Strategies to link broiler farmers to lead firm processors for guaranteed market and improved income

A case study of Mazowe District of Mashonaland Central Province and partly Harare in Zimbabwe

Research Project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfilment of the requirements for the award of a Master's Degree in Agricultural Production Chain Management Specializing in Livestock Chains

By: Trust Shumba

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Van Hall Larenstein
University of Applied Sciences
The Netherlands

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Dedication

This research work is dedicated to Almighty God for divinely enabling me to complete my study and to my beloved family and parents for their endurance during my study. I love you all.

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List of abbreviations

AMA - Agricultural Marketing Authority
DBFO - Developing Broiler Farmers Organisation
DLPD - Department of Livestock Production and Development
FAO - Food and Agriculture Organisation
GDP - Gross Domestic Product
IFAD - International Fund for Agricultural Development
LINKS - Livestock Information Network and Knowledge System
MPA - Manicaland Poultry Association
NGO - Non- Governmental Organisation
SAPA - South Africa Poultry Association
SPSS - Statistical Package for Social Science
VAT - Value Added Tax
VCA - Value Chain Analysis
ZFMA - Zimbabwe Feed Manufactures Association
ZPA - Zimbabwe Poultry association
ZWPT - Zimbabwe Women Poultry Trust

Exchange rate €1 = USD $ 1.28 (16 August 2013)

Abstract

The research was done to find strategies to link small to medium scale broiler farmers to lead firm processors for guaranteed market and improved income. This study was carried out due to decline in the percentage of small and medium scale broiler farmers who are no longer repurchasing day old chicks because of difficulties in finding market for their produce.

The research was carried out in Mazowe District of Mashonaland Central Province and Harare in Zimbabwe using desk research, a survey with two clusters of broiler farmers, and a case study with semi structured questions which were used to interview the following stakeholders Processors, ZPA, Directorate, retailers and middlemen

The survey was conducted with the aid of a structured questionnaire with closed questions and a few open questions. Information gathered from the survey included farmers' membership of associations, source of inputs, places where birds are sold, number of times they produce in a year, whether they sell live or dressed birds, cost price, selling price, payment method, problems faced in marketing and their opinion on possible strategies to overcome these problems. Other qualitative data was processed into chain map and stakeholder matrix.

Results of the study indicated that processors have got facilities for small to medium scale farmers under certain conditions which are regard to quantity, quality and also biosecurity systems on top of their contract grower scheme. The processors indicated that farmers could either team up to form farmer groups so that they can be able to meet the volumes required by the processors and would be able to enter into contract farming with processors. It also showed that farmers were not aware of such facilities which are beneficial to them from processors since most of them are not members of the association. The association indicated that joining the association could be another strategy for farmers to have a linkage with the processors or other buyers of their produce. Most farmers were taking 3 to 4weeks to finish selling their birds and were selling to individual and middlemen, both on cash and credit.
Cost prices of both the two clusters of farmers were higher than the expected producer price of products for selling to processors. Major problems that constrained the activities of the farmers were difficulty in marketing; high feed prices, electricity power cuts and poor chick quality from some breeders. Strategies to overcome the included to have a combined marketing of the produce so as to have enough volume required to meet the volumes of processors and also to buy inputs in bulk since it has some cost advantages. Some also said you need to look for more customers like institutional consumers who can take a much higher number of birds.

Finally the research study recommends the formation of farmers groups or producer organisation as a strategy to meet the volumes of the processors and also encourages the ZPA to further undertake its activities at district or provincial level so that farmers get to know them. The Directorate and also the Association to encourage other private players and also the existing processors to establish processing facilities at district and provincial level in close proximity to the farmers as a strategy, so that farmers would cut on the transaction costs due to transport problems. The extension workers in the DLPD and poultry research unit should encourage farmers to join the association as a strategy so that they can become accessible to lead firm processors who are also part of the association.

Chapter 1 Introduction

1.1 Country background

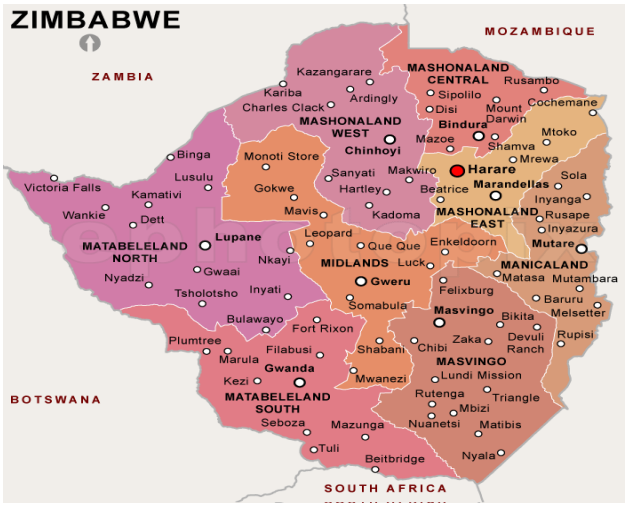

Figure 1 Map of Zimbabwe

Source Google maps

Zimbabwe is a landlocked country which is bordered by South Africa on the south, Mozambique on the east, Botswana on the west and Zambia on the northern part. Its population is estimated at 12.62 million. The country has a total land area of over 39 million hectares, of which 33.3 million hectares are used for agricultural purposes. The remaining 6 million hectares have been reserved for national parks and urban settlements

1.2 Agriculture in brief

Agriculture is the backbone of Zimbabwe's economy but only contributes 14% of Gross Domestic Product (GDP). The sector provides employment for around 70% of the population, and about 60% of all raw materials for the industry. About 45% of the country's exports are of agricultural origin (Ministry of Foreign Affairs, 2012).

1.3 Livestock Production

The national cattle herd stands at 4.9 million. Beef used to be the most consumed protein, with average of 13 kg per annum in the 1980, but today this has dropped to 3.3 kg per person per year. Chicken and pork have since replaced this, with chicken now being the most consumed and being half of all the meat consumed. After the introduction of the multiple currency system in 2009 meat consumption rebounded as the economy started improving, and is now estimated to be 11000 MT per month with poultry contributing 6500 MT per month while the rest is coming from other meat types (Scoones, 2013).

The retail price of economy beef which has the highest demand is around USD$ 4.80 per kg compared to the average chicken retail price of about USD$ 3.30/kg (Scoones, 2013). Due to the high price of beef, there has been an increase in the demand for chicken and a shift in consumer preferences from beef to chicken due to its lower price (Sukume and Maleni, 2012).

Broiler production in Zimbabwe is undertaken roughly in four sizes of classes which are the

- large-scale fully integrated operations the lead firms,
- large-scale semi-integrated,
- medium scale
- small scale.

The sector is split up only in two; the first two classes are the formal sector which contributes (35%), while the last two classes are the informal sector contributing (65%) to the poultry industry (Sukume, 2011).

Imports of poultry products

Importation of broiler chicken portions and offal has been escalating in the recent years. In 2008 due to the shortage of stock feed which was brought about by the combination of drought and economic crisis, the local broiler industry had to heavily destock their flock resulting in an acute shortage of broilers in the country. This prompted the government to allow greater importation of poultry products into the country to avert the shortage of chicken. After the introduction of the multiple currency system in 2009 the poultry industry started to recover, but still there was immense pressure from imports which had persisted mainly due to their low cost (Sukume, 2011)

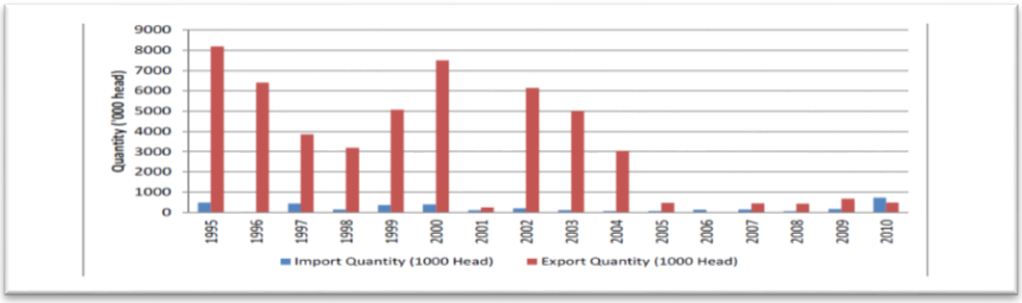

Figure 2 Poultry trade flows from 2000 to 2010

Source FAO (2013)

The implementation of the new duty tax by the Ministry of Finance an Economic Development in 2013 has seen the significant decrease in the presence of imported poultry products in the country. The removal of duty tax on imported soybean meal resulted in the local poultry producers competing with the South Africa Poultry producers since the price of feed had stabilised. The Department of Livestock and Veterinary Services also reported that there has been a decline in permit application and collection for those who wanted to import poultry products. Chickens from Brazil were no longer coming to the country and this was a positive move for the local producers who were failing to compete with the cheap imports (5m Enterprise, 2013).

Poultry production trends

Zimbabwe's poultry production has reached 5 million chicks and around 65 000 dozen of eggs a month (ZPA, 2012). The figure below shows the quantities of day old chicks that were produced from 2002 to 2011. There was a sudden decrease of chicks produced from 2007 to mid-2009. This was due to drought that affected the country in the 2007 to 2008 rainy season, so chick breeders had to destock their birds resulting in a decrease in chick production. Furthermore many farmers had to go out of business due to economic crisis, thereby resulting in the decrease in the number of people buying the day old chicks.

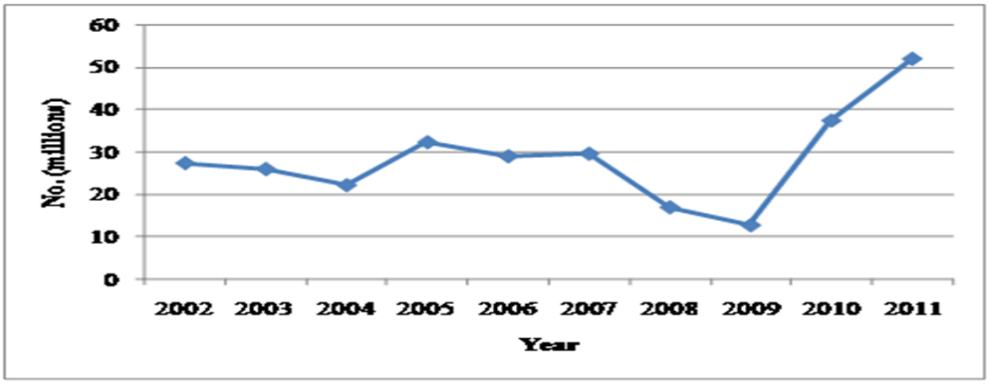

Figure 3 Day old chick production

Scoones (2013)
Figure 4 below shows the quantities of broilers slaughtered from the period from 1995 to 2011 with an average carcass weight of 1.3 kg. The steady increase was due to heavy destocking of birds due to acute shortage of feed caused by drought and economic crisis.

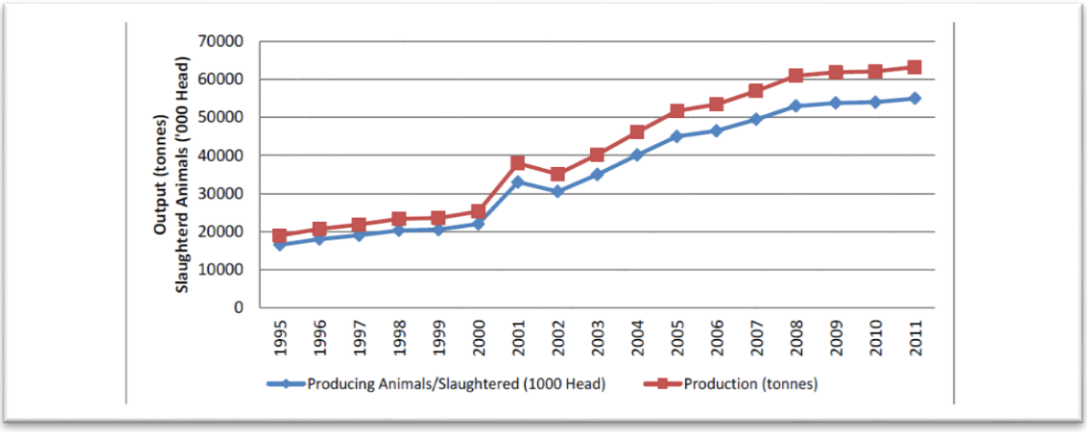

Figure 4 Amounts of broilers slaughtered

Source FAO (2013)

Small to medium scale farmers have limited access to processing facilities that are required to meet standards of the formal chain which is largely dominated by the poultry processors (the lead firms) and large scale semi-integrated farmers. The unavailability of a market for their broilers is negatively affecting their income since they only rely on traders/middlemen as their buyers of their live birds. This is resulting in high feed cost since the broilers have to be continuously fed up until they are all bought. The Zimbabwe Poultry Association reported that small to medium scale farmers are failing to get market for their broilers so most farmers' are no longer repurchasing day old chicks resulting in them leaving the sector (ZPA, 2012).
Lead firm processors are developing small to medium-scale farmers in rural areas through provision of training free of charge to equip them with the knowledge of raising chickens. This has gone a long way in empowering the farmers to produce poultry, not only for improving nutrition but also providing family income (Scooner, 2013).

1.4 Problem statement

Small to medium scale farmers are facing high production costs and low prices due to limited access to processers (lead firms), that pays better prices and offers a guaranteed market. The farmers rely on selling their birds as live to buyers (middlemen) who offer lower prices and who in turn earn a lot of profits. The high costs are also necessitated by longer time periods taken for the broilers to be sold after they have reached their market weight since

they have to be fed until they are all finished. So the farmers are no longer repurchasing day old chicks thereby resulting in reduced net income.

1.5 Objective

To analyse the broiler value chain in order to identify strategies for farmers to increase access to the guaranteed market of lead firm processors for increased income.

1.6 Main research question 1

1. What are the features of the broiler value chain of Mazowe District?

Sub questions

- What are the stakeholders and their roles in the chains?
- What are the cost prices and selling prices of the produce in the chains?
- What are the value shares of the actors in the chains?
- What challenges do farmers and lead firm processors face?

1.7 Main research question 2

2 What barriers are hindering small to medium scale farmers to have access to the lead firm processors?

Sub questions

- What is the quality attributes of the products produced by the farmers?
- What is the status of business relationship between poultry processors and the farmers?
- What methods of marketing are used by the farmers for marketing their produce and their market outlets?
- What are the volumes of produce required for processing by the lead firm processors?
- What strategies can be identified to allow farmers to have access to lead firm processors?

1.8 Definition of terms and concepts

Value chain - describes the full range of activities that are required to bring a product (for example meat, milk, eggs, leather, fibre, manure) to final consumers by passing through the different stages of production, processing (where a combination of physical transformation and the input of various producer services is put into) and delivery to final consumers, and also its final disposal after use.
Actors are a group or individuals who are creating and delivering the product. These are owners of the product as it moves along the chain.
Supporters These are people and companies that do not deal with the product directly, but offers services that add value to the product and increase effectiveness or efficiency of the chain.
Influencers- this is the enabling environment which consists of the critical factors and trends that shape the value chain environment and operating conditions.
Value shares -This is the percentage of the final retail price that the actor earns. This is calculated as the added value divided by the final retail price and then multiplied by 100 to give as a percentage.
Marketing mix- The term is used to describe the different kinds of choices organizations, companies or individuals have to make in the whole process of bringing their product or service to the market.
Value chain development- This is a participatory process by various stakeholder in the value chain with the aim of bringing a desirable change in a value chain which is sustainable and with the intention of improving the productive operations along the value chain.

Market access- defines the conditions that are agreed upon by the actors in the value chain to allow the entry of goods. These conditions might be based on price, quality and or quantity

Horizontal integration- refers to consolidation of ownership and control within one stage of the food system, such as production, processing, for one particular product

Contract farming- Contract farming is an agreement between farmers and processing firms and/or marketing firms for the production and supply of agricultural products under forward agreements at predetermined prices.

Chain relations- this is the form of relationship between two or more actors in the value chain

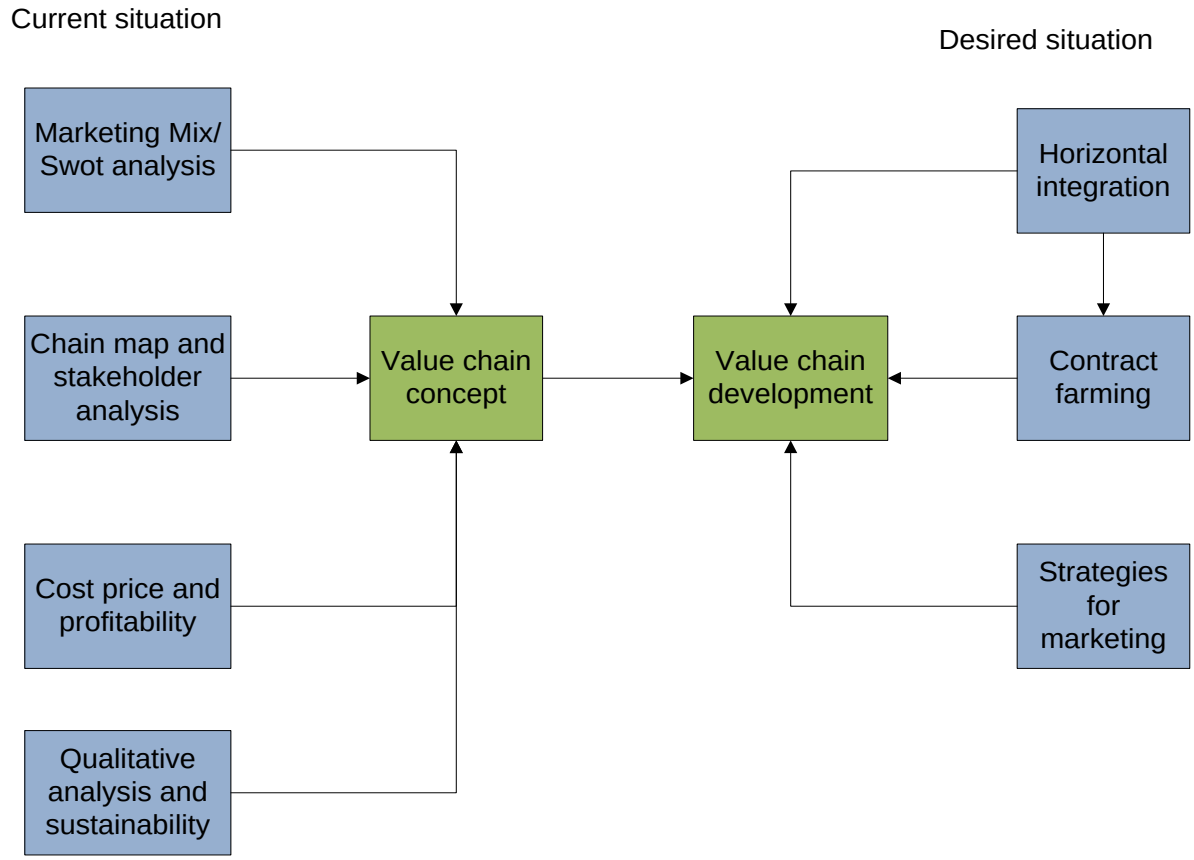

Figure 5 Conceptual framework

Chapter 2 Value chain and market access concepts

2.1 Value chain analysis

Roduner (2007) defined value chain analysis as the study of identifying the full set of economic costs along the value chain, so as to determine where value is added, how much value is added and what's the relative importance of different actors are (the formal and informal governance structure) in the chain. Value chain analysis (VCA) also focuses on the available services and the supporting institutional and political framework thereby allowing the determination and analysis of bottlenecks which would help in identifying upgrading strategies to be employed to improve the efficiency of how the chains are operating. The information for value chain analysis can be found through desk study (literature review), statistical review, government offices, associations, interview with stakeholders involved in the chain and also through surveys done to farmers.

Sukume (2011) conducted a value chain analysis study of the broiler production in Zimbabwe and found out the following main channels:

- Large Processors: Large-scale integrated companies that are involved in the production of day old chicks, rearing, processing and trade of chicken.
- Large scale farmers with their own small abattoirs who are involved in rearing, processing and trading of chickens.
- Small scale producers which include small to medium scale poultry producers that are involved in the rearing and sell of chicken mostly as live and sometimes slaughtered. Their markets outlets include local villagers, road side traders, local retail outlets and other major urban centres
- Large Import Traders: brokers and traders that purchase from foreign producers in countries such as South Africa and Brazil for sale in wholesale and retail outlets, although now the amount of imports are decreasing.
- Wholesalers and Retailers: These include butcheries, medium to large retailers and wholesalers who sell directly to consumers in urban and rural areas.

Sukume and Maleni (2012) reported that the large scale processors and large scale farmers both have advantages over medium and small scale producers. The large scale processors have an integrated production, so they have economies of scale and can ensure the availability of better feed and day-old chicks at lower prices to them. They also import feed raw materials on their own and hence avoid paying importer margins. The large scale farmers have significant control over their feed and processing costs compared to medium and small scale operations thus giving the large processors and the large scale farmers a more competitive advantage in terms of production costs.

2.2 Value shares in value chains

It is necessary to know the following costs before calculating the value shares. You need to know the variable costs and also the fixed costs. Variable costs are costs that change according to the amount of produce being handled and fixed costs are costs that are independent of the amount traded. After that you will need to know the revenue (selling price) of the actors

Added value

This is the amount of value that each actor in the chain adds. It is the difference between the price the actor pays for the produce, and the price she or he sells it for. It can be calculated by the following formula:

Added value = Price received by actor – Price paid by actor

Value share

Value share = Added value x 100 / Final retail price

KIT and IIRR 2008

2.3 Market access

Mwanza (2010) reported that market access by small scale broiler producers is hindered by their small scale of operations, weak technical capacity, high vulnerability to diseases and difficulty in obtaining appropriate market information. In addition, small scale farmers experience difficulties in complying with the high quality standards required by high-end markets such as supermarkets, big butcheries and top class hotels.

In most instances, small scale producers have little bargaining power hence they are always price takers. They sometimes lack enough market information which is mostly vested in the hands of buyers who have information about market conditions, better negotiation skills and often better assets. In the Kenya broiler sector small scale farmers rely on middlemen for market information. These have a tendency of giving unreliable information which helps them to negotiate for lower prices which will be at the disadvantage to the farmers (Mugo, Perisia, Wanjiru, 2012).

According to IFAD 2003 an effective market-based livestock production have the potential to increase output in terms of quantity, quality and prices; and improve margins for the actors in the chain especially the small scale farmers thus leading to an efficient production and distribution technology system.

2.4 Value Chain Development

Value chain development involves product upgrading which seeks to meet the needs of the market, by changing the form of the product for improved quality like organic production so as to establish a niche market. Accompanied with this is the process upgrading, which seeks to improve the efficiency of the chain by increasing the output in an economic way by applying good agricultural practices to meet the volumes and quality required by the buyers.

Compliance with hygiene standards is a major challenge for small scale poultry producers. There farmers cannot meet the costs required to meet these standards so would rather sell their birds to middlemen. In Botswana it was reported that the halaal requirement by the majority of retailers was denying small scale producers' access to the formal market since it was very costly to produce broilers that meets the halaal requirement (Moreki, 2011).

Information is one of the important things in market access, since when farmers knows the needs of the market, hence they can try to produce products that meets the needs of the market. According to Mugo, et al (2012) information and communication technology tools like mobile phones, computers, internet services, print and electronic devices were used to access market cheaply in arid and semi-arid areas for large livestock keepers. This could be also a strategy to help farmers to access market information and help to know the existence of facilities useful to them in the market. This program helped to increase efficiency of the marketing system and thereby increasing production capacity of small scale livestock farmers. This was facilitated by the Livestock Information Network and Knowledge System (LINKS).

2.5 Framework for trading up

According to KIT and IIRR 2008 there are strategies that can be employed for trading up. These strategies have been used by the livestock farmers in the Mbire District of Zimbabwe and led to transparency, mutual respect and also better business operations. The first strategy for trading up includes stronger chain relations which create well-organized

business relations between the various actors in the value chain. This seeks to improve the condition for trading within the chain. The second strategy involves creation of stronger market institutions that establish standards, regulations, policies and services to coordinate and support trading activities, thus improving the conditions in the business environment around the value chain.

Figure 6 Chain relations. How well do players in the game work with each

Source KIT and IIRR (2008)

Farmers and traders can benefit if they manage to make their relationships more stable, transparent and better organized manner. Such kind of relations will help both parties to reduce transaction costs and risks that they face in their businesses and help all the chain actors in the value chain since it may result in upgrading strategies like product development which will see all the actors benefiting. This can be done by:

- Farmers can team up as producer organisation or cooperative societies, so can be able to support one another thereby strengthening skills and technologies, upgrading of products and services and can help to access other markets. This is a strategy to allow farmers to have enough volumes and a consistency supply to meet the needs of the market. Farmers can be able to learn about the demands of the consumers, and can gain access to finance and also negotiating with clients. Dealing with a group of farmers, other than individuals will reduce transaction costs for the buyers.
- Farmer organizations were found to be most successful with small, cohesive groups that are involved in simple activities in liaison with agribusiness. The linkage independent group can stand alone in the market, and will be able to provide small scale farmers with sufficient market information without the presence of market intermediaries (middlemen).
- The Lower Guruve Development Association is an association of livestock farmers that helps its members to get the best value for their animals by offering assistance in marketing their products. It organised farmers into marketing groups so that they have more bargaining power. The association was also involved in information transfer since it was able to find market information about the prices that were offered in urban areas. It found that, prices were much higher in urban areas than what was being offered by traders and this reinforced farmers' determination to take the marketing in their own hands (KIT and IIRR, 2008). These associations can also be formed in broilers farmers as a strategy for them to access market information and help each other in marketing.
- The marketing chain will only function well if all actors in the chain respect the roles and needs of the other chain actors. Open dialogue and exchange visits can help to create mutual understanding between farmers and traders.

- Once the farmers and traders recognize each other's roles in the value chain, there will be need for specialization in their own business, like improving their products and services so as to strengthen the value chain to benefit all the actors. Traders can specialize in getting the best market for the farmers' products, developing new customers, and providing feedback from the market to the producers, while the farmers specialise on the production of the product with the required quantity and quality attributes.
- Coordination can be done through continual communication between the actors. This can be steered by the business associations of farmers and or traders like the Zimbabwe Poultry Association, or by a chain facilitator or a service provider. The South African Broiler Association (SAPA) initiated the formation of the Developing Broiler Farmers Organization (DBFO). The main purpose of the DBFO was to serve as a conduit to the developing small scale broiler farmers for information dissemination and to co-ordinate and address collective issues in the industry (Department of Agriculture, Forestry and fisheries, 2011). This is another strategy which would help farmers to air out their views as an organisation and have their problems addressed jointly by the poultry industry.
- When chain relations are really strong, then farmers and traders can agree upon a shared vision and a joint action plan to strengthen the value chain as a whole.

2.6 Market institutions

Market institutions are norms, rules, regulations, policies or services that shape the way in which farmers and traders interact. They give structure and support to trade activities, thereby reducing the costs and risks that farmers and traders face in their businesses (KIT and IIRR, 2008). These market institutions help to open up new opportunities for small to medium scale farmers.

In Malawi little enforcement of market regulations was seen as major limiting factor for the smallholder marketing system. It is a requirement for all private traders of produce to be licensed and registered, but in practice it has been contrary since there were a lot of non-licensed and unregistered produce traders, including foreigners from neighbouring countries, who have operated freely in the country thereby affecting the marketing system of small scale farmers (Nhakhumwa, 2009). Strengthening market institutions could be another strategy that can help farmers to access possible markets of lead firm processors or other buyers of their products.

Figure 7 Market institutions. How strong are the rules of the game.

Source KIT and IIRR (2008)

The second strategy to improve trading in value chains is improving market institutions as these have a bearing on the marketing of produce in the small scale farming sector. This can be done by:

Standardise quality, weights and measures: Quality grades, calibrated weights and measures helps trading to become more effective. Transaction costs with regards to inspection, handling costs (weighting and bagging), are reduced and long distance trade is stimulated This improves business returns and client satisfaction since higher prices will be rewarded based on best quality.

Develop contract enforcement mechanisms: Formal or informal mechanisms to prevent and punish breach of contracts are an important part in making trading more effective. When farmers and traders trust each other, agreements will be respected, and they will be in a much better position to buy or sell on credit, trade at long distance, make long-term agreements, invest in business growth and many more. Contract enforcement can be done by public service, like courts and police, or by private like certification schemes.

Develop market information systems: Market information is very important for trading to be more effective. Suppliers and buyers both need accurate market information in order to make good sound decisions as to where, when, to whom, and at what price to buy or sell their commodities. Incomplete or non-transparent market information leads to what economists call market failures. Market information systems can be a public service or private, and can involve various media, such as radio, television, internet, cell phones and SMSs.

Provide financial services: In trading there is need for finance, since in the movement of goods along the chain, there are costs involved. Chain actors need capital for investments in staff, infrastructure, so that their businesses can grow. Insurance and savings are also important. Access to financial services is vital to keep trade going and to make it grow and prosper and also to expand the existing business. This is all possible if the farmers are now supplying the processors, so they can be helped to continually expand their business.

Provide business support services: There are other services that are important in supporting business and trade. Some of these services include: transport, accountancy, security, extension, research and development, utilities, road maintenance. These services are provided by supporters in the chain who include public, private and also donor agencies. These services help to increase the efficiency of how the chain operates.

Use policy leverage: It is important for trade and business to have some participation in decision-making over government policies. Policies influence business through taxation, permits, sector policies, trade tariffs, and also subsidies. The decisions with regards to policies are mostly done without taking into consideration views of farmers and traders. So farmers and traders need to be organised to achieve policy influence, which will in turn improve their conditions of trading.

Source KIT and IIRR 2008

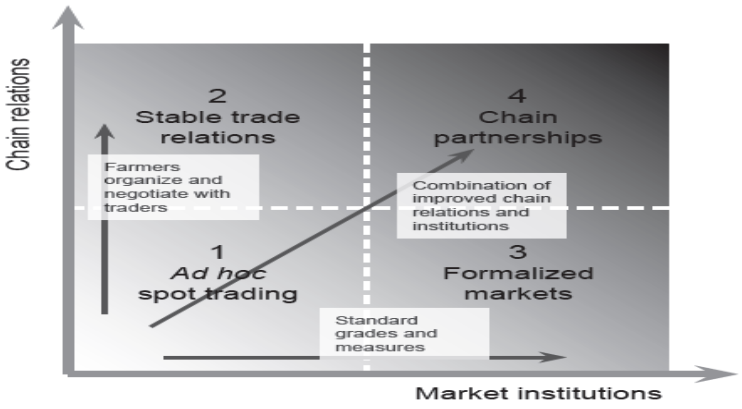

Figure 8 Movements in the market interaction matrix

Source KIT and IIRR 2008

2.7 Coordination

2.7.1 Horizontal integration

Producers can come together for the purpose of achieving economies of scale, reduce transaction costs under set regulations, quality management, reduce competition or access new markets and ensure a constant supply base (KIT. Faida. Mali and IIRR, 2006). This can help to reduce farmers' default in contract farming schemes through peer pressure and is important in fostering good company-farmer relationships.

Horizontal integration involves information management, quality management, innovation management and chain cooperation. Horizontal integration will help farmers to enter into contracts for the delivery of products with special quality characteristic, provision of technical advice to cooperative members on how to comply with quality standards and also lowering transaction costs by gathering, processing and disseminating information on markets, products and potential transaction partners to its members (Mwanza, 2010).

Cooperative farming was very successful in the Kenya Dairy industry. It has helped small scale dairy farmers to access new markets as they were now supplying the processor via their cooperative. The Ndumberi farmers' Dairy Cooperative was now able to sell half of its production to the processor Brookside Dairies and has seen the cooperative, investing its profits on its own processing facilities therefore, were now able to process some of the milk into yoghurt (Karangae, 2012).

According to Ministry of Agriculture of Botswana (2010), the Botswana Government was offering assistance to build cooperative slaughter facilities across the country and this assistance was only channelled to those farmers who had formed themselves into a cooperative society. The purpose of this was to allow small to medium scale farmers to have access to slaughter facilities which would help them to access the formal market which is are more profitable.

2.7.2 Contract farming

Contract farming is a chain coordination mechanism between farmers and agribusiness firms. The agreement involves the purchaser providing some production support through, for example, the supply of inputs and the provision of technical advice. The information contained in the contract includes the product quality, volumes required and also the payment system. The farmer has to supply the specific product in quantities and at quality standards required by the buyer and the buyer has to be committed to support the farmer's production and to purchase the commodity (Eaton and Shepherd, 2001).

Contracts are used to partnership on different levels which are between a cooperative and its producers, between a cooperative and a company and directly between a company and an individual producer. The contract is used to coordinate both parties involved and to enforce compliance to the terms of the agreement (Mangnus and De Steenhuijsen Piters, 2010). Contracts are also a strategy to allow farmers to have access to guaranteed markets and have all their produce bought all at the same time. This improves the cash flow of farmers as they will be paid their money in bulk, so can make planning easier. Since in contract farming, farmers are given all the inputs and technical expertise it would also further increases the knowledge capacity.

In Botswana a large number of small scale broiler producers are supplying the large firms on a contract basis. This has seen the small scale broiler farmers getting a guaranteed market for their product and has improved their net revenue. These small scale producers have no direct access to supermarkets and many of their sales were to small village retail outlets and individuals. In addition of being contracted by the large scale farmers these small scale

producers are also supplying government institutions, such as schools and the Botswana Defence Forces on tender basis (Grynberg and Motswapong, 2010). Opportunities arising from contract farming include market access and commercialization of small to medium scale farmers.

2.7.3 Inclusion of commercial small holder farmers

This could be another strategy that can be done by the lead firms and small scale farmers. In this system the farmers produce with their own resources (inputs) and the lead firm may offer for example, processing facilities at a fee or the lead firm may be the buyer of the farmers produce at a pre-determined price. In this case, a business relationship would exist between the farmers and the processor, and this would ensure a ready market for the farmers. The major disadvantage associated with this type of chain coordination is that if there are changes in market demand and the lead firm closes down then the farmers would be left with no market outlet for their produce. Non-Governmental Organisation (NGO's) or donor agencies may establish the firm in which case it holds the shares of the target group (farmers) until such a time that the farmers can take over full responsibility of managing the firm (Roduner, 2007).

Chapter 3 Methodology

3.1 Research framework

The research framework is composed of desk study, field work including data collection and compilation, analysis of results, conclusion and recommendations.

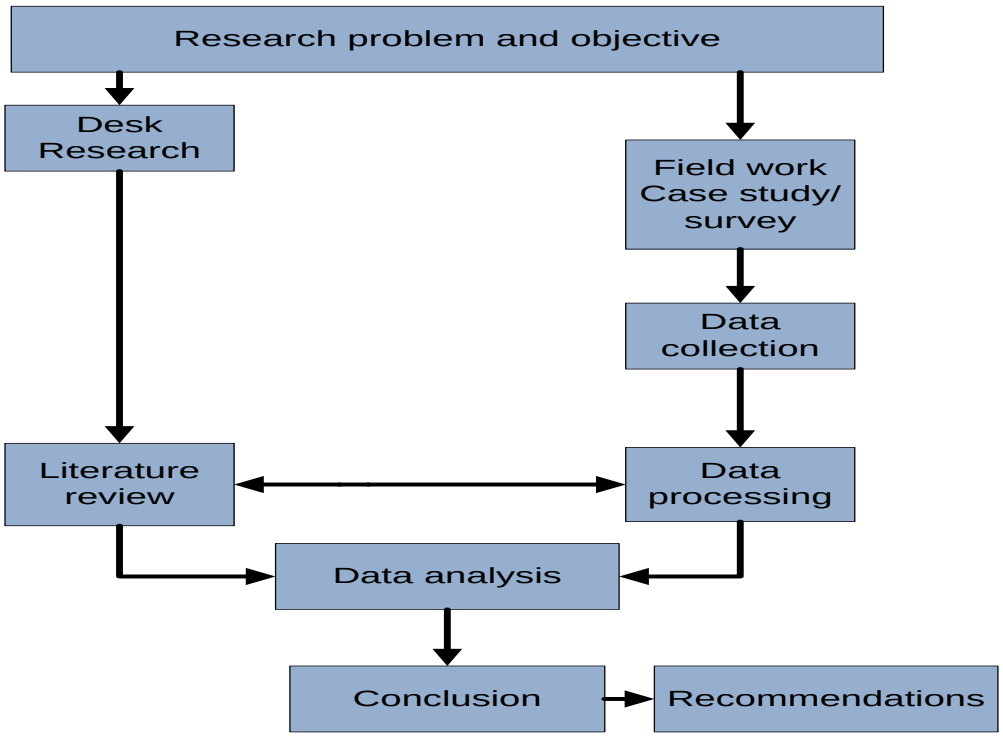

Figure 9 Conceptual framework

3.2 Study areas

Mazowe District is found in Mashonaland Central Province of the country and to the northern part of the capital city Harare. It is the southernmost district of seven districts in the Province. The District has got a population of around 232 885 and an area coverage of 4 354.16km^2 with a population density of 53.5 inhabitants/km^2. It is an agrarian district with the larger part being commercial and forestry farms. There is a research station called Henderson Research Institute, where training and livestock research is done. There is a dam called Mazowe Dam that provides water for irrigation to the orange plantations of Mazowe Citrus Estate. The soils are sandy and not very fertile and farmers grow tobacco and cotton. The district map is shown below. The other interviews were done in the capital city Harare where the other stakeholders are located with Glen View High Density suburb chosen as one market area where the traders of live birds were interviewed.

MAZOWE DISTRICT MAP

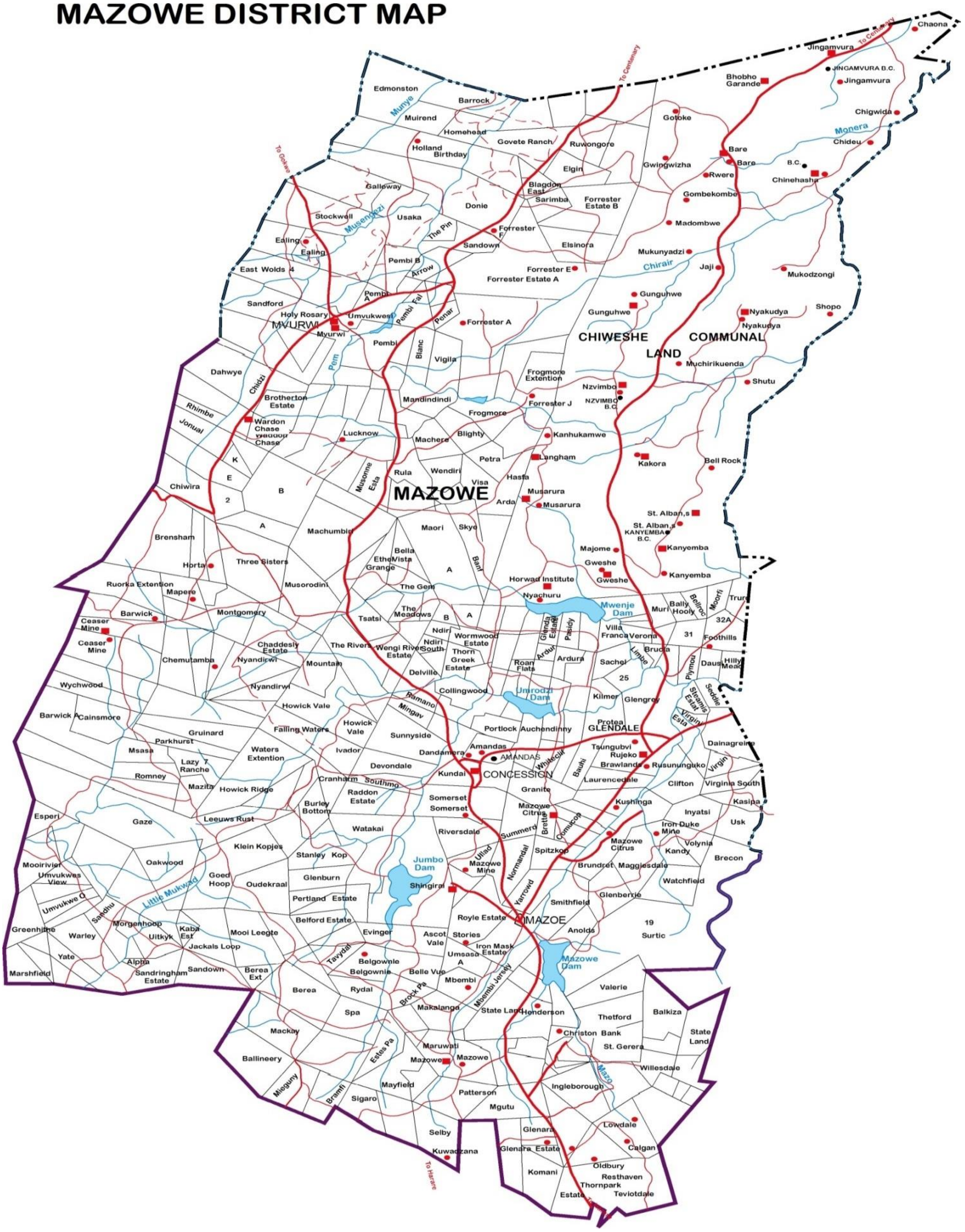

Figure 10 Map of Mazowe District

Scale 1 cm represents 5 km

3.3 Desk research

Desk research involved searching relevant and actual literature on broiler value chains. The information was searched from libraries, latest scientific journals, internet, reports from the Ministry of Agriculture Mechanisation and Irrigation Development and reports from ZPA.

3.3 Case study

Interviews with the lead firm processors

Interviews were done with The Slaughter Line Manager of Irvine's Day Old Chicks, Assistant Engineer of Crest Breeders and Managing Director of Lunar chickens. All their companies are located in Harare and are three of the four lead firm processors in the country. These are the processors which are much close to Mazowe District. The interviews were done to find out their business relationship with the farmers, their roles in the chain, factors they consider to allow farmers to have access to their processing facilities. This was used in formulating strategies to help farmers have access to processing facilities.

Interview with the secretary of Zimbabwe Poultry Association

Zimbabwe Poultry Association Secretary (ZPA) was interviewed to get information on the current status of broiler industry in the country and their functions in the chain. Questions were focussing on the services they offer to farmers, constraints they are facing, and also faced by the poultry industry, effect of these problems as well as their opinion on possible strategies that can be adopted to improve marketing in the small to medium scale farmers.

Interview with the Deputy Director of Livestock production and Development

The Deputy Director of the Livestock production and Development (DLPD) was interviewed to find information on the policies/market institution in place to develop the poultry sector and also opinion on strategies that can be employed to improve marketing of broilers for the small to medium scale farmers.

Interview with buyers/retailers in the both formal and informal market

Five traders/middlemen selling live birds at the market place in Glen View High density suburbs, 4 butcheries and 4 supermarket owners in the city were interviewed to obtain information on their activities. Questions were focused on where they are obtaining the broilers, number sold, the cost involved and selling prices, quality attributes and preferences of the consumers on local products against imported products, means of transporting the birds and problems faced in marketing.

3.4 Survey

The survey had a questionnaire that was administered to the broiler farmers in Mazowe District. The farmers were grouped into two clusters according to the number of birds. Small scale farmers have 300 to >1000 and medium scale farmers with 1000 to 7000 farmers. A convenient sampling technique was used in sampling the farmers. The farmers were selected from within a radius of 40 km from Mazowe Township. 32 farmers were selected from the two clusters of farmers. 16 farmers from each cluster were interviewed to obtain a broad range of primary data on their activities in the chain and also the constraints they face with more emphasis on marketing of their produce. The questions focused on the cost of production, selling price, where they obtain their chicks, quality attributes of buyers, number of cycles per year, their marketing method and market outlets and how their marketing is organised, constraints they face and strategies to improve marketing.

Another method of observation was used while undertaking both the survey and the interviews.

3.5 Data analysis

Qualitative data from the interviews were processed into chain map, stakeholder matrix, marketing mix and swot analysis to illustrate the structure of the broiler value chain and also the marketing methods used in the chain, as well as trading up strategies for improving marketing adapted from KIT and IIRR (2008).

Quantitative data from the survey was coded and grouped according to preselected clusters and analysed using Statistical Package for Social Science (SPSS) version 21. Descriptive statistics were used to analyse gender, age, educational level and flock size. Cross tabs and Chi squares test (X^2 test) were used to find if there were relationships between levels of education, number of cycles per year, opinion of getting the market and marketing method. Cost price and selling price calculations were done using Microsoft excel to find the value shares of the different actors in the different chains.

3.6 Limitations of the study

There were inadequate resources to allow movement for data collection on broilers farmers in the district, so only concentrated on areas that were accessible and 40 km distance from Mazowe Township. The sample size was very small and the study concentrated in one district.

Chapter 4 Results

4.1 Case study

The interviews were done between the 22nd of July and the 16thof August 2013 on the following stakeholders, Lead firm processors, ZPA, DLPD and traders of both live and dressed birds. Each interview had its own transcript and the entire transcripts were processed to produce the report below.

4.1.1 Interview with Lead firm processors

The lead firm processors supply day old chicks to farmers. They all have a contract grower's scheme with a minimum of 10 000 birds. In this scheme the farmers are given all the inputs and technical services, and the company deducts all the cost on payment.

Table 1 Requirements for contract grower scheme

Requirements	Crest breeders	Irvine's Day Old chicks	Lunar Chicks
Number of birds	10 000	10 000	10 000
Age	4-6 weeks	4-6 weeks	4-6 weeks
Weight	1.3 - 1.5 kg live weight	1.3 - 1.5 kg live weight	1.7 - 2.0 kg live weight
Healthy status	Disease free	Disease free	Disease free

The Managing Director of Lunar chickens and Slaughter Line Manager of Irvine's Day Old Chicks indicated that their companies offer technical services and pamphlets for free to small and medium scale farmers who purchase chicks from them.

Differences between the three companies

Slaughter Line Manager of Irvine's Day Old Chicks indicated that the company does not offer processing facilities to non out grower farmers because it is afraid of the inadequate biosecurity system existing in the small to medium scale broilers farming sector. He further on said that if they take the birds from these farmers they run a risk that its plant may be destroyed due to diseases from birds supplied by these farmers.

The Managing Director of Lunar Chickens indicated that they have a facility for small to medium scale farmers where farmers may group together and supply a minimum of 1000 birds/ batch, with weight and age of the birds as mentioned above and disease free birds, of which the company would buy all the farmers, produce. He further on said the company offers slaughter facilities to farmers at USD$ 0.43/bird, or instead of paying the slaughter cost the company might take all the offal as payment. This could be strategy where farmers would produce with their own inputs and then get slaughter facility from Lunar Chickens or Lunar Chickens buys the farmers produce on the prevailing market price. The company preferred to buy the birds since it said the farmers have no brands so would be more difficult for them to access other markets with slaughtered birds and it would increase the farmers' transaction cost.

Assistant Engineer of Crest Breeders indicated that, farmers can group themselves together as a strategy to deliver required number of broilers, but before they can deliver them they need to enter into a contract with the company first. He further on said that, this would ensure a ready market for them as the company would take all their produce.

The entire lead firm processors highlighted that electricity power cuts is affecting their business, so standby generators are needed to avert the power crisis. They are facing high feed costs due to shortage of feed ingredients like maize on the local market.

4.1.2 Interview with secretary of Zimbabwe Poultry Association

The Secretary was the one who was in office. The original plan was to interview the chairman. The secretary highlighted issues of membership, services offered to farmers, problems they face as an association and also strategies that can be employed by farmers to improve marketing

Membership and functions

Membership of the ZPA was said to be voluntary to all the poultry players in the industry which include breeders/hatcheries, small and medium scale farmers, large scale farmers, Zimbabwe Women Poultry Trust (ZWPT) and the Manicaland Poultry Association (MPA). A subscription fee of USD$ 10-00 per annum should be paid to remain a member. Services offered by the association include, lobbying on behalf of its members on policies that strengthen the poultry industry, provision of quarterly newsletters and information with regards to standards, costing models and market needs. The association help by advertising among its members and linking farmers with buyers. In addition it undertakes training of small to medium scale farmers in association with distributors of day old chicks in some parts of the country.

Problems faced by the association

The association is much concerned of the appearance of illegal chickens and pork bones on the market from unapproved plants. There are high feed costs caused by shortage of maize and wheat bran on the local market due to reduced milling which has been necessitated by the influx of maize meal and wheat flour in the country. Importation of beef is further putting pressure on poultry meat and small to medium scale farmers failing to get market for their produce therefore are no longer repurchasing day old chicks.

Strategies to solve the problems

There is need to increase transparency on importation permits. There should be close monitoring at boarder points for imports entering the country so that there would be no illegal imports entering the country. There is need to undertake a study to identify local requirements of all animal protein so as to avoid over importation of one protein source. The government should further increase tariff measures to create a fair competition for the local products. The secretary further on said that farmers should willingly join the association so that they become linked to processors who are the buyer of their produce.

4.1.3 Interview with the directorate

The Deputy Director of Livestock Production and Development was interviewed to obtain his views on the role of the Directorate in chain governance. In the Legislative Instrument the Directorate, has the mandate to develop, promote and sustain poultry and livestock production for food security, employment creation and income generation through research, effective technical support, and extension services.

The Deputy Director highlighted that the government created the Agricultural Marketing Authority (AMA) in an effort to coordinate the marketing of agricultural products and to help in linking farmers to markets. The Government strengthened the poultry permits allocation which is now chaired by the Department of Economics and Marketing with representatives from the Agricultural Marketing Authority (AMA). Imports have since been reduced due to tariff measures employed by the Government. The Government reduced import tax on soybean meal and this has gone a long way in helping stabilise feed prices. He also emphasized on the revival of the poultry advisory board which should help the poultry farmers with information on production and marketing of their products and facilitating formation of farmers groups to meet the volumes required by the processors. Furthermore the extension staff should encourage farmers to join the association as a strategy to become linked to other poultry players in the industry where they can jointly address their problems together.

4.1.4 Interview with retailers of dressed birds

The supermarkets OK, TM, Food World and Spar indicated that they obtain their supplies from processors who are registered with their companies and have no contracts with their suppliers. Spar supermarket further on indicated that it can take from anyone else if that person meets the quality attributes it requires, veterinary clearance certificate to certify that the birds were slaughtered on a hygienic place and are disease free. All the supermarkets indicated that the suppliers are the ones who deliver the produce to them. They all said everyone is a customer, and consumers prefer cutlets more than full chicken. The brands mostly favoured are that of Irvine's and the Suncrest brands. In terms of imports the retailers indicated that they are no longer importing chicken since the local production is meeting their needs. One retailer interviewed said

"We only imported chickens in 2008 when there was economic crisis but for now we are no longer importing them as we are getting all our supply from the local suppliers".

The supermarkets indicated that to improve marketing there is need of a good packaging which is attractive to consumers. Advertising and also undertaking demonstrations for consumers were also indicated as other methods to improve marketing. It was also said that there is need to have a variety of products from small to large packages that suit the different classes of consumers. All the retailers indicated that they are inspected for housekeeping by the health inspector of the city council. Below are some of the most common brands sold by the supermarkets.

Figure 11 Brands of Irvine's and family choice found in the supermarkets

The 4 butcheries in the city indicated that they obtain their produce from registered abattoirs which are checked for hygiene. One of the butchery owners indicated that he owns an abattoir so he also buys broilers from farmers who can supply him with a minimum of 1000 healthy birds with an average weight between 1.7 kg-2.0 kg. They all indicated that they are facing competition from farmers who are now doing illegal slaughters and then bringing their products to the market. Their customers include the general public and restaurants. The veterinary department from the government and the healthy inspector of the city council periodically inspect their abattoirs and butcheries premises for hygiene.

Figure 12 Packaging chicken in the butchery

4.1.5 Interview with middlemen of live birds

The traders in Glenview High density suburb indicated they obtain their supplies from producers who are close to the city to cut on transport cost. Some of the traders indicated that they have teamed up on buying and selling so as to cut on costs like transport and have a constant supply throughout the whole year. Open trucks are used for the transportation of broilers.

Figure 13 Cage with broilers being sold

Table 2 Strategies used for marketing by middlemen

Product	The product might be slaughtered depending on consumers' request and weighing around 2 kg when slaughtered or around 2.5 kg when live. If slaughtered they are packed in small transparent plastic bags.
Place	The broilers are put in cages and placed alongside the road for easier identification by the consumers.
Price	The prices of the product differ from place to place but are in the range of USD$ 6.00 - USD$ 7.00 while the purchase price ranges from UDS$ 4.50 - USD$ 5.00 per bird.
Promotion	This is done to the buyers who buy at least 20 birds and more there will be a discount.

On monthly bases the traders sell more than 300 chickens both live and some dressed upon consumer's request. These chickens are mostly sold in the high density suburbs. The middlemen are faced with problems of mortality on transportation, cannibalism and also flooding of the market causing prices to drop.

The slaughtering is done in an open air and in an environment where flies can settle on the chicken so the quality of the meat is not known since there in no inspection by the veterinarians. The slaughter is done in the absence of the customers and all the offal and

feathers are placed in the bins that are close to the market place. There is quite low hygiene at the slaughtering process.

Table 3 Cost and revenues of traders of live birds

Item	No	Unit cost (UDS$)	Total cost (USD$)
Cost of the birds	400	5-00	2 000
Transport	2	20-00	40-00
Feed	2bags	34-00	68-00
Total costs			2 108
Selling price	390	6-00	2 340-00
Profit			232-00

4.2 Survey among farmers

A survey was done to the two clusters of farmers that are the small scale with 300 - >100 birds and medium scale farmers with 1000 - 7000 birds. The information gathered covered gender, age, educational level, number of batches per year, marketing method, their market outlets, forms in which they sell their birds, relationship with suppliers of day old chicks, constraints they face, payment method and how they can improve marketing.

Table 4 Proportion of male and female farmers

Sex respondents	Farmers	
	Small scale	Medium scale
Females	62.5%	25%
Male	37.5%	75%

The majority of small scale farmers 62.5% were females while the minority 37.5% were males whereas the majority of medium scale farmers 75% were males and the minority 25% were females.

Average age of small scale farmers

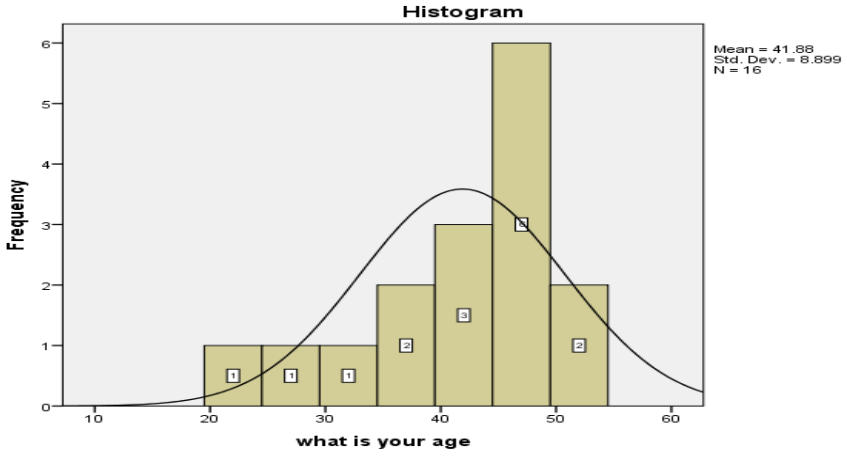

Figure 14 Average age of small scale farmers

The average age of small scale farmers was 41.9 and a standard deviation of 8.9, with the highest age being 53 while the lowest was 22 years

Average age of medium scale farmers

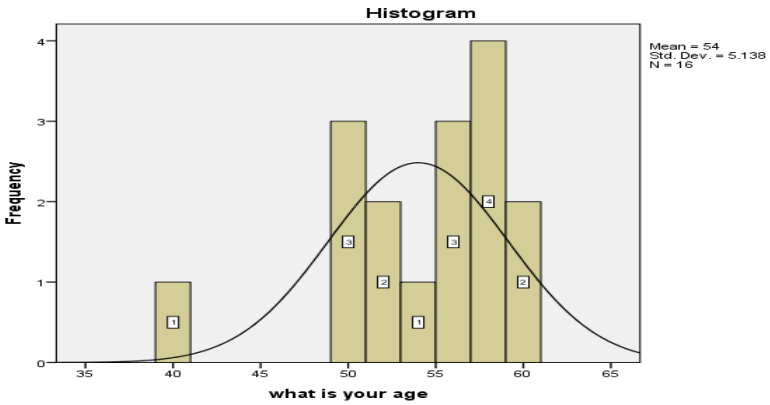

Figure 15 Average age of small scale farmers

The average age of the medium scale farmers was 54 years with a standard deviation of 5.1 and with the highest age being 60 and lowest 40 years.

Table 5 Cross tabulation of educational level and number of batches

Type of farm	Educational level	Number of batches						Total
		1	2	3	4	5	6	
Small scale	Secondary		2(15%)	10(77%)	1(8%)	0	0	13(100%)
	Tertiary		0	2(67%)	1(33%)	0	0	3(100%)
Medium scale	Secondary		0	4(80%)	1(20%)			5(100%)
	Tertiary		0	7(64%)	3(27%)		1(9%)	11(100%)

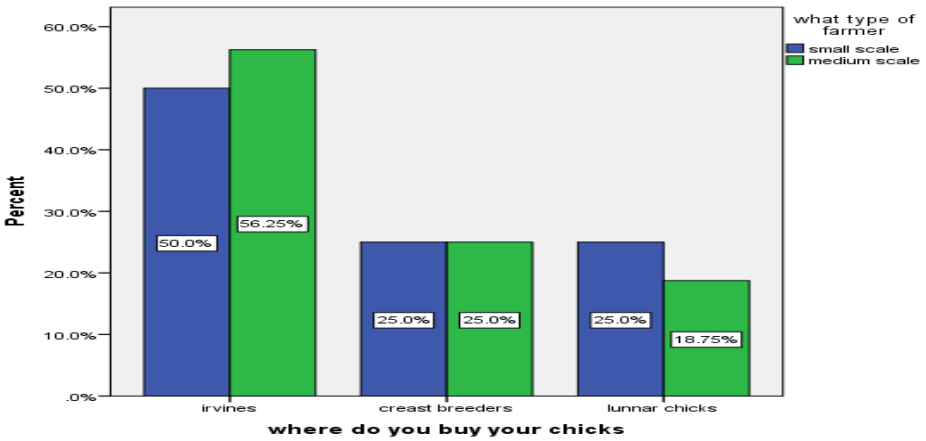

Figure 16 Source of day old chicks

Half of small scale and around 56% of the medium scale farmers purchase their chicks from Irvines Day Old Chicks, while the same number of 25% for both small and medium scale farmers purchase their chicks from crest breeders. 25% of small scale farmersand 18.75% of medium scale farmers are purchasing their chicks from Lunar chickens

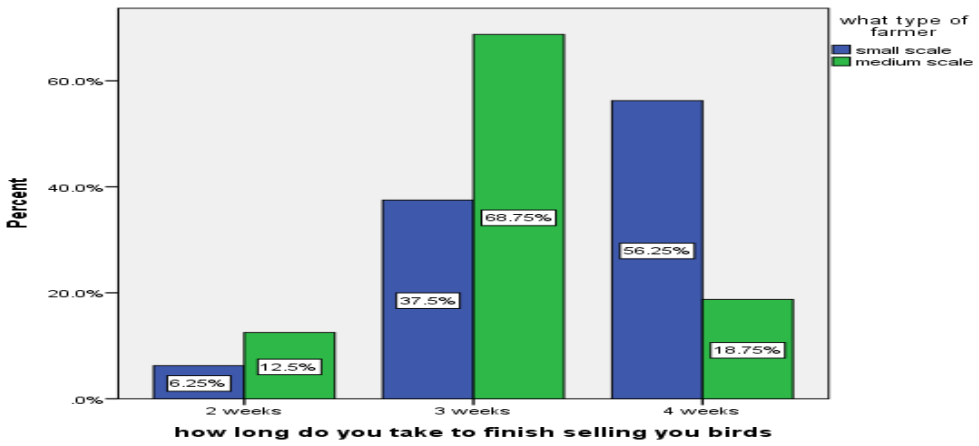

Figure 17 Time taken by farmers to finish selling the birds

The majority of 68.75% for medium scale farmers and a considerable number of 37.5% for small scale farmers take around three weeks to finish selling their birds. The greater number of respondents 56.25% from small scale farmers and a slightly lower number of 18.75% for medium scale farmers indicated that they take 4 weeks to finish selling their birds. A very small percentage 6.25% and 12.5% for both small and medium scale farmers respectively take 2 weeks to sell their.

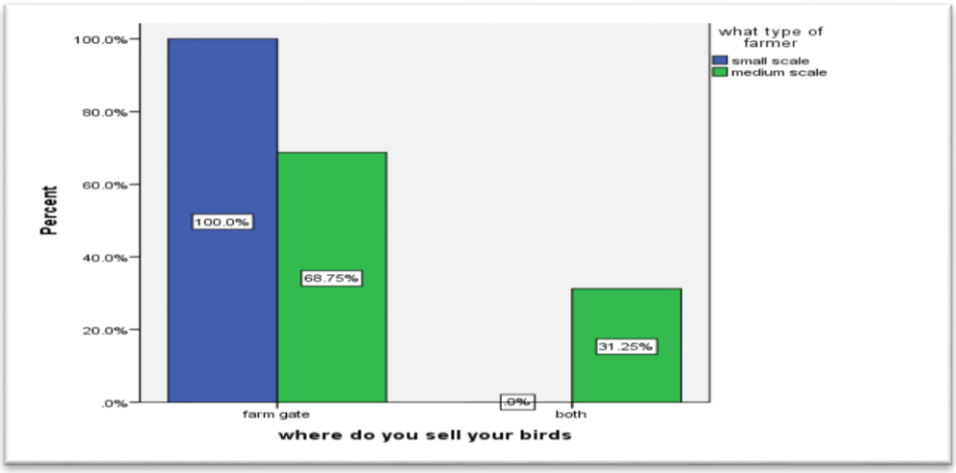

Figure 18 Place where farmers sell their birds

All the small scale farmers and a greater number of medium scale farmers 66.75% sell their produce at the farm while 31.25% sell their produce both at the farm and open market.

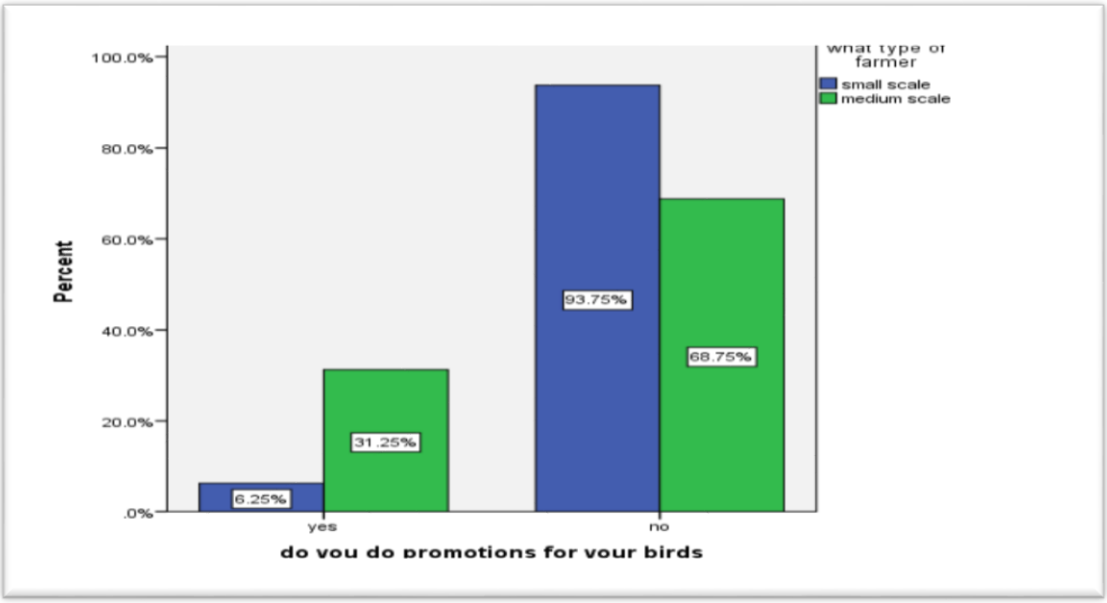

Figure 19 Promotions done by farmers

A greater proportion 93.75% and 66.75% for both the the small scale and medium scale farmers respectively do not undertake any promotions of their products. A very small percentage 6.25% and 31.25% for small scale and medium scale farmers respectively indicated they give discounts for those who buy 100 birds and above as a way of promoting their produce.

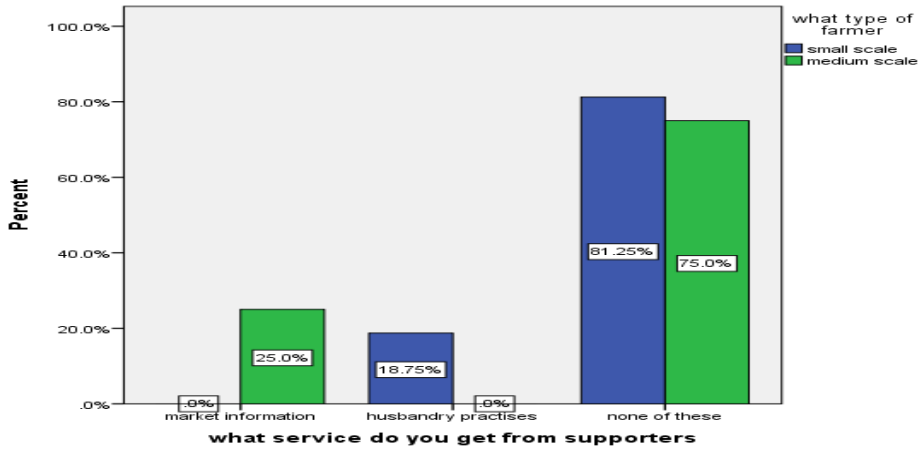

Figure 20 Services obtained from supporters

A greater number of the respondents from both small and medium scale farmers 61.25% and 75% indicated that they have no any services they get from supporters, while 16.75% of small scale farmers get technical services whereas 25% of medium scale farmers get market information from the supporters.

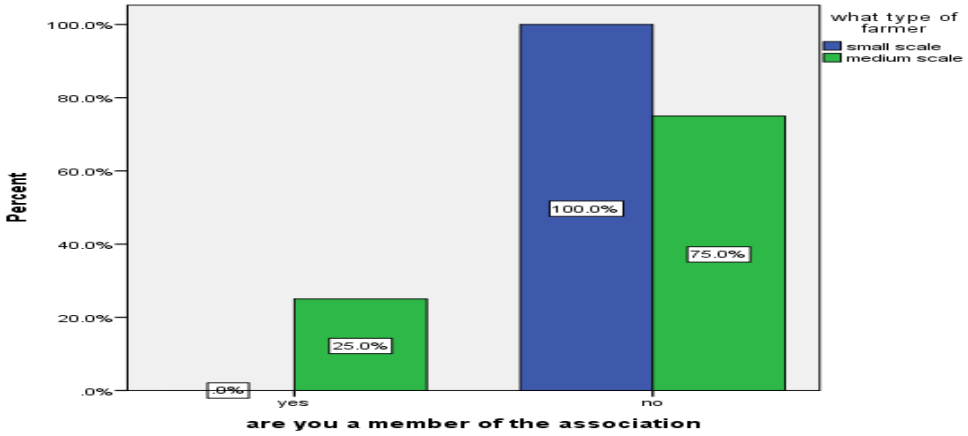

Figure 21 Membership in the association

All the small scale farmers and 75% of medium scale farmers indicated that they are not members of the association and 25% of the medium scale farmers where members. Many of the small scale and some of the medium scale farmers indicated that they were not aware of the existence of The Zimbabwe Poultry Association.

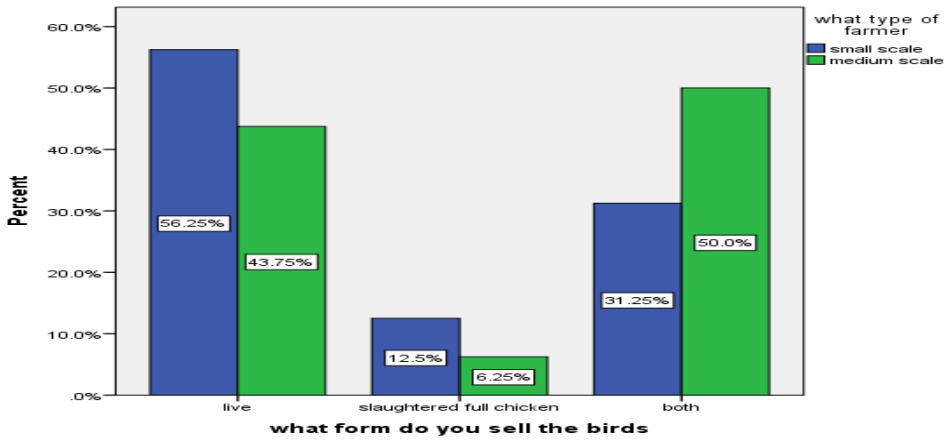

Figure 22 Forms in which farmers sell their birds

A greater number of small scale farmers 56.25% sell their birds as live while half 50% of medium scale farmers sell their birds both as live and slaughtered and around 43.75% selling them as live only for medium scale farmers. A small numbers of 12.5% and 6.25% for both the small scale and medium scale farmers respectively sell their birds as slaughtered full chicken while 31.25% for small scale farmers sell their birds as both live and slaughtered.

All the farmers indicated that they were aware of the qualities required by their customers, in terms of size, colour and healthy status. They both indicated that the customers are mostly concerned with size of the birds of around 2 kg or more live weight. If the bird is slaughtered customers prefer birds with no bruises and blood sports on it. In addition they both said the customers require birds that are disease free.

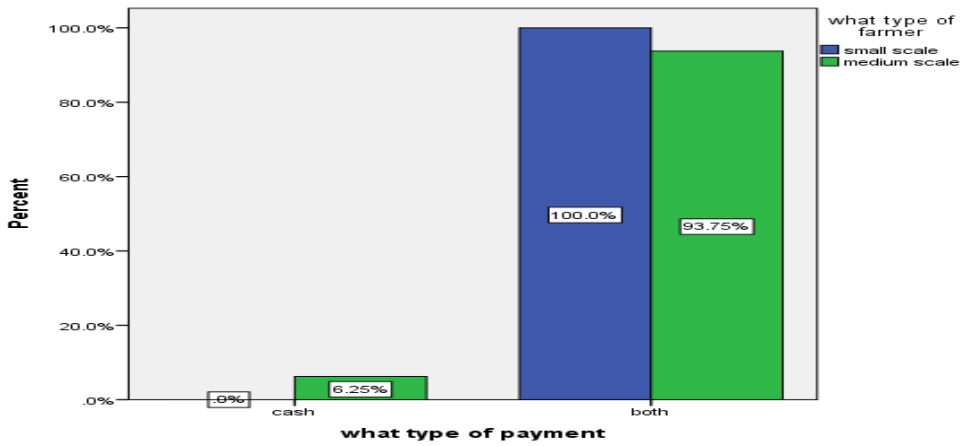

Figure 23 Payment methods

All the small scale farmers 100% and a greater number 93.75% for the medium scale farmers indicated that they accept both cash and credit, whereas only 6.25% of medium scale farmers accept cash only.

Table 6 Cross tabulation of educational level and opinion of getting market

Type of farm	Educational level	Opinion of getting market		
		Very difficult	Difficult	
Small scale	Secondary	5(38%)	8(62%)	13(100%)
	Tertiary	1(33%)	2(67%)	3(100%)
Medium scale	Secondary	3(30%)	7(70%)	10(100%)
	Tertiary	3(50%)	3(50%)	6(100%)

One farmer had this to say

"Getting market for broilers is difficult and it becomes more and more difficult as you increase the number of birds you are keeping."

The chi-square calculated value P>0.05 (0.725). This indicates that there is no significant difference between the level of education and the opinion for getting the market for the broilers.

Table 7 Cross tabulation of educational level and marketing method

Type of farm	Educational level	How do you market your birds			Total
		Signboards	Phoning	Both	
Small scale	Secondary	5(38%)	0	8(62%)	13(100%)
	Tertiary	0	0	3(100%)	3(100%)
Medium scale	Secondary	3(30%)	0	7(70%)	10(100%)
	Tertiary	2(33%)	0	4(67%)	6(100%)

The chi-square calculated value P>0.05 (0.00) thus indicating that there is a significant difference between the level of education and the marketing method.

Average flock for small scale farmers

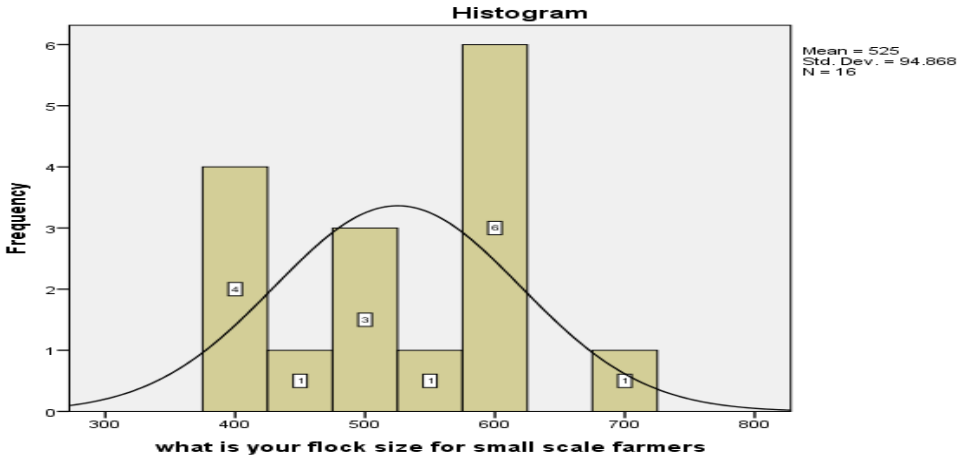

Figure 24 The average flock size for small scale farmers

The average number of birds for small scale was 525 birds with a standard deviation of 94.7. The maximum number being 700 and the minimum being 400 birds

Average flock size for medium scale farmers

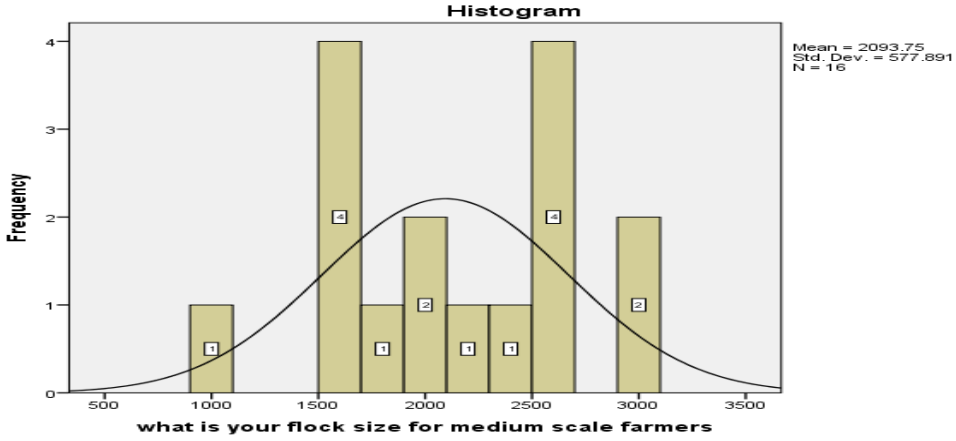

Figure 25 The average flock size for medium scale farmers

The mean number of flock size for medium scale farmers was 2093.8 with a standard deviation of 577.9. The numbers of birds were ranging from as low as 1000 to as high as 3000 birds.

4.3 Quality controls at farm level

The farmers exercised a lot of management practises to ensure better quality birds are to be produced.

Housing

The houses from the majority of farmers had a foot bath with a disinfectant at the entrance door so that visitors and workers would deep their boots in the disinfectant to ensure that there is no spread of diseases. All the litter was removed after each batch and the house cleaned and disinfected and then lay to rest for a period of two weeks before a new batch has to come in. The litter was turned regularly to avoid caking and the houses, well ventilated to avoid the build-up of ammonia gas. The farmers reported that the manure was either spread in the fields or sold to other farmers in need of it.

Drugs
The farmers indicated that they only sell their birds after the withdrawal periods of any of the dugs they would have used. In case of diseases the farmers mostly used antibiotics for treatment and the most commonly used is ESB3 and some undertake vaccination of infectious bursal disease (IBD).

Feed and water
These were given *ad libitum* with water changed everyday. All the farmers reported that they were giving borehole water to their birds. The farmers used different types of feeds which ranged from premix, concentrate, straight mash or pellets, and the feed is stored in a moisture free environment to avoid spoilage.

The farmers indicated that they face a lot of constraints listed below

- High feed costs
- Mortality of the chicks in the first two weeks of life mostly due to intermittent power cuts
- Failure to get market for the produce
- Cash flow problems due to selling some of the produce on credit thus delaying the other batches and also lack of access to credit facilities
- Transport problems for carrying their produce to the market
- Low quality chicks from some of the chick suppliers.

Strategies to improve marketing
To improve marketing the farmers highlighted that there is need to look for more market outlets like institutional consumers which include schools, hospitals and many more. Furthermore in order not to lose customers, there is need to have a consistency supply so that customers will always find the product available. There is need to improve on communication so that many customers would know well in advance that the birds will be available. The farmers also highlighted that there is also need to have a combined marketing system so as to meet the needs of the processors since they required a large number of birds.

4.4 Costs and revenues for the farmers

The costs of production and also the revenue for the two clusters of farmers were calculated and the data presented in the table below. The data is based on the findings from the survey.

Table 8 Average costs and revenues for the farmers

Farmers	**Small scale**	**Medium scale**
Average no of chicks	525	2093.75
Variable cost (UDS $)		
Chicks	516.28	2030.31
Feed	1748.25	6535.00
Labour	97.50	104.38
Total cost	2399.50	8763.50
Miscellaneous costs	201.08	438.18
Total costs	2714.58	9201.74
Selling price	**6.00**	**5.00**
Revenue	2961	9840.63
Profit	**246.42**	**638.88**
Cost per bird	5.17	4.40

One of the medium scale farmers had this to

"To feed my 2500 broilers up to slaughter weight of 2 kg I need 10 tonnes of feed but to finish selling the birds I need an extra 2 tonnes".

For detailed information of costs and revenues for each farmer see annex 3.

4.5 Broiler chain map

The data from all the interviews and survey were all processed to produce a broiler value chain map and value shares for the different chains were calculated accordingly.

Broiler value chain

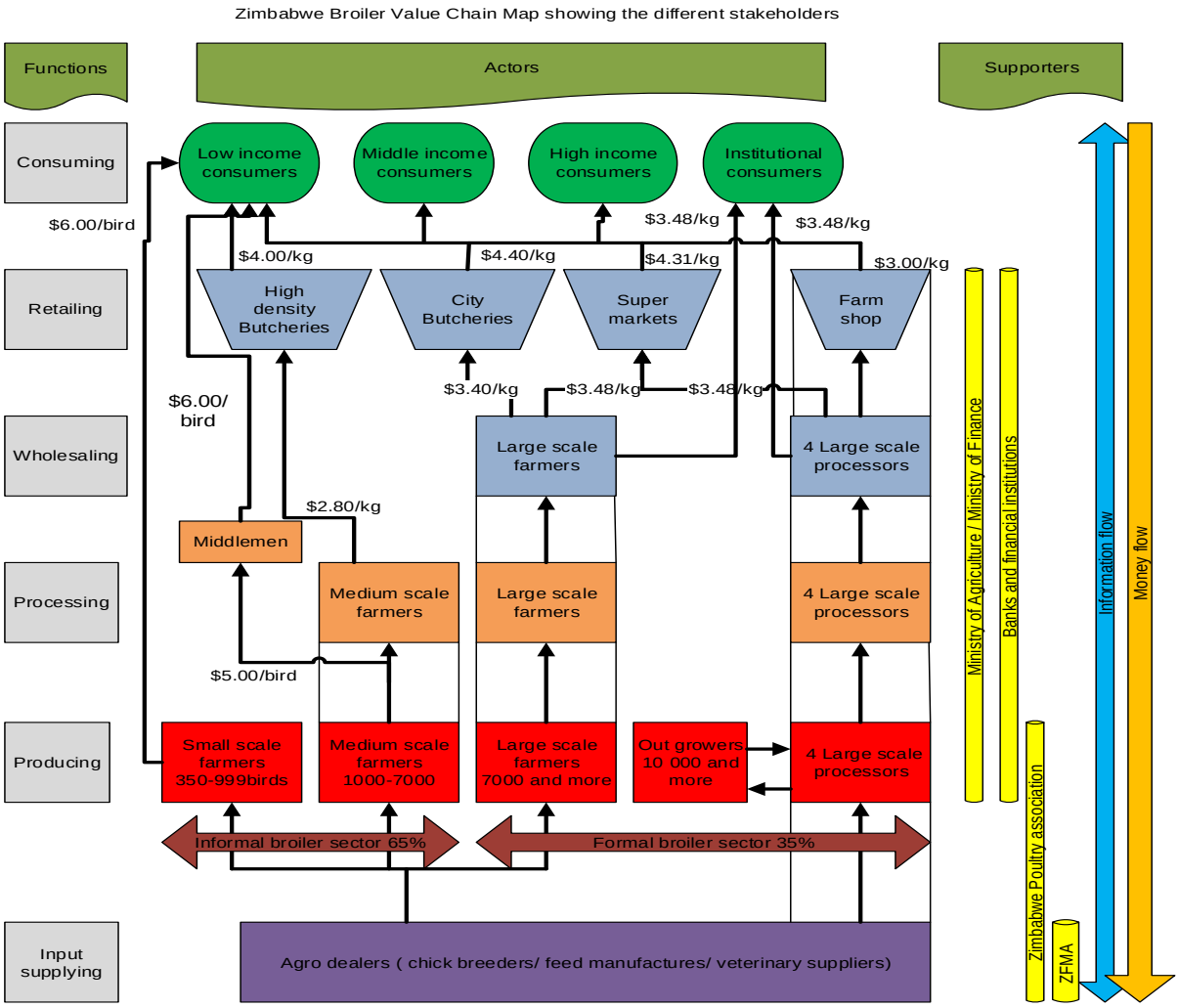

Figure 26 Broiler value chain map

4.6 Value shares

The tables below indicate the value shares of the various channels where the broilers are sold. The figures used in the calculation of the values shares have been obtained from the interviews and survey that was done with the various stakeholders.

Table 9 Value share for the farmers selling to traders

Chain actor	Variable costs	Revenue Selling price	Gross income Revenue – costs	Added value Revenue – previous actor revenue($)	Gross margin Gross income x 100/Revenue	Value share Added value x100/Retail price
Farmer	4.40	5.00	0.60	5.00	15%	83%
Trader	0.30	6.00	0.70	1.00	12%	17%

Table 10 Value share for the farmers selling to the butcher

Chain actor	Variable costs	Revenue Selling price	Gross income Revenue – costs	Added value Revenue – previous actor revenue	Gross margin Gross income x 100/Revenue	Value share Added value x100/Retail price
Farmer	2.20	2.80	0.60	2.80	21%	70%
Butcher	3.22	4.00	0.78	1.20	20%	30%

Table 11 Value share for the farmer selling to the butcher via the processor

Chain actor	Variable costs/kg	Revenue Selling price	Gross income Revenue – costs	Added value Revenue – previous actor revenue	Gross margin Gross income x 100/Revenue	Value share Added value x100/Retail price
Farmer	1.50	2.05	0.65	2.05	32%	47%
Processor	2.50	3.40	0.90	1.35	26%	31%
Butchery	3.85	4.40	0.55	1.00	13%	22%

Table 12 Value share for the farmer selling to the supermarket via the processor

Chain actor	Variable costs/kg	Revenue Selling price	Gross income Revenue – costs	Added value Revenue – previous actor revenue	Gross margin Gross income x 100/Revenue	Value share Added value x100/Retail price
Farmer	1.50	2.05	0.65	2.05	32%	48%
Processor	2.60	3.48	0.88	1.30	25%	30%
Supermarket	3.60	4.31	0.81	1.05	19%	22%

4.7 Functions of the actors

Agro dealers

These include feed manufactures, breeders and also veterinary shops, all of which are involved in the supply of inputs. The feed manufactures supply feed to the farmers and the chick breeders supply day old chicks. The veterinary shops provide all the drugs needed for the treatment of broiler chickens. Some chick breeders also supply veterinary drugs, poultry equipment like drinkers, feeders, infra-red lamps, electrical cables and so much more.

Farmers

The farmers range from small scale, medium scale, large scale and also contract growers. The chick breeders are involved in broiler production, processing, wholesaling and partly retailing.

The small scale and medium scale farmers sell their birds as live or dressed and they either sell them at farm gate or open market.

The large scale farmers and the breeders all have abattoirs where they process their birds and later on sell to supermarkets and butcheries in the city.

Middlemen

These buy broilers from, medium scale farmers and later own sell them as live or dressed to low income consumers in the high density residential areas.

Supermarkets and butcheries
Supermarkets and butcheries in the city buy broilers from the formal sector, who are the breeders and large scale commercial farmers and sell the products to the high, medium and low incomes consumers.

Consumers
These include institutional consumers who buy directly from the processors and the high, medium and low income consumers who buy either from the supermarkets, butcheries, open market and farm gate.

4.8 Functions of supporters and influencers

Table 13 Functions of supporters and influencers

Zimbabwe Poultry Association	-Represents the interest of the Zimbabwe Poultry farmers at numerous fora. -Focuses on the competitiveness of the local poultry industry, looking at various constraints that are affecting the poultry industry. -Championing the removal of value added tax (VAT) in the live birds. -Participating on the regulatory reviews processes which are discussed at regional meetings with various stakeholders and also linking farmers to buyers. -Monitoring the present of imported poultry products on the informal sector market.
Banks and financial institutions	-Providing loans to farmers. Access to these loans needs collaterals.
Department of Veterinary Services	-Offers extension services on animal health issues and enforcement of biosafety regulation. -Carrying out anti mortem and post mortem inspection and certification at the poultry processing plants. -Regulates the importation of poultry products by issuing poultry permits. -Diagnosis of poultry diseases and giving the relevant prescription. -Undertaking vaccination of notifiable diseases in case of an outbreak
Poultry Research Unit	-Gives advisory services on poultry production to farmers. -It also undertakes research on poultry nutrition. -Testing the various feeds produced by the feed companies if they are of the rightful quality.
Agricultural Marketing Authority	-Regulate and supervises the marketing of agricultural produce to ensure fairness in the sector. -Registering of all traders in the agricultural sector and linking producers to buyers -Provision of market information to the various associations in the agricultural industry.
Department of Livestock Production and Development	-Provision of advisory technical service to farmers -Training of poultry farmers on the best methods of poultry husbandry and undertaking demonstrations. -Providing farmers with pamphlets and fact sheets at agricultural shows and at farmer trainings
Ministry of Finance	-Regulation of imports by putting duty on imported agricultural products

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Chapter 5 Discussion

5.1 Requirements of processors

Lunar chickens has got a facility for small to medium scale farmers where they can supply a minimum of 1000 birds for slaughter in which case the processor buy all the birds at the market price or access slaughter facility at USD$ 0.43 or payment with offal, besides the contract grower scheme which requires 10 000 birds as a minimum number. Farmers can produce with their own inputs and then group together when marketing to meet the volumes of Lunar Chickens. These is in line with the studies done by (Badubi, Ravindran and Reid, 2004) who indicated that small scale farmers have got smaller volumes of birds to supply the processors thereby rely on selling to individuals. The farmers have since indicated that they can produce the birds of the required sizes of 2 kg for the processers within 4 to 6 weeks, thus indicating an opportunity for them as long as other factors of volume and biosecurity issues are resolved.

Crest breeders wanted farmers who can supply 10 000 birds and above and of the right quality to enter into a contract grower scheme to ensure constant supply of the right product which is in line with the studied by (Mangnus and De Steenhuijsen Piters, 2010) who found that contract farming is a means of reducing transaction cost and organizing the production and sale of quality food products as spot market entails high transaction costs in form of uncertainty. The farmers indicated that there more one expand a business; the more one needs to look for more reliable market outlets especially institutional consumers like schools, hospitals that might require a significant number of birds. This is in line with the findings of (Grynberg and Motswapong, 2010) who found that in addition to being contracted by the processors, these small and medium scale producers can also supply government institutions, such as schools and hospitals on tender basis.

Grouping farmers together will help farmers in achieving the required volumes of the birds required by the processors and this would make it easier for service delivery to the farmers like training, credit facilities and information dissemination. This is in line with studies done by (Mwanza, 2010) who reported that horizontal integration helps farmers to enter into contracts for the delivery of products with special quality characteristic, provision of technical advice to cooperative members on how to comply with quality standards and lowering transaction costs by gathering, processing and disseminating information on markets, products and potential transaction partners to its members.

5.2 Information dissemination

While medium scale farmers have the capacity to supply above 1000 birds they and the small scale farmers had no information on the existence of such a facility from Lunar Chickens since many of them are not members of the ZPA which provides a link to all the other actors in the poultry industry. The ZPA have also indicated that farmers can join the association voluntarily upon payment of USD$ 10.00 fee every year. This is another strategy for farmers to become linked to processors if they join the association, and would also benefit by accessing all the information about what is happening in the poultry industry which would help them in planning their business. This is in line with the studies done the (Department of Agriculture, Forestry and Fisheries, 2011) which said The South African Broiler Association (SAPA) initiated the formation of the Developing Broiler Farmers Organization (DBFO) with the purpose of serving as a conduit to the developing small scale broiler farmers for information dissemination, coordination and addressing collective issues in the industry.

The reason for farmers not joining the association is lack of information on its existence, including not enough knowledge about the functions and the benefits they get by joining the association so they remain individualistic. This is in line with the studies done by (Sonaiya,

2006) who found the existence of inevitable gaps in the farmer's indigenous knowledge due isolation and lack of scientific research and expertise so bridging this information gap will go a long way in improving the lives of small to medium scale farmers.

5.3 Broiler production systems

The type of broiler production systems practised in the District according to the survey include: small scale and medium scale farmers who are all practicing intensive broiler production. The small scale farmers had 300- 700 birds per batch while the medium scale had 1000 - 3000 birds. These stock numbers for the two clusters were not in line with the production systems characterised by (Sukume and Malemi, 2012) that categorised the small scale farmers as those farmers who are keeping broilers ranging from 50 to around 1000 birds per every batch and medium scale farmers from 1000 to 5000 broilers This is because the broiler industry in Zimbabwe is still growing so much due to the use of multiple currencies so many upcoming farmers have started keeping broilers with many of whom are starting with very small numbers of 50 or 100 birds per batch (ZPA, 2013).

Both the two clusters of farmers, kept their birds solely indoors with a certain level of biosecurity system being practised. The majority of the farmers have got a biosecurity system which is quite good where there are standard poultry houses with enough ventilation and also footbath at the entrance door of the poultry houses, which can meet the biosecurity requirements of Irvine's Day Old Chicks, while only a few especially those keeping 400 birds do not have structures which are up to standard to warrant the company to accept their birds.

5.4 Education background

With regards to educational background of the farmers, the medium scale farmers were the most highly educated with most of them having tertiary education and also being the oldest compared to small scale farmers. This can be attributed to the fact that the more one grows up doing a business the more experience and skills one gains and will be able to manage an increased number of birds. The small scale farmers on the other hand were the youngest probably because they had not stayed that much long in the business.

The reason for this might be that, there more the number of birds you keep, the higher the standard of management needed since one would need to build higher management and technical skills in order to cope up with an increasing number of birds. (Kilpatrick, 1998) found out that education and training increases farmer's ability and willingness to make successful changes to their management practices. This is also in line with (Badubi et al, 2004) who reported that better trained and educated farmer can effectively seek out and process new information and would be able to keep all the production and financial records which are important for productivity and farm profits. This would be an advantage since better educated farmers can cope up with the standards required by processors due to the enough knowledge which they would have. To add to this knowledge Lunar Chickens and Irvine's Day Old Chicks are undertaking training of farmers free of charge so that the farmers can be able to produce broiler of the right quality demanded by them.

5.5 Where farmers sell their produce

The farmers sell most of their produce at the farm gate other than the open market and emphasized that selling at the open market will require other costs of labour and transport which will lower down the profit margins at the end. So the farmers depend much on individuals and middlemen for selling of their birds which is an unreliable market. With this kind of marketing farmers indicated that they lose a lot of revenue in continuously feeding the birds up until they are finished. This is more of production oriented than market oriented since farmers look for the market while they are already in production. This is concurred by the studies undertaken by (Moreki, 2011). Farmers should first have a market for their produce before they undertake production.

5.6 Forms in which they sell their birds

Many of the small scale and medium scale farmers often sell their birds as live. This is in line with the studies undertaken by (Badubi *et al* 2004) which indicated that due to lack of refrigeration the farmers mostly sell their birds as live, and sometimes slaughter their birds illegally on their farms so their products are not well received by the big retailers in the city. This is in line with the studies done by (Anon, 2004), which indicated that supermarkets (chain stores) only buy products from small and medium scale broiler producers under the conditions that their birds are slaughtered in a registered abattoir, with veterinary clearance as evidence and also some in accordance with the halaal rituals. Unless there is a ready market for small and medium scale farmers, then they might be able to expand their business with the resultant of an increased income to them that would raise their standard of life.

5.7 Payment method

Farmers sell their produce both on cash and credit but much of the birds are bought on credit which then causes cash flow problem since there would be delayed payment from the customers. Crest breeders have since indicated that by entering into a contract with them farmers are assured of a ready market, where they will be given all their money at once and being cash, this was also concurred by Lunar Chickens.

The farmers do not have access to credit due to the fact that they have no collateral. This is in line with the finding of KIT (2010) who reported that financial institution are not willing to lend money to small and medium scale agribusiness since they say is too risky and involves high transaction cost and doubt the ability of the farmers to repay back the loan. (Badubi et al, 2004) also found out that that commercial banks in Botswana viewed poultry farming as a risky business and this is a handicap faced by small and medium scale farmers especially the emerging farmers. So if farmers are supplying to processors, the processors can help farmers as a strategy to access loans from banks so that they can expand their business.

KIT and IIRR (2008) reported that farmers need capital for investments in staff, infrastructure, so that their businesses can grow and improve to meet the standard of the processors. The farmers indicated that selling to processors is an advantage since you would get all your income as bulk so planning could be easier. Due to the lack of enough income from their produce the farmers would not think of improving their operations to suit the needs of the processors. This is in line with the report of (Mwanza, 2010) who reported that since the farmers get little return on what they sale, they never try to improve the quality of the poultry products and farms to meet the standards for selling to the processors

5.8 Comparison of cost prices of the difference clusters of farmers

The farmers incur extra costs after the birds have reached slaughter weight due to the unavailability of the market. Producing a broiler up to slaughter weight of around 2.kg requires around USD$ 3.00 (ZPA, 2013). The small scale farmers face high production costs of USD$ 5.17 compared to the medium scale farmers USD$ 4.40 implying that the small scale and medium scale farmers incur extra costs of USD$ 2.17/bird and USD$ 1.40/bird respectively. This is due to high feed cost by continually feeding the birds after they have reached their slaughter weight.

5.9 Swot analysis

A swot analysis for the broiler value chain was done by looking at the strengths and weakness of the actors and then opportunities and threats surrounding the broiler sector. Data used was found from the interviews, survey with farmers, observation and also literature search. The table below represents the findings of the swot analysis

Table 14 Swot analysis of the broiler value chain

Strengths	Weaknesses
-A lot of dormant poultry structures which can be used for production -promotion of small to medium production through provision of training on poultry production by some of the poultry breeders -Existence of the Zimbabwe Poultry Association representing the needs of the players in the poultry industry -Production of chicks that satisfy the local demand of broiler day old chicks by the breeders.	-Weak Zimbabwe Poultry Association - Limited number of developed infrastructure like abattoirs for value addition -Inadequate monitoring systems on chick breeders for the quality of chicks -low quality of chicks from some chicks breeders -Low levels of advertising by breeders to allow farmers to know of the facilities which are on offer for them
Opportunities	**Threats**
-There is potential market since current production is not meeting demand -Long socio- cultural history of high consumption pattern for poultry products - Preference by customers for local poultry products. - A large number of financial institutions with a potential to support the industry. -use of multiple currency that has helped to stabilise the economy - Favourable policies on poultry through tax exemptions, regulation of imports and also reduction of duty on imported feed ingredients	- Some competition from imported poultry products -Low produce of crops like maize resulting in shortage of feed ingredients -Shortage of electricity that is negatively affecting the broiler sector -inadequate control over imports of broilers products resulting in more imports entering the country beyond the stipulated quantity - High cost of inputs especially feed resulting in high cost of production -Pressure from imports of other animal protein sources like beef and pork thus having an impact on the poultry production

5.10 Further research

The farmers were difficult to reach since they were scattered. Again there was no equal number of both sexes in the survey which done. For future research there is need to have a whole clear picture of the broiler value chain in the district and also assess the possibilities of linking farmers to other market outlets in steady of the lead firm processors only.

Chapter 6 Conclusions and recommendation

6.1 Conclusions

Relationship between the three processors and farmers ranged from chick supply, with Irvine's Day Old Chicks and Lunar Chickens providing technical services and pamphlets to the farmers free of charge. Lunar chicken has a facility where small to medium scale farmers can supply a minimum of 1000 birds per every batch and be paid on the prevailing market prices. Irvine's Day Old Chicks is much concerned with biosecurity while Crest Breeders requires farmers to enter into a contract for supplying the required quality and quantity of birds.

The processors faced problems which included high feed cost, and power cuts and they are the coordinators in the chain since they are involved in all the activities from input supply, production, processing and partly retailing.

All the farmers had no information on the existence of a facility for them from Lunar Chickens and the majority of them both small and medium scale farmers were not members of the association. By joining the association is a strategy for farmers to come to know of the existence of such facilities from processors and would have more linkage with them. The farmers were keeping 300-700 birds for small scale farmers and 1000-3000 for medium scale farmers and were all practising some intensive system of production.

The majority of small scale farmers have poultry houses which meet standards required by the processors so can supply the processor without any hindrance. Most of the farmers from the two clusters sold their birds both on cash and credit with most of their birds bought on credit and this was one factor delaying farmers to come back into business and also to improve their standards due to lack of finance, they can be helped to access credit as a strategy for farmers to expand their business. In terms of weight the farmers were producing birds which were 2 kg or more at six weeks which is an opportunity since they can meet the required weight of processors.

Grouping farmers together is another strategy that would allow farmers to be able to supply the required minimum volumes of 1000 for Lunar Chickens and 10 000 for crest breeders to have a contract. Since the farmers looked for the market when they are already in production by supplying to the processor they would be guaranteed a market so would plan their production according to the needs of the intended market. They farmers were marketing their birds individually and were using signboards as their marketing methods with middlemen and individual people as their customers.

The small scale farmers had a cost price USD$ 5.17 with a selling price of USD$ 6.00 whereas the medium scale farmers had a cost price of USD$ 4.40 and a selling price of USD$ 5.00. Producing birds with the weights required by the processors only requires around USD$ 3.00.

The major problems faced by the farmers are market availability, power cuts, high feed costs, cash flow problems due to selling on credit and in some cases low chick quality.

The major strategies to improve market include looking for more market outlets like institutional consumers, have a combined marketing so as to meet the volumes of processors and can be able to enter into the contract out grower scheme. Furthermore there is need to have a constant supply of birds so that any time consumers will have the product at the time they need it.

6.2 Recommendations

In order to overcome the challenges faced by farmers the following recommendations can be used to improve the marketing constraints of the farmers.

Zimbabwe Poultry Association

- The Zimbabwe Poultry Association should also undertake some of its activities at provincial and district levels so that farmers would come to know their existence, so farmers can be able to receive services like market information, input supply, marketing, access to finance to invest into technologies, training in agribusiness management and negotiation skills can be offered. This will improve their competitive position and make farmers able to access new markets.

The processors

- The processor should also advertise their services they offer to farmers even at their chick collection points, at trainings which they do to farmers and at agricultural shows so that farmers get to know the existence of such facilities that can help them access better markets for improved income. This would help to strengthen the relationship between the farmers and the processors.

The Directorate

- The Directorate in conjunction with the Zimbabwe Poultry Association can encourage private companies, individuals or the existing processors to also establish slaughtering / processing points for poultry at district or provincial level where it is accessible to farmers so that farmers would benefit since there would be cost reduction in terms of transport.

Department of Livestock production and Development and Poultry Research Unit

- In order to have reliable statistics on all the actors in the broiler value chain which will provide a basis for planning activities for the region, The Chief Provincial Livestock Specialist with livestock specialist and extension workers for the various wards in the district can conduct a census to quantify all actors involved in the broiler value chain.
- The extension and research workers may encourage farmers to join the association so that they can be linked to the buyers of their produce since that is the forum where all the poultry players meet to discuss issues concerning the poultry industry and put together efforts as an industry to solve them. This would also make it easier for planning since the association would be having all the statistic of the poultry producers which is an initial bases for planning purposes.
- The extension and research workers should encourage farmers to join together to form farmer groups or producer organisations so that they can be able to supply the required volumes to the processors. This would make it easier for services providers to provide services to groups other than dealing with individual farmers that would increase transaction costs.

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Annex 1 Checklist of interview questions

Checklist for the Processors

1. Do you have any relationship with the small to medium scale farmers?
2. Do you also offer processing facilities to farmers who are not your contract growers?
3. If yes what are the requirements necessary for farmers to have access to your processing facilities?
4. What are the volumes you require for processing per day?
5. What are the qualities of the bird you require for processing?
6. What other services do you offer to small and medium scale farmers?
7. What strategies can be done to help farmers access processing facilities?

Checklist for the Chairman Zimbabwe Poultry Association

1. Who are the members of the association?
2. What services do you offer to farmers?

3 What can be done to allow small and medium scale farmers to participate in the formal chain?

4. What problems do you face as an industry?
5. How do you think these problems can be resolved?

Checklist for the Director of Livestock Production and Development

1. What is the role of the Directorate in facilitating chain governance?
2. What are some of the policies and programs on poultry being undertaken by the department?
3. What strategies can be undertaken to improve marketing for farmers?

Checklist for the Retailers of dressed birds

1. Where do you obtain your birds?
2. What are the costs and selling prices of the birds?
3. Who are your final consumers?
4. What is the preference of your customers?
5. Do you have any contracts with the suppliers of your birds?
6. Do you obtain the produce yourself or the supplier brings the birds to you?
7. Are there any institution inspecting your premises?
8. If yes which are they?

9. What problems do you face in marketing?

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10. What Strategies do you think can be used to improve marketing?

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Buyers of live birds.

1. Where do you buy your birds?
2. Do you have access to supply throughout the year?
3. What costs do you incur per month?

Item	No.	Unit Cost	Total cost (USD$)
Cost of birds			
Transport			
Feed			

4. How many do you sell per month? .....
5. What is the selling price per bird? .....

6. How do you promote sales of your products? …….. …….
7. What vehicles do you use in transporting birds? ……
8. Who are your final customers? .....
9. What are the preferences of your customers? ……
10. What are the problems you face in marketing?

Annex 2 Questionnaires for the farmers

1. (a) Gender (M) (F)

(b) Age …… (c) Educational level.....
2. What is the size of your flock? .....
3. How many batches do you produce in a year?
   (a) Once (b) Twice (c) Thrice (d) Four Times
4. Where do you buy your day old chicks?
   (a) Irvine's day old chicks (b) crest breeders (c) lunar chicks
5. What costs do you incur per batch?

Inputs	Quantity	Unit costs(USD $)	Total costs (USD$)
Feed			
Day old chicks			
Labour			
Total			
Miscellaneous (20%) electricity, water, antibiotics, transport, marketing			
Total costs			
Gross output			
selling price			

6. Do you get the expected market price of birds before selling them?
   (a) Yes (b) No
7. If yes how do you get the information?

……..
8. How long do you take to finish selling all your birds?
   (a)≤1week (b) 2weeks (c) 3weeks (d) 4weeks
9. In what form do you sell your birds?
   (a)Live (b) slaughtered full chicken (c) cutlets
10. If dressed where are they slaughtered?
   (a) On farm manually (b) Abattoir for poultry
11. Are you aware of the quality of products wanted by customers?
   (a)Yes (b) No
12. Where do you sell your birds?
   (a) Open market (b) Farm gate (c) shop outlets (d) middlemen
13. Do you have direct contacts with your consumer?
   (a) Yes (b) No
14. Do you sell on cash or credit?
   (a) Yes (b) No (c) Both
15. How do you market your birds?
   (a) Putting signboards (b) Phoning (c) Both

16. Do you also sell your birds to the formal market?

(a) Yes (b) No

17. If yes where?

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18. Who are your competitors in the business?

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19. Do you have any promotion for you product?

(a) Yes (b) No

20. What do you think about getting market for your birds?

(a) Very difficult (b) Difficult (c) Easy (d) Very Easy

21. What services do you get from the supporters?

(a) Credit facilities (b) Market Information (c) Husbandry practices (d) None of these (e) All of the above

22. Do you belong to The Zimbabwe Poultry Association?

(a) Yes (b) No

23. If yes, what services do you get from the Association?

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24. What do you think of selling your birds to the processors (abattoirs)?

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25. What are some of the constraints you face as an industry?

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…….. ……
…….. ……

26. What strategies do you think can be used to improve marketing?

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Annex 3 Cost and revenues for the two clusters of farmers

Table of costs of production for all the farmers

Type	size of flock	no of batches	no of chicks	unit costs	total cost	no of bags	unit cost	total cost	total
small scale	450	2	450	1	450	48	36	1728	2178
small scale	400	3	400	1	400	38	36	1368	1768
small scale	600	3	600	1	600	55	36	1980	2580
small scale	500	3	500	0.95	475	48	36	1728	2203
small scale	600	3	600	1	600	44	36	1584	2184
small scale	500	2	500	0.95	475	58	36	2088	2563
small scale	700	3	700	1	700	67	36	2412	3112
small scale	400	3	400	1	400	48	36	1728	2128
small scale	550	3	550	1	550	53	36	1908	2458
small scale	600	3	600	1	600	58	36	2088	2688
small scale	600	2	600	0.95	570	60	36	2160	2730
small scale	400	3	400	1	400	39	36	1404	1804
small scale	600	3	600	0.95	570	58	34	1972	2542
small scale	500	3	500	1	500	46	36	1656	2156
small scale	600	3	600	0.95	570	58	36	2088	2658
small scale	400	4	400	1	400	49	36	1764	2164
Total	8400	46	8400	15.75	8260	827	574	29656	37916
Average	525	2.88	525	0.98	516.25	51.69	35.88	1853.5	2369.75
medium scale	2500	4	2500	0.95	2375	235	34	7990	10365
medium scale	3000	3	3000	0.95	2850	275	34	9350	12200
medium scale	2500	6	2500	1	2500	165	36	5940	8440
medium scale	1500	3	1500	0.95	1425	149	30	4470	5895
medium scale	1500	3	1500	1	1500	160	25	4000	5500
medium scale	1000	3	1000	0.95	950	110	30	3300	4250
medium scale	3000	3	3000	0.95	2850	261	36	9396	12246
medium scale	2000	3	2000	0.95	1900	204	34	6936	8836
medium scale	1800	2	1800	0.95	1710	194	30	5820	7530
medium scale	1600	3	1600	0.95	1520	166	30	4980	6500
medium scale	2200	3	2200	1	2200	217	34	7378	9578
medium scale	2000	2	2000	1	2000	200	34	6800	8800
medium scale	2400	3	2400	0.95	2280	211	36	7596	9876
medium scale	2500	3	2500	1	2500	216	36	7776	10276
medium scale	1500	3	1500	0.95	1425	140	36	5040	6465
medium scale	2500	2	2500	1	2500	230	34	7820	10320
Total	33500	49	33500	15.5	32485	3133	529	104592	137077
Average	2093.75	3.06	2093.75	0.97	2030.31	195.81	33.06	6537	8567.31

Table of cost of production continued

	Labour	unit cost	total cost	total cost	Miscellaneous (6%)	grand
small scale	1	100	100	2278	182.24	2460.24
small scale	1	100	100	1868	149.44	2017.44
small scale	2	100	200	2780	222.4	3002.4
small scale	2	100	200	2403	192.24	2595.24
small scale	1	100	100	2284	182.72	2466.72
small scale	2	100	200	2763	221.04	2984.04
small scale	2	100	200	3312	264.96	3576.96
small scale	1	100	100	2228	178.24	2406.24
small scale	1	100	100	2558	204.64	2762.64
small scale	1	100	100	2788	223.04	3011.04
small scale	2	100	200	2930	234.4	3164.4
small scale	1	100	100	1904	152.32	2056.32
small scale	2	100	200	2742	219.36	2961.36
small scale	1	100	100	2256	180.48	2436.48
small scale	2	100	200	2858	228.64	3086.64
small scale	1	100	100	2264	181.12	2445.12
Total	23	1600	2300	40216	3217.28	43433.28
Average	1.44	100	143.75	2513.50	201.08	2714.58
					Miscellaneous (6%)	
medium scale	2	170	340	10705	535.25	11240.25
medium scale	2	100	200	12400	620	13020
medium scale	2	100	200	8640	432	9072
medium scale	2	100	200	6095	304.75	6399.75
medium scale	2	100	200	5700	285	5985
medium scale	1	100	100	4350	217.5	4567.5
medium scale	2	120	240	12486	624.3	13110.3
medium scale	2	80	160	8996	449.8	9445.8
medium scale	2	100	200	7730	386.5	8116.5
medium scale	2	100	200	6700	335	7035
medium scale	2	100	200	9778	488.9	10266.9
medium scale	2	100	200	9000	450	9450
medium scale	2	100	200	10076	503.8	10579.8
medium scale	2	100	200	10476	523.8	10999.8
medium scale	1	100	100	6565	328.25	6893.25
medium scale	2	100	200	10520	526	11046
Total	30	1670	3140	140217	7010.85	147227.9
Average	1.88	104.38	196.25	8763.56	438.18	9201.74

Table of revenue for the farmers

Type of farmer	no of chicks	mortality 6%	output	selling price	Revenue
small scale	450	27	423	6	2538
small scale	400	24	376	6	2256
small scale	600	36	564	6	3384
small scale	500	30	470	6	2820
small scale	600	36	564	6	3384
small scale	500	30	470	6	2820
small scale	700	42	658	6	3948
small scale	400	24	376	6	2256
small scale	550	33	517	6	3102
small scale	600	36	564	6	3384
small scale	600	36	564	6	3384
small scale	400	24	376	6	2256
small scale	600	36	564	6	3384
small scale	500	30	470	6	2820
small scale	600	36	564	6	3384
small scale	400	24	376	6	2256
Total	8400	504	7896	96	47376
Average	525	31.5	493.5	6	2961
medium scale	2500	150	2350	5	11750
medium scale	3000	180	2820	5	14100
medium scale	2500	150	2350	5	11750
medium scale	1500	90	1410	5	7050
medium scale	1500	90	1410	5	7050
medium scale	1000	60	940	5	4700
medium scale	3000	180	2820	5	14100
medium scale	2000	120	1880	5	9400
medium scale	1800	108	1692	5	8460
medium scale	1600	96	1504	5	7520
medium scale	2200	132	2068	5	10340
medium scale	2000	120	1880	5	9400
medium scale	2400	144	2256	5	11280
medium scale	2500	150	2350	5	11750
medium scale	1500	90	1410	5	7050
medium scale	2500	150	2350	5	11750
Total	33500	2010	31490	80	157450
Average	2093.75	125.63	1968.13	5	9840.63

Table of costs versus revenue

Type of farmer	total cost	revenue	Profit
small scale	2431.1	2538	106.9
small scale	1982.6	2256	273.4
small scale	3114.2	3384	269.8
small scale	2680.65	2820	139.35
small scale	3082	3384	302
small scale	2929.05	2820	-109.05
small scale	3601.8	3948	346.2
small scale	2313.8	2256	-57.8
small scale	2817.5	3102	284.5
small scale	3082	3384	302
small scale	3245.3	3384	138.7
small scale	2001	2256	255
small scale	2996.9	3384	387.1
small scale	2428.8	2820	391.2
small scale	3047.5	3384	336.5
small scale	2396.6	2256	-140.6
Total	44150.8	47376	3225.2
Average	2759.43	2961	201.58
medium scale	11240.25	11750	509.75
medium scale	13020	14100	1080
medium scale	9072	11750	2678
medium scale	6399.75	7050	650.25
medium scale	5985	7050	1065
medium scale	4567.5	4700	132.5
medium scale	13110.3	14100	989.7
medium scale	9445.8	9400	-45.8
medium scale	8116.5	8460	343.5
medium scale	7035	7520	485
medium scale	10266.9	10340	73.1
medium scale	9450	9400	-50
medium scale	10579.8	11280	700.2
medium scale	10999.8	11750	750.2
medium scale	6893.25	7050	156.75
medium scale	11046	11750	704
Total	147227.9	157450	10222.15
Average	9201.74	9840.63	638.88