



Value Chain Analysis of Botswana Poultry Industry: The Case of Gaborone, Kgatleng, Kweneng and South East Districts

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ABSTRACT

The poultry industry in Botswana has experienced tremendous growth over time and remains the most celebrated example of import substitution, which has resulted in the achievement of national food self-sufficiency. This study evaluated and characterized the structure of poultry value chain in Botswana. Specifically, it identified the actors, linkages, challenges faced by the players; and also assessed the relative importance of specific flows of poultry products. A structured questionnaire was administered to 40 poultry farmers, 10 input dealers, 10 retail stores and 5 Ministry of Agriculture extension staff using a purposive sampling technique. The results showed market access for small-scale farmers was undermined by the increasing complexity of value chain and increased vertical coordination of resources. Therefore, the reality of economies of scale and the need to establish strong marketing links with existing supermarkets by smallholder farmers for a more competitive poultry industry is inevitable. The poultry market structure is dominated by a few large-scale farmers. On a Likert scale of 1 to 4, these farmers scored an average of 3.62 in comparison to 2.60 scored by small-scale farmers, when their working relationship levels with other players were explored. These results implied that large-scale farmers have stronger linkages. The study also found out that poultry industry still faces some challenges that impede its growth and one such challenge is high feed prices. Therefore, policies aimed at supporting the industry players must be developed with a view to ensuring sustainable development of the subsector and enhancing the benefit derived by the player.

Key words: Botswana, Marketing, Poultry Industry, Value Chain, Vertical Coordination

INTRODUCTION

Botswana has an estimated human population of 2 million and about 70% of the population lives in the rural areas and depends on agriculture for survival. Agriculture plays a vital role in the lives of Botswana even though its economic contribution to the Gross Domestic Product (GDP) has decreased from 42.7% at independence (1966) to 1.9% in 2009 (Ministry of Finance and Development Planning, 2009). Botswana augments 20% of its food production with the 80% imports mainly from the Republic of South Africa (RSA). Furthermore, Botswana imports Further Processed Chicken Products (FPCs) from RSA and Zimbabwe (Moreki, 2010). However, government is determined to achieve the national policy of food security as evidenced by its continued support in the form of subsidies and provision of enabling environment. The economic standing of production has increased over the years as Botswana have evolved from subsistence agriculture to cash based economy. Poultry is one of the most widely consumed meat in the world providing a high biological protein value in human nutrition. The commercial chicken holding in Botswana has generally increased substantially over time (TRANSTEC and BIDPA, 2010). Commercial

poultry production in Botswana began in the early 1980's (Moreki, 2010). The author estimated the value of the poultry industry (excluding ostriches) to be approximately 1 billion Botswana Pula (US\$300 million). The industry is characterized by three production scales (Moreki, 2011). Farmers that rear up to ≤ 20000 birds at a time are categorized as small-scale, 20001 to 50000 birds as medium-scale and more than 50000 birds as large-scale. The commercial production setup is common with the urban setting while family poultry (also known as indigenous chickens) production occurs mainly in the rural areas. It is apparent that the poultry industry can be an option for bridging the gap of meat demands as a substitute of beef, especially the cattle industry which is frequently threatened by Foot and Mouth Disease outbreaks.

According to Nguyen (2010), value chain, or supply chain, commodity chain, production chain in other terminology, is defined as a range of activities conducted by individual or organizational stakeholders of the same chain to provide product or service from the beginning to the end users. Each stage of the value chain requires a mix of skills (African Research Forum, 2014). Peterson et al. (2005) stated that value chain

determines the character, nature and value of the product at the time of receipt by the end user. Value chain is the inception of raw materials as input, the value adding processes until the product is in the consumer's dining table for final consumption, from farm to fork. The value chain concept was first expressed and explained by Porter (1985) in his book, "Competitive Advantage: Creating and Sustaining Superior Performance", in which the key element was the value chain model. According to the model, value is added at each stage in a chain of interconnected activities, as each product or service passes through different interconnected activities. Value chain is very useful in understanding the building blocks of competitive advantage; hence the creation of value by people, households or communities is vital for economic development (Khalea, 2012 and 2013). The main aim of value chain is consumer satisfaction (acceptability) hence profit making. The poultry industry in Botswana is uncompetitive and is dominated by about 10 large-scale broiler farmers in terms of market power, thus making it oligopolistic (Grynberg and Motswapong, 2011). According to TRANSTEC and BIDPA (2010), these producers are vertically integrated along the value chain all the way from poultry, day old chicks, production and finally to freezer and distribution facilities. As a result of the market structure, the same firms operate across Botswana (African Competition Forum, 2014). It is therefore important to evaluate and analyse the value adding process of the industry. Therefore, a study was undertaken to assess the poultry value chain situation in Gaborone, Kgatleng, Kweneng and South-East Districts

and make policy recommendations. The specific objectives were to:

- Evaluate and characterize the current structure of the poultry value chain of the four districts
- Identify the different actors in the poultry value chain and how they are linked with each other
- Identify challenges faced by the poultry industry and how to overcome them to ensure real profits and sustainability of the industry.
- Assess the relative importance of specific flows of poultry and poultry products

MATERIAL AND METHODS

Study sites

The study sites were Gaborone, Kgatleng, Kweneng and South-East Districts (Figure 1). Table 1 gives area (km²) and the human population of the four districts. Gaborone is the capital city of Botswana with a human population of about 10% of the country's population. The city lies between latitude 24°39'29''S and longitude 25°54'44''E. Kgatleng district lies between latitude 24°15'S and longitude 26°30'E. Kweneng lies between coordinates 24°00'S and 25°00'E. South-East surrounds Gaborone and lies between coordinates 25°0'S and 25°45'E. Table 2 shows the number of farms visited in the present study. The majority (32.5%) of the farms visited were in South East District followed by Gaborone and Kgatleng Districts. Only 10% of the farms were interviewed from Kweneng District because upon visiting the farms it was observed that some farmers were not available on-site and/or other poultry farms were not operational.

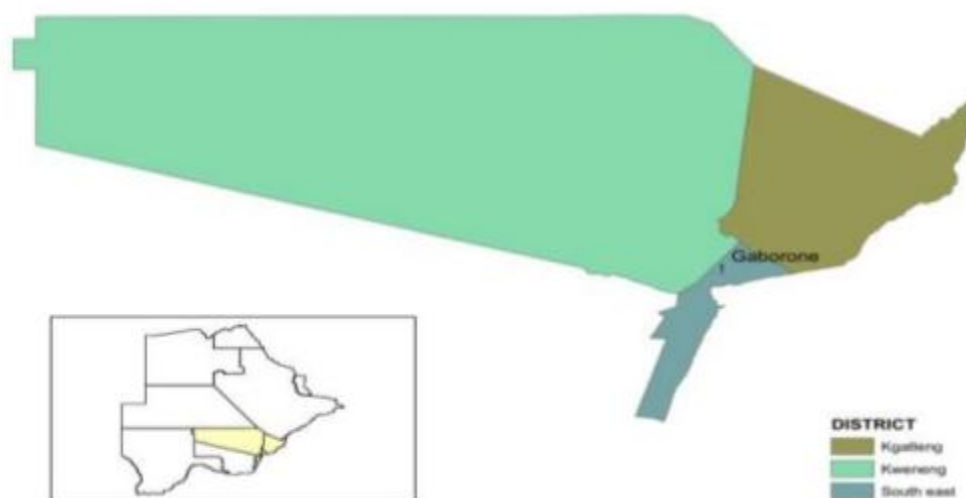


Figure 1. Map showing research sites

Table 1. Land area and human population in the research sites

District	Area (km ²)	Human population
Gaborone	169	231,626
Kgatlang	7,960	91,660
Kweneng	35,890	230,335
South-East	1,611	44,693
Total	35,799	811,787

Source: CSO (2011).

Table 2. Number of farmers in the research sites

District	Number of farms	Percentage
Gaborone	11	27.5
Kgatleng	12	30
Kweneng	4	10
South East	13	32.5
Total	40	100%

Sampling

A random sampling technique was used to select participants from a list obtained from the Ministry of Agriculture and 40 poultry farmers, 10 input dealers, 10 retail stores and five extension staff were selected. A total of 65 respondents were interviewed. Both desk and field studies were applied. The field study which was the main source of primary data used a structured questionnaire, oral interview and direct observation upon visiting the field. For farmers, the focus was on the three chicken production scales being small, medium and large-scale.

Data analysis

Every respondent was given the opportunity to rate potential challenges on a Likert-scale, with 1 to 2 indicating minor challenge, 4 to 5 (major challenge) and 3 the average. Rankings were based on the player's average scores on each challenge. The participants' perceived levels of commitment, communication, joint-problem solving and trust in working relationships with each other were estimated using an index derived from their scores on Likert-type of scales that showed how strongly they agreed or disagreed with the statements under each relationship aspect. To avoid neutral responses, the respondents selected one of the four responses being strongly agree, agree, disagree or strongly disagree with a score of 4 for strongly agree and 1 for strongly disagree. The index was computed by summing the result scores and averaging score over the number of statements that related one aspect of relationship. The same was done for other relationship aspects such as commitment, joint-problem solving and trust. Frequency counts, tables and percentages were produced through the help of a Statistical Package for Social Sciences (SPSS version 21).

RESULTS AND DISCUSSION

Table 3 gives the socio-economic characteristics of the respondents. Seventy-five percent of the respondents were males while the remainder was females. This finding is in contrast to Moreki (2006) who reported that in Botswana, family chickens are generally regarded as women folk's livestock mainly as they are perceived to be of lesser commercial value than other livestock such as cattle and goats. The reason could be that chicken production in Botswana has become one of the major commercial and value adding industries. Forty-five percent of the respondents were

aged 31-40 years followed by ≥ 51 years. About 68% of the respondents were Batswana while the remainder was non-citizens indicating that most of the income generated will be directed towards the sustainable economy of Botswana since the majority of the farmers were nationals. Seventy-five percent of the respondents were single while the remainder was married. According to Table 3, 82.5% of respondents had secondary school education and above, indicating that the level of literacy among the poultry farmers was high. High literacy level enables the respondents to understand extension messages and to adopt new technologies. About 33% of the respondents said they had been in business for less than a year while 40% had ≥ 10 years' experience in running businesses, whereas the remainder was in business for more than a year but less than 10 years. In this study, 60% of the farmers have been in business for less than 10 years.

Players' perceived levels of relationship

The study identified different players in the poultry value chain and how they are linked with each other (Figure 2). The levels of relationship aspects in the poultry value chain were also evaluated (Table 4) using Likert scale. Index scores above 3.5 indicate high levels of good relations while an index value of 1.5 suggests low levels in the working relationship. The scores of extension staff were 2.25 on joint-problem solving and 3.67 on communication, which calls for improved relations between extension staff and farmers. Grocery stores that sold poultry products scored a minimum of 1.25 and a maximum of 4.00 on joint problem solving. A minimum of 1.33 and a maximum of 4.00 was scored by feed stores on communication, joint problem solving and trust aspects of the relationship. Small-scale farmers scored an average score of 2.60 showing weak business relations, implying that farmers should work towards improving their weak links in order to realize their potential opportunities and fulfil their roles. Grynberg and Motswapong (2011) stated that small-scale farmers do not have direct access to the primary poultry market such as supermarkets probably due to weak links. A minimum score of 3.00 on commitment, joint-problem solving and trust was captured with a high of 3.67 and 4.00 on all aspects of the relationship in medium and large-scale poultry operations. The stronger links observed in medium and large-scale operations could be attributable to vertical integration, which is common in these enterprises.

Table 3. Socio-economic data of poultry farmers in the four districts of Botswana

Variables	Population frequency	Percentage frequency
Sex		
Male	30	75
Female	10	25
Age (years)		
20-30	9	22.5
31-40	18	45
41-50	3	7.5
51 and above	10	25
Citizenship		
Motswana	27	67.5
Non-citizen	13	32.5
Marital status		
Single	30	75
Married	10	25
Education level		
Non-formal	7	17.5
Primary school	Nil	-
Secondary school	13	32.5
Tertiary	20	50
Production experience		
<12 months (a year)	13	32.5
<10 years	11	27.5
≥10 years	16	40

Table 4. Poultry chain players' scores for their perceived levels of commitment, communication, joint-problem-solving and trust in working relationship with each other in the poultry value chain

Relationship feature	Extension staff			Grocery Retailer stores			Feed stores			Poultry farmers					
										Small scale			Medium and large-scale		
	Min Index	Max Index	Mean Index	Min Index	Max Index	Mean Index	Min Index	Max Index	Mean Index	Min Index	Max Index	Mean Index	Min index	Max index	Mean index
Commitment	2.33	3.33	2.92	3.00	3.67	3.41	1.33	3.67	3.13	1.33	3.33	2.23	3.00	3.67	3.33
Communication	2.33	3.67	3.00	2.67	3.67	3.19	2.67	4.00	3.30	1.33	3.67	2.80	3.00	3.67	3.50
Joint-problem-solving	2.25	2.75	2.44	1.25	4.00	3.36	2.25	4.00	3.28	1.55	3.25	2.39	3.00	4.00	3.75
Trust	3.00	2.80	2.90	2.40	3.80	3.20	2.00	4.00	3.24	2.20	3.40	2.95	3.60	4.00	3.90

*Scores ranging between 1 (strongly disagree) and 4 (strongly agree) indicate to what extent producers agree or disagree with statements linked to relationship aspect. Scores close to 1 suggest a perceived weak aspect of the relationship, while scores close to 4 indicate a strong aspect

Challenges in the poultry value chain

Table 5 presents data on the challenges that the four players (farmers, retailers, feed stores and extension staff) in the industry face. In the present study, farmers, feed stores and extension staff ranked high prices of raw materials, especially poultry feed as number 1 challenge, whereas retail stores ranked lack of skilled personnel as a top most challenge (Table 5). In agreement with this finding, Moreki (2010) reported high feed costs to be a major challenge in the poultry

industry in Botswana. High feed costs contribute to decreased profits because customers are not ready to buy products at high prices. Also, Badubi et al. (2004) reported high feed expense and low prices offered by chain stores to be the major challenges in small-scale broiler production. Feed is a major input in poultry production and accounts for between 50% and 70% of the total input costs (African Competition Forum, 2014).

Table 5. Ranking the key challenges by the four district's poultry value chain players

Challenge	Ranking of challenges			
	Poultry Farmers	Retail stores	Feed stores	Extension staff
Lack of government production incentives	3	6	5	5
Unfavourable climatic conditions	5	6	6	5
Crime	4	3	3	5
Lack of skilled personnel	14	1	10	5
Increased competition from mushrooming firms	8	2	2	13
Inconsistent market information	16	9	11	5
High interest rates	6	11	4	15
Long distance to the market	12	13	14	15
Inadequacy of resources	13	9	13	13
Expensive machinery and replacement costs	9	11	11	5
Lack of commitment from employees	15	3	6	5
Low price selling of goods	7	13	8	5
Pests and diseases	2	6	15	3
Transport challenges	10	13	8	3
High price of raw materials	1	5	1	1
Halaal	11	16	16	2

The majority of farmers, especially small-scale farmers ranked high poultry feed costs as the major challenge in poultry production. This finding is in agreement with Mosinyi (1999) and Moreki (2010) who reported high feed costs to be one of the major challenges in commercial poultry production. The second major challenge was poultry pests and diseases, which, however, was indicated to be of no threat to the flock when vaccinated or treated on time. Lack of government incentive, crime and unfavourable climatic conditions ranked third, fourth and fifth, respectively as the major challenges. Small-scale farmers indicated that crime was prevalent, especially when the chickens are left with few days before slaughter. High interest rates was ranked the 6th major challenge. Farmers, especially small-scale farmers reported that they find themselves in a situation where they have to reduce their selling prices for their products to sell, which is challenging. High interest rates reduce farmer's willingness to invest. Halaal ranked 11th and was a challenge mainly to small-scale farmers as they could not afford to pay for its implementation because it squeezes their profits. The finding is in agreement with Moreki (2010) who reported that halaal requirement by the majority of retailers denies small-scale producers access to the market as they do not have money to employ Muslim slaughterers who are salaried higher than most

employees in the poultry operations. According to African Completion Forum (2014), halaal certification acts as a potential competition concern for farmers. Competition appeared to be a challenge and was ranked eighth. Small-scale farmers said that more entrepreneurs entering the industry reduce their profit margins and even force them out of business as they are competing for the same market. Expensive machinery and transport also posed a challenge to business growth since their costs of maintenance or repairs were high resulting in reduced profit margins.

Grocery retail stores that sell both raw and cooked poultry meat and eggs cited lack of skilled personnel, competition from other stores, crime, uncommitted employees and high raw materials as factors limiting their operations (Table 5). Pests and diseases, lack of government incentives and harsh climatic conditions ranked 6th challenge. Halaal ranked the least challenge by the retailers as they mentioned that customers have a choice to buy either halaal or non-halaal poultry meat. High prices of raw material, competition from other firms, crime, high interest rates and lack of government incentives were ranked the top five major challenges by poultry feed stores. Harsh climatic conditions and employees' lack of commitment to work were ranked 6th major challenges. The top eight challenges were transport and a situation where

feed stores had to reduce prices in order to clear stock. Lack of skilled personnel, inconsistent market information, uncommitted employees, high machinery costs, distance to market and pests and diseases ranked 10 to 15. Some farmers operating outside Gaborone indicated that their market was in Gaborone and so distance to the market marginalised their profits because transport was accounted for. Again, halaal was ranked the least challenge by feed stores because is not a challenge to them.

Extension staff identified high raw material prices, halaal issue, pests and diseases, transport as the four major challenges faced by poultry farmers (Table 5). The diseases reported by extension staff were Newcastle disease (ND), Infectious Bursal Disease (IBD), fowl pox and these were vaccinated against by farmers. Mites, rats and lice were the most common poultry pests in the present study. Competition emanating from a lot of farmers entering the poultry industry, especially small-scale farmers was ranked the 13th challenge since many farmers compete for the smaller market serviced by those farmers who entered the industry earlier. High interest rates and long distances were ranked 14th and 15th challenges, respectively.

Value chain product flows

Broiler value chain

The three main broiler strains of choice are Ross, Cobb and Arbor Acres which are all reared under intensive system. The two main products in broiler breeder production are hatching eggs and spent hens. For this study, the sole product in a hatchery operation is one day old chicks. In the present study, 60% of the respondents reared Cobb, thus making it the most popular bird. In RSA, the most notable new breed is Arbor Acres, which was introduced by the vertically integrated firm Country Bird Holdings (CBH) in 2007 (African Competition Forum, 2014). In this study, broilers in small-scale enterprises take up to six weeks to be ready for slaughter while in the majority of the large-scale farmers in the poultry value chain broilers are slaughtered at five weeks of age, which gives them a cost advantage over small and medium-scale farmers. Since the industry is currently dominated by large-scale farmers; these are the ones that benefit from economies of scale. Badubi et al. (2004) stated that small-scale broiler producers have difficulties in gaining access to big retail outlets because they cannot offer a regular supply of broiler meat. Additionally, Moreki (2011) argued that small-scale poultry farmers do not have economies of scale to compete with the large-scale commercial enterprises and therefore remain marginalized.

Poultry meat is the main product of intent and litter is sold to horticultural farmers as is a norm with the small-scale farmers. However, large firms mentioned that poultry litter was available to any one for free. Previous study by Moreki and Keaikitse (2013) in Kgatleng, Kweneng and South-East Districts found that that 80% of commercial poultry farmers disposed of manure and/litter by giving it away to other farmers,

16% used it as a fertilizer on their own fields, whereas 4% of the respondents disposed of manure/litter in the landfills/dumping sites. The previous study by Moreki and Chiripasi (2011) reported that the predominant methods of poultry waste disposal in Botswana are direct disposal at the landfills, application as a fertilizer in gardens or farms, burning and composting.

The main chicken meat producers are Goodwill Chickens, Moleps Poultry, Tswana Pride, Medina Chickens, Richmark, and Bobbies Chickens. These companies are vertically integrated along the value chain all the way from day old chicks, production, packaging and labelling and finally to freezer and distribution facilities (Grynberg and Motswapong, 2011). The large-scale farmers have direct marketing links to supermarkets while small-scale farmers do not have direct access to the primary poultry market such as supermarkets.

The common poultry diseases that farmers vaccinated chickens against at the start of rearing were ND and IBD. Following depopulation, chicken houses were cleaned and disinfected, and thereafter allowed to rest for a week to break the disease cycle before new birds are placed. Seventy-five percent of the farmers in this study vaccinated chickens in accordance with vaccination program and rested chicken houses following depopulation, cleaning and disinfection.

Egg value chain

The main producers of eggs in Botswana are Notwane East, Star Poultry and Egghead Poultry. The two main products in this chain are table eggs and spent hens for human consumption. Pullets start to lay eggs at 18-20 weeks of age and lay eggs for 8 to 10 months depending on the level of production. Thereafter, they are sold as spent hens. The most common layer strains are Hyline and Lohmann brown. Poultry manure is removed and given out freely to horticultural farmers who use it as a fertilizer. Most of the inputs required for egg production such as vaccines, point of lay pullets and housing materials are imported from RSA. A number of actors are involved in this layer-egg chain from hatcheries, farmers, extension services, feed stores, extension staff, retail stores and final consumers of eggs. The enterprise is challenged by inter alia high feed costs, diseases, poor infrastructure and irregular supply of pullets (Moreki and Montsho, 2011).

Indigenous/family chicken value chain

The production of indigenous chickens (also known as family chickens) is most predominant in the rural areas and women are mostly associated with this type of rearing. Sonaiya (2009) mentioned that family poultry are kept mainly by women. The importance of family chicken rearing cannot be undermined because more women are empowered than men since this production is common with women (Moreki 2006). The author reported that the majority of people prefer indigenous Tswana chickens as their meat is tasty compared to that of commercial broilers. Similarly, Bell (1992) observed that village chicken is perceived to have superior taste compared to its industrial counterparts, whose taste can often reflect feed

components such as fish meal. There exist informal breeders who sell chicks to those wishing to rear them. This study found that the birds are mostly reared semi-intensively. Furthermore, the birds are left to scavenge during the day and are provided a night shelter to protect them from theft, predation and harsh weather conditions. Maize and sorghum grains produced by the rearers and mixed fowl feed (a mixture of sorghum, maize and sunflower) served as the main feeds. Meat from Tswana chickens is expensive probably because of its better taste. In the current study, mature Tswana chickens normally sold for about 70.00 to 80.00 Pula (equivalent to 7-8 US\$) and were usually sold to individuals, lunch caterers and restaurants. In Uganda, indigenous chickens are valued mainly for their ability to scavenge (32%), disease tolerance (29%), good meat quality (22%) and their hardiness (17%) (Ssewanyana et al., 2008). Wattanachant (2008) stated that the indigenous chicken meat has high glutamic acid content

but low fat and cholesterol contents which leads to the acceptably palatable meat that is desirable to consumers. Indigenous chickens are reared mostly for consumption (Gabanakgosi et al., 2013), but are sometimes sold for income generation (Magothe et al., 2012).

Employment generation along the poultry value chain

Table 6 presents data on employment creation along the value chain. The industry employs more males than females. According to Table 6, the retail stores employed 42 people (64% males and 36% females) strictly under the poultry section, whereas the input dealers employed 119 people (83% males and 17% females). In total, the 40 farms employed 1422 people (877 males and 545 females). It was, however, indicated that during slaughter times temporary labour is employed, the majority of whom are women.

Table 6. Number of people employed in feed stores, retailers and poultry farms in four districts of Botswana from March to May 2014

Sex	Feed stores	Retailers	Farms
Males	99 (83%)	27 (64%)	877 (62%)
Females	20 (17%)	15 (36%)	545 (38%)
Total	119	42	1422

Opportunities

Opportunities still exist in the poultry subsector including production of FPCs and pullet rearing. Poultry production in Botswana has an opportunity to create a competitive market by increasing its market size, as currently the country imports the bulk of FPCs from RSA. Moreki (2010) mentioned that Botswana needs to produce FPCs as these are in high demand. The establishment of pullet rearing facilities in the country will go a long way in saving the country the much needed foreign exchange and creating employment for citizens (Moreki, 2010). Furthermore, expanding existing broiler breeding facilities with a view to meeting the country's hatching egg requirements will also play a role in developing the poultry industry.

- Government should establish abattoirs and make provisions for storage facilities for small-scale farmers close to the markets to reduce transport costs and consumer price.
- Government should assist smallholders to have access to direct links to supermarkets provided that they meet certain safety standards.
- Government should endeavour to intensify the role of collective action (working as a unit) in enhancing competitiveness and to mentor small-scale farmers in creating groups.
- Farmers should be equipped with skills and knowledge through frequent capacity building sessions.

CONCLUSION

The majority of commercial poultry producers and employees in this study are males. Different actors in the poultry value chain were identified and how they are linked with each other. We further analyzed how actors in the value chain related to each other. Medium to large-scale operations showed stronger working relationship links compared to small-scale operations. This study identified various challenges faced by the industry and several opportunities that can be tapped into.

Recommendations

- Government should provide production incentives to local entrepreneurs by subsidizing feed and providing alternative supply of poultry inputs as a way of promoting a competitive environment.

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