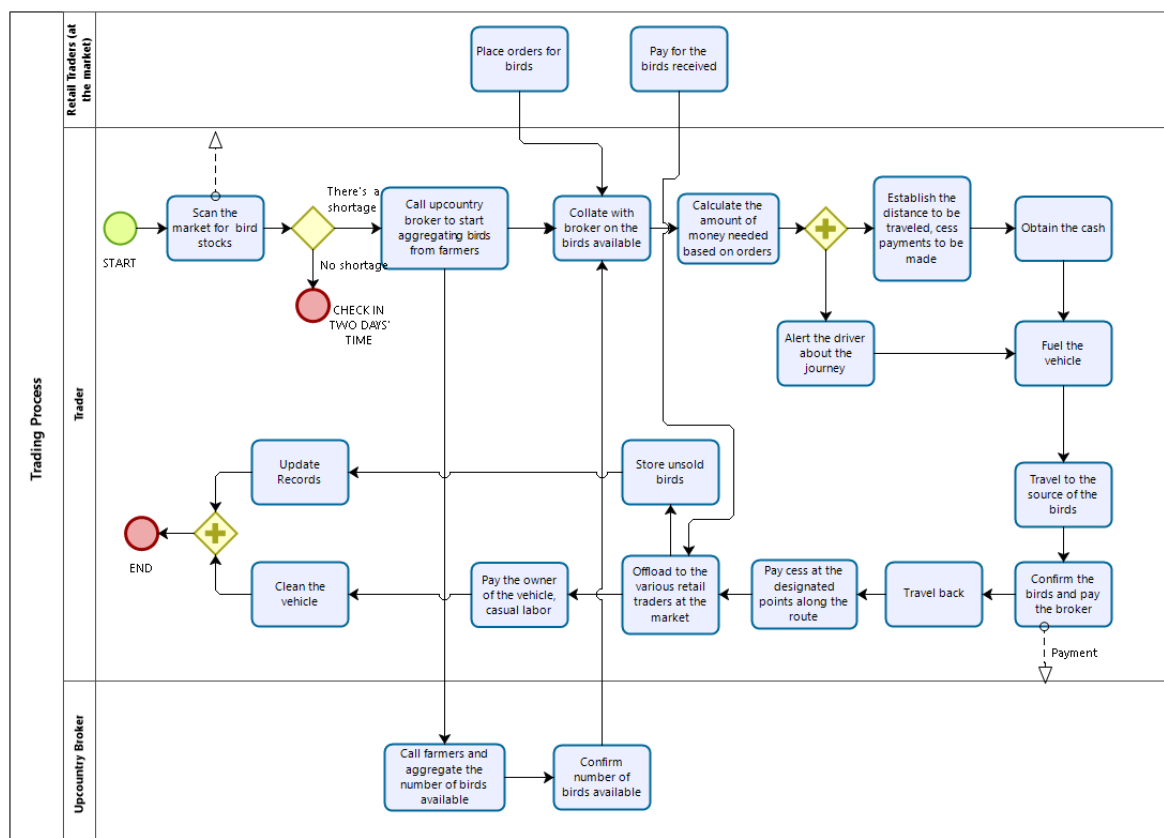
**Revenue streams:** Traders obtain income from the sale of chicken. The prices for ex-layers range from KES 400 to KES 480. The *mfalme* variety sells for KES 600. Indigenous birds attract higher prices, ranging from KES 900 to KES 1 000 per bird depending on the weight. Broiler traders also receive revenue from the sale of gizzards (KES 10), liver (KES 10), neck (KES 10) and legs (KES 2).

Live bird (ex-layer) traders can sell around 11 500 birds per month, making a profit of KES 355 000. Covid-19 has greatly affected the sales volume per week. The monthly profit of a young (age 27 years) broiler trader selling 2 000 birds per week at KES 370 per dressed bird amounted to KES 340 250. This

decent profit has enabled him to diversify his business into broiler production and real estate (he bought a plot at KES 7M). Details are presented in the enterprise budget section.

## Business process

Details of the business process of an ex-layer trader are presented in Figure 3.



**Figure 3:** Business process model of live bird (ex-layer) trader

The trader scans the market for an indication of shortage of the *kienyeji* or ex-layer birds. If retailers still have unsold birds, the trader waits for one or two days before informing the upcountry broker to start aggregating chicken from farms. The upcountry broker informs the urban trader of the numbers available. The urban trader starts taking orders from stall retailers at the market (who have stalls where they sell live chicken to consumers).

The trader then calculates the amount of cash required to purchase the birds, transport costs and other incidentals like cess. The trader alerts the driver to prepare for the journey. The trader prepares the cash and fuels the vehicle with the driver. They then proceed to collect the birds, usually several kilometres away, pay the broker and return to the city, paying cess at the designated points along the travel route.

Upon arrival, the consignment is delivered to all retailers who had placed orders. Then the trader pays the casual labourers (off-loaders) as well as the owner of the transport vehicle. The birds that are not sold are kept in stalls the traders refer to as “stores”. The trader organizes for the vehicle to be cleaned and updates his/her records.

## Enterprise budgets

Examples of enterprise budgets of a broiler trader and an ex-layer trader are presented in Table 4.

Broiler trader: The trader buys broilers from farmers at KES 340 and sells each bird at KES 370. He sells an average volume of 2 000 birds per week. The sale of gizzards, necks, liver, and legs fetch KES 32 per bird sold. At the farm, the cost of slaughtering is KES 10 per bird. The trader averages five trips per week, with each roundtrip costing KES 1 500. The person who does the loading charges KES 50 per bag, with each bag containing 50 birds. The trader mentions that he pays KES 500 to council officials every time he delivers “to avoid problems”. The motor vehicle is washed after every delivery at the cost of KES 200. Vehicle insurance is calculated as 7 percent of the value of the car (KES 700 000) per annum, which is divided by 12 to obtain a monthly figure. The cost of the freezer (KES 60 000) is spread over a period of 10 years; hence the monthly amount of KES 500. The amortization for the vehicle is spread over five years.

Ex-layer trader: The figure of 11 507 birds was obtained from the trader’s records for October 2020. The broker is paid KES 5 per bird. Casual labour costs KES 600 per day and the labourer worked for 29 days that month. Cess at Burma market is KES 1 000 per consignment and 22 trips are made in the month. A filling of fuel costs KES 7 000 and covers 3 round trips to Thika.

**Table 4:** Monthly budget of broiler trader and trader of ex-layers (in KES, 110KES = 1USD)

Item	Broilers	Ex-layers
<b>Revenue</b>		
Sale of dressed/live birds	2 960 000	4 372 660
Sale of gizzards, liver, neck, legs	256 000	na
<b>Total revenue</b>	<b>3 216 000</b>	<b>4 372 660</b>
<b>Operating/variable costs</b>		
Chicken purchase	2 720 000	4 602 800
Slaughter cost	80 000	na
Casual labour	8 000	17 400
Transport (fuel) cost	30 000	28 000
Washing vehicle	4 000	2 400
Council 'fee'/cess	10 000	22 000
Broker fee	na	57 535
<b>Total operating costs</b>	<b>2 852 000</b>	<b>4 730 135</b>
<b>Returns over operating costs</b>	<b>364 000</b>	<b>217 875</b>
<b>Overhead costs</b>		
Amortization/lease of vehicle	11 667	60 000
Servicing of vehicle	7 500	na
Vehicle insurance	4 083	na
Driver	na	25 000
Store rent	na	10 000
Local council fee		400
Freezer	500	na
<b>Total overhead costs</b>	<b>23 750</b>	<b>95 400</b>
<b>Overall total costs</b>	<b>2 875 750</b>	<b>4 825 535</b>
<b>Indicators</b>		
<b>Returns over total costs</b>	<b>340 250</b>	<b>352 615</b>
<b>Net profit margin (%)</b>	<b>10.6</b>	<b>8.1</b>
<b>Overheads/revenue (%)</b>	<b>0.7</b>	<b>1.8</b>
<b>Profit/bird</b>	<b>42.5</b>	<b>30.6</b>
<b>Volumes and prices</b>		
<b>Birds traded</b>	<b>8 000</b>	<b>11 507</b>
<b>Purchase price</b>	<b>340</b>	<b>400</b>
<b>Sales price</b>	<b>370</b>	<b>450</b>

### 4.3. Poultry slaughter on farm (broilers) and at market (*kienyeji*)

There are two types of poultry slaughterers. Those who are called upon to slaughter at the farms (exotic broilers) and those who dub in retailing and only offer slaughtering as an added service.

#### Business model canvas

**Customer segments:** The customers who buy *kienyeji* chicken are mainly retail consumers, who select the birds for home consumption. The slaughterer provides his services to these clients at the retail market.

Customers of broiler slaughterers are mainly the traders who travel to the farms, select the chicken according to certain specifications (usually weight) and invite the slaughterers at the farms to help slaughter, package and load the chicken into transport vehicles

Some institutions and individuals holding events can engage slaughterers to slaughter chicken on specific occasions, but these requests are few.

**Value propositions:** Slaughterers perform the job of transforming live birds into poultry parts ready for cooking. Customers who hire them value quality slaughtering. This means that the carcass should have the following characteristics:

Characteristic	Description
Size of birds	The slaughterers should select chicken of the required weight, the selected birds should comply with the traders' requirements, such as to be of dressed weight between 1.2 kg and 1.4 kg (this is particularly common for the broiler market)
Hue	The colour of the dressed broilers should be whitish and not reddish
Cleanliness	The carcass should be without blood, the plucking should be "clean", that is all the feathers should be removed
Integrity of parts	The parts like the wings and liver should not be damaged/broken. To avoid the wings being broken, birds are often suffocated in bags.

Some slaughterers package the chicken into special bags; some clients require labelling indicating the name of the client's enterprise. Sometimes the *kienyeji* slaughterer delivers dressed chicken at customer requests, usually at the customer's own transport cost.

*Kienyeji* processors at the market have garbage bags for waste disposal and containers for removal of blood. In Kiambu, public health officials look for cleanliness, white coat, health certificate and safe disposal of waste when they visit their business premises.

**Customer relationships:** Most customer interactions are transaction-based and on the spot. A few customers have become personal friends and slaughterers / processors accept to be paid with some delay, though the credit period rarely exceeds a day.

**Channels:** Slaughterers reach their customers mainly through mobile phones. The slaughterers interact with the traders at the farm where the slaughtering takes place.

**Key resources:** Slaughterers of broilers rely on their phones to receive slaughtering orders, to receive payments and to communicate with their customers, who are mainly traders. However, the farmers provide them with the slaughtering equipment, such as scalding drums, buckets, saucepans (*sufurias*), knives, firewood and water.

The slaughterers of *kienyeji* chicken in the market require a stall (averaging KES 25 000 to put up) and equipment such as gas cylinders (KES 3 500), burners (KES 400), saucepans (KES 1 800), knives (KES 350), weighing scale (KES 1 000), and packaging bags (KES 250/kg).

Slaughterers have access to credit through Microfinance Institutions (MFIs) and Savings and Credit Cooperatives (SACCOs). Like other actors in the poultry value-chain, slaughterers have the perception that bank loans are expensive, and the process of applying for these loans are tedious. However, most slaughterers are not aware of the market interest rates; some take more expensive loans because of the "ease in access" as opposed to formal bank loans.

**Key activities:** Key activities of poultry slaughterers comprise:

Activity	Frequency
Transacting with traders	Per order
Selecting birds for slaughtering	Per order
Counting to confirm the number of birds	Per order
Slaughtering	Per order
Scalding	Per order
Defeathering	Per order
Packaging	Per order
Labelling	Per order
Loading	Per order
Cleaning	After each day's slaughtering
Obtaining licenses & permits	Per year

In terms of biosecurity measures, there is a wide variation. Some farmers have dug a pit next to the slaughter area to drain the blood, while the intestines and head are given to owners of dogs and pigs for free on the condition they clean the slaughtering area. Feathers are disposed of the same way the household waste is disposed of. On other farms, the blood just drains where the slaughtering is done. After the blood clots, the farmer cleans the area with water. For the *kienyeji* slaughterers, the slaughtering is done either at abattoir constructed by the members of the cooperative; those who dub in trading-slaughtering-retailing, slaughter on slabs adjacent to the pen holding the birds. There are minimal biosecurity measures during slaughtering, with slaughterers only wearing white coats and slaughtering on tables rather than on the ground.

**Key partners:** The slaughterers have few interactions other than with their clients. They interact with public health department officials only when applying for certificates, such as health certificates and permits to transport chicken, or for licenses, such as the business trading license.

**Cost structure:** Slaughterers of broilers have minimal fixed costs as farmers provide the slaughtering equipment (though a number decry their inadequacy in some farms). Their main cost is transport to the farm (though some traders cater for this cost), which on average is around KES 200 per day of slaughtering.

The *kienyeji* slaughterers, on the other hand, require a structure to operate in the market for which the cost is around KES 25 000. They have to purchase equipment such as gas cylinders (about KES 3 500) and the subsequent filling of the gas (KES 1 000 per week) and other item, such as a white coat and chopping board.

Item	Units/Quantity	Unit Cost (KES)
Gas cylinder	1	3 500
Knives	3	350
Weighing scale	1	1 000
Sufurias	2	1 800
Chopping board	1	900
White coat	2	350

The *kienyeji* slaughterers incur the cost of purchasing the birds as well as feeding as they wait to process them at the sale point. However, the feeding costs are very low since they are able to acquire vegetable waste from the groceries for free and they usually cook ugali using maize flour for the birds. One kilogram of maize flour (KES 50) cooks ugali that can feed 70 birds for two days. Since the *kienyeji*

slaughterer operates in business premises, they require the following licenses: a business permit in Kiambu county at KES 3 600, a fire certificate at KES 500, an advertisement banner at KES 2 500, and a health certificate at KES 1 000. Some *kienyeji* processors have also acquired food and hygiene certificate at KES 7 500. The *kienyeji* slaughterers also incur the following overheads:

Expense	Frequency/Quantity	Unit Cost (KES)
Water	Two 20-litre containers per day	30
Sharpening knives	3 knives sharpened per week	20
Weighing scale battery	Monthly	100
Gas cooker/burner	Replaced monthly	400
Packaging bags	Per bird slaughtered	4
Garbage bags	3 per week	10
Security services	Once a month	800

**Revenue streams:** Slaughterers of broiler chicken charge KES 10 per bird while slaughter of *kienyeji* chickens is charged KES 15. The slaughtering price for broilers has not changed over the past ten years due to high competition. If the slaughterer is required to slaughter less than 100 birds, he usually demands the customer to cater for his transport. Some traders pay the slaughterers with parts of the entrails (usually one piece of either gizzard, neck or livers). The slaughterers that accept such arrangements generally have outlets where they cook these parts and make a return from their sale. The purchase and sale prices are presented below.

Chicken Part	Purchase Price (KES)	Sales Price after cooking (KES)
Gizzards	10	15
Necks	10	20
Livers	10	15
Legs (pair)	2	4

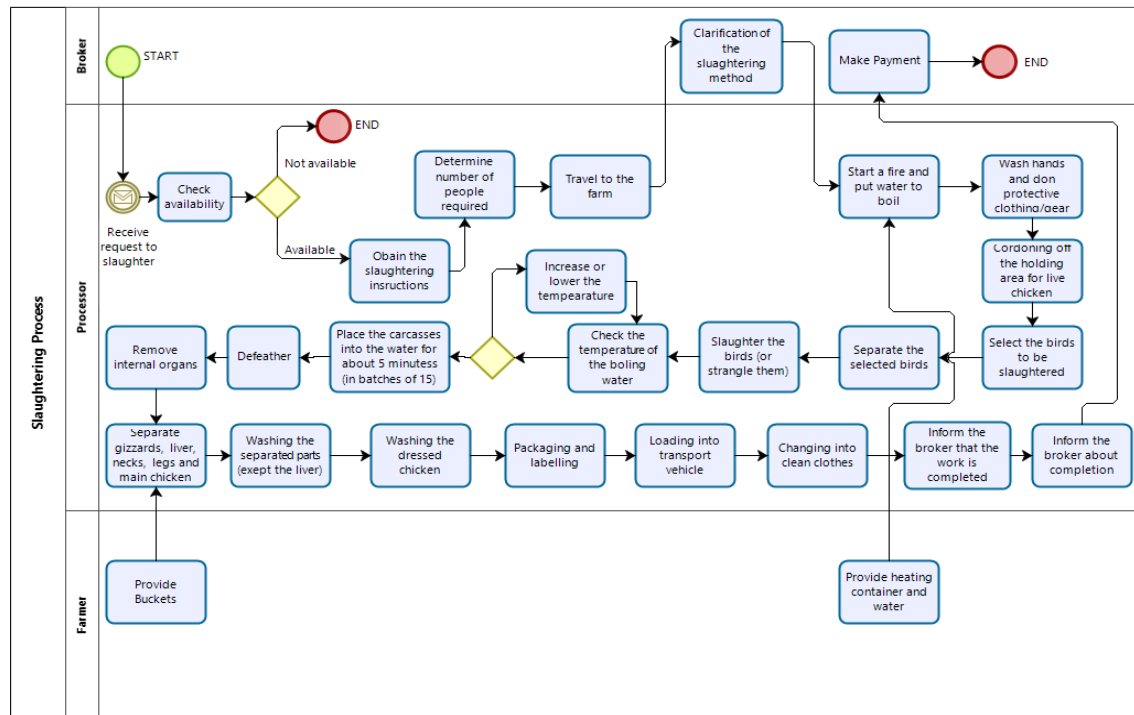
*Kienyeji* slaughterers/retailers generate revenue from the sale of birds based on live weight as displayed below.

Weight of chicken (kg)	Purchase price (KES)	Sales Price (KES)	Margin (KES)
2.0 kg	950	1 400	450
1.7 kg	750	1 200	450
1.5 kg	650	1 100	450
1.0 kg	550	1 000	450

*Kienyeji* slaughterers offer the processing services for free, which attracts many customers who want to select the live bird for home consumption and give specific indications on the cutting of the carcass. Weekly sales of birds range from 50 to 80, with 80 being the number of birds sold in a good week.

### Business process

Details of the business process of on-farm broiler slaughter are presented in Figure 4.



**Figure 4:** Business process of on-farm poultry slaughter

The process of slaughtering is triggered by a call by the trader requesting slaughtering services. If the slaughterer is not available then the process ends there (the trader looks for someone else), otherwise the trader will specify the slaughtering instructions, namely the location of the farm, the time of slaughtering, weight specification of the birds to be selected, etc. The slaughterer determines how many other slaughterers are required (depending on the number of birds to be slaughtered). The team of slaughterers then travel to the farm. The trader specifies the slaughtering method, for instance by cutting off the heads or suffocating the birds first.

Water is put to boil as the slaughterers prepare themselves to slaughter by washing hands and wearing slaughtering “gear”. They cordon off an area within the poultry house where the selected birds will be held temporarily before being processed. The selection of birds is based on the trader’s requirements, e.g. only birds of a specific weight range. The birds are then slaughtered and the boiling water is tested to confirm if it is at the right temperature (this is usually done by hand from experience); if the water is too hot or not hot enough then cold water is added or firewood added respectively. Then the slaughtered birds are placed into the hot water to facilitate plucking of the feathers.

The dressed birds are cut up and entrails removed. The gizzards, necks, livers and legs are separated into different buckets (provided by the farmer). They are then washed thoroughly and packaged into bags (some farmers don’t package), labelled (most traders do not label) and loaded onto transport vehicles. The slaughterers then change their clothes and inform the trader that the work is complete. The trader pays them, and the process ends.

The broiler slaughterers do not have any official documentation, though they would be willing to become formal as way to expand their business. Given the informal nature of broiler trading for small and medium scale farmers, it is difficult to slaughter the birds away from the farm. Some of the challenges include the high cost of transporting live birds, high mortality during transport and small orders, often irregular and impromptu. Furthermore, slaughtering in specialized facilities, where most of the functions are automated, would result in a loss of jobs.

## Enterprise budgets

Examples of the budgets of a broiler slaughterer and a *kienyeji* chicken slaughterer/retailer are presented in Table 5.

On-farm slaughter: The slaughterer charges KES 10 for each slaughtered bird. The transport cost is KES 200 per day. The figures for amortized costs refer to the spreading of the cost of the items purchased over time. The apron (KES 750) and bag (KES 1 000) to carry slaughtering gear and other equipment will be used for approximately one year while gumboots (KES 700) and woolen mavin cap (KES 100) are expected to last for three years.

Market slaughter: The slaughterer sells 50 birds on average per week and each bird fetches KES 450 margin. The stall (KES 25 000) and equipment (gas cylinder @KES 3 500 and sufurias @KES 3 600) are expected to last for 3 years. The chopping board (KES 1 000) and two white coats (@KES 350) are expected to last for 6 months. Knives (3 @KES 350) and weighing scale (KES 1 000) are expected to last for one year. The licenses (business permit @3 600, fire certificate @500, banner @2 500, health certificate @1 000) are paid annually hence their cost divided by 12 to obtain the monthly figure.

**Table 5:** Monthly budget of on-farm broiler slaughterer and market slaughterer and retailer of *kienyeji* chicken (in KES, 110KES = 1USD)

Item	Broiler (on farm)	<i>Kienyeji</i> (at market)
<b>Revenue</b>		
Slaughter services	25 000	
Slaughtered birds		230 000
<b>Total revenue</b>	<b>25 000</b>	<b>230 000</b>
<b>Operating/variable costs</b>		
Purchase of chicken		140 000
Transport	6 000	
Gas & water		5 800
Sharpening of knives		240
Misc. consumables		620
Security		800
Feed		750
<b>Total operating costs</b>	<b>6 000</b>	<b>148 210</b>
<b>Returns over op costs</b>	<b>19 000</b>	<b>81 790</b>
<b>Fixed/amortization costs</b>		
Structure		694
Equipment		535
“Gear” (apron, boots, cap etc.)	268	
White coats		117
Licenses		633
<b>Total fixed/amortization costs</b>	<b>268</b>	<b>1 979</b>
<b>Overall total costs</b>	<b>6 268</b>	<b>150 189</b>
<b>Indicators</b>		
<b>Returns over total costs</b>	<b>18 732</b>	<b>79 811</b>
<b>Net profit margin (%)</b>	<b>74.9</b>	<b>34.7</b>
<b>Fixed costs/revenue (%)</b>	<b>1.1</b>	<b>0.9</b>
<b>Profit/bird</b>	<b>7.5</b>	<b>399.1</b>
<b>Volumes and prices</b>		
<b>Birds slaughtered</b>	<b>2 500</b>	<b>200</b>
<b>Purchase price</b>		<b>700</b>
<b>Sales price</b>		<b>1 150</b>

#### 4.4. Poultry transport

In some cases, traders rely on transporters to transport live and dressed birds to their customers. Transporters are largely if not only male and transport either live (2%) or slaughtered birds (98%), depending on the customer’s requirements. Motorcycles are the most popular means of transport in Kiambu and Nairobi counties as they are able to navigate through traffic congestions and deliver the consignments fast (usually within 30 minutes).

Live chickens are transported using crates, while the transportation of dressed birds is done either in nylon gunny bags (locally known as *gunias*) or in specially designed metallic boxes (recommended by the public health authorities). The majority of transporters, however, do not have the recommended boxes and prefer to use gunny bags since their motorbike is also used for providing public transport services. Indeed, only some transporters are specialized in transporting chicken.

### Business model canvas

**Customer segments:** Traders and farmers are the main customers of transporters, who transport the birds to retailers, hotels and restaurants. Some transporters also deliver to institutions such as schools, government agencies and hospitals. Most of the agreements are oral, with no written contracts. Some are impromptu transport requests while others are planned on the eve of the transport, especially those that require delivery early in the morning (5 to 7am).

**Value propositions:** The value proposition is speedy delivery of chicken, for the dressed chicken not to *turn bad*. If one is stuck in traffic for 2 to 3 hours (which could happen to those who use *tuk tuk* for transport), the meat will start to smell due to the high temperature, and the customer will reject the consignment. In addition, customers require the rider to wear a clean white coat when offloading the meat.

**Customer relationships:** Most customer interactions are transaction-based and on the spot; however, a few customers have become personal friends and the transporter accepts to be paid with some delay, though the credit period rarely exceeds two days. Loyal customers recommend a transporter to their fellows.

**Channels:** Transporters reach their customers mainly through mobile phones. They interact with the traders at the destination of their consignments or at the source of the chicken (farms).

**Key resources:** Transporters either lease or purchase motorcycles. Some also hire a driver for some trips. They require capital for fuel for the first two trips. Transporters who are specialized in the transport of dressed chicken also need a meat box.

Transporters have access to credit through their pooled daily savings fund. They contend that bank loans are expensive, and the process of applying for these is tedious. However, most transporters are not aware of the prevailing market interest rates and some of them take more expensive loans because of the “ease in access” as opposed to cheaper bank loans.

**Key activities:** Key activities of poultry transporters include:

Activity	Frequency
Transacting with traders	Per trip
Transporting the consignment	Per trip
Counting to confirm the number of birds	Per trip
Washing the motorcycle	Per trip
Servicing the motorcycle	Per month
Fuelling	Per day (depending on the number of trips)
Transacting with traders (brokers)	Per consignment
Transporting the consignment	Per trip
Loading	Per trip

The only biosecurity measure transporters systematically adopt is the use of clean sacks (or box) for birds. There is no adherence to biosecurity measures during offloading and counting.

**Key partners:** Transporters interact with the police who man the highways and enforce transport regulations, including procedures for the transport of live and dressed birds. Policemen ascertain that transporters have the necessary documentation, like transport permits and medical certificates.

Transporters decry the exploitative nature of the police officers in the enforcement of the regulations. Other enforcers are the county officials, particularly in the Central Business District of Nairobi, who regulate the movement of chicken. To avoid being checked by the police, transporters that lack the required documentation prefer not delivering to Nairobi city centre, where it's more likely to encounter the police and city council officers.

**Cost structure:** The cost of starting up as a transporter business depends on the selected type of transport vehicle. Motorcycles are preferred. The cost of motorcycles ranges from KES 80 000 to KES 130 000, depending on the model. Below is a table showing the preferred models and their price.

Model of motorcycle	Cost (in KES)
Boxer	120 000
Tiger	100 000
Captain	100 000
Keeway	85 000

Each rider requires a helmet, heavy jacket, boots, reflector, and gloves. The purchase of the materials for and fitting of the special metallic box costs KES 10 000. The total capital required to start the business is about KES 145 000.

There is need of about 3 litres of fuel per round trip (from the source areas of Juja, Ruiru, Kiambu to market places) with each litre costing KES 110. Most transporters do two trips per day. Servicing costs are around KES 5 000 per month, comprising the cost of minor services, KES 2 000, and major repairs, KES 3 000.

The yearly Insurance premium charged depends on whether the underwriting is for a third party (KES 9 000) or comprehensive (KES 3 000).

The rider, when hired, is usually paid KES 600 per day, that is KES 18 000 per month, while each day the motorcycle is washed at the cost of KES 100, hence KES 3 000 per month.

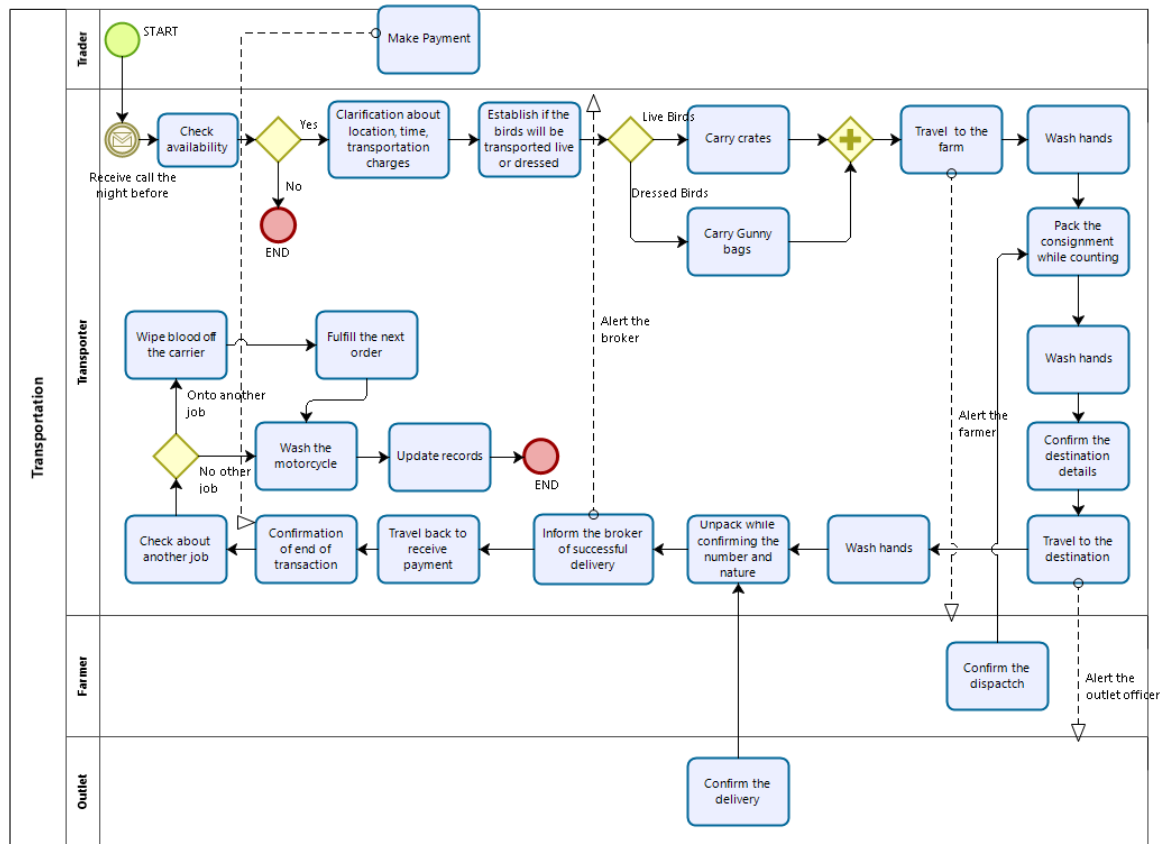
Transporters need the certificate of transport (COT) at the cost of KES 20 per consignment. However, as transporters performs many trips on a single day, they are inclined to collude with the inspector to include all those stops on the COT document and pay between KES 50 and KES 100. For single trips, the transporter ends up often paying KES 50 because the inspectors claim to lack coins for "change". The transporter usually pays KES 300 per week on COT. Interestingly, the transporter is only charged COT when he uses the *tuk tuk* but not when he is using the motorcycle. The COT is acquired from the veterinarian at the slaughter slab but, given that most of the broilers are slaughtered at the farm, it is difficult for the transporter to acquire this document.

**Revenue streams:** Transporters charge KES 1 000 per trip to the Central Business District (CBD), which is the final destination designated by most traders. They usually perform two trips per day. Most transporters who use motorcycles also provide public transport services (*boda bodas*) and ferry chicken as an addition to human transport services.

Some transporters purchase the entrails from the traders they ferry for and fry them in outlets, which provides some extra income. Specifically, they buy the gizzards, necks, legs and liver. The profit from gizzards, liver and necks is KES 10 each (after frying) while the profit from legs is KES 2 apiece.

## Business process

Details of the business process of a poultry transporter are presented in Figure 5.



**Figure 5:** Business process of poultry transport

The process starts with the trader calling the transporter for his services (transporters are usually male). If the transporter is not available then the trader looks for another transporter, otherwise the trader will provide details about where the source farm and consignment place are located, time of collection as well as the charges for transporting. The transporter will ask about the nature of the birds, i.e. live or dressed. If the birds are live then crates will be used, if the birds are dressed then gunny bags, buckets or a metallic box is used (the recommended option).

The transporter then travels to the farm where he washes his hands and helps load the live or dressed birds as he counts them. He confirms the destination and departs. When he gets to the market he confirms that it is the right destination and (in most cases) helps unload the consignment while confirming the numbers and status of the birds. The transporter then informs the trader that he has delivered the consignment and heads to the trader to receive his payment. If there is another job to be done on the same day, the transport vehicle is cleaned minimally and the transporter proceeds for the next job. After the last trip of the day, the motorcycle is cleaned thoroughly.

## Enterprise budgets

Examples of the budgets of two business models of poultry transporters are presented in Table 6.

**Table 6:** Monthly budgets for two types of chicken transporters: a hired motorcycle driver transporting chicken only and motorcycle and *tuk tuk* transporting chicken and passengers (in KES, 110KES = 1USD).

Item	Motorcycle, chicken only	Motorcycle & tuk tuk, chicken+
<b>Revenue</b>		
Transport of chicken	60 000	64 000
Transport of passengers	na	
Total revenue	<b>60 000</b>	<b>64 000</b>
<b>Variable &amp; overhead costs</b>		
Fuel	19 800	12 800
Washing	3 000	3 000
Servicing	5 000	9 000
Insurance	750	833
Hired driver	18 000	
Certificate of transport (COT)		1 200
Total variable & overhead costs	<b>46 550</b>	<b>26 833</b>
Returns over variable & overhead costs	<b>13 450</b>	<b>37 167</b>
<b>Fixed/amortization costs</b>		
Motorcycle	3 333	3 333
Metallic box & modification	556	556
Tuk tuk		8 056
Metallic box		694
Total fixed/amortization costs	<b>3 889</b>	<b>12 639</b>
Overall total costs	<b>50 439</b>	<b>39 472</b>
<b>Indicators</b>		
Returns over total costs	<b>9 561</b>	<b>24 528</b>
Net profit margin (%)	<b>15.9</b>	<b>38.3</b>
Fixed costs/revenue (%)	<b>6.5</b>	<b>19.7</b>
Profit/trip	<b>159.4</b>	
<b>Volumes and prices</b>		
Trips by motorcycle	<b>60</b>	<b>16</b>
Price/trip	<b>1 000</b>	<b>1 000</b>
Trips by tuk tuk		<b>32</b>
Price/trip		<b>1 500</b>

Motorcycle, hired rider, transport of chicken only: The transporter owns the motorcycle and hires a rider. He organizes a minimum of 2 trips per day, transporting about 150-220 birds per trip; the amortized figures are based on the assumption that the motorcycle and equipment can be used for 3 years.

Motorcycle and tuk tuk, transport of chicken and passengers: The transporter makes a minimum of 4 motorcycle trips per week from Mwiki to the Central Business District (CBD) and 8 tuk tuk trips from the rural area to CBD. The motorcycle has a capacity of up to 200 birds per consignment while the tuk

tuk can carry up to 400 dressed birds. The amortized figures are based on the assumptions that the motorcycle and tuk tuk can be used for three years.

#### 4.5. Poultry retail (dressed birds)

##### Business model canvas

**Customer segments:** Two main retailer categories exist at the main point of sale in Nairobi city, that is, *City Market*: those with stalls and those without stalls. The retailers with stalls mainly sell to walk-in consumers, while those without stalls sell to fast-food restaurants and hotels.

Retailer	Sells to	Unit of measure	Price (KES)
With stall	Walk-in consumers	Weight (kg)	300/kg
Without stall	Hotels, restaurants, institutions	Pieces	370/piece

**Value propositions:** Retailers sell dressed chicken to their customers. Fast food restaurants prefer whole chicken weighing between 1.1 kg to 1.2 kg as they usually use the horizontal rotisserie-style cooking where chickens are inserted onto skewers that revolve around an open grill. Hotels prefer ordering parts of the chicken, which can be easily included in buffet servings as wings, boneless, legs and gizzards.

The retailers usually decide whom to sell to based on the weight of the birds received from the traders or farmers. If the chickens are heavy, they cut them into pieces that they deliver to hotels; smaller chickens are sold to fast food restaurants.

Cling film is used to package the meat for customers (plastic paper bags have been banned by the government since 2017). The retailers reckon that the cling film is relatively more expensive but “safer” than other forms of packaging.

**Customer relationships:** Many customer interactions are transaction-based. However, a few customers have become personal friends and retailers accept they purchase chicken parts on credit. Some customers, such as hotels, take longer to pay their debts (some hotels closed down due to Covid-19 and went down with retailer’s money).

**Channels:** The city market is centrally located in the Central Business District (CBD) and visited by a constant stream of customers. The retailers with stalls, therefore, interact with customers at their stall and some use posters to advertise their products. Retailers without stall reach their customers mainly through mobile phones, though the tech-savvy ones also rely on social media platforms like Facebook and WhatsApp to communicate with their customers.

**Key resources:** Retailers operate from stalls erected by the government (local government) many years ago. Inside these stalls, they install freezers for their use and/or lease them to the retailers who don’t have stalls.

Retailers are required to have licenses to operate at the market as well as to have a health and a fire safety certificate.

Retailers have access to credit, though many fear financial commitment.

**Key activities:** Key activities of broiler retailers include:

Activity	Frequency
Receiving consignments of chicken	Daily
Transacting with vendors & customers	Daily
Weighing	Daily
Checking/Inspecting	Daily
Packing	Daily
Freezing	Daily
Updating records	Daily
Paying county levies	When necessary
Cleaning premises	Daily
Fumigating	Monthly
Conducting medical check-ups for staff	Every six months
Paying staff	Daily
Facilitating inspections	Every two months
Recalibrating weighing scales	Once a year

**Key partners:** Veterinary officers based at the market inspect the meat and certify it is fit for human consumption; public health officials conduct inspections to ascertain if the premises are operating in proper hygienic conditions. Retailers also interact with county officials who charge the county levies.

**Cost structure:** Retailers buy broilers at between KES 220/kg to KES 250/kg. Keeping a stall costs about KES 28 000 per month, including rent and the county fees. Electricity costs vary between KES 10 000 and KES 12 000 per month and largely depends on the number of freezers a retailer operates. Retailers hire casual labour at a daily rate of KES 700. Casual labourers usually commence work at 5 am and clock off at 7 pm (for as long as there is work to be done). Retailers who don't have stalls rent freezers at the cost of KES 2 500 per freezer.

Licenses and fees include:

License/Fee	Annual Amount (in KES)
Trading license	15 000
Fire safety certificate renewal	4 500
Hygiene inspection license	7 000
Medical check-up	2 000 (per employee)

Other costs include packaging material (cling film @ KES 4 000 per roll; disposable bags @ KES 10); Weighing scale recalibration costs KES 1 000 per annum.

The initial investment starting up a chicken retailer business is between KES 100 000 and KES 200 000, though a major challenge is the lack of space in the city market.

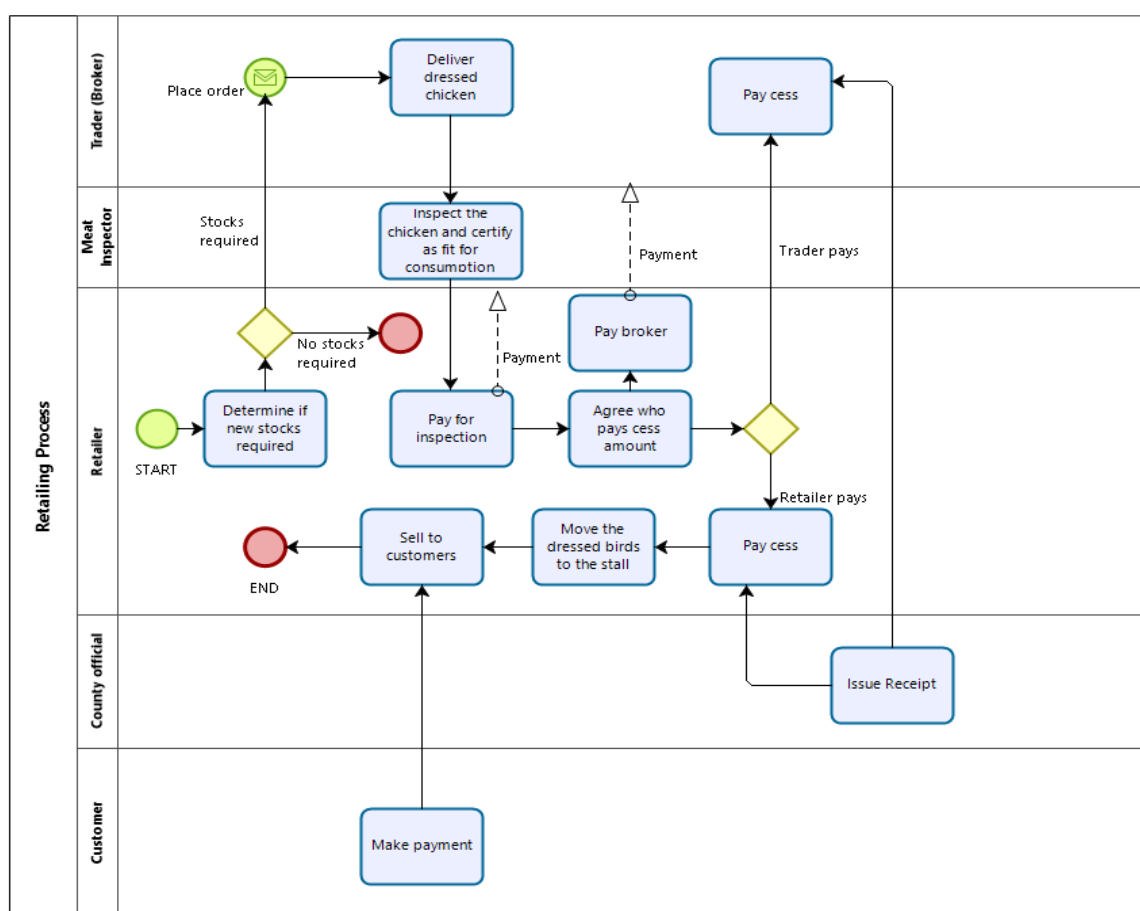
**Revenue streams:** Retailers sell either whole dressed birds or parts. They charge KES 370 per dressed bird to hotels while walk-in consumers are charged between KES 300 and KES 400 per kilogram of meat. The retailers charge the following amounts for the different parts of the chicken.

Chicken Part	Price (KES/kg)
Wings	400
Boneless	400
Legs	300
Gizzards	300

A retailer selling around 300 kg of meat per day at the price of KES 300 per kg makes a monthly profit of KES 280 000 (he usually works for 26 days in a month, i.e. 6 days per week excluding Sundays). This is a good profit, which makes the business bankable and would allow the retailer to easily access credit.

### Business process

Details of the business process of a broiler retailer are presented in Figure 6.



**Figure 6:** Business process of poultry retail (dressed birds)

The retailing business process starts with the retailer checking his/her stock. If the chicken numbers are still high, then he/she waits for the number to reach reorder level; otherwise, he/she places an order with a trader. Upon delivery the meat inspector inspects the meat and certifies it is fit for human consumption. The retailer pays for the inspection and, if the meat is fit for consumption, pays the trader for the consignment of the chickens and agrees with him trader on who will settle the market cess. The market cess is paid to the county official. The retailer moves the dressed chickens to his/her stall and starts selling to customers.

## Enterprise budget

The following enterprise budget is based on retailers who sell at the city market.

**Table 7:** Monthly budget of a city market retailer (in KES, 110KES = 1USD)

Item	Amount (KES)
<b>Revenue</b>	
Sale of chicken meat	2 340 000
<b>Total revenue</b>	<b>2 340 000</b>
<b>Variable costs</b>	
Purchase of chicken	1 950 000
Casual labour	18 200
Market cess	31 200
Inspection fee	15 600
<b>Total variable costs</b>	<b>2 015 000</b>
<b>Returns over variable costs</b>	<b>325 000</b>
<b>Overhead costs</b>	
Store rent	28 000
Electricity	12 000
Fumigation	200
Licences	2 375
<b>Total overhead costs</b>	<b>42 575</b>
<b>Overall total costs</b>	<b>2 057 575</b>
<b>Indicators</b>	
<b>Returns over total costs</b>	<b>282 425</b>
<b>Net profit margin (%)</b>	<b>12.1</b>
<b>Overhead costs/revenue (%)</b>	<b>1.8</b>
<b>Profit/kg</b>	<b>36.2</b>
<b>Volumes and prices</b>	
<b>Chicken traded (kg)</b>	<b>7 800</b>
<b>Purchase price</b>	<b>250</b>
<b>Sales price</b>	<b>300</b>

The retailer does not operate on Sundays; hence a monthly figure of 26 days is used for the calculations. The retailer sells an average of 300 kg of chicken per day; the market cess is KES 200 per bag of chicken, with each bag containing an average of 50 birds. The meat inspection fee is KES 2 per bird. The overheads, such as stall rent and electricity, are divided by 12 to get the monthly figure.

### 4.6. Vertically integrated business of *kienyeji* chicken

A few businesses are vertically integrated and active at all the nodes of the *kienyeji* chicken value chain, except production. They source indigenous chicken (*kienyeji*) from up-country, especially from Bomet county and neighbouring counties; transport the birds to Nairobi, where they slaughter and/or grill them for customers. We interviewed one integrator of *kienyeji* chicken.

## Business model canvas

**Customer segments:** The integrator only sells to retail consumers. Some hotels send their agents to buy chicken from the integrator, who however adopts the same price strategy for all consumers.

**Value propositions:** The value proposition is the sale of indigenous chicken (*kienyeji*) sourced from up-country regions, like Kericho, Bomet and environs. Customers have a preference for the taste of indigenous chicken and there is a perception that pure *kienyeji* chickens are safer to consume because they feed on organic matter and are free of chemicals, drugs and antibiotics.

**Customer relationships:** Most customer interactions are transaction-based. However, the integrator has developed trusted relationships with some long-term customers and accepts being paid by them with some delay (though the credit period rarely exceeds two days).

**Channels:** The integrator reaches his customers mainly through mobile phone and maintains a database of over 3 000 clients. A lot of interaction also occurs in the market

**Key resources:** The integrator is located adjacent to a busy mall off Thika super-highway. This guarantees a constant flow of customers, including those who come to have their cars cleaned in a car wash within the same compound.

The integrator owns a van with specially fitted cages that facilitates efficient transportation of birds. The van has the capacity to transport up to 600 birds per consignment.

The processing of chicken requires approximately 600 litres of water daily. Beyond accessing water from the Nairobi City Water and Sewerage Company (NCWSC), the integrator has also some tanks to stock water. There are designated areas for slaughtering and draining blood; all staff follow strict biosecurity measures, such as maintaining personal hygiene, wearing appropriate clothing and go for medical check-ups every six months.

**Key activities:** Key activities of the integrator include:

Activity	Frequency
Transacting with traders and brokers	Per trip
Transporting the consignment	Per trip
Counting to confirm the number of birds	Per trip
Washing the van	Per trip
Servicing the van	Per month
Fuelling	Per day
Loading	Per trip
Slaughtering	Daily
Grilling chicken	Daily
Transacting with customers	Daily
Cleaning the premises	Daily
Paying for permits and licenses	Once a year
Paying for utility services	Per month
Updating records	Daily

**Key partners:** These include the driver of the van, who interacts with the police who man the highways and enforce transport regulations, including checking that all van paper is in order and the transport permit for the birds. The country office, who releases the trading license, the fire certificate, and food handling and hygiene certificates. Finally, the integrator also interacts with the providers of utilities,

like the Kenya Power & Lighting Company (KPLC) for provision electricity and the Nairobi City Water and Sewerage Company (NCWSC) for provision of water.

**Cost structure:** The main cost is that of purchasing live chicken, whose price ranges from KES 600 to 1 000 per bird, followed by the cost of fuel, with the average daily transportation cost averaging KES 5 000. The vehicle is serviced monthly at an estimated cost of KES 15 000 (the exact amount was not disclosed, but the estimate is obtained from other commercial vehicles, e.g. *matatus*).

The value of the vehicle determines the insurance cost. The value (cost) of the van was estimated at KES 1 000 000, as the integrator stated that the vehicle was bought second hand. Therefore, the insurance cost is estimated at KES 70 000 (7 percent of the value of the vehicle). The vehicle is assumed to provide useful service for three years; hence we estimate an amortization cost of KES 27 777 per month.

The total value of equipment and fixtures, such as slaughtering surfaces, water piping and accessories like taps, tanks and others, is KES 250 000. Equipment is expected to be used for 10 years, such as for the other value chain actors, which gives a monthly amortization value of about KES 2 000. Labour cost is estimated at KES 95 000 per month for the six staff, while the monthly rent of the premises is KES 30 000.

Costs of water and electricity are estimated in KES 1 000 and 1 500 per month, respectively. The integrator uses about 600 litres of water per day, and from Nairobi City Water & Sewerage tariffs the charge per 1m<sup>3</sup> of water KES 55. Electricity is only used for lighting in the morning and in the early evening.

Additional costs include the meals for staff (KES 250 to 300 per day), including preparation, and the feed for the chickens before slaughters (estimated cost of KES 500 per day).

Finally, the integrator needs to acquire a number of licenses to run the business.

License/Fee	Annual Amount (in KES)
Trading license	10 000
Fire safety certificate renewal	4 500
Food and Hygiene license	7 000
<b>Total</b>	<b>21 500</b>

A summary of the cost structure is presented in the enterprise budget section.

**Revenue streams:** The income generated from selling chicken depends on whether the birds are sold uncooked or cooked, with prices ranging from KES 800 for live birds to KES 1 500 for slaughtered birds. The profit mark-up depends on the size of the bird: it's higher for heavier chicken (bought KES 1 000 and sold for KES 1 500) than for small ones, where the margins can be as low as KES 80. We assume in our revenue calculation a conservative figure of KES 150 mark-up per bird sold live. The integrator sells over 100 birds per day.

The integrator also sells some grilled chicken, which yields another KES 200 per bird. Currently, the weekly sales figures for the grilled chicken are estimated as follows:

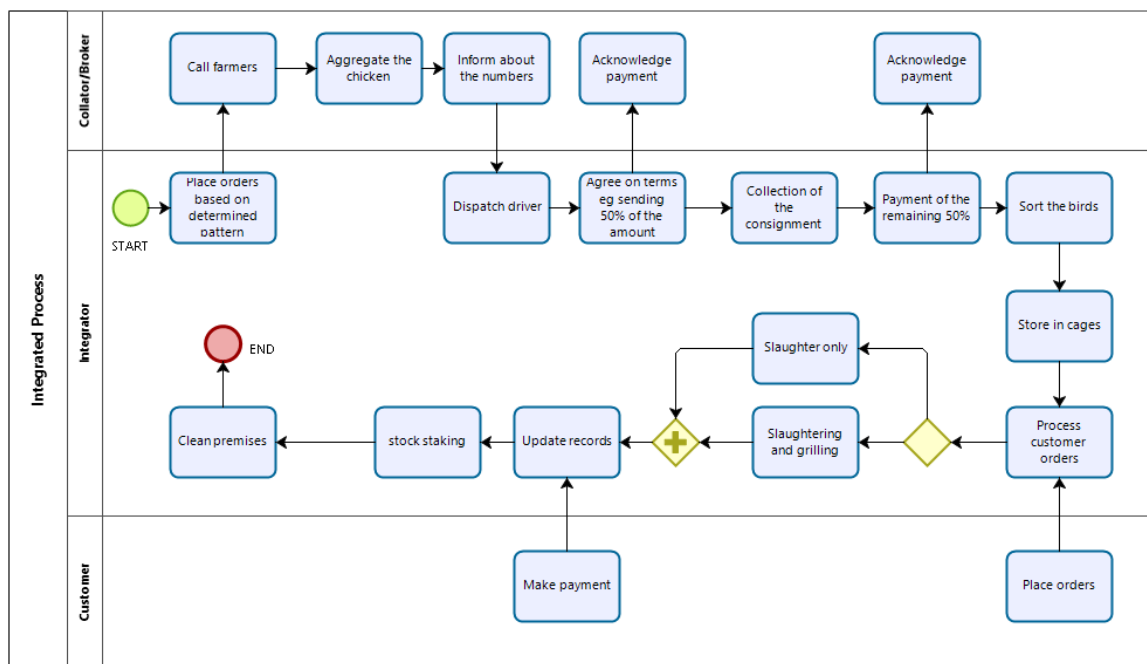
Day of the week	Average Sales
Monday	15
Tuesday	15
Wednesday	15
Thursday	15
Friday	50
Saturday	30
Sunday	20
<b>Total</b>	<b>160</b>

There are other sources of revenue in addition to the sale of birds (cooked and uncooked), including sale of intestines to catfish farmers (KES 1 000 per bucket) and sale of blood (the amount is based on agreement with buyer). The integrator also charges KES 100 to slaughter a chicken for customers who bring their own bird, but this is not frequent.

The integrator is considering expanding his business to start producing 40 000 pure indigenous chickens as to better control the quality of his meat.

### Business process

Details of the integrated business process are presented in Figure 7.



**Figure 7:** Business process of vertically integrated *kienyeji* enterprise

The integrator places orders in consultation with brokers in the upcountry source markets. The brokers are responsible to aggregate the birds, while the integrator sends the driver to collect the birds and pay 50 percent of the agreed purchase price. Upon the driver's return, the integrator pays the remaining 50 percent and sorts birds according to their sizes into different cages. The customers select the birds of their choice, which after slaughter can be either cooked at home or grilled at the premises of the integrator. The customer pays, and the integrator updates his records. In the evening the premises are cleaned and prepared for the next day of business.

**Enterprise budget**

The integrator sells more than 100 dressed birds per day and 160 grilled chickens per week. He makes a margin of KES 150 for the dressed birds and KES 350 for the grilled chicken. He obtains chicken daily and incurs an average of KES 5 000 per day for fuel and related transport costs, such as insurance. He spends KES 500 daily on glucose to boost the energy of the birds distressed by the travel. He incurs an average cost of KES 300 day on food for staff. Miscellaneous costs include overheads, e.g. such as water and waste disposal, as well the amortization costs of the van (KES 1 000 000) and equipment (KES 250 000), expected to be usable for 3 years.

**Table 8:** Monthly budget for the vertically integrated business

Item	Amount (KES)
<b>Revenue</b>	
Sale of live chicken	2 850 000
Sale of grilled chicken	736 000
<b>Total revenue</b>	<b>3 586 000</b>
<b>Variable &amp; overhead costs</b>	
Purchase of chicken	2 912 000
Labour	95 000
Food for staff	9 000
Transport (fuel etc.)	150 000
Electricity, gas, water	5 000
Vehicle insurance	5 833
Vehicle servicing	15 000
Glucose	15 000
Rent	30 000
Miscellaneous	5 000
Licenses	1 792
<b>Total variable &amp; overhead costs</b>	<b>3 243 625</b>
<b>Returns over variable &amp; overhead costs</b>	<b>342 375</b>
<b>Amortization/fixed costs</b>	
Vehicle	27 778
Equipment	2 083
<b>Total amortization/fixed costs</b>	<b>29 861</b>
<b>Overall total costs</b>	<b>3 273 486</b>
<b>Indicators</b>	
<b>Returns over total costs</b>	<b>312 514</b>
<b>Net profit margin (%)</b>	<b>8.7</b>
<b>Fixed costs/revenue (%)</b>	<b>0.8</b>
<b>Profit/bird</b>	<b>85.9</b>
<b>Volumes and prices</b>	
<b>Chicken traded</b>	<b>3 640</b>
<b>Av. purchase price</b>	<b>800</b>
<b>Av. sales price</b>	<b>985</b>

#### 4.7. Slaughterhouse in retail market

The retailers at *Maziwa* open-air market in Nairobi county operate a slaughtering facility through a public-private partnership (PPP) model: the retailers provide the funds for running the slaughterhouse while the local county government grants the land where the slaughterhouse is located; it is responsible for meat inspection, licensing and coordinating other regulatory aspects, such as ensuring inspections by the public health authority and the National Environmental Management Authority (NEMA).

## Business model canvas

**Customer segments:** The slaughterhouse caters to retail consumers, from individuals to hotels, of ex-layer and indigenous chicken at *Maziwa* market.

**Value propositions:** The value proposition is quality slaughtering and packaging of ex-layer and indigenous chicken. Customers select the bird and have it slaughtered according to their preferences. Customers pay both the bird and the slaughtering (KES 30), which is factored into the sale price.

**Customer relationships:** Customer interactions are purely transaction-based.

**Channels:** Interaction with customers is on the spot. Some hotels place orders via mobile calls and orders delivered via motorcycles (*boda bodas*).

**Key resources:** The slaughterhouse is located along a busy road (Jogoo road), which makes it conducive for the slaughtering business. There is no tap water on-site and the water is fetched from water vendors.

**Key activities:** Key activities of the slaughterhouse include:

Activity	Frequency
Transacting with customers (via traders)	Daily
Slaughtering	Per sales transaction
Packaging	Per sales transaction
Paying for the trading permit	Per year
Cleaning the slaughterhouse	Thrice a week

**Key partners:** Stakeholders at the slaughterhouse interact with county officials for the authorization to operate via the business permit. The county government is also responsible for meat inspection and to coordinate other regulatory aspects, such as inspections of the NEMA officials.

**Cost structure:** The main costs are that of slaughterers and meat inspection. Each slaughterer is paid KES 25 per chicken slaughtered, while the meat inspector is paid KES 2 per bird inspected. The other major cost is security, about KES 20 000 per month. The business permit costs KES 20 000 per annum.

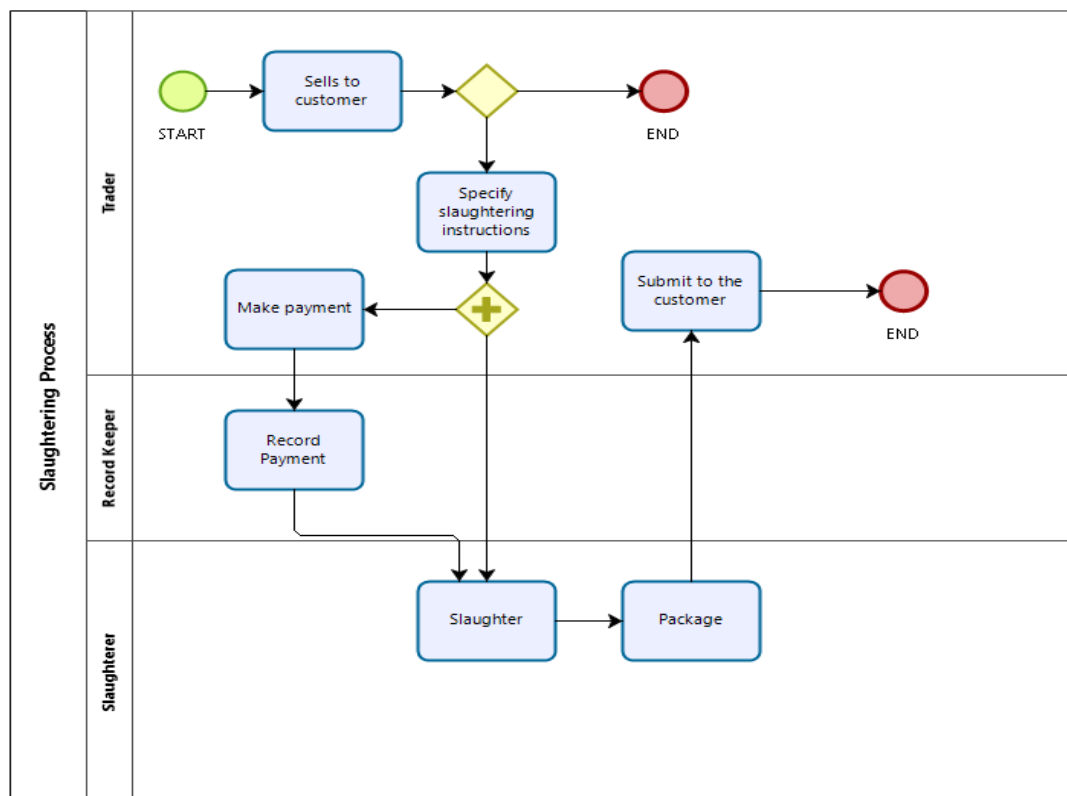
There is a record keeper, who chronicles all the transactions and issues receipts. He is paid KES 10 000 per month. Electricity is only used for lighting purpose and totals KES 500 per month. The slaughter facility uses ten 20-litre jerrycans of water per day; on days when thorough cleaning is done, twenty containers are used. Each jerrycan costs KES 20.

**Revenue streams:** The slaughter facility generates income from slaughtering and packaging chicken. During the Covid-19 epidemic, it slaughtered up to 400 birds on a good day and about 100 birds on a bad day. We use a conservative figure of 250 birds per day in our calculations. The slaughter facility collects KES 300 per month from each member for security purposes.

For every bird slaughtered, KES 3 are paid to the common pool of a Savings and Credit Cooperative Organization (SACCO). At the end of each year, the collected amount is either distributed as dividend among members or used for maintaining / upgrading the facility (in 2019, the amount collected was KES 60 000 and used for upgrading the slaughterhouse).

## Business process

Details of the business process of the trader/retailer-owned slaughterhouse are presented in Figure 8



**Figure 8:** Business process of live bird trader/retailer-owned slaughterhouse

Customers arrive at the open-air market (*Maziwa* market) and select chicken. If the customer wishes to have the chicken slaughtered, then s/he specifies the slaughtering instructions and pays for the chicken. The trader/retailer takes the chicken to the abattoir, where it is slaughtered and packaged. The trader/retailer gives the package to the customer.

### Enterprise budget

The current as well as the pre-Covid-19 monthly budget for the slaughterhouse is presented in Table 9.

**Table 9:** Monthly budget for the retailer-owned slaughterhouse before and during the Covid-19 pandemic (in KES, 110KES = 1USD)

Item	2020 (COVID)	2019 (Pre- COVID)
<b>Revenue</b>		
Slaughter fees	225 000	900 000
Member contributions	24 000	24 000
<b>Total revenue</b>	<b>249 000</b>	<b>924 000</b>
<b>Variable costs</b>		
Slaughterers	187 500	750 000
Meat inspector	15 000	60 000
<b>Total variable costs</b>	<b>202 500</b>	<b>810 000</b>
<b>Returns over variable costs</b>	<b>46 500</b>	<b>114 000</b>
<b>Overhead costs</b>		
Record keeper	10 000	10 000
Security	20 000	20 000
Water	8 000	8 000
Electricity	500	500
Business permit	1 667	1 667
<b>Total overhead costs</b>	<b>40 167</b>	<b>40 167</b>
<b>Total costs</b>	<b>242 667</b>	<b>850 167</b>
<b>Indicators</b>		
<b>Returns over total costs</b>	<b>6 333</b>	<b>73 833</b>
<b>Net profit margin (%)</b>	<b>2.5</b>	<b>8.0</b>
<b>Overheads/revenue (%)</b>	<b>16.1</b>	<b>4.3</b>
<b>Profit/bird</b>	<b>0.8</b>	<b>2.5</b>
<b>Volumes and prices</b>		
<b>Chickens slaughtered</b>	<b>7 500</b>	<b>30 000</b>
<b>Slaughter fee paid by retailers</b>	<b>25</b>	<b>25</b>
<b>Slaughter cost for customer</b>	<b>30</b>	<b>30</b>

Currently, the slaughterhouse process about 250 birds per day. Before the COVID-19 pandemic, 1 000 birds per day were slaughtered. Slaughtering a bird costs KES 30, of which KES 25 go to the slaughterer and KES 2 to the meat inspector. The remaining KES 3 enters a common pool (cooperative). The business permit costs KES 20 000 per annum, which amounts to KES 1 667 per month.

## 5. Discussion and conclusion

We performed an analysis of the poultry businesses along the value chain in Kiambu and Nairobi City counties, Kenya. We held focus group discussions, interviewed key informants and paid visits to selected businesses. We used the gathered information to develop the business model canvas (BMC), the business process model and the enterprise budget for the different businesses along the poultry value chain, including production, transporting, slaughtering and retailing. We also documented the business of an integrator of live indigenous birds.

Table 10 summarises the key indicators for the different businesses, including the monthly turnover or the value of total sales; the monthly profit; the profit per bird; the profit margin, that is the profit as a percentage of the sale; and the fixed costs over revenue, which shows the contribution of assets and overheads to the generation of profits for the actor and hence assists in taking decisions on investments, cost-cutting and general cashflow management.

**Table 10:** Summary of monthly poultry production/turnover and financial indicators of three value chain nodes, an integrated enterprise, and two service providers

Node	Turnover (Birds)	Profit (1 000KES)	Profit/bird (KES)	Profit margin (%)	FCs <sup>1</sup> /revenue (%)
<b>Producer</b>					
Broiler, modern	1,667	40.0	24.0	6.6	50.4
Broiler, Innovative	1,667	63.5	38.1	11.5	29.1
Local birds	333	56.3	168.9	55.6	2.4
<b>Trader</b>					
Broiler <sup>2</sup>	8,000	340.3	42.5	10.6	0.7
Ex-layers	11,507	355.0	30.9	6.9	1.8
<b>Retailer</b>					
Broiler	7,800	282.4	43.4	12.1	1.8
Local birds <sup>3</sup>	200	79.8	399.1	34.7	0.9
<b>Integrated enterprise</b>					
Local birds	3,640	312.5	85.9	8.7	0.8
<b>Service providers</b>					
Broiler slaughterer	2,500	18.7	7.5	74.9	1.1
Transporter <sup>4</sup>	60 trips	27.8	460/trip	45.9	6.5

<sup>1</sup> FC = Fixed costs; <sup>2</sup> arranges for slaughter at farm; <sup>3</sup> slaughters birds for customer; <sup>4</sup> chicken only, self-driving

### Profitability

All businesses along the poultry value chain are profitable and all ensure a net profit higher than the Kenya minimum wage, that was KES 13 572 in 2020 according to the Kenya National Bureau of Statistics.

The efficiency and procurement of feeds is the primary driver of broiler producers' profitability. The more efficient producer earns a profit of KES 38 per bird while the less efficient farmer makes KES 24 per bird. It is noteworthy that the farmer making the lower profit is using feeds that are considered of high-quality, such as *Fugo* feeds and *Isinya* feeds brands, though they are also more expensive (KES 240/bird vs. KES 190/bird for less renowned feed brands).

Traders and city market retailers of broilers have the highest monthly profit given their low cost of operations and continuity of their businesses (daily sales). The margins per bird are low at this node of the value chain ranging from KES 30.6 for the ex-layer traders to KES 42.5 per bird for broiler traders. Broiler traders noted that the leading share of their profitability is the sale of entrails at KES 32 per bird, without which their profit would drop to KES 10.5/bird.

Broiler slaughterers and transporters (majority women and youth) have the lowest monthly profit, which is below the minimum wage.

### Biosecurity practices

To the majority of farmers, traders and slaughterers, the key value proposition is quality, which they associate with a heavy and clean dressed bird. However, stakeholders do not really adopt good

biosecurity practices, which would improve their capacity to deliver heavy and clean birds, as only the use of water for cleaning is a common practice.

Farmers, however, are eager to adopt good practices, especially for slaughtering at their farm, on the condition that any change in their business does not substantially increase their cost of production or reduce profits. For example, a farmer spent around KES 80 000 to build an improved slaughtering area with proper waste disposal, which is between  $\frac{1}{4}$  and  $\frac{1}{2}$  of his annual profit. Farmers are also satisfied with their contacts with Kenchic, which provides them with production inputs, from day-old chicks to feed and disinfectants against the right to purchase the broilers at a predetermined price. Slaughterers and transporters contend that farmers and traders should be responsible for biosecurity. At the same time, farmers and traders noted that it is a logistical nightmare not only to comply with all biosecurity practices but also to acquire all the documentation necessary to sell live or slaughtered birds. Most birds, either live or slaughtered, are therefore sold without being inspected by a frontline health worker. An exception is the integrated poultry business, which strictly complies with all biosecurity practices: not only all staff adhere with biosecurity rules and standards but all paper is in order, i.e. the business has all the required licences, including food and hygiene licenses.

### **Profitability, bankability and good practices**

As businesses along the value chain are profitable, they have got resources to invest to start regularly adopting biosecurity practices. However, actors noted that the market does not reward compliance with good practices and that the informal nature of the value chain can, in many cases, make it challenging to adopt good practices. For example, meat inspectors are willing to inspect only birds that are slaughtered in licensed facilities, while in most cases birds are slaughtered at the farm. There are also economies of scale at work: farmers raising over 1 000 birds per cycle can easily service a loan, while smaller ones have insufficient resources to access formal finance, which makes it challenging for them to implement some of the investments necessary to adopt good practices, such as purchasing a stainless steel table for slaughtering.

Traders and retailers have sufficient cash flow to access loans, although many contend that interest rates are too high and, therefore, they shy away from bank loans. The transporters' profits, instead, are too low to service a loan.

### **Recommendations**

While there are several bottlenecks along the poultry value chain, the good news is that most operators are running profitable businesses and are open to improve their business, to start adopting practices that both increase their profitability and reduce public health risks along the poultry value chain. Tapping into this opportunity, however, is not straightforward because of the complexity of the chain and the heterogeneity of actors. In these circumstances, an evidence-based multi-stakeholder dialogue, involving both private businesses and local authorities, is the most promising way to identify actionable options to enhance the profitability and the sustainability of the poultry value chain.

The public-private sector dialogue should be action-oriented and target specific private and public sector actions that, jointly, could ensure the adoption of selected good practices by poultry operators and promote the sustainability of their businesses. The objective of this public-private sector dialogue should not to revolutionize the entire poultry value chain, which would be unfeasible and unreasonable, but to ensure small and critical changes on the ground – such as the adoption of one or two good practices – thereby creating mutual trust and a spirit of collaboration between the public and private sector that is essential, in the long-term, to steer the development of the poultry sector on a sustainable development path both from a business and societal perspective.

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## Annexes

### Annex 1: The Business model canvas and process modelling

The Business Model Canvas (BCM) is strategic management and lean startup template for documenting existing business models. It is a visual chart with elements describing an enterprise through value proposition, infrastructure, customers, and finances. It assists firms in aligning their activities by illustrating potential trade-offs. The BMC tool contains 9 distinct areas that relate with aspects of business from a 360° perspective (BMI, 2020). They include:

- **Customer Segments**, which entails the description of the categories of buyers / clients and their attributes.
- The **Value Proposition**, which shows the nature of the product or service that provides value to the consumers, in other words, what the customers are willing to pay for.
- The **Revenue Streams** section discusses the various sources of income in terms of sales.
- The **Channels** section describes the means of transacting and communicating with customers.
- The **Customer Relationships** section discusses nature of the interaction with customers.
- The **Key Activities** section describes the processes and tasks that occur in the course of running operations, that is, what is done every day to run the business model.
- The **Key Resources** section discusses the people, knowledge, means, and money the entity needs to run the business.
- The **Key Partners** section lists the various stakeholders that the business cannot do without;
- The **Cost Structure** details the various costs incurred by the enterprise.

The below Figure displays the elements within each of the nine blocks:

KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONS	CUSTOMER SEGMENTS
Who are the key partners? Who are the key suppliers? Which key resources is the business acquiring from key partners/suppliers? Which key activities do the key partners perform? What is the quality of resources gained from partners?	What key activities are associated with: <ul style="list-style-type: none"><li>- Production / processing?</li><li>- Sale of products?</li><li>- Logistics / management?</li><li>- Financing?</li><li>- Quality control?</li></ul>	What value does the business deliver to the customers? What are the tangible and intangible characteristics of the product? What makes the product / service offered to customers different? What volume or percentage of the products is rejected by customers?	How does the business acquire, keep, and grow customers? Which customer relationships has the business established? How are they integrated with the rest of the business model? How costly are they?	For whom is the business creating value? Who are the most important customers? What is the volume and sales frequency for each customer (e.g. number of birds per week)? What are the customer archetypes? (e.g. intermediaries, processors, wholesalers, retailers, end consumers)
	KEY RESOURCES		CHANNELS	
	What key resources do your value propositions require? What are your resources in terms of: <ul style="list-style-type: none"><li>- Expertise?</li><li>- Physical resources?</li><li>- Natural resources?</li><li>- Networks?</li><li>- Customer relationships?</li><li>- Financial resources?</li><li>- Intellectual property?</li></ul>		Through which channels does the business reach the different customer segments? Who bears the transport costs? How long does transport take? How is the product stored?	
COST STRUCTUTRE		REVENUE STREAMS		
What are the most important costs inherent to the business model? Which key resources are the most expensive? Which key activities are the most expensive? What are the major fixed and variable costs?		For what value are customers really willing to pay? For what do they currently pay? What is the revenue model? What is the total sale per customer/product? How often do customers pay? What are the pricing tactics?		

**Figure A1: The Business Model Canvas**

Business process modelling (BPM) is the activity of representing processes of an enterprise, so that the current process may be analysed, improved, and automated. The business objective is often to increase process speed or reduce cycle time; to increase quality; or to reduce costs, such as labour, materials, scrap, or capital costs. In practice, a management decision to invest in business process modelling is often motivated by the need to document requirements for an information technology project.

## **Annex 2: Enterprise budgeting**

Profitability is measured as the difference between revenues and costs/expenses. For chicken producers, the following are the main variable costs (Ayieko et al., 2014): purchase of DOCs, cost of feed, cost of litter, labour cost, and cost of drugs/medication. Fixed costs, including housing and equipment purchase, refer to assets whose value is spread over various years. Therefore, only the depreciation costs are calculated as the current year's figures and are expensed in the income statement (profit calculation). Revenues are all incomes emanating from the products and by-products of the poultry farms, for example, sale of broilers and sale of manure. The figure for total costs is then deducted from the total revenue to estimate profit.

For the other actors, comprising transporters, processors, traders and retailers, profit computation is based on the same principle of deducting their specific costs from their revenues. For example, for the transporters, major costs would be the expense of fuelling the vehicle from the farmer's premises to the market outlets while their revenue would be the negotiated amount charged per bird multiplied by the number of birds/carcasses in the consignment. However, there is scanty information regarding these costs in literature.

