Impact of Poultry Marketing on the Uptake of Improved Indigenous Chicken Among Poultry Farmers in Konoin Sub-County, Bomet County, Kenya

Brendah N. Machuki[1], Stephen W. Maina[2] & Mary M. Waiganjo[3]

[1]*Department of Agricultural Education and Extension, Egerton University, Kenya*

[2,3]*Department of Agricultural Education and Extension, Egerton University, Kenya*

**Corresponding author: brendahmachuki18@gmail.com*

https://doi.org/10.62049/jkncu.v5i2.312

Abstract

Indigenous chicken products, especially their flavourful meat and deep yellow-yolked eggs, are highly valued for their taste, nutrition, and organic appeal. To enhance the productivity of indigenous chicken, Kenya Agricultural and Livestock Research Organisation (KALRO) developed the fast-growing, high yielding improved indigenous chicken. However, uptake of improved indigenous chicken remains low at just 24% despite awareness efforts. Therefore, this study seeks to determine the impact of poultry marketing on the uptake of improved indigenous chicken among poultry farmers in Konoin Sub- County, Bomet County, Kenya. The study employed a descriptive survey design, and a sample of 150 farmers was surveyed using questionnaires. The formula N≥104+8m was used to determine the sample size of 136 participants. The sample size was increased by 10%, giving a total sample size of 150 farmers to maximise accuracy and take care of non-response. Systematic sampling was used to select the sampled farmers from a list of poultry farmers. Data was analysed using frequencies, percentages, and multiple linear regression. The majority of the poultry farmers sold improved indigenous chicken at premium prices, especially in towns with higher demand. There was heavy reliance on brokers who control market access and pricing. Poultry marketing had a significant impact on the uptake of improved indigenous chicken, with a p-value of 0.000. The study concludes that poultry marketing has a statistically significant impact on uptake of improved indigenous chicken among poultry farmers. The study recommends that there is need to improve poultry marketing through price transparency, setting competitive value-based prices, market access, and training to promote uptake of improved indigenous chicken.

Keywords: Poultry Marketing, Uptake, Improved Indigenous Chicken, Multiple Linear Regression

Introduction

Poultry farming is one of the most accessible and vital agricultural enterprises for smallholder farmers globally, offering both food security and income-generation opportunities (Waithaka et al., 2022). Improved indigenous chicken (IIC) breeds have emerged as a strategic asset for rural development due to their adaptability to local environments, disease resistance, and consumer preference for traditional meat and egg quality (Manyelo et al., 2020). Farmers are gradually recognizing the benefits of improved indigenous chicken, viewing them as a practical alternative to commercial breeds, particularly in areas where traditional poultry farming remains prevalent (Pius et al., 2021).

Countries such as India, Nigeria, and Bangladesh have successfully increased the uptake of IIC through improved marketing strategies, including cooperative marketing models, branding, and certification of indigenous poultry products (Kulla et al., 2021). These strategies have not only increased market access for smallholders but have also enhanced the perceived value of indigenous poultry among consumers. In contrast, Kenyan poultry farmers face challenges such as fragmented markets, lack of price incentives, and limited awareness of value chains tailored to IIC (Carron et al., 2017).

In Kenya, Wambua et al. (2022a) indicated that the agricultural sector (crop production and livestock production) contributes 25% to the country's GDP, with the poultry subsector accounting for 30% of this contribution. The country has an estimated poultry population of 43.8 million. Accordingly, it is evident that the poultry sector is highly diverse, producing more than 35,000 tonnes of meat and 1.6 billion eggs. Indigenous chicken contributes 71% of the total egg and poultry meat produced in Kenya, and therefore, indigenous chicken have a significant impact on the trade, welfare, and food security among farmers (Bukachi et al., 2023).

Indigenous chickens are kept under scavenging production systems with limited application of management interventions to improve flock productivity. With constraints such as diseases, lack of proper housing, and insufficient feed, the maturing rate and productivity of these chicken are usually low (Yusuf & Popoola, 2022). Prevalence of transboundary animal and zoonotic diseases and pests, inadequate capacity for service delivery, weak delivery of extension services, and demographic factors have an impact on indigenous chicken production (Wambua et al., 2022b). Consequently, to counter some of the problems like low productivity and slow maturity, the Kenya Agricultural and Livestock Research Organisation (KALRO) bred a fast-growing chicken with high egg production, popularly known as KARI Kienyeji chicken, also known as improved indigenous chicken (Wambua et al., 2022a).

A study on the analysis of improved indigenous chicken adoption among smallholder farmers in Makueni and Kakamega Counties indicated that improved indigenous chicken production is mainly done for subsistence use by smallholder farmers (Kamau et al., 2019). Smallholder farmers and commercial producers have adopted improved indigenous chicken. Additionally, the average adoption rate of improved indigenous chicken is estimated at 24% among poultry farmers despite the awareness generated around improved indigenous chicken (Kamau et al., 2019).

A study by Wambua et al. (2022a) indicated that various factors have an impact on improved indigenous chicken production. These factors include socio-economic factors, technological factors, policy and legal frameworks, and erratic and unpredictable weather conditions. Divergent factors have an impact on the

uptake of improved indigenous chicken. However, limited information is known about the impact of these factors on the uptake of improved indigenous chicken. To fill the existing knowledge gap, it was necessary to determine the impact of poultry marketing on the uptake of improved indigenous chicken in Konoin Sub-County, identifying best practices and policy recommendations that can be tailored to the Kenyan poultry sector.

Methodology

Study Area

This study was conducted among poultry farmers in the Konoin sub-County. Konoin sub-County has five wards, which include Chepchabas, Kimulot, Mogogosiek, Boito, and Embomos. Konoin Sub-county spans approximately 0.8178° S in latitude and 35.3382° E in longitude (Bomet County, 2023). The sub-County has a population of approximately 163,507 people. The number of households is approximately 36,278, where 83,120 are males, 80,384 are females, and 3 are intersex people (Kenya National Bureau of Statistics [KNBS], 2019).

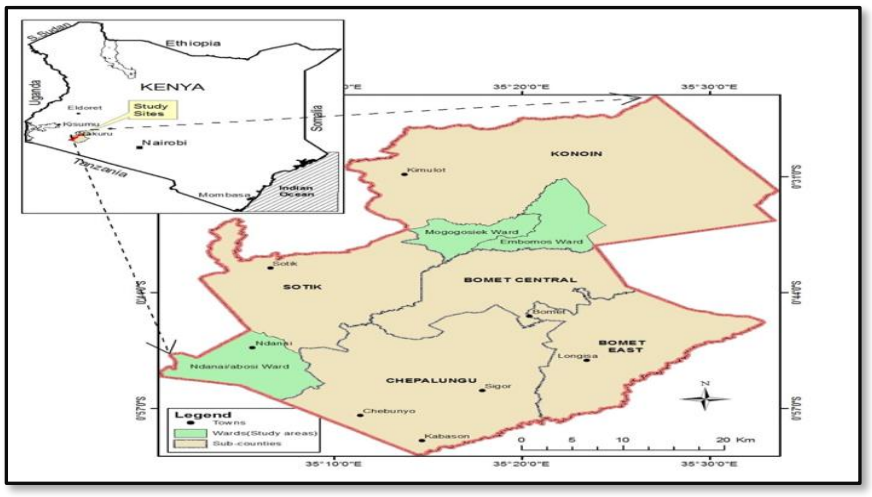

Figure 1: Map of Kenya Showing the Geographical Location of the Study Area

Research Design, Sampling Procedure and Sample Size

This study employed a descriptive survey research design since it mainly looks at phenomena, events, and issues the way they are (Catania et al., 2021). Purposive sampling was used to select two wards (Embomos and Mogogosiek) because the two wards had both adopters and non-adopters of improved indigenous chicken in Konoin sub-County. The two wards were also purposively selected because they had a lower average improved indigenous chicken flock size compared to the other wards in Konoin Sub-County. The study adopted the formula; N≥104+8m by VanVoorhis & Morgan (2007) to determine sample size. The formula $N \geq 104 + 8m$ is used to determine the minimum sample size required for multiple regression analysis. Below is what each component of the formula means:

N = the minimum required sample size, 104 = a constant baseline number that accounts for a stable estimate of regression coefficients, 8 = the number of additional participants required per predictor variable, and m = the number of independent variables included in the regression model.

The study considered four independent variables; hence, using this formula, the sample size was worked out as follows:

N≥104+8(4), which gave a sample size of 136 participants.

Furthermore, during a research study, natural attrition may occur; therefore, to take care of drop-out, the sample size should be increased by 10 per cent (Junyong et al., 2020). In this study, there was an additional 10 per cent of 136 respondents to maximise accuracy and to take care of the non-response. Therefore, a sample size of 150 respondents was considered in the study, as shown in Table 1.

Table 1: Number of Poultry Farmers and Sample Size in Embomos and Mogogosiek Wards

Ward	**Adopters of IIC**	**Adopters sample size**	**Non-adopters of IIC**	**Non-adopters Sample size**	**Total number of farmers**	**Sample size**
Embomos	112	37	2305	37	2417	74
Mogogosiek	118	38	2320	38	2438	76
Total	230	75	4625	75	4855	150

In every research study with two or more different study groups, all the groups should have an equal number of participants. Therefore, an equal number of participants should be considered for each study group (Kumar & Yale, 2016). Consequently, an equal number of adopters (75) and non-adopters (75) participated in the study. Proportionate size formula was used to calculate the sample size of adopters and non-adopters drawn from each ward (Ndirangu et al., 2018).

The proportionate to size formula is as follows.

$$ni = \left(\frac{\mathrm{n}}{\mathrm{N}}\right) Ni$$

Where: ni = Sample size of the ward, n = Population of the ward, N = Total population, and Ni = Sample size

Adopters in:

$$\text{Embomos;} \quad ni = \left(\frac{112}{230}\right) 75 = 37$$

$$\text{Mogogosiek;} \quad ni = \left(\frac{118}{230}\right) 75 = 38$$

Non-Adopters:

$$\text{Embomos;} \quad ni = \left(\frac{2305}{4625}\right) 75 = 37$$

$$\text{Mogogosiek;} \quad ni = \left(\frac{2320}{4625}\right) 75 = 38$$

This was followed by systematic sampling in the field. Systematic sampling was used to select the sampled farmers from a list of IIC and IC farmers. Systematic sampling involved the selection of every third consecutive person among 112 and 118 adopters of IIC in Embomos and Mogogosiek, respectively, to arrive at the calculated sample sizes of 37 and 38, respectively. Systematic sampling was also used to select every 61st consecutive person among 2,305 and 2,320 non-adopters of IIC in Embomos and Mogogosiek, respectively, arriving at the calculated sample sizes of 37 and 38 per ward.

Data Collection

Data was collected using questionnaires, which were hand-delivered. Poultry farmers were reached at their homes. The researcher gave a brief self-introduction and explained to the respondents the purpose of the study. The questionnaires were administered face-to-face to ensure that all the items were correctly filled.

Data Analysis

Data was analysed using frequencies and percentages and multiple linear regression. The hypothesis of the study stated that there is no statistically significant impact of poultry marketing on the uptake of improved indigenous chicken by poultry farmers. The hypothesis was tested at a statistically significant level of $p \leq 0.05$. The multiple linear regression equation derived is as follows:

$$Y = \alpha + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$$

Where Y = Uptake of improved indigenous chicken, X_1= Price of IIC, X_2= Where poultry is sold, X_3 = Information on who finds poultry market, and X_4 = Information on who determines poultry price.

Results And Discussion

Descriptive Analysis of Poultry Marketing

Frequencies and percentages were used to describe the four poultry marketing items considered in this study. The first poultry marketing item was the price of mature improved indigenous chicken. Information on the price of IIC was analysed, and the results are shown in Figure 2.

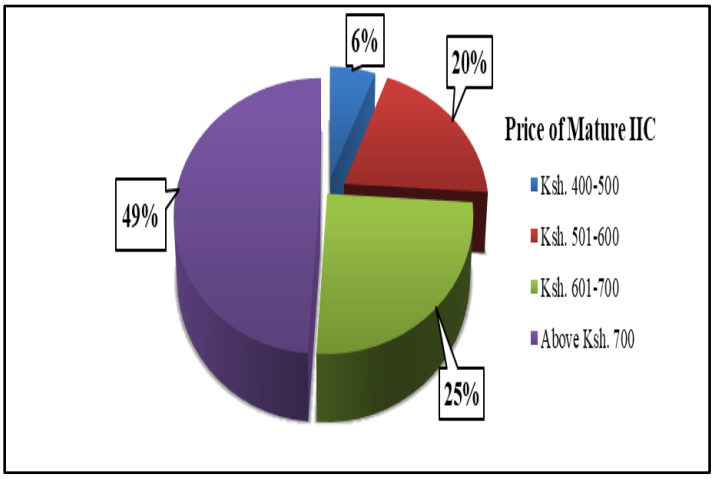

Figure 2: Price of Mature Improved Indigenous Chicken

Figure 2 indicates that the majority of the poultry farmers sell IIC above Ksh. 700 (49%). Nearly half of the farmers indicated that mature IIC are sold at prices exceeding Ksh. 700, suggesting a high demand and premium pricing for IIC. This could be attributed to their perceived quality, productivity, and adaptability to local environments compared to exotic breeds. Studies have shown that consumers often prefer indigenous chicken for their taste, nutritional value, and suitability for free-range systems (Lee, 2024). The high proportion of sales at this price range reflects farmers' ability to tap into niche markets, especially urban and peri-urban areas, where demand for organic and traditionally bred chicken is growing.

The mid-range price categories (25% at Ksh. 601–700 and 20% at Ksh. 502–600) demonstrate variability in the quality, age, sex, or weight of the birds sold. The relatively high proportion of farmers in these ranges may indicate varying levels of farmer expertise or access to inputs, which affect the marketability of the birds. Price differentiation could also arise from local market conditions, consumer preferences, and supply-demand dynamics, as noted by studies such as those (Hosseinnezhad, 2024).

Furthermore, a small percentage of poultry farmers (6%) indicated that IIC are sold at lower prices (Ksh. 400–500), likely reflecting challenges such as underdeveloped market linkages, low production efficiency, or lack of awareness regarding pricing strategies. This could also indicate the presence of distressed sales or the sale of underweight or younger birds. According to Penrith et al. (2023), farmers in resource-constrained environments often face difficulties in accessing lucrative markets, leading to suboptimal pricing.

Another critical poultry marketing item was where poultry is sold. Information on where poultry is sold was also analysed, and the results are shown in Figure 3.

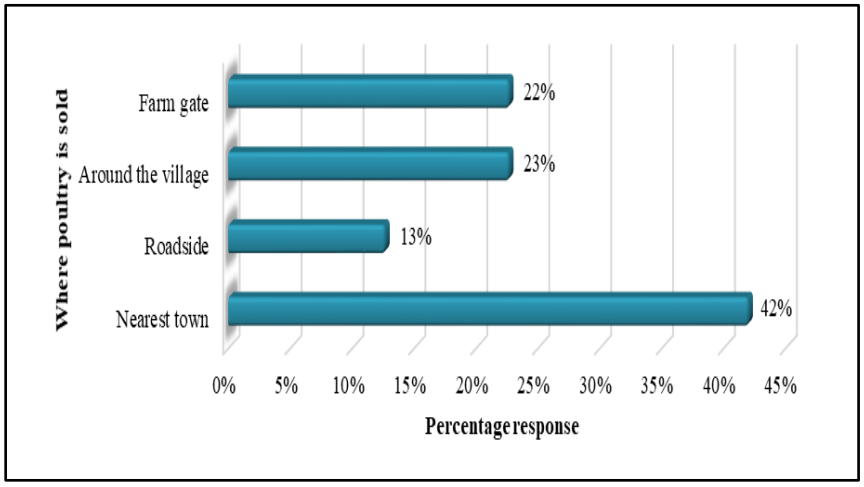

Figure 3: Information on Where Poultry is Sold

According to the data in Figure 3, 42% of the poultry farmers indicated that most IIC are sold in the nearest town. This finding indicates that towns offer better market opportunities, likely due to higher demand, better prices, and access to a larger customer base. Town markets may attract farmers seeking more lucrative sales, especially if they are targeting middle-income urban consumers (Kwiringira et al., 2024). In addition, 23% of the poultry farmers suggested that IIC are sold around the village, highlighting the importance of localised markets. This group might consist of poultry farmers who prefer lower transaction costs and more

convenient sales. Selling within the village could also reflect a focus on informal, community-based trade (Suwanmaneepong et al., 2024).

Additionally, some farmers chose to sell their produce directly at the farm gate, with 22% engaging in this method. Farm gate sales are often chosen by farmers who have limited mobility or resources to access more distant markets. This practice might also appeal to buyers looking for fresh, farm-sourced products or those engaged in bulk purchases directly from farmers (Goldstein et al., 2024). Lastly, 13% of farmers sell their chicken at the roadside. Roadside sales may represent a less formal market channel, often targeting passers-by or local consumers. While this method requires minimal investment, it may be less reliable due to fluctuating customer traffic and competition from other roadside vendors (Effiong et al., 2023).

In the effort to increase the uptake of IIC among poultry farmers, identifying reliable markets plays a crucial role (Seufert et al., 2023). Table 2 shows information on who helps in looking for a poultry market so that farmers can get a market for their poultry for sale.

Table 2: Information on Who Helps in Looking for Poultry Market

Marketing of Poultry	Category of Those Who Help Look for Poultry Market	Percentage
Who Helps in Looking for Poultry Market	Farmers' Co-operative Society	1.3
	Farmer	34.7
	Neighbours	12.7
	Brokers	51.3
	Total	100.0

Farmer cooperatives (1.3%) play a limited role in looking for poultry market despite their potential to enhance market access. Studies by Zhu & Wang (2024) indicate that the low involvement of cooperatives may result from weak institutional frameworks, limited membership, or poor awareness among farmers about the benefits of cooperative societies. Neighbours (12.7%) contributed moderately to the dissemination of market information. This aligns with findings by Yami et al. (2024), which suggest that informal networks within communities, such as neighbours, facilitate the spread of market-related knowledge, albeit less effectively than organised farmer groups or brokers.

Moreover, fellow farmers (34.7%) were a significant source of information regarding poultry markets. Farmer-to-farmer interactions are often seen as credible and relatable because of shared experiences and similar farming contexts (Effiong et al., 2023). Social learning theories emphasise that peer influence is vital in disseminating agricultural innovations, including market opportunities for improved indigenous chicken breeds. Brokers (51.3%) played a dominant role as intermediaries in the poultry value chain, as they often link farmers with potential buyers. However, their impact can be both positive and negative. According to Surmeier et al. (2024), brokers frequently have greater access to market information but may exploit farmers by dictating prices, thus affecting profit margins. Nevertheless, their significant share highlights the reliance of farmers on external market facilitators.

The price of poultry is a critical factor that has an impact on the decisions of poultry farmers, especially when considering the adoption of IIC. Various stakeholders determine poultry prices, including producers, middlemen, wholesalers, and retailers, with government policies, market demand, and production costs

playing significant roles. This study determined the uptake of IIC among poultry farmers, taking into account how poultry prices have an impact on poultry farmers' decisions to invest in IIC. Understanding the key determinants of poultry prices is essential to understanding the barriers and motivations behind farmers' willingness to adopt improved poultry in the context of changing market conditions (Buckel et al., 2024). The results of who determines poultry price are shown in Table 3.

Table 3: Information on Who Determines Poultry Price

Marketing of poultry	Category of Those Who Determine Poultry Price	Frequency
Determining poultry price	Poultry farmer	62
	Farmers' co-operative society	2
	Poultry farmers' group	5
	Brokers	81
	Total	150

The results suggest that fellow poultry farmers were cited by 62 respondents as one of the key groups that has an impact on prices. This peer-based price-setting can be indicative of a market where farmers adjust their prices based on competition and informal exchanges of market information (Chimenti, 2021). The close relationship among farmers can lead to price harmonisation, but it can also result in price wars or collusion, depending on market dynamics. The involvement of poultry farmers' groups (5) and farmer cooperatives (2) in price determination was relatively limited. This could reflect limited organisational strength or lack of impact on price negotiations. Cooperatives and farmer groups are typically expected to play a stronger role in collective bargaining, yet their limited impact might be attributed to factors such as insufficient capacity, fragmentation of the poultry industry, or the informal nature of many of these groups (Schmidt et al., 2023).

Furthermore, brokers played a dominant role in determining poultry prices, with 81 poultry farmers indicating that brokers were the primary price determinants. This aligns with the broader literature on agricultural value chains, where middlemen or brokers are often the primary negotiators of prices, particularly in developing markets. Brokers can have an impact on price determination due to their control over market access, information, and distribution channels (Ngoc et al., 2023). The results are the same as those of the past studies, indicating that intermediaries such as brokers are common in the market to negotiate prices for a farmer on a specific commodity (Mburu, 2021). This act of brokers acting as intermediaries in price negotiation threatens the existence of small traders, resulting in exploitation and, hence, low profits for the farmers (Kuijpers et al., 2024).

Uptake of Improved Indigenous Chicken by Poultry Farmers

The results in Table 4 reveal that 51.3% of the poultry farmers were keeping between 0 and 10 IIC. However, within this group, only 1.3% of the poultry farmers were adopters of IIC, keeping ten or fewer than ten birds, while the remaining 50% of the poultry farmers were non-adopters. These non-adopters continued to keep IC but had not yet transitioned to IIC. Several possible explanations for this include lack of awareness about the benefits of IIC and financial constraints preventing investment in improved breeds. Low hatchability of IIC or a preference for IC due to cultural familiarity or market demand could also be possible explanations (Ochora et al., 2023). Additionally, farmers might be hesitant to adopt improved

breeds due to perceived risks related to disease susceptibility, input costs, or uncertainties about productivity and profitability (Bogueva et al., 2023). The presence of only two adopters keeping ten or fewer than ten IIC may indicate that some farmers are testing the IIC before fully integrating them into their flocks. This could reflect a cautious adoption approach, which has an impact on the availability of extension services, market incentives, or previous experiences with IIC performance (Birhanu & Jensen, 2023). The category of poultry farmers keeping between 10 and 20 IIC was 4.7%, representing a small segment of farmers. These results may indicate a transitional phase where farmers are beginning to scale up from a smaller flock but are not yet fully committed to larger-scale poultry farming. This trend could have an impact on the desire to test the performance of improved chicken before making larger investments. The small percentage might also reflect limitations in access to capital or support systems for scaling up poultry production (Mdletshe & Obi, 2023). A significant portion of farmers, almost half (44.0%), were maintaining larger flocks of over 20 IIC. This suggests a higher level of adoption among some farmers, likely indicating that they perceive tangible benefits from the improved chicken, such as better disease resistance, higher productivity, and marketability. The results are consistent with studies that show increased flock size as farmers become more confident in the benefits of IIC (Kamau et al., 2023).

Table 4: : Uptake of Improved Indigenous Chicken by Poultry Farmers

Uptake of Improved Indigenous Chicken	Category of Uptake of Improved Indigenous Chicken Items	Percentage	
		IIC Adopters	IIC Non-adopters
The number of IIC kept	0-10	1.3	50.0
	10-20	4.7	0.0
	>20	44.0	0.0
Number of IIC sold per year	0-10	2.0	50.0
	10-50	11.3	0.0
	>50	36.7	0.0
Number of IIC eggs produced per month	0-150	3.3	50.0
	150-200	13.3	0.0
	>200	33.3	0.0
Number of IIC eggs sold per month	0-100	4.0	50.0
	100-200	12.0	0.0
	>200	34.0	0.0

The results indicate that more than half (52%) of poultry farmers were selling between 0 and 10 improved indigenous chicken per year. However, within this group, only 2% of the poultry farmers were adopters of IIC, selling ten or fewer than ten IIC annually. The remaining 50% of the poultry farmers were non-adopters who were only keeping IC; not keeping IIC and, therefore, not selling IIC. These findings suggest that the commercialisation of IIC remains low among IIC farmers. Some factors may contribute to this trend, including limited access to improved chicken breeds, lack of awareness of their market potential, or financial constraints that hinder investment in improved stock (Karamchedu et al., 2022). Additionally, farmers may be cautious in expanding their production due to uncertainties in market demand, pricing, and profitability of improved indigenous chicken (Zziwa et al., 2023). The low number of adopters selling improved indigenous chicken could also indicate that some farmers are in the early stages of adoption and may not yet have reached full production capacity. Furthermore, non-adopters keeping indigenous chicken but not keeping IIC and, therefore, not selling improved breeds may suggest a preference for IC due to

factors such as lower production costs, cultural significance, or established market networks (Behera & Adhikary, 2023).

Additionally, another category of poultry farmers selling between 10 and 50 IIC per year was 11.3%, representing a middle tier of adoption. These farmers might be in a transition phase, scaling up their production gradually as they gain confidence in the profitability and sustainability of IIC farming (Bartolacci et al., 2023). A substantial portion of farmers, 36.7%, were selling more than 50 IIC per year. This indicates that a smaller group of farmers has embraced improved practices and achieved a higher level of production, potentially due to access to better resources, markets, or support systems that facilitate larger-scale poultry farming. The greater volume of sales could also reflect the economic viability and market demand for improved indigenous chicken breeds (Ramukhithi et al., 2023). Overall, while a large proportion of farmers are selling fewer IIC, a significant percentage are scaling up production. Therefore, this could indicate growing confidence in the benefits of IIC farming, such as higher productivity and market demand, despite challenges in uptake (Bulte & Lensink, 2023).

The findings suggest that 53.3% of the poultry farmers produced between 0 and 150 eggs from IIC monthly. Within this group, only 3.3% of the poultry farmers were adopters of improved indigenous chicken, producing 150 or fewer than 150 IIC eggs monthly. The remaining 50% of the poultry farmers were non-adopters, keeping only IC; not keeping IIC, therefore not producing any IIC eggs. These findings suggest that the adoption of improved indigenous chicken for egg production is still relatively low among poultry farmers. Some factors could explain this, including the age and health of the chicken, feed quality, management practices, and environmental conditions. For instance, research by Kumalasari et al. (2023) indicated that IIC often show increased productivity, but this can be contingent upon proper management and feed. Low egg production may also be a result of genetic limitations, where some IIC strains are not as prolific as others in terms of egg-laying capacity (Mensah et al., 2023).

A smaller portion of farmers (13.3%) producing between 150-200 eggs per month suggests that a middle ground of egg production exists. This could reflect varying levels of management, feed, or other environmental factors that affect egg output. As Balabaygloo et al. (2023) indicate, intermediate production levels often occur when farmers are beginning to optimise conditions but may not have yet fully harnessed the genetic potential of the IIC for higher egg output. The breakdown of egg sales among poultry farmers provides insights into market trends, consumer behaviour, and the overall reach of IIC eggs. The poultry farmers producing more than 200 eggs per month were 33.3%. This figure shows that a significant portion of farmers are seeing relatively high egg production from their IIC. This could be attributed to improved management practices, better feed, or genetic improvements in the stock of IIC being used by these farmers. Improved indigenous chicken with proper breeding and nutrition can produce significant numbers of eggs, often exceeding 200 per month, aligning with the experiences of these farmers (Yadav et al., 2024).

The results indicate that 54% of the poultry farmers sold between 0 and 100 eggs from improved indigenous chicken (IIC) monthly. Within this group, only 4% of the poultry farmers were adopters of improved indigenous chicken, selling 100 or fewer than 100 IIC eggs monthly. The remaining 50% of the poultry farmers were non-adopters, keeping IC only; not keeping IIC, therefore, not selling any IIC eggs. This suggests that the majority of the farmers may still be in the early stages of adopting improved breeds or that they are facing challenges in scaling up production. The relatively low sales of IIC eggs could indicate

factors such as limited flock sizes, inadequate infrastructure, or insufficient market access (Vieira et al., 2022). This trend might reflect the caution with which some farmers approach the introduction of new breeds, possibly due to concerns about the cost and management of improved chicken, as well as the need for training and support. Research by Hasimuna et al. (2023) highlights that many small-scale farmers face difficulties in the transition to new breeds, including inadequate information on management practices and breeding strategies.

The 34% of the poultry farmers selling more than 200 eggs suggests a significant portion of the farmers can produce at a larger scale and have successfully adopted IIC for more commercial purposes. This indicates that these farmers may have larger flock sizes or more efficient production systems. This category of farmers is likely benefiting from the improved genetics of IIC, which can lead to better egg production rates compared to IC. The finding aligns with studies like that of Kpomasse et al. (2023), who found that improved indigenous breeds generally have better productivity metrics in terms of egg production. The poultry farmers selling 100-200 IIC eggs were 12%. This group represents those with moderate sales, possibly indicating a transition phase between small-scale and large-scale production. They might be experimenting with improved breeds or slowly increasing their flock sizes. These farmers could be facing barriers such as access to reliable feed, veterinary care, or marketing channels that would allow them to move to higher levels of production. According to Pansara (2023), a challenge often faced by farmers in this intermediate category is the ability to scale production effectively due to resource constraints or fluctuating demand.

Impact of Poultry Marketing on Uptake of Improved Indigenous Chicken

The results in Table 5 indicate that the adjusted R^2 is 1.17 per cent. The adjusted R^2 (1.17%) indicates the change in uptake of improved indigenous chicken as a result of the change in the uptake of improved indigenous chicken that poultry marketing would account for if data was obtained from the population.

Table 5: Multiple Linear Regression Results on Uptake of Improved Indigenous Chicken

Model		Adjusted R Square	Sig.	Standardised Coefficients
1	(Constant)	0.117	0.000[b]	
	Price of mature IIC			0.358
	Where poultry is sold			0.042
	Who finds poultry market			0.058
	Who determines poultry price			0.114

The findings revealed that poultry marketing has a significant impact on the uptake of improved indigenous chicken. The regression equation is significant with P = 0.000. The study, therefore, rejects the null hypothesis and accepts the alternative hypothesis that: "There is a statistically significant impact of poultry marketing on uptake of improved indigenous chicken among poultry farmers in Konoin Sub-county, Bomet County, Kenya." This is explained by the fact that the uptake of improved indigenous chicken requires the right marketplace where poultry will be sold and the right price at which poultry will be sold. These results agree with those of Chiekezie et al. (2022), who established that market outlet price of a product is agreed upon and grounded on the prevailing prices. This guides the poultry farmers on how and where to sell their poultry.

The regression coefficients demonstrate the extent to which each variable has an impact on the uptake of IIC. A unit increase in the price of mature IIC (X_1) leads to a +0.358 increase in uptake, suggesting that higher prices incentivise farmers to invest in improved breeds due to the expectation of better financial returns. Access to market-related information or where poultry is sold (X_2) leads to a +0.042 increase in IIC uptake. Similarly, access to information on who finds the poultry market (X_3) is associated with a +0.058 increase in IIC uptake, implying that strong market linkages and buyer access encourage the uptake of IIC. Additionally, knowledge of who sets poultry price (X_4) contributes to a +0.114 increase in uptake, indicating that when farmers have clarity on pricing mechanisms or participate in price-setting decisions, they are more likely to engage in the keeping of IIC. This suggests that well-informed farmers who understand market trends and pricing dynamics are more inclined to invest in improved indigenous chicken. These findings align with previous studies highlighting the impact of market access, price incentives, and information availability on the adoption of improved agricultural technologies (Marion et al., 2024).

Conclusion and Recommendation

The impact of poultry marketing on the uptake of IIC is shaped by key factors such as the price of IIC, market location, market facilitation, and price determination. Low IIC prices often deter uptake, especially when poultry sales are the primary source of income for many farmers. Poultry farmers can also be discouraged from the uptake of IIC when constrained by low or inconsistent returns. Farmers who sell poultry in local markets or through informal channels often face limited bargaining power, which reduces their ability to secure adequate profits for reinvestment in IIC. Additionally, the role of intermediaries or support organisations in finding markets significantly impacts farmers' access to better prices and reliable buyers. When market facilitation is lacking, farmers are more likely to sell IIC at undervalued prices, reducing their capacity to afford IIC technologies. Moreover, price determination by intermediaries or market forces, rather than the farmers themselves, can further limit their financial returns.

To enhance IIC uptake, it is essential to strengthen poultry marketing systems by ensuring better price transparency, supporting farmers in accessing wider and more competitive markets, and providing price negotiation training. These measures will empower farmers to achieve more favourable income levels, enabling them to invest in IIC. Poultry farmers need to conduct market research to establish competitive and attractive pricing for IIC, ensuring prices reflect the added value while remaining affordable to both farmers and consumers. Agricultural extension officers should implement training programs for farmers on cost-benefit analysis to demonstrate how IIC offer higher returns compared to IC. Subsidies or microfinance schemes could be introduced to reduce the initial investment cost for farmers to maximise profits after sale.

References

Balabaygloo, B. J., Bekee, B., Blair, S. W., Fey, S., Fotouhi, F., Gupta, A., Menke, K., Vangala, A., Palomares, J. C. M., Prestholt, A., Tanwar, V. K., Tao, X., Carroll, M. E., Das, S., Depaula, G., Kyveryga, P., Sarkar, S., Segovia, M., Sylvestri, S., … Singh, A. K. (2023). *Smart Connected Farms and Networked Farmers to Tackle Climate Challenges Impacting Agricultural Production* (arXiv:2312.12338). arXiv. https://doi.org/10.48550/arXiv.2312.12338

Bartolacci, F., Marcantoni, M., & Usci, R. (2023). How to Turn Poultry Manure into Valuable Resources: A Circular Business Model for Resilient and Sustainable Small and Medium-Sized Farms. *Journal of Management and Sustainability*, *13*(2), 1. https://doi.org/10.5539/jms.v13n2p1

Behera, R., & Adhikary, L. (2023). Review on Cultured Meat: Ethical Alternative to Animal Industrial Farming. *Food Research*, *7*(2), 42–51. https://doi.org/10.26656/fr.2017.7(2).772

Birhanu, M. Y., & Jensen, N. (2023). Dynamics of Improved Agricultural Technologies Adoption: The Chicken and Maize Paradox in Ethiopia. *Sustainable Futures*, *5*, 100112. https://doi.org/10.1016/j.sftr.2023.100112

Bogueva, D., Marques, M., Molento, C. F. M., Marinova, D., & Phillips, C. J. C. (2023). Will the Cows and Chickens Come Home? Perspectives of Australian and Brazilian Beef and Poultry Farmers Towards Diversification. *Sustainability*, *15*(16), 12380. https://doi.org/10.3390/su151612380

Bomet County. (2023). *The County Government of Bomet: County Annual Development Plan*. http://www.bometassembly.go.ke/blog/county-annual-development-plan-fy-2023-2024

Buckel, A., Afakye, K., Koka, E., Price, C., Kabali, E., & Caudell, M. A. (2024). Understanding the Factors Influencing Biosecurity Adoption on Smallholder Poultry Farms in Ghana: A Qualitative Analysis Using the Com-B Model and Theoretical Domains Framework. *Frontiers in Veterinary Science*, *11*, 1324233. https://doi.org/10.3389/fvets.2024.1324233

Bukachi, S. A., Ngutu, M., Omia, D., Musyoka, M. M., Chemuliti, J., & Nyamongo, I. K. (2023). Gender-Linked Dynamics and Sustainable Small Holder Poultry Value Chains in Makueni County, Kenya. *Sustainability*, *15*(14), 10907. https://doi.org/10.3390/su151410907

Bulte, E., & Lensink, R. (2023). Why Agricultural Insurance May Slow Down Agricultural Development. *American Journal of Agricultural Economics*, *105*(4), 1197–1220. https://doi.org/10.1111/ajae.12353

Carron, M., Alarcon, P., Karani, M., Muinde, P., Akoko, J., Onono, J., Fèvre, E. M., Häsler, B., & Rushton, J. (2017). The Broiler Meat System in Nairobi, Kenya: Using a Value Chain Framework to Understand Animal and Product Flows, Governance and Sanitary Risks. *Preventive Veterinary Medicine*, *147*, 90–99. https://doi.org/10.1016/j.prevetmed.2017.08.013

Catania, G., Zanini, M., Hayter, M., Timmins, F., Dasso, N., Ottonello, G., Aleo, G., Sasso, L., & Bagnasco, A. (2021). Lessons from Italian Front-Line Nurses' Experiences during the Covid-19 Pandemic: A Qualitative Descriptive Study. *Journal of Nursing Management*, *29*(3), 404–411. https://doi.org/10.1111/jonm.13194

Chiekezie, N. R., Nwankwo, E. C., & Ozor, M. U. (2022). Analysis of Small-Scale Broiler Poultry Production in South East Nigeria, West Africa. *International Journal of Animal Health and Livestock Production Research*, *6*(1), 1–16. https://doi.org/10.37745/ijahlpr.15/vol6n1116

Chimenti, G. (2021). *Performing Ambiguity: Following Multiplicity in Shared Mobility Markets* (1st ed., Vol. 6). Stockholm School of Economics.

Effiong, M., Ekerete, U., Emmanuel, M., & Kajang, V. (2023). Roadside Trading and Road Traffic Management in the Development of Uyo Metropolis, Akwa Ibom State. *ICIDR Publishing House*, *21*(2), 111–123.

Goldstein, M., Sanchez, D., Theveny, P., College, W., & Gardner, P. S. (2024). Sowing Seeds of Connection: Amplifying Farm to School Initiatives in North Adams. *The American Journal of Clinical Nutrition*, *110*(1), 66.

Hasimuna, O. J., Maulu, S., Nawanzi, K., Lundu, B., Mphande, J., Phiri, C. J., Kikamba, E., Siankwilimba, E., Siavwapa, S., & Chibesa, M. (2023). Integrated Agriculture-Aquaculture as an Alternative to Improving Small-Scale Fish Production in Zambia. *Frontiers in Sustainable Food Systems*, *7*(2), 1161121. https://doi.org/10.3389/fsufs.2023.1161121

Hosseinnezhad, D. (2024). *A Study on Supply Chain Resilience: Vertical and Horizontal Collaborations, Flexible Contracts, and Digitisation*. 7268754 Bytes. https://doi.org/10.34961/RESEARCHREPOSITORY-UL.27637383.V1

Junyong, I., Kang, H., Kim, J. H., Kim, T. K., Ahn, E. J., Lee, D. K., Lee, S., & Park, J. H. (2020). Tips for Troublesome Sample-Size Calculation. *Korean Journal of Anesthesiology*, *73*(2), 114–120. https://doi.org/10.4097/kja.19497

Kamau, C. N., Kabuage, L. W., & Bett, E. K. (2019). Analysis of Improved Indigenous Chicken Adoption among Smallholder Farmers: Case of Makueni and Kakamega Counties, Kenya. *International Journal of Agricultural Extension*, *7*(1), 21–37. https://doi.org/10.33687/ijae.007.01.2809

Kamau, C. N., Majiwa, E. B., Otieno, G. O., & Kabuage, L. W. (2023). Intention to Adopt Improved Indigenous Chicken Breeds among Smallholder Farmers in Machakos County, Kenya. Do Socio-Psychological Factors Matter? *Heliyon*, *9*(11), e22381. https://doi.org/10.1016/j.heliyon.2023.e22381

Karamchedu, A. K., Syndicus, I. S., & Tak, M. T. (2022). *Identifying Economic and Financial Drivers of Industrial Livestock Production—The Case of the Global Chicken Industry*. Tiny Beam Fund. https://doi.org/10.15868/socialsector.40548

Kenya National Bureau of Statistics [KNBS]. (2019). *Kenya Population and Housing Census*. http//www.knbs.or.ke

Kpomasse, C. C., Kouame, Y. A. E., N'nanle, O., Houndonougbo, F. M., Tona, K., & Oke, O. E. (2023). The Productivity and Resilience of the Indigenous Chickens in the Tropical Environments: Improvement and Future Perspectives. *Journal of Applied Animal Research*, *51*(1), 456–469. https://doi.org/10.1080/09712119.2023.2228374

Kuijpers, R., Smits, E., Steijn, C., Mulumba, N., Asindu, M., Kruijssen, F., & Kikulwe, E. M. (2024). Prices, Profit Margins and Intermediary Market Power: Evidence From the Matooke Value Chain in Uganda. *Journal of Agribusiness in Developing and Emerging Economies*, *14*(4), 694–711. https://doi.org/10.1108/JADEE-06-2022-0105

Kulla, D., Amoussou, P., Dognon, A. Y., Gbèdé, T. R., Glele, I. T., Graser, M., Jimmy, K. P., Karimou, S., Kinkpet, A. T., Klause, K. A., Castro, G. M., & Marner, E. M. (2021). *The Impact of Chicken Imports on the Beninese Poultry Industry: Analysis of Trade Issues, Consumer Preferences and Production Systems to Strengthen the Competiveness of the National Sector* (1st edition). Humboldt-Universität zu Berlin, SLE Postgraduate Studies on International Cooperation for Sustainable Development. https://doi.org/10.18452/24478

Kumalasari, C., Adriani, L., Yudha Asmara, I., & Nayan, N. (2023). Administration of Probiotics to Increase Egg Production and Extend the Productivity of Late-Phase Laying Hen: A Review. *Advances in Animal and Veterinary Sciences*, *11*(8), 14. https://doi.org/10.17582/journal.aavs/2023/11.8.1236.1249

Kumar, C. S., & Yale, S. S. (2016). Identifying and Eliminating Bias in International Research Studies: A Qualitative Indicator. *International Journal of Contemporary Medical Research*, *3*(6).

Kwiringira, J., Mohling, E. W. P., Mathias, A., Ariho, P., Mugisha, J., Zakumumpa, H., Rujumba, J., & Tumwebaze, I. K. (2024). Urban Agriculture as an Evolved Sustainable Urban Livelihood: Evidence from Kampala City, Uganda. *Agriculture & Food Security*, *13*(1), 53. https://doi.org/10.1186/s40066-024-00507-y

Lee, H. P. (2024). *"Chickens Living in Better Environments Lay Happier Eggs": Consumer Attitudes Towards Cage-Free Eggs* [A Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Science in the Faculty of Applied Animal Biology]. The University of British Columbia.

Manyelo, T. G., Selaledi, L., Hassan, Z. M., & Mabelebele, M. (2020). Local Chicken Breeds of Africa: Their Description, Uses and Conservation Methods. *Animals*, *10*(12), 2257. https://doi.org/10.3390/ani10122257

Marion, P., Lwamba, E., Floridi, A., Pande, S., Bhattacharyya, M., Young, S., Villar, P. F., & Shisler, S. (2024). The Effects of Agricultural Output Market Access Interventions on Agricultural, Socio-Economic, Food Security, and Nutrition Outcomes in Low- and Middle-Income Countries: A Systematic Review. *Campbell Systematic Reviews*, *20*(2), e1411. https://doi.org/10.1002/cl2.1411

Mburu, P. (2021). Resolving the Disconnect Between Market Actors, Agents and Brokers and Smallholder Fresh Produce Farmers in Agribusiness. *E3 Journal of Business Management and Economics*, *11*(1), 001–009. https://doi.org/10.18685/EJMR(8)1_EJBME-21-011

Mdletshe, S. T. C., & Obi, A. (2023). Investigating the Profitability of Government-Funded Small-Scale Broiler Projects in Northern Kwazulu-Natal, South Africa. *Agriculture*, *13*(12), 2269. https://doi.org/10.3390/agriculture13122269

Mensah, P., Adomako, K., Hagan, B. A., Hamidu, J. A., & Olympio, S. O. (2023). Qualitative Mutant Traits Within the Indigenous Chicken Population in Selected Ecological Zones of Ghana. *Scientific African*, *20*, e01695. https://doi.org/10.1016/j.sciaf.2023.e01695

Ndirangu, S., Mbogoh, S., & Mbatia, O. (2018). Evaluation of the Elasticity of Farm Output among Smallholder Farmers in Selected Agro-Ecological Zones of Embu County, Kenya. *Asian Journal of Agricultural Extension, Economics & Sociology*, *26*(3), 1–10. https://doi.org/10.9734/AJAEES/2018/43048

Ngoc, N. M., Duc, L. D. M., Hieu, V. M., & Tien, N. H. (2023). Enhancing Efficiency of Real Estate Brokerage Activities in Vietnam. *International Journal of Business and Globalisation*, *1*(1), 24. https://doi.org/10.1504/IJBG.2022.10061770

Ochora, S., Kasima, J. S., Okot, W. M., & Ndyomugyenyi, E. K. (2023). Performance of Local and Local X Improved Chicken Crosses Under Semi-Intensive Management System in Northern Uganda. *Cogent Food & Agriculture*, *9*(1), 2213925. https://doi.org/10.1080/23311932.2023.2213925

Pansara, R. R. (2023). Seeding the Future by Exploring Innovation and Absorptive Capacity in Agriculture 4.0 and Agtechs. *International Journal of Sustainable Development*, *5*(2), 46–59.

Penrith, M.-L., Van Heerden, J., Pfeiffer, D. U., Oļševskis, E., Depner, K., & Chenais, E. (2023). Innovative Research Offers New Hope for Managing African Swine Fever Better in Resource-Limited Smallholder Farming Settings: A Timely Update. *Pathogens*, *12*(2), 355. https://doi.org/10.3390/pathogens12020355

Pius, L. O., Strausz, P., & Kusza, S. (2021). Overview of Poultry Management as a Key Factor for Solving Food and Nutritional Security with a Special Focus on Chicken Breeding in East African Countries. *Biology*, *10*(8), 810. https://doi.org/10.3390/biology10080810

Ramukhithi, T. F., Nephawe, K. A., Mpofu, T. J., Raphulu, T., Munhuweyi, K., Ramukhithi, F. V., & Mtileni, B. (2023). An Assessment of Economic Sustainability and Efficiency in Small-Scale Broiler Farms in Limpopo Province: A Review. *Sustainability*, *15*(3), 2030. https://doi.org/10.3390/su15032030

Schmidt, V., Webster, E., Mhlana, S., Forrest, K., International Labour Organisation. Conditions of Work and Equality Department, & International Labour Organisation. Inclusive Labour Markets, Labour Relations and Working Conditions Branch. (2023). *Negotiations by Workers in the Informal Economy* (1st ed., Vol. 1). International Labour Organisation. https://doi.org/10.54394/PVTN9258

Seufert, V., Austin, S. E., Badami, M. G., Turner, S., & Ramankutty, N. (2023). The Diversity of Organic Farmer Motivations and Livelihoods in the Global South: A Case Study in Kerala, India. *Geoforum*, *138*, 103670. https://doi.org/10.1016/j.geoforum.2022.103670

Surmeier, A., Meyer, I., & Maleka, M. (2024). Living Wages in Global Value Chains: Pitfalls and Pathways to Successful Implementation. *Organisational Dynamics*, 101109. https://doi.org/10.1016/j.orgdyn.2024.101109

Suwanmaneepong, S., Llones, C., Kerdsriserm, C., Khermkhan, J., Sabaijai, P. E., Samanakupt, T., Kaewtaphan, P., Chourwong, P., Mankeb, P., & Dana, L.-P. (2024). Participatory Value Chain Development. Insights from Community-Based Enterprise in Rural Thailand. *International Journal of Agricultural Sustainability*, *22*(1), 2371703. https://doi.org/10.1080/14735903.2024.2371703

VanVoorhis, C. R. W., & Morgan, B. L. (2007). Understanding Power and Rules of Thumb for Determining Sample Sizes. *Tutorials in Quantitative Methods for Psychology*, *3*(2), 43–50. https://doi.org/10.20982/tqmp.03.2.p043

Vieira, L. M., Nacimento, R. A., Mendes, C. M. I., De Carvalho, Í. C. S., & Demattê Filho, L. C. (2022). Assessing Smallholder Farmers' Perception of Value Creation and Appropriation in Sustainable Production. *International Journal of Environment and Sustainable Development*, *1*(1), 1. https://doi.org/10.1504/IJESD.2022.10052369

Waithaka, M. K., Osuga, I. M., Kabuage, L. W., Subramanian, S., Muriithi, B., Wachira, A. M., & Tanga, C. M. (2022). Evaluating the Growth and Cost–Benefit Analysis of Feeding Improved Indigenous Chicken with Diets Containing Black Soldier Fly Larva Meal. *Frontiers in Insect Science*, *2*, 933571. https://doi.org/10.3389/finsc.2022.933571

Wambua, S., Macharia, I., & Mwenjeri, G. (2022a). Challenges and Opportunities in Improved Indigenous Chicken Production in Kenya. *East African Agriculture Journal*, *88*(3), 180–189.

Wambua, S., Macharia, I., & Mwenjeri, G. (2022b). Cost Efficiency of Improved Indigenous Chicken Producers in Kenya: A Stochastic Frontier Approach. *East African Agriculture Journal*, *88*(4), 220–226.

Yadav, O. P., Singh, D. V., Kumari, V., Prasad, M., Seni, S., Singh, R. K., Sood, S., Kant, L., Rao, B. D., Madhusudhana, R., Bhat, B. V., Gupta, S. K., Yadava, D. K., & Mohapatra, T. (2024). Production and Cultivation Dynamics of Millets in India. *Crop Science*, *8*(2), 26. https://doi.org/10.1002/csc2.21207

Yami, M., Cavicchioli, M., Abate, G. T., & Kramer, B. (2024). *Gendered Drivers of Varietal Turnover: A Qualitative Assessment for Improved Teff and Wheat Varieties in Ethiopia* (Food Policy 3; p. 41). International Food Policy Research Institute. https://www.researchgate.net/publication/385937012

Yusuf, S. F. G., & Popoola, O. O. (2022). An Evaluation of the Effectiveness of the Training Offered to Smallholder Scavenging Chicken Farmers in Raymond Mhlaba Local Municipality, Eastern Cape Province, South Africa. *Sustainability*, *14*(23), 15735. https://doi.org/10.3390/su142315735

Zhu, X., & Wang, G. (2024). Impact of Agricultural Cooperatives on Farmers' Collective Action: A Study Based on the Socio-Ecological System Framework. *Agriculture*, *14*(1), 96. https://doi.org/10.3390/agriculture14010096

Zziwa, A., Matsapwe, D., Kyeyune, R. K., Kizito, S. S., & Mukebezi, R. (2023). *Innovative Pathways to Profitability: A Comprehensive Analysis of Value Addition and Resource Recovery in Peri-Urban Poultry Farming*. *2*(6).