

## ORIGINAL RESEARCH ARTICLE

## Factors affecting production and market performance of Guinea fowls and Quails in Kenya

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**ABSTRACT**

Emerging livestock like guinea fowls and quails are important alternative sources of poultry meat and eggs to chicken. These poultry species are also a significant source of income, especially to poor rural farmers. The study surveyed selected regions of Kenya to determine the factors influencing market performance of guinea fowl and quail products. A total of 652 guinea fowl and quail farmers participated in the study through interviews and filling questionnaires. Data was analyzed using quantitative and qualitative procedures where descriptive statistics were conducted by calculating frequencies and percentages. The results identified the main stakeholders in the guinea fowl and quail value chain that play a significant role in influencing their market performance. This study reveals that product, market, capital, technology and disease interrelation factors positively influence the market performance of guinea fowl and quail products. Therefore, we recommend that the involved relevant stakeholders should establish mechanisms that will streamline and improve guinea fowl and quail farming thereby making it sustainable and profitable for Kenyan farmers.

**Keywords:** Agribusiness, emerging livestock, demand, significance

**1.0 Introduction**

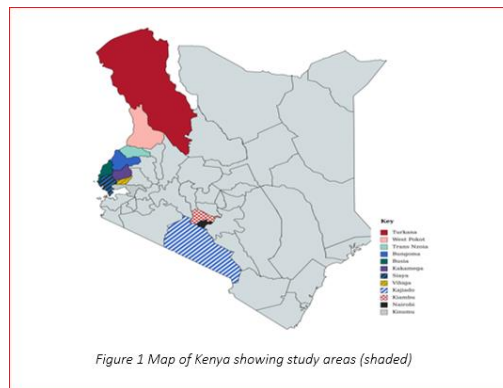
The poultry industry in Kenya is categorized into two main production systems, that is, the indigenous and commercial poultry production systems (Omondi, 2018). The indigenous chicken production system comprises 75% of the total poultry whereas the commercial chicken production system constitutes 22.8%. Other poultry species such as guinea fowl, quail, ducks, geese, turkey, and ostrich comprise about 2.2% of the total poultry population (MOALF, 2021). The indigenous poultry population is mainly kept by poor rural farmers under scavenging conditions with inadequate food and little to no biosecurity and biosafety measures being applied. They are mainly preferred by rural farmers due to their low maintenance costs and minimal losses through diseases and parasites infestations.

The poultry farming business is affected by some key factors that determine its survival and success rate. Some of these key factors include politics and legislation, capital, product interrelation factors, infrastructure and technology, disease and market challenges. Product interrelation factors such as the introduction of levies by governments on poultry products like feeds often affect poultry farming businesses. Policies devised by national and local governments will either promote or inhibit the growth of a sector. On the other hand, the availability of capital also determines the size of the poultry farm one can start. In countries where credit facilities are easily procured, starting medium or even large-scale farming systems becomes possible (Gershon *et al.*, 2020). Besides, diseases such as Newcastle have a high mortality rate and could result in losses of up to 100% of the total flock especially in chicken (Ipara *et al.*, 2021). Such diseases when left uncontrolled have negatively impacted on the production and profitability of poultry enterprises. In many African countries, markets are highly unorganized and vital information about the industry is lacking. Most poultry farmers lack cooperative unions that can assist individual farmers in locating favorable markets. As a result, the gap between the producers (farmers) and consumers is usually filled by middlemen who exploit the farmers by offering to buy birds at lower rates than the prevailing market prices (Aslam *et al.*, 2020).

Like many other developing countries, the Kenyan poultry business is also affected by these factors and which have hampered its growth. The business has the potential of creating employment and uplifting the lives of poor rural farmers. This implies that the whole production process needs to be fully analyzed and understood. A value chain analysis is normally useful in identifying the various stakeholders and understanding their roles in the production to consumption process of a product (Naziri *et al.*, 2014). This also includes highlighting the market performance of a product in the marketing chain. Several studies on the value chain of various livestock products have already been done. For instance, Kariuki (2011) analyzed the market performance and value chain of fish in some selected outlets in Kenya. The results indicated that longer market value chains resulted in not only high costs and high retail prices but also lower returns to the fishermen. Furthermore, the study identified that there was no integration amongst fish markets in Kisumu and other markets within the country. Therefore, in this study, a value chain analysis will be conducted to determine the key stakeholders and factors influencing guinea fowl and quail production and their market performance to provide useful information that can be used to improve it or educate interested individuals.

**2.0 Material and Methods****2.1 Study area**

The survey was conducted in Busia, Bungoma, Kakamega, Kisumu, Vihiga, Siaya, Trans-Nzoia, West Pokot, Turkana, Kajiado, Kiambu and Nairobi counties from March 2014 to August 2014 (Fig. 1). We selected the study areas based on the relative importance and popularity of indigenous poultry in these regions, especially guinea fowls and quails. These regions also contain poor rural farmers who rely heavily on poultry farming for food and income.



**2.2 Data collection and analysis**

Indigenous guinea fowl and quail farmers together with the Kenya Wildlife Service officers formed the target population of 657 respondents. The approach included personal and key informant interviews and focus group discussions (FGD) with the various players in the business. A questionnaire with both closed-ended and open-ended questions was used for primary descriptive data collection. The questionnaire mainly focused on identifying the key players in the guinea fowl and quail value chain together with the factors affecting it. Both qualitative and quantitative data collection approaches were applied according to Yin (2003). The questionnaires were hand-delivered to the respondents at the time of data collection. We used Microsoft Excel 2013 and SPSS to calculate frequencies, percentages and correlation relationship of the quantitative data.

**3.0 Results**

**3.1 Guinea fowl and quail farming**

The general perception of guinea fowl and quail farming was largely positive. Using information from the respondents, our results pointed out that guinea fowls and quails were more profitable and had a ready market when compared to other poultry species (Table 1). Besides, guinea fowl and quail farming were also preferred due to their disease tolerance nature, low maintenance cost and delicious taste (Moreki & Seabo, 2012; Wamuyu *et al.*, 2017). However, some farmers only kept guinea fowls and quails for aesthetic purposes due to the colorful nature of their feathers.

Parameter	Frequency	%	Cumulative %
<i>Reasons for keeping guinea fowls and quails over other species of poultry</i>			
Has more profit and ready market	88	45.4	
Resistant to diseases	82	42.3	45.4
More delicious when used for food	22	11.3	87.6
Aesthetic purposes	2	1.0	99.0
<b>Total</b>	<b>194</b>	<b>100.0</b>	<b>100.0</b>
<i>Sources of capital for guinea fowl and quail business</i>			
Personal savings	78	40.2	
Family and friends	68	35.1	40.2
SACCO loans	36	18.6	75.3
Bank loans	12	6.2	93.8
<b>Total</b>	<b>194</b>	<b>100.0</b>	<b>100.0</b>
<i>Source of feeds for guinea fowls and quails</i>			
Retailers	22	11.3	
Buy raw materials and make feeds	66	34.0	11.3
Scavenging	106	54.6	45.4
<b>Total</b>	<b>194</b>	<b>100.0</b>	<b>100.0</b>
<i>Distribution channels of guinea fowls and quails</i>			
To end-users	60	30.9	
Through middlemen	98	50.5	30.9
All	36	18.6	81.4
<b>Total</b>	<b>194</b>	<b>100.0</b>	<b>100.0</b>
<i>If respondents met the current market demand</i>			
No	170	87.6	
Yes	24	12.4	87.6
<b>Total</b>	<b>194</b>	<b>100.0</b>	<b>100.0</b>

**3.2 Capital interrelation factors**

Capital interrelation factors involve aspects that affect the availability of funds and credit for starting, developing and maintenance of any business venture. The source and amount of capital required are paramount towards the start of a business. Personal savings were found to be the main source of capital for most respondents (40.2%). The majority of respondents used personal savings from other agricultural and social-economic activities to start their guinea fowl and quail farming businesses. Other sources of capital included family and friends, savings and credit cooperative organization (Sacco) loans and bank loans (Table 1).

Financial support from the government through enterprise funds was found to be inadequate according to the respondents as the majority disagreed on ever receiving government financial support (Table 2). The Kenyan government has not taken adequate measures to empower and develop this agricultural sector as seen in the results shown. Other than the government, microfinance institutions have also not provided enough financial support to guinea fowl and quail farmers as well. It was also clear that raising capital in rural areas was challenging to most of the respondents (44.3%) and this could be credited to the low economic standards that were common in those areas.

*Table 2. Responses on market performance, capital and market interrelation factors*

Parameters	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
<b>Factors affecting capital interrelations</b>												
Guinea fowl and quail farming is funded by government through enterprise funds			10	5.2	2	1.0	90	46.4	92	47.4	194	100
Micro-finance fund for guinea fowl and quail farming			26	13.4	6	3.1	108	55.7	54	27.8	194	100
It is easy to raise capital for guinea fowl and quail farming in rural areas			44	22.7	24	12.4	86	44.3	40	20.6	194	100
Guinea fowls and quails do not require much capital			56	28.9	8	4.1	56	28.9	74	38.1	194	100
<b>Effects of input costs on the market performance</b>												
Cost of inputs affect the prices of guinea fowl and quail products	24	12.4	132	68.0	22	11.3	14	7.2	2	1.0	194	100
Cost of inputs encourage import of guinea fowl and quail products	56	28.9	100	51.5	26	13.4	10	5.2	2	1.0	194	100
Supply of guinea fowl and quail products to the market is affected by the cost	50	25.8	60	30.9	36	18.6	46	23.7	2	1.0	194	100
Input costs discourages potential financiers	56	28.9	98	50.5	18	9.3	20	10.3	2	1.0	194	100
<b>Factors affecting the market interrelations</b>												
There is ready market for guinea fowl and quail products	108	55.7	72	37.1	0	0	14	7.2	0	0	194	100
Guinea fowl and quail products are considered very expensive	78	40.2	104	53.7	4	2.1	4	2.1	0	0	194	100
Guinea fowl and quail consumption is very low thus poor market structure	60	30.9	104	53.6	6	3.1	22	11.3	2	1.0	194	100
Trade restrictions in place leads to low trade of guinea fowl and quail products	46	23.7	106	54.6	30	15.5	12	6.2	0	0	194	100
Local market is affected by import of poultry and poultry products	56	28.9	104	53.6	14	7.2	16	8.2	4	2.1	194	100

**3.3 Feed source and input costs**

Poor rural farmers heavily rely on the free-range system as it reduces feeding costs. The birds are allowed to roam around the homestead scavenging for food. This was evident by the large number of respondents who practiced this production system (54.6%, Table 1). This was followed by farmers who purchased raw materials and locally mixed their concentrates to reduce on the feeding costs. Only a small number of respondents (11.3%) sourced their feeds from retailers and these were mainly farmers from urban areas with small pieces of land and better financial standing.

**3.4 Market demand and performance**

Middlemen were found to be one of the key distribution channels used as 50.5% of the respondents sold their poultry products through them whereas 30.9% sold the guinea fowl and quail products directly to the end-users (Table 1). Our results also confirmed that majority of the respondents (87.6%) were not able to meet the current market demand for guinea fowl and quail products through the available distribution channels while only 12.4% of them were (Table 1). Furthermore, 55.7% of the respondents strongly agreed that there is a ready market for guinea fowl and quails, showing their potential as alternatives to chicken (Table 2).

The affordability of guinea fowl and quail products, poor market structure and harsh trade policies were found to affect their market demand and performance (Table 2). A higher number of respondents agreed that guinea fowl and quail products were expensive and that was mainly influenced by their short supply in the market. The market structure was also noted to be inefficient and with harsh trade policies which tended to discourage trading amongst the entrepreneurs in the locality since 23.7% strongly agreed, 54.6% agreed, 15.5% were neutral while 6.2% disagreed (Table 2). Trading within the domestic market, the regional, international or global market is dependent on the nature of the existing legal policies. Trade policies that easily allowed the access of local market to other poultry species and products from other regions that have production advantage affect the available market demand of guinea fowls and quails in the study regions.

**3.5 Input costs**

Input costs towards the creation of a product will affect its pricing. Most respondents agreed (12.4% strongly agreed, 68% agreed) that indeed input costs did affect the prices of guinea fowl and quail products (Table 2). Our results indicated that the higher the cost of input, the higher the price of guinea fowl and quail products. Furthermore, the high cost of inputs encouraged the access of local market to cheaper guinea fowl and quail products from other regions which negatively affected the local farmers. We also investigated whether the supply of guinea fowls and quails in the market were affected by their respective cost. From the results, 25.8% strongly agreed with the statement, 30.9% agreed, 18.6% were neutral, 23.7% disagreed while only 1% strongly disagreed (Table 2). High input costs were also found to discourage potential financiers who are crucial in providing financial assistance to these farmers, especially rural farmers.

**3.6 Correlation relationship between the variables affecting guinea and quail production**

Four independent variables (product interrelations, market interrelations, capital interrelations, and technology and disease interrelations) were found to positively influence the market performance of guinea fowls and quails (Kwesisi *et al.*, 2015), however, at different levels (Table 3). It was noted that among the four players in the value chain, market interrelation factors had the highest positive significant impact on market performance ( $r = 0.871, P < 0.01$ ) whereas capital interrelations had the lowest ( $r = 0.035, P > 0.01$ ). A positive but insignificant correlation between capital interrelation factors and market performance showed that capital interrelation factors do positively influence the market performance of a product but at a low extent. The correlation relationship between product interrelation factors and market performance was also positive suggesting that factors affecting guinea fowl and quail products also affect their market performance such as competition from other poultry products. Factors that influence the market demand of guinea fowl and quail products were shown to affect their market performance through a positive and significantly strong correlation relationship ( $r = 0.871, P < 0.01$ ) between market interrelation factors and market performance (Table 3). A weak and insignificant relationship between market performance and technology and disease interrelation factors was also found (Table 3). However, the correlation was weak and insignificant ( $r = 0.126, P > 0.01$ ). It is important to note that though the correlation relationship is weak, diseases that affect guinea fowls and quails together with the technologies applied to curb and prevent such diseases influence the quality and quantity of their products.

Table 3. Correlation between independent variables and dependent variable

		Market performance	Product interrelations	Market interrelations	Capital interrelations	Technology & disease interrelations
Market performance	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	194				
Product interrelations	Pearson Correlation	.206**	1			
	Sig. (2-tailed)	.004				
	N	194	194			
Market interrelations	Pearson Correlation	.871**	.065	1		
	Sig. (2-tailed)	.000	.365			
	N	194	194	194		
Capital interrelations	Pearson Correlation	.035	-.145*	.055	1	
	Sig. (2-tailed)	.629	.043	.449		
	N	194	194	194	194	
Technology and disease interrelations	Pearson Correlation	.126	.031	.156*	.632**	1
	Sig. (2-tailed)	.079	.665	.030	.000	
	N	194	194	194	194	194

\*\* . Correlation is significant at the 0.01 level (2-tailed), \* . Correlation is significant at the 0.05 level (2-tailed).

**4.0 Discussion**

The popularity of guinea fowl and quail farming in Kenya has always been in question; however, this study stands to affirm that the rearing of the two poultry species is known and preferred by many farmers since their meat and eggs fetch higher prices in the market. The high prices were attributed to the unique features of guinea fowl and quail meat and eggs and their low supply. The low supply was consecutively linked to the low number of farmers who keep guinea fowls and quails (MOALF, 2021).

Many individuals also fail to venture into guinea fowl and quail farming out of fear that there is no ready demand for their meat and eggs. This perception has been challenged by this study as many respondents agreed that there is an already existing market. The already existing farmers are not able to meet the demand in most regions. From our results, the majority of the respondents (87.6%) were also not able to meet the market demand because the development of this sector was still at its curdling stage due to low production and inadequate awareness by the public about this venture. This was an

indication that many people had not realized the economic value attached to guinea fowl and quail farming despite the availability of their market (Macharia *et al.*, 2017). Despite the many advantages of keeping guinea fowls and quails, high profitability, disease tolerance capabilities and low maintenance costs were the main reasons for keeping the two poultry species, especially guinea fowl (Asena, 2018).

Our results were able to show that capital, product, market and technology, and disease interrelations were the main elements that were found to positively influence the value chain of guinea fowls and quails. Each of these elements affected the production process at different stages thereby the scale of their effect was highly dependent on the production stage involved. Capital interrelation factors such as the source of capital had the weakest correlation relationship with market performance while market interrelation factors such as poor market structure had the strongest. Both elements are at extreme ends of the production process with capital interrelations mostly affecting the start of the guinea fowl and quail farming venture while market interrelations commonly affecting the end product that's to be sold to the market. This could explain the disparities observed in their effects on market performance.

Personal savings from other agricultural and social-economic activities are still considered the best source of capital by most farmers. However, the majority of these farmers are unable to raise the required amounts themselves. Alternatively, many opted for family and friends as sources of their capital because it was an easy source of credit whereby collateral and other stringent requirements were not needed (Karanja *et al.*, 2013).

Those who sourced their capital from the various savings and credit cooperative organizations attributed their decisions to the fact that this source had fewer credit restrictions and requirements as compared to banks and other formal sources of credit. A small percent acquired their capital from banks and this was attributed to the stringent credit regulations such as the huge amount of collateral needed, the inadequacy of these credit sources, high amounts of interest rates charged and inadequate knowledge about bank procedures and requirements by the respondents (Acheampong, 2018). Majority of the respondents agreed that starting a guinea fowl or quail farming business doesn't require abundant capital. Titus *et al.*, (2021) also reported that starting a guinea fowl farming business did not require much capital to initiate even in the low economic standards of most farmers in the study areas. The low economic standards of most rural farmers were mainly attributed to the high poverty levels (Wattel & Savelkoul, 2018).

The source and price of poultry feed were shown to highly contribute towards the total input cost of a farmer (Etuah, 2013; Omondi, 2019). Many respondents seemed to agree that input costs such as high feed costs discouraged potential financiers, affected the price of guinea fowl and quail products and encouraged sourcing from other regions instead of buying locally which would subsequently support the production. The sourcing of the products often affects the market performance of the locally produced ones (Savchenko *et al.*, 2019). On matters of transport and distribution to markets, the majority of respondents preferred to use middlemen and this was attributed to the inability of the respondents to access the markets themselves. Middlemen have also been found to reduce losses by farmers and create efficient pricing systems in the market (Kiprop *et al.*, 2020). The consumption rates of any given market product have a significant bearing on the market structure. A strong and well-developed consumption pattern leads to a more developed market for a product (Amanto *et al.*, 2019; Stampa *et al.*, 2020). A well-developed market system enables managers to develop systematic ways to manage future performance through planning, performance forecasting and target setting (Abdollahi Kalourazi, 2020; Roiter *et al.*, 2021).

Correlation analysis is useful in checking the relationship between variables (Bewick *et al.*, 2003). From our results, the correlation relationship between capital interrelation factors and market performance was positive suggesting that capital does affect market performance. By nature of its positivity, it can also imply that any improvement done on capital interrelation factors (access to finance) will have a small but significant effect on the market performance of guinea fowl and quail products. Anwar *et al.*, (2018) supported the hypothesis that firms' intellectual capital had a positive impact on market value and performance of various products and may be an indicator for future financial performance. This was established when an investigation was conducted on the relationship between intellectual capital and firms' market value and financial performance. Our findings also suggested that product interrelation factors such as poultry feed cost, input costs and competition from other poultry products have a significant effect on the market performance of guinea fowl and quail products. Milosevic (2018) suggested that the increase in value addition to product interrelation factors such as market competition leads to an increase in the market performance of a given product. This provided strong empirical support for the idea that increases in product market competition raise productivity by mitigating agency costs.

The most prevalent diseases that commonly affect indigenous poultry are Newcastle disease, fowl typhoid, and coccidiosis (Onono *et al.*, 2018). However, most indigenous poultry rural farmers were unaware of the different types of diseases and parasites affecting their poultry. This suggests a lack of information dissemination in the regions regarding poultry diseases, parasites and factors that affected them. Technological advancement in line with communication would have allowed for access to prior information regarding an outbreak which could have enabled them to take precautionary measures. The low technological knowledge also translated to an inability to produce more disease-resistant drugs and the development of new technology to enhance production. Our results indicated that these factors positively influence the market performance of the various guinea fowl and quail products. Therefore, any improvement done on technology and disease interrelation factors such as improving treatment methods of poultry and training more skilled individuals with technological know-how on diseases prevention and management will significantly enhance the market performance of guinea fowl and quail products. Investment in and heavy use of technology was found significantly and consistently associated with strong firm performance (Nkukwana, 2018). Heavy use of technology was found to be neutral in the long term and associated only with relatively poor performing firms in the short term. Kamau (2018) also suggested that early adopters of new technology could experience spectacular success but once the technology becomes common, the competitive advantage is lost.

## 5.0 Conclusion

Guinea fowls and quails are becoming increasingly important as an alternative poultry protein source thus reducing the over-reliance on chicken. A majority of rural farmers in Western Kenya obtain guinea fowls from families, neighbors, or the market with a few obtaining eggs from the wild. Contrariwise, most farmers in Western Kenya obtain their quails from the wild with a few from markets in urban regions. Urban and peri-urban farmers obtain guinea fowl from Western Kenya whereas the quails are often exotic. The continuous capture of wild guinea fowls and quails for breeding has raised the concerns of wildlife and environmental conservation agencies. Therefore, the establishment of accessible breeding stock centers for guinea fowls and quails will help avert the practice of harvesting them from non-protected areas and to ensure quality breeding stock. Besides, relevant stakeholders should also roll out a sensitization program on the legal policies that govern the production of guinea fowls and quails to the public to discourage the habit of harvesting them from either protected or non-protected areas. This will also aid in conserving the wild guinea fowl and quail species.

This study has been able to outline the players and stakeholders in the value chain of guinea fowls and quails. It has also shown the statistically significant relationship between the players in the value chain and the market performance of guinea fowls and quails in Kenya. Therefore, there should be value addition in the enhancement of guinea fowl and quail products to encourage reduced dependence on chicken and to help improve the financial status of

poor rural farmers. This could be done by improving one or more of the elements within the value chain by agricultural organizations and stakeholders in the national government ministry of livestock, agriculture, and fisheries. For instance, the national and county government ministries of agriculture should ensure that poultry feeds are easily accessible and affordable to help farmers reduce production costs. A sound market structure should also be developed so that farmers can access the market directly to avoid the use of unscrupulous middlemen who exploit them. This will help increase their profit margin and further encourage them to invest more into their poultry businesses.

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