MAKERERE UNIVERSITY

COLLEGE OF VETERINARY MEDICINE, ANIMAL RESOURCES AND BIOSECURITY

SCHOOL OF VETERINARY MEDICINE AND ANIMAL RESOURCES

DEPARTMENT OF LIVESTOCK AND INDUSTRIAL RESOURCES

FACTORS INFLUENCING THE UTILISATION OF POULTRY FEED ADDITIVES AND FARMER'S PERCEPTIONS OF THEIR QUALITY IN SELECTED PARISHES OF KASANGATI TOWN COUNCIL, WAKISO DISTRICT.

BY

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BAPTM 3

A SPECIAL PROJECT REPORT SUBMITTED TO COLLEGE OF VETERINARY MEDICINE ANIMAL RESOURCES AND BIOSECURITY IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A DEGREE OF BACHELOR OF ANIMAL PRODUCTION TECHNOLOGY AND MANAGEMENT OF MAKERERE UNIVERSITY.

MAY 2026

DECLARATION

I, Nankwanga Joyce, hereby declare that this special project report, entitled ''Factors Influencing the Utilization of Poultry Feed additives and Farmers' perceptions of their Quality in selected parishes of Kasangati Town Council, Wakiso District' 'is my original work and has never been submitted for any academic degree or award at any other Institution. All sources of information used have been duly acknowledged and appropriately cited in accordance with academic convention.

Signature: .....

Date.....4/09/2026.....

APPROVAL

The special project report has been submitted for examination with the approval of my supervisor

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Signature: ..Sebulime Peregrine.....

Date.....04/09/2026.....

DEDICATION

This work is dedicated to Almighty God, whose endless grace, guidance and sustaining strength carried me through every stage of this journey.

To my dear mother; a widow and my sole parent and supporter. I offer my deepest gratitude for your countless sacrifices, steadfast prayers and unwavering love.

You have been my greatest source of strength and inspiration. This achievement is as much yours as it is mine.

ACKNOWLEDGEMENT

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Special appreciation is extended to the veterinary extension officers of Kasangati town council for their assistance in identifying study respondents and facilitating the data collection process.

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation	Meaning
AGP	Antibiotic Growth Promoters
AMR	Antimicrobial Resistance
BAPTM	Bachelor of Animal Production Technology and Management
BSF	Black solider fly
Ci	Confidence interval
COVAB	Collage of Veterinary Medicine Animal Resources and Biosecurity.
DON	Deoxynivalenol
E. coli	Escherichia coli
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCR	Feed conversion ratio
FOS	Fructooligosaccharides
GOS	Galacto-oligosaccharides
HSCAS	Hydrated Sodium Calcium Aluminosilicates.
ISAPP	International Scientific Association for probiotics and prebiotics
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
SPSS	Statistical Package for social scientists
SMS	Short message service
SD	Standard Deviation
OR	Odds Ratio
UNBS	Uganda National Bureau of Standards
TBARS	Thio barbituric Acid Reactive Substance

UGX	Uganda Shilling
XOS	Xylo-oligosaccharides
MOS	Mannan-Oligo saccharides.

ABSTRACT

Poultry production constitutes a critically important enterprise in Uganda, contributing substantially to household food security, income generation and rural employment.

Although feed additives are widely recognized for their potential to enhance growth performance, feed conversion efficiency, and disease resistance, their utilization among small holder farmers remains inconsistent and the quality of products available on local markets is poorly regulated. Against this background, the present study was designed to assess the factors influencing the utilization of poultry feed additives and to evaluate farmers' perceptions of their quality among poultry producers in selected parishes of Kasangati Town Council, Wakiso District.

Across sectional survey design was adopted, and primary data were collected from 100 poultry farmers selected through a multistage purposive sampling from five parishes. Data were collected using a structured questionnaire administered via kobo Toolbox, and all analyses were carried out using SPSS version 26, employing descriptive statistics, multiple response analysis and chi square tests.

The findings revealed that vitamins, growth promoters and minerals were the most widely utilized additive categories, whereas probiotics and antioxidants were never used. Expected benefits for birds, price and professional advice emerged as the primary drivers of Utilizations, while high cost was most frequently cited barrier. Although farmers generally held positive perceptions of additive quality, a substantial proportion reported encountering poor quality products, checked only limited label information, and rarely reported quality concerns to regulatory authorities.

It is concluded that, despite generally favorable perceptions of feed additive quality, significant challenges persist, including cost barriers, product quality inconsistencies, unsupervised use of growth promoters and week regulatory enforcement.it is recommended that the Animal feed Act ,2024 be expedited, that complaint reporting mechanisms be strengthened, and that targeted farmer training on responsible additive use be prioritized.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

Feed additives have emerged as valuable inputs for improving feed efficiency, promoting growth, preventing disease and enhancing overall bird performance in modern poultry production systems worldwide(Alabi and Adedokun 2025, Kırkpınar, Açıkgöz et al. 2025).The food and Agriculture Organization defines feed additives as non-nutritive substances or preparations added to animal feeds in order to improve feed quality, enhance animal health and improve production efficiency. Common categories include vitamins and mineral premixes, amino acids, enzymes, probiotics, prebiotics, antibiotics and toxin binders.(Okey 2023).

In recent years, there has been an increasing interest in feed additive utilization across sub-Saharan Africa, as the global animal feed market continue to expand driven by rising consumer demand for high protein diets and the subsequent growth in livestock production(Kırkpınar, Açıkgöz et al. 2025)Chicken feeds constitutes more than75% of input costs on most commercial farms(Nampanzira, Kizza et al. 2025),and feed quality directly determines bird productivity in terms of egg and meat output, which intern affects enterprise productivity(Nampanzira, Kizza et al. 2025).Despite these realities the feed production industry in Uganda remain largely unstructured and unregulated, and the quality of feed produced is not systematically monitored(Kizza, Okello et al. 2024).

In Uganda, poultry production is a cornerstone of the Agricultural sector, contributing significantly to household food security income, generation and employment creation, particularly among rural and peri-urban communities. Across -sectional study conducted across 10 districts found that 54.7% of poultry farmers were female with broilers (37.2%),layers (21.6%),and kuroilers (28.5%) constituting the major poultry types reared(Nampanzira, Kizza et al. 2025).The same study identified price fluctuation (40.5%of farmers) and low quality and feed ingredients (24.3% of farmers) as the foremost challenges facing poultry production in Uganda.

Evidence suggests that farmers ‘perceptions of feed additive quality significantly shape their utilization patterns. Research indicates that organoleptic evaluation methods (visual inspection, smell, touch and feel)are used by 72.6% of farmers to assess feed quality, while 13.0% rely on peer

opinions and 7.6% depend on feed sellers' recommendations(Nampanzira, Kizza et al. 2025).In Wakiso District, a study in Nangabo sub county found that 57% of poultry farmers had used Black Solider Fly (BSF) larvae as a feed supplement, with knowledge primary sourced from friends (33%),community members(27%) and extension workers (20%)(Birra 2024).The growing body of research on poultry feed additives in Uganda and across Africa underscores the need for a deeper understanding of the factors governing their Utilization and quality perceptions that shape adoption decisions.

1.2 Problem statement.

There is urgent need to address the persistent feed quality challenges that constrain poultry productivity in Uganda. Despite the fact that chicken feeds account for more than 75% of input costs on most commercial farms, and the feed quality directly determines the bird productivity and enterprise profitability (Nampanzira, Kizza et al. 2025),poultry farmers across Uganda continue to experience low productivity, high mortality rates and suboptimal growth performance. Study by(Nampanzira, Kizza et al. 2025) revealed that price fluctuation of feed ingredients well as poor feed and ingredient quality, were identified as the dominant challenges confronting poultry production in Uganda.

The feed sector in Uganda is not well regulated, no systematic surveillance has been conducted to evaluate the quality of products sold to farmers, and the only requirement for operating a feed business is an annual trade license(Kizza, Okello et al. 2024) This legislative gap has created an environment for counterfeit and substandard feeds to thrive on the Market. Research conducted on layer chicken farms in Wakiso District found that storage of feeds beyond one week significantly increased the risk of aflatoxin contamination, and that only 15.3% of farmers have ever considered feed formulation (Nakavuma, Kirabo et al. 2020).

Despite the strategic position of Kasangati Town Council as a peri urban poultry production hub close to Kampala City, limited research has been conducted on specific factors influencing Utilization of poultry feed additives and farmers' perceptions of their quality in this area. This knowledge gap hinders the development of targeted interventions to improve feed additive utilization, enhance productivity and safeguard farmer livelihoods. The present study therefore sought to address this gap by investigating the factors influencing utilization of poultry feed

additives and evaluating farmers 'perceptions of their quality among poultry farmers in Kasangati Town Council Wakiso District.

1.3 Main Objective

To assess the factors influencing Utilization of poultry feed additives and evaluate farmers 'perceptions of their quality in selected parishes of Kasangati Town council Wakiso District.

1.3.1 Specific Objectives

To determine the factors influencing the utilization of poultry feed additives by farmers in Kasangati Town Council

To evaluate farmers 'perceptions regarding the quality of poultry feed additives available in Kasangati Town Council

1.4 Research Questions

What categories of poultry feed additives are commonly used by farmers in Kasangati Town Council?

What factors influence the utilization of poultry feed additives among farmers in Kasangati Town Council?

What are farmers 'perceptions regarding the quality of poultry feed additives available in Kasangati Town Council?

1.5 Significance of the study

The findings of the study provide valuable evidence -based information for a range of stakeholders involved in the poultry value chain in Uganda.

- Poultry farmers: the study provides insights into the determinants of feed additive utilization and the quality attributes that influence adoption decisions, thereby enabling farmers to make more informed input choices that can improve productivity and profitability.

- Agricultural extension services: The findings identify specific knowledge gaps among farmers of different educational and experimental backgrounds, enabling extension providers to develop targeted training programs.
- Feed Additive manufacturers and suppliers: The study provides critical insights into farmer quality expectations and the attributes used to judge products quality, enabling manufacturers to highlight quality cues that resonate with farmers in Kasangati.
- Policy makers and regulatory bodies: The study furnishes evidence-based information to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the Uganda National Bureau of Standards (UNBS) to support the development of more effective quality control mechanisms following the enactment of the Animal Feeds Act, 2024.
- Academia: The study contributes to the existing body of literature on poultry feed additive utilization and quality perception in Uganda, providing a foundation for the future research.

1.6 Scope of the Study

1.6.1 Geographical scope

The study was conducted in five selected parishes of Kasangati Town Council, Wakiso District; Kabubbu, Kiteezi, Gayaza, Wampeewo, and Katadde. Kasangati Town Council was selected because it represents a significant peri-urban poultry production hub in close proximity to Kampala City, affording ready market access and hosting a diversity of production systems ranging from small-scale backyard operations to medium-scale commercial farms.

1.6.2 Content Scope

The study focused on three main areas; the socio-demographic profile of poultry farmers, the factors influencing utilization of poultry feed additives, encompassing socio-economic, institutional and farm-level determinants, and farmers' perceptions of feed additive quality including product efficacy, physical characteristics, safety, price and brand reputation.

1.6.3 Time Scope

The literature review covered documents published between 2023 and 2026. Primary data collection was conducted between April and May 2026 using a structured questionnaire administered via Kobo Toolbox.

1.7 Justifications of the study

This study is justified on three principal grounds. First the persistent challenges in poultry feed quality and utilization in Uganda have been well documented. A survey conducted across 10 districts, involving 320 poultry farmers and 59 feed millers, established that price fluctuation and low-quality feeds are the foremost challenges in the sector, and that both chicken producers and feed millers are aware of feed adulteration despite the industry remaining largely unregulated (Nampanzira, Kizza et al. 2025). Research in south-western Uganda further found that lack of awareness and limited appreciation of alternative feed additives constrain their adoption,(Kizza, Okello et al. 2024) underscoring the need for targeted investigation.

Second, the inadequate regulatory framework governing the poultry feed sector in Uganda justifies the study. The only operational requirement for conducting a feed business is an annual trade license, and regulatory services such as feed mill certification remain insufficient(Kizza, Okello et al. 2024).Although the Uganda National Bureau of Standards (UNBS) has established quality standards, compliance monitoring and farmer awareness of these standards remain limited (Nakavuma, Kirabo et al. 2020). This study provides evidence to strengthen regulatory enforcement and quality assurance, particularly in the context of the newly enacted Animal Feeds Act, 2024.

Third, the limited farmer knowledge and reliance on inadequate quality assessment methods underscores the need for this study. Organoleptic evaluation (Visual inspection, smell, and touch) is the predominant quality assessment method among 72.6% of farmers, and the majority of farmers have little or no knowledge of aflatoxins and their risks to poultry health(Kizza, Okello et al. 2024) (Nampanzira, Kizza et al. 2025). Gender also significantly influences quality assessment practices, with female farmers disproportionately relying on peer options (Nakavuma, Kirabo et al. 2020) These knowledge gaps justify profiling farmers' socio-demographic characteristics and their relationship to feed additive utilization decisions.

1.8 Conceptual Framework

The conceptual framework for this study posits that five sets of independent variables; socio-demographic, economic factors, farm characteristics, institutional factors, and quality perceptions; influence the utilization of poultry feed additives through three intervening variables: availability of additives, access to information and quality concerns. Educated, experienced farmers with higher incomes, larger flocks, access to extension services, and positive quality perceptions are expected to demonstrate greater additive utilization. For the purposes of this study, utilization is operationally defined and measured in terms of the type of additives used, frequency of use, and consistency of application.

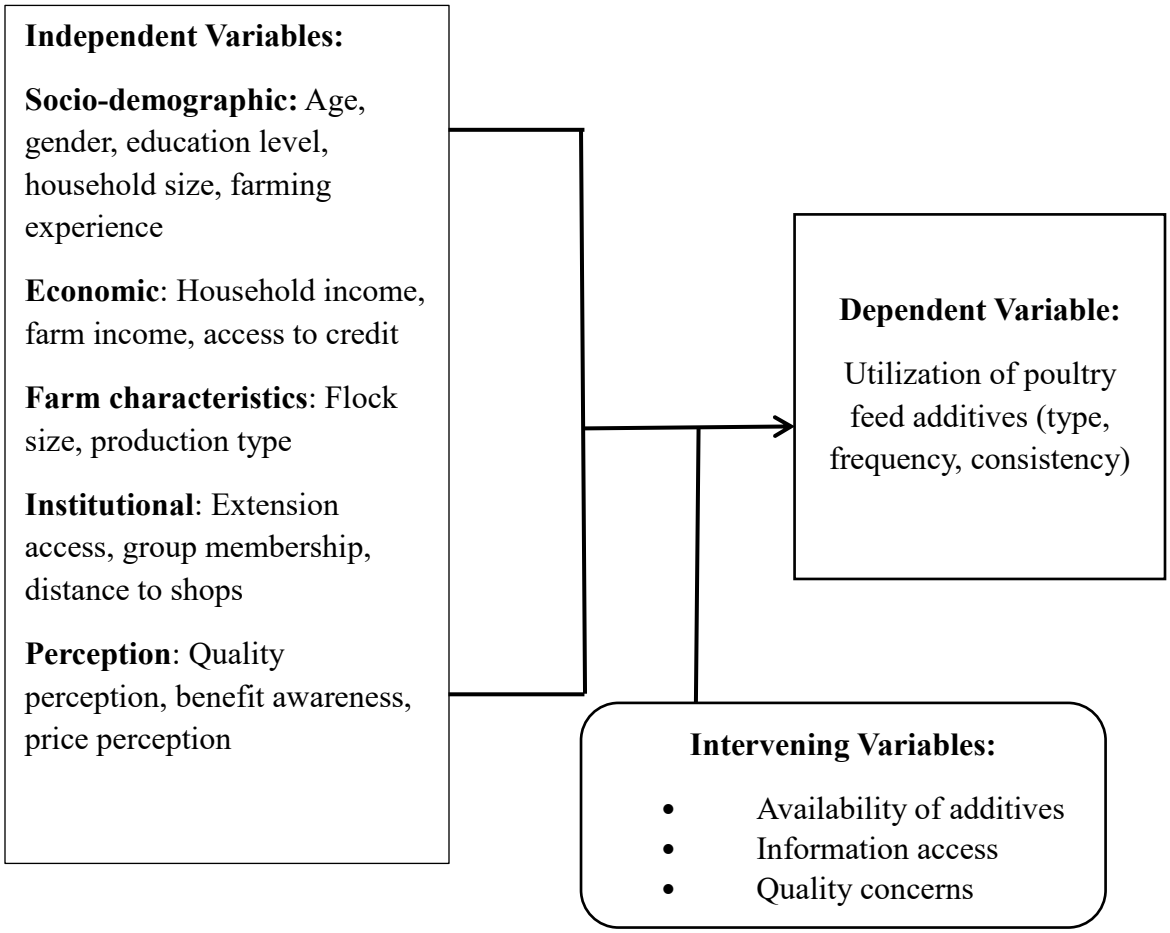

Figure 1: Showing a diagrammatic representation of the Conceptual framework used.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a crucial review of the literature on factors influencing the utilization of poultry feed additives and farmers' perceptions of their quality. It covers the major categories of feed additives used in poultry production, their documented benefits, the multifactorial determinants of their utilization, and current evidence on farmer quality perceptions. The review identifies critical gaps in the literature that the present study aims to address.

2.1 Common Poultry Feed Additives Used

Feed additives are defined as non-nutritive substances, ingredients, or preparations added to animal feed to improve feed quality, enhance animal health, promote growth performance, or increase production efficiency(Birra 2024). In modern intensive poultry production, feed additives have become indispensable, given the demanding requirements of achieving optimal growth rates, feed conversion ratios, and disease prevention outcomes.

2.1.1 Vitamins and Minerals Premixes

Vitamins and minerals are among the most fundamental feed additives in poultry nutrition. Although required only in trace amounts, these micronutrients play critical roles in metabolic functions, immune competence, bone development, feathering, and reproductive performance (Leeson and Summers 2009). Common vitamins include A, D3, E, K and the B-complex group. Macro minerals such as calcium, phosphorus, magnesium, sodium, and potassium, as well as trace minerals including Zinc, iron, copper, manganese, selenium, and iodine, are routinely supplemented as premix blends (Świątkiewicz, Arczewska-Włosek et al. 2014). Deficiencies in any of these micronutrients can result in severe metabolic disorders, compromised growth, poor eggshell quality, and elevated mortality.

2.1.2 Amino Acid Supplements

Amino acids are the structural basis of proteins and are essential for tissue growth, egg production, and body maintenance. Conventional poultry diets based on maize and soybean meal are frequently deficient in the first-limiting amino acids, namely methionine, lysine, and threonine (Kırkpınar, Açıkgöz et al. 2025). Supplementation with synthetic amino acids enables the formulation of precisely balanced diets, reducing nitrogen excretion, lowering feed costs, and improving feed conversion efficiency(Alabi and Adedokun 2025).

2.1.3 Enzymes

Exogenous enzymes are added to poultry feed to improve nutrient digestibility, degrade anti-nutritional factors, and enhance feed efficiency. Phytase, xylanase, β-glucanase, protease, and amylase are among the most widely used enzyme supplements in poultry nutrition (Burton 2023). Phytase releases bound phosphorus from phytate complexes in plant-based ingredients, thereby reducing dependence on inorganic phosphorus supplementation and minimizing environmental phosphorus excretion (Abdollahi, Zaefarian et al. 2018). Non-starch polysaccharide-degrading enzymes such as xylanase and β-glucanase reduce digesta viscosity, improving nutrient absorption and litter quality.

2.1.4 Probiotics

Probiotics are live microorganisms that when administered in adequate amounts, confer health benefits to the host by improving intestinal microbial balance(Marounek and Pebriansyah 2018). Their mechanisms of action include competitive exclusion of pathogens, production of antimicrobial compounds, immune modulation, and synthesis of digestive enzymes and vitamins. In broilers, probiotic use has been associated with improvements by body wight gain, feed conversion ratio, and reduced enteric disease mortality; in layers, improvements in egg production, shell quality, and faucal ammonia emissions have been reported. With growing antimicrobial resistance concerns and regulatory restrictions on antibiotic growth promoters, probiotics have emerged as the leading non-antibiotic alternative for supporting gut health in poultry.

2.1.5 Prebiotics

Prebiotics are non-digestible feed ingredients that selectively stimulate the proliferation and activity of beneficial intestinal bacteria, thereby improving host health(Cunningham, Azcarate-Peril et al. 2021). Common prebiotics used in poultry nutrition include fructooligosaccharides (FOS), mannan-oligosaccharides (MOS), faucal (GOS), inulin, and xylo-oligosaccharides (XOS). Mannan-oligosaccharides, derived from Saccharomyces cerevisiae cell walls, also agglutinate pathogenic bacteria such as Salmonella and E. coli, inhibiting their colonization of the intestinal mucosa. Prebiotics have been reported to improve growth performance, enhance immune function, reduce pathogen shedding, and improve gut morphology. Their use in synergistic combination with probiotics (synbiotics) offers additional benefits beyond either additive alone(Guarner, Sanders et al. 2024).

2.1.6 Anticoccidials

Coccidiosis, caused by protozoan parasites of the genus Eimeria, is widely regarded as one of the most economically significant infectious disease in commercial poultry production, imposing substantial losses through impaired growth, elevated feed conversion ratios, and increased mortality. Anticoccidial feed additives are therefore considered indispensable components of intensive broiler and layer rations, and are broadly classified into ionophore anticoccidials such as monensin and salinomycin which disrupt ionic balance across the parasite cell membrane, and synthetic chemical anticoccidials such as diclazuril and toltrazuril, which inhibit parasite unclear division(Mathis, Lumpkins et al. 2025). It has been well established that the development of drug resistance following prolonged single-product use necessitates the adoption of shuttle and rotation programs, in which different anticoccidial classes are alternated across production cycles to delay resistance development.

2.1.7 Antibiotics as Growth Promoters

The sub-therapeutic inclusion of antibiotics in poultry feed has historically been associated with improvements in growth rate and feed conversion efficiency, attributed to the suppression of intestinal bacteria that compete with the host for nutrients and sustain low-grade gut inflammation(Kolawole, Mustapha et al. 2023). However, it is now well established that the unsupervised use of antibiotic growth promoters (AGPs) is a significant driver of antimicrobial

resistance (AMR), with resistant bacteria and resistance genes demonstrated to disseminate from animal production environments into human populations through the food chain(Kolawole, Mustapha et al. 2023). In response to these public health concerns, the European Union enacted a comprehensive ban on AGP use in 2006, and a growing number of countries have since introduced similar restrictions, intensifying research into non-antibiotic alternatives including probiotics, organic acids, and phytogenic compounds,(Kolawole, Mustapha et al. 2023).

2.1.8 Toxin Binders

Mycotoxins, toxic secondary metabolites produced by fungi of the genera Aspergillus, Fusarium, and Penicillium contaminate cereal grains and oilseeds under conditions of elevated temperature and humidity, posing a persistent challenge to feed safety in tropical regions including sub-Saharan Africa.(Akinmoladun, Fon et al. 2025). Their adverse effects in poultry include reduced feed intake, impaired growth, hepatotoxicity, immunosuppression, and elevated mortality, the severity of which is dose-dependent.(Akinmoladun, Fon et al. 2025). Toxin binders such as hydrated sodium calcium aluminosilicates (HSCAS), bentonite clays, and yeast-derived glucomannans are incorporated into feed to absorb mycotoxins within the gastrointestinal tract, preventing systemic absorption and mitigating their toxic effects(Akinmoladun, Fon et al. 2025).

2.1.9 Phytogenic Feed Additives

Phytogenic feed additives encompassing herbs, spices, essential oils, and plant extracts have attracted considerable research attention as non-antibiotic alternatives for supporting poultry health and productive performance (Bryden 2012, Akinmoladun, Fon et al. 2025). Their bioactive constituents, including thymol, carvacrol, and cinnamaldehyde, have been demonstrated to exert antimicrobial, antioxidant, and gut microbiota-modulating effects, contributing to improvements in nutrient digestibility, feed conversion efficiency, and intestinal morphology(Noruzi, Aziz-Aliabadi et al. 2026). It is, however, important to note that the efficacy of phytogenic additives is subject to considerable variability depending on the botanical source, extraction method, and concentration of bioactive compounds, underscoring the need for standardized, quality-assured commercial formulations.

2.1.10 Organic Acids

Organic acids including formic, propionic, lactic, butyric, and citric acids are incorporated into poultry feed as both feed preservatives and vivo gut acidifiers, serving to inhibit pathogenic bacteria and improve the gastrointestinal environment for nutrient digestion and absorption (Tipper, Stanton et al. 2025). Their antimicrobial mechanism is well characterized: undissociated acid molecules penetrate bacterial cell membranes, dissociate intracellularly, and disrupt essential metabolic processes, with particular efficacy against Salmonella spp., Escherichia coli, and Clostridium perfringens (Dittoe, Ricke et al. 2018). Of particular nutritional significance is butyric acid, which serves as the primary energy substrate for intestinal epithelial cells, supporting gut barrier integrity and mucosal immune function, effects that are enhanced through the use of microencapsulated formulations enabling targeted delivery to the distal intestine(Dittoe, Ricke et al. 2018).

2.1.11 Pigments (Carotenoids)

Carotenoids are lipid-soluble pigments that cannot be synthesized de novo by poultry and must therefore be provided through the diet, either from natural sources such as marigold extract and red paprika, or from synthetic compounds including canthaxanthin and beta-apo-8-carotenoid (Marounek and Pebriansyah 2018),(Nabi, Arain et al. 2020). Their primary application in poultry nutrition is the enhancement of egg yolk color in layers and skin pigmentation in broilers attributes that are highly valued by consumers in many East African and Asian markets and directly influence market price and acceptability(Karadas, Grammenidis et al. 2006). Beyond their pigmentation function, carotenoids have been shown to act as antioxidants, scavenging reactive oxygen species in biological membranes, and certain provitamin A carotenoids contribute to vitamin A activity essential for immune competence and epithelial integrity.

2.1.12 Emulsifiers

Emulsifiers are surface-active compounds that reduce interfacial tension between dietary fat and water phases, facilitating fat digestion and absorption a function of particular importance in young broilers whose endogenous bile salt secretion and pancreatic lipase output are limited in the early post-hatch period(Valente Junior, Genova et al. 2024). Commercially used emulsifiers include soybean lecithin, lysolecithin, and glycerol monoesters, with lysolecithin demonstrating superior

surface-active properties and capacity to enhance micellar solubilization and fatty acid absorption across the intestinal mucosa (Valente Junior, Genova et al. 2024). It has been demonstrated that emulsifier supplementation improves the metabolizable energy value of the diet and feed conversion ratio, with the greatest benefits observed in diets containing high proportions of saturated fats such as palm oil and tallow, which are more resistant to endogenous emulsification than unsaturated plant oils.

2.2 Benefits of Feed Additives on Poultry Production

It is widely acknowledged that the strategic use of feed additives confers measurable benefits across multiple dimensions of poultry production performance, including enhanced growth, improved feed efficiency, reduced disease burden, and superior product quality(Valente Junior, Genova et al. 2024, Alabi and Adedokun 2025). Probiotic and prebiotic supplementation has been shown to improve average daily gain and feed conversion ratio through modulation of intestinal microbiota composition, competitive exclusion of pathogens, and improvement of gut morphology (Alabi and Adedokun 2025). Enzyme supplementation particularly phytase and non-starch polysaccharide-degrading enzymes improves the digestibility of energy, protein, and phosphorus from plant-based diet ingredients, reducing feed costs and environmental nutrient excretion(Alabi and Adedokun 2025). Taken together, these benefits demonstrate that feed additives are not merely supplementary inputs but integral components of the efficient and health-supportive poultry feeding program.

2.3 Factors influencing Utilization of Poultry Feed Additives

The Utilization of poultry feed additives is influenced by complex interplay of socio-demographic, economic, farm-level and institutional factors, and it is a consistent finding in the adoption literature that no single determinant is sufficient to explain farmers' input use decisions (Nampanzira, Kizza et al. 2025). Education level has been identified as a strong positive predictor of adoption, as more educated farmers are better positioned to interpret products labels, apply dosage recommendations, and evaluate cost-benefit relationships, while access to agricultural extension services has been shown significantly increase the livelihood of correct and consistent additive use (Kizza, Okello et al. 2024, Nampanzira, Kizza et al. 2025). Economic constraints particularly the high cost of additives relative to farm income and perceived cost-benefit ratio are equally critical determinants, with farmers demonstrating a tendency to sustain use only when

observable improvements in bird performance confirm that returns outweigh input costs (Nampanzira, Kizza et al. 2025).

2.4 Farmers' Perceptions on Quality of Feed Additives

A considerable body of recent literature has drawn attention to the central role that farmers' quality perceptions play in shaping agricultural input adoption decisions, particularly in smallholder production contexts across Sub-Saharan Africa. It is well established that perceived quality, defined as farmers' subjective assessment of a product's fitness for purpose based on observable characteristics and prior experience ,is more immediate driver of purchasing behavior than objectively measured product quality, particularly because most smallholder farmers have limited access to formal laboratory-based quality assessment methods (Nampanzira, Kizza et al. 2025). Research conducted among poultry farmers and feed millers across selected districts of Uganda has confirmed that farmers principally rely on organoleptic methods visual inspection, smell, and reflects both the accessibility of sensory evaluation and the limited availability of regulatory quality assurance infrastructure at the point of sale(Nampanzira, Kizza et al. 2025).

Evidence further suggest that extrinsic quality cues including product packaging integrity, labeling completeness, brand reputation, and supplier trustworthiness significantly influence farmers' quality judgements in contexts where product adulteration and counterfeiting are documented concerns(Nampanzira, Kizza et al. 2025). A qualitative study involving veterinary extension staff in Uganda established that awareness of feed adulteration is widespread among both farmers and industry actors, yet formal complaints and reporting mechanisms remain largely inaccessible or unknown to most smallholder producers (Kizza, Okello et al. 2024). It has also been demonstrated that label-reading practices among Ugandan poultry farmers are selective and heuristic, with expiry date verification and manufacturer identification being near-universal practices, while critical compliance markers such as batch numbers, registration numbers and dosage instructions are systematically overlooked (Nakavuma, Kirabo et al. 2020).Taken together, these findings indicate that strengthening farmers' quality assessment capacity through targeted extension education on comprehensive label reading and awareness of formal reporting channels is essential for improving feed additive market outcomes for smallholder poultry producers.

CHAPTER THREE

MATERIAL AND METHODS

3.0 Introduction

This chapter describes the methodology adopted for the study. It covers the study design, study area, study population, sample size determination and sampling technique, data collection methods, data analysis procedures, quality control measures and ethical considerations.

3.1 Study Area

The study was conducted in Kasangati Town Council, located in Wakiso District, Central Uganda, approximately 15 kilometers north of Kampala City along the Kampala-Gayaza-Ziroobwe road. Kasangati Town Council lies at an elevation of approximately 1,200 meters above sea level and serves as a significant peri-urban poultry production hub owing to its proximity to Kampala's large consumer market.

The area was purposively selected because of its active poultry production sector which provides an appropriate setting for assessing the factors influencing the utilization of poultry feed additives and farmers' perceptions of their quality.

In addition, its proximity to Kampala facilitates access to a variety of poultry production inputs and markets, while the presence of different scales of poultry production provides an opportunity to obtain information from farmers with varying production experiences and management practices. The study specifically focused on five parishes with substantial poultry farming activity namely; Kabubbu, Kiteezi, Gayaza, Wampeewo and Katadde.

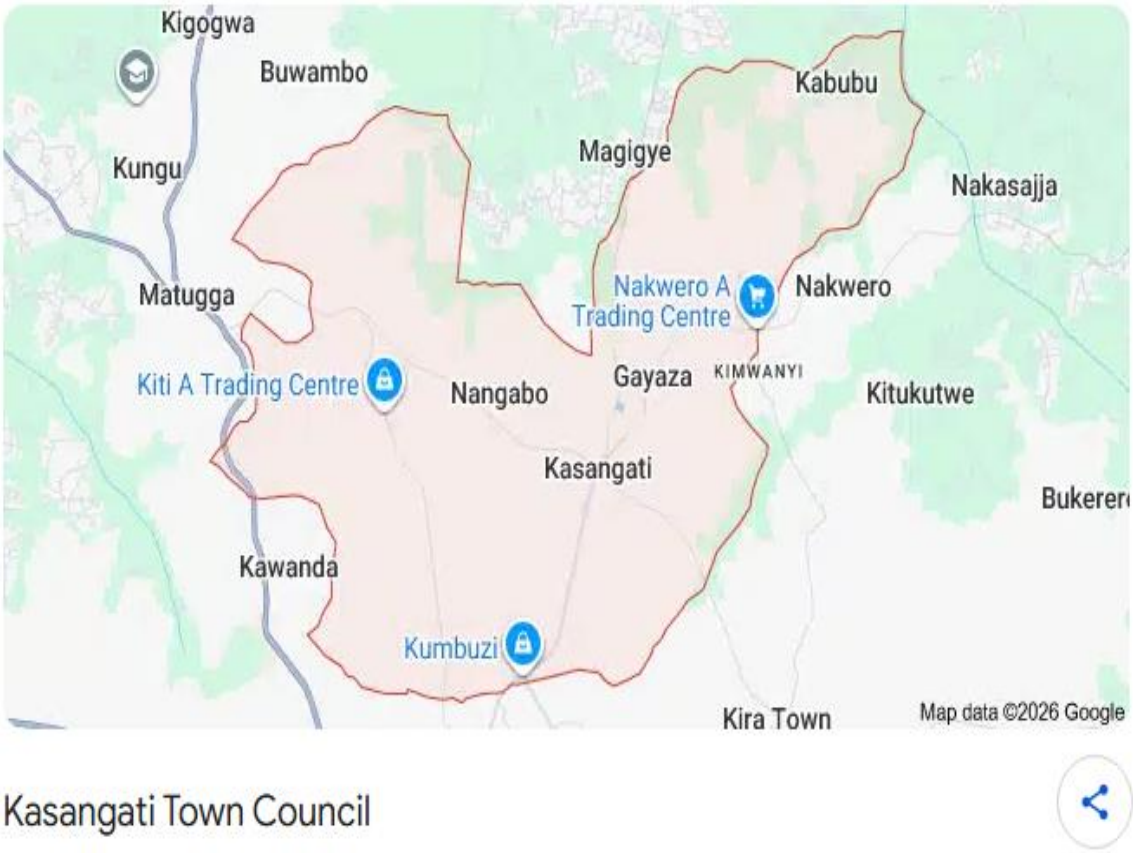

Figure 2: SHOWING A SKETCH MAP OF KASANGATI TOWN COUNCIL

3.2 Study Design

A cross-sectional survey design was employed, utilizing a structured questionnaire to collect primary data from poultry farmers. This design was adopted because it allowed for the efficient assessment of the current status of feed additive utilization and the documentation of farmers' quality perceptions across the study area. A quantitative approach was employed since the study sought to establish measurable patterns in feed additive utilization and to identify statistically significant predictors of adoption. The cross-sectional design was also selected for its well-established advantages of cost-effectiveness, time-efficiency, and suitability for large study populations.

3.3 Study Population

The target population consisted of all poultry farmers actively engaged in poultry production within the five selected parishes of Kasangati Town Council, including farmers rearing broilers,

layers and dual-purpose birds, with flock sizes ranging from 50 to over 1,000 birds. The population was estimated at approximately 134 poultry farming households, based on data provided by Kasangati Town Council Local veterinary Officers.

3.4 Sample Size Determination

Sample size was calculated using Yamane's formula (1967):

$$\mathbf{n = N / (1 + N \cdot e^2)}$$

Where: n = required sample size; N = population size (134); e = margin of error (0.05 at 95% confidence level)

Substituting: $n = 134 / (1 + 134 \times 0.0025) = 134 / 1.335 \approx 100$ farmers. A total of 100 poultry farmers were therefore included in the study.

3.5 Sampling Technique

A multi-stage purposive sampling technique was employed to ensure systematic and representative selection of participants. In the first stage, Kasangati Town Council was purposively selected because of its strategic position as a peri-urban poultry production hub. In the second stage, five parishes were purposively selected based on the intensity of the poultry farming activity and accessibility. In the third stage, individual poultry farmers within each parish were identified and accessed through the guidance of area veterinary extension workers who possessed established working relationships with the local farming communities and could confirm farmers' eligibility for inclusion.

3.6 Inclusion and Exclusion Criteria

Inclusion Criteria

Poultry farmers actively engaged in commercial or semi-commercial production within the five study parishes.

Farmers with a minimum flock size of 50 birds.

Farmers who provided informed consent to participate.

Exclusion Criteria

Farmers who kept poultry solely for subsistence or household consumption purposes.

Farmers who declined to provide informed consent.

Farmers who had been practicing poultry for less than six months.

3.7 Data Collection Methods

Primary data were collected using a structured questionnaire developed in Kobo Toolbox and administered directly by the principal researcher.

3.8 Data Analysis

All analyses were carried out using SPSS, version 26. Descriptive data were generated for all variables, including frequencies, percentages, mean, and standard deviations. Chi-square tests were used to assess associations between categorical variables such as farmer characteristics and feed additive utilization patterns, with P value <0.05 considered statistically significant. Multiple response analysis was applied to variables where respondents could select more than one answer, enabling the computation of frequencies and percentages both by number of respondents and by the total responses. Results were presented in tabular and narrative form.

3.9 Quality Control

Several measures were taken to ensure data quality. The questionnaire was pretested and revised before data collection. The principal researcher was responsible for administering the questionnaire and ensuring that the questions were consistently presented to all respondents. Completed questionnaires were reviewed daily by the principal researcher to identify and correct any missing or inconsistent information. To minimize potential for bias associated with self-reported data, respondents' information was anonymized confidentiality was assured.

3.10 Ethical Considerations.

Ethical clearance was obtained from the relevant academic and institutional authorities at Makerere University prior to data collection. All participants were informed of the voluntary nature of their participation, their right to withdraw at any time without consequence, and the confidentiality of their responses. Written informed consent was obtained from each participant

before questionnaire administration. Data were stored securely and accessed only by authorized members of the research team.

CHAPTER FOUR

4.0 RESULTS

This chapter presents the analysis and interpretation of the study findings. The details of thus chapter include the results on background characteristics of the respondents and the empirical results from descriptive statistics and binary logistic regression analysis, as well as qualitative results. All targeted participants were successfully interviewed during the data collection period, yielding a response rate of 100%.

4.1 social demographic characteristics of respondents

Table 1: Showing Socio-Demographic Characteristics of Respondents.

Variable	Category	Frequency (n)
Sex	Male	36
	Female	64
Age group (years)	29–40	24
	41–50	31
	51–60	31
	61–70	14
Education level	Primary	6
	Secondary	15
	Certificate/Diploma	57
	Bachelor’s degree or higher	21

Farming experience (years)	1–5	29
	6–10	34
	11–15	22
	>15	15
Type of poultry kept	Broilers	60
	Layers	4
	Indigenous chicken	7
	Kuroilers	29
Average flock size (birds)	201–500	43

As shown in Table 1, the majority of respondents were female (64.0%). The most common age groups were 41-50 years and 51-60 years, each representing 31.0% of the sample, indicating that the study area's poultry sector is dominated by middle-aged and older producers. Over three-quarters of respondents (78.0%) held at least a certificate or diploma qualification, suggesting a relatively high level of formal education. The majority had between six and ten years of poultry farming experience (34.0%). Broilers were the most widely kept poultry type (60.0%), with the most common flock size being 201-500 birds (43.0%).

4.2 Categories of feed additives used by respondents.

It is important to note that, a total of 97 farmers out of 100 respondents provided valid responses with regard to the type of feed additives utilized on their poultry farms. Multiple response analysis revealed that farmers employed a combination of additive categories simultaneously, as evidenced by the total number of responses (341) substantially exceeding the number of respondents. This

pattern confirms that concurrent use of multiple additive type is the norm rather than the exception among poultry farmers in this study area.

Question E1, designed to capture reasons for non-use, was not applicable to 97 out of 100 respondents who confirmed feed additive use. No valid responses were therefore recorded for this item and it is excluded from the analysis.

Table 2: Showing types of feed additives used by farmers (n=97)

Feed additive	Number of users	% of respondents
Vitamins	96	99.0%
Growth promoters	94	96.9%
Minerals	90	92.8%
Herbal additives	20	20.6%
Amino acids	14	14.4%
Enzymes	12	12.4%
Antibiotics	10	10.3%
Probiotics	5	5.2%
Antioxidants	0	0.0%

4.2.1 Most used additives.

The data presented in Table 2 demonstrate that Vitamins constituted the most widely utilized additives category (96 farmers, 99.0%), followed closely by growth promoters, (94 farmers, 96.9%) and minerals (90 farmers, 92.8%). These three categories collectively formed the core additive combination adopted by the overwhelming majority of respondents.

4.2.2 Least used additives.

With regard to least utilized categories, Probiotics were found to be least commonly conventional additives (five farmers, 5.2%), followed by antibiotics (10 farmers, 10.3%) and enzymes (12 farmers, 12.4%). It is particularly noteworthy that no farmer reported using antioxidants.

4.2.4 Frequency of feed Additive use.

With respect to overall frequency of feed additive use, it was found that the majority of farmers-88 farmers (88.0%) applied additives only occasionally, that is on an as needed basis. Seven

farmers (7.0%) reported weekly use, whilst only 3 farmers (3.0%) indicated daily use. These findings suggests that most poultry farmers in the study area do noy apply feed additives as a routine daily practice but rather as an intermittent intervention.

4.2.4 Frequency of growth promoter use.

Among the 94 farmers who used growth promoters, 85 (90.4%) applied them on a daily basis, seven (7.4%) used them occasionally, and two (2.1%) reported weekly use. The chi-square test (value = 0.317, p = 0.854) reflect the very limited variation in frequency patterns among growth promoter users, given that 90.4% applied them daily. The consistency of daily application is evident from the descriptive data and does not require inferential confirmation. It is however important to note that the high prevalence of daily growth promoters use raises significant public health concerns, given that prolonged sub-therapeutic use of synthetic growth promoters has been associated with development of antimicrobial resistance, hormone residues in poultry products, and potential health risks to consumers, underscoring the need for regulatory oversight and farmer sensitization on safe withdraw periods.

4.2.5 Frequency of herbal additive use

The data show that all 20 herbal additive users applied them on a daily basis, with no respondent reporting occasional or weekly use. It is nonetheless noteworthy that the exclusive daily use pattern suggests that once the farmer adopts herbal additives, they tend to incorporate them as a consistent component of their feeding regime rather than as occasional interventions. Whilst herbal additives are generally regarded as safer alternatives to synthetic compounds, concern remain regarding the absence of standardized dosing protocols, the potential contamination with heavy metals or pesticide residues, and insufficient scientific validation of locally sourced plant-based additives, all of which may pose indirect risks to both bird health and food safety.

4.2.6 Frequency of Antibiotic Use

The findings reveal that all 10 antibiotic users (100.0%) applied them daily, with no respondent falling into the occasional or weekly categories. Given the small number of users, inferential testing was not meaningful, the descriptive pattern of universal daily use among the subgroup is the more relevant finding. The comparatively low prevalence of antibiotics use may suggest that

the majority of farmers rely on alternative health management interventions or that limited awareness of antibiotic use protocol in poultry constrains adoption.

Nevertheless, the daily use pattern among the minority who do use antibiotics is a critical public health concern, as indiscriminate and unsupervised antibiotic use in poultry is a leading driver of antimicrobial resistance, with antibiotic residues in poultry meat posing direct risks to human through consumption and the potential transfer of resistant bacterial strains across the food chain.

4.2.7 The Factors Influencing the Utilization of Poultry Feed Additives

Multiple response analysis of factors influencing farmers' decision to utilize feed additives conducted among 96 valid respondents yielded the ranking presented in table 3 below;

Table 3: Showing factors influencing decision to use feed additives (n=96)

Factor	NO. of Respondents	% of Respondents	%of cases
Expected benefits for birds	95	32.6%	99.0%
Price	87	29.9%	90
Advice from Agro-Vet /Extension offices	57	19.6%	59.4%
Recommendations from farmers	46	15.8%	47.9%
Availability	3	1.0%	3.1%
To enhance bird health and immunity	3	1.0%	3.1%
Total	291	100.0%	303.1%

As shown in table 3, expected benefits for birds emerged as the most influential factor (95 farmers, 99%), closely followed by price which was reported by 87 farmers, (90.6%). These findings indicate that performance expectations and cost considerations collectively constitute the two primary drivers of additive utilization decisions among farmers in the study area. It is also evident that Advise from Agro veterinary personnel or extension officers was by 57 farmers (59.4%), confirming the important role of institutional guidance in shaping farmer behavior. Peer

recommendations from fellow farmers were cited by 46 respondents each (47.9%). It is noteworthy that product availability and the goal of enhancing bird health and immunity were the least frequently cited factors (3 farmers each, 3.1%), suggesting that access constraints are not yet a wide spread primary driver in this particular context.

4.2.8 Factors affecting growth promoter use.

The Universal adoption of growth promoters (96.9%) appears to have been driven primarily by strong farmer confidence in their efficacy for improving meat yield and overall flock performance, as well as by their wide availability at Agro veterinary outlets. It is also evident that advice from Agro vet personnel and Extension Officers played a significant role in guiding farmers towards growth promoter adoption, reflecting the broader finding regarding the influence of institutional guidance on utilization decisions.

4.2.9 Factors influencing herbal additive use

The comparatively limited adoption of herbal additives (20.6%) may be attributable to restricted availability, insufficient farmer awareness, or limited familiarity with the functional benefits of plant-based formulations. It is noteworthy that among farmers who did adopt herbal feed additives, integrated use was sustained on a daily basis, suggesting a high level of satisfaction once adoption has occurred. Peer recommendation, perceived natural health benefits for birds and reducing on feeding costs were the most probable influencing factors among the users.

4.2.10 Factors influencing Antibiotic use.

Antibiotic use was recorded the lowest of all additive categories (10.3%), a pattern which may reflect limited access to veterinary prescriptions, growing awareness of antimicrobial resistance risks, regulatory constraints or a preference for alternative health interventions such as vitamins and minerals. The finding that all antibiotic users applied them on a daily basis is consistent with targeted therapeutic rather than prophylactic application, through this pattern warrants further investigation given its public health implication.

4.3 Farmers' perceptions Regarding the Quality of poultry Feed Additives.

On the importance of product quality, 65.0% of farmers rated quality as "Very important" and a further 32.0% as "important" when selecting feed additives, with 3.0% unspecified. These findings

clearly indicate that farmers in the study are place high value on quality assurance when making input purchasing decisions.

Regarding overall quality rating, the data show that majority of farmers assigned rating of "very high" (77.0%) or (18.0%), reflecting generally positive quality perceptions of additive across the study sample. It is noteworthy that only 1.0% of respondents rated quality as average, 1.0% as low, and 3.0% were unspecified.

Regarding receipt of fake or poor-quality additives, 44.0% of farmers reported having received suspected fake or poor-quality additives, while 53.0% had not, and 3.0% were unspecified. This finding is of considerable significance as it indicates that nearly half of the respondents have experienced quality failures at some point in their farming operations.

Concerning bird performance improvement, an overwhelming 97.0% of farmers reported that feed additives "greatly improve" bird performance, demonstrating strong belief in the efficacy of these products. Only 1.0% were unsure, and 2.0% were unspecified.

Finally, regarding health problems after use, 86.0% of the farmers reported no health issues, while 11.0% had noticed adverse health effects, and 3.0% were unspecified. This suggests that while most additives are perceived as safe, a notable minority have experienced negative consequences.

4.3.1 Quality of Feed Additives Available on the Market.

Regarding quality available, the majority of farmers rated available additives as "very good" (60.0%) or "good" (32.0%), with only 5.0% rating them as "fair" and 3.0% unspecified. No farmer rated quality as "poor" or "very poor", indicating that farmers generally perceive the available feed additives as satisfactory.

4.3.2 Frequency of label checking.

With regard to label checking frequency, it was found that the majority of farmers (60.0%) reported checking product labels only sometimes, while 31.0% indicated that they always checked labels prior to purchase. Smaller proportions reported checking labels often (2.0%), rarely (2.0%), or never (2.0%), with 3.0% of responses unspecified. The finding suggests that, while a substantial proportion of farmers demonstrate some degree of label awareness, consistent and through label checking at the point of purchase is far from universal among poultry farmers in the study area.

4.3.3 Information Checked on Product Labels

The most frequently checked information was the expiry date, verified by 94.0% of farmers, indicating that farmers are primarily concerned about product freshness and safety. Manufacturer's name and address was checked by 92.0%, suggesting that farmer's value knowing the source of their additives for accountability and traceability. Ingredients/composition was checked by 64.0%, indicating that nearly two-thirds of farmers are interested in knowing what components are in their additives. Dosage instructions were checked by only 15.0%, suggesting that many farmers may rely on experience or external advice rather than label instructions. Only 2.0% reported not checking labels at all. Notably, no farmers checked batch numbers, registration/license numbers, or storage instructions.

4.3.4 Encountered Poor Quality and Problems Observed

Regarding encountered poor quality, 53.0% of farmers reported never encountering poor-quality additives, while 44.0% confirmed having experienced such products, and 3.0% were unspecified. This indicates that two in five farmers have directly experienced quality failures.

Among the 44 farmers who encountered poor quality, the most frequently observed problem was no improvement in bird performance, reported by 83.6% (37/44). This suggests that the primary manifestation of poor quality is ineffectiveness. Unusual smell or color was observed by 54.5% (24/44), indicating that sensory cues often alert farmers to quality issues. Poor packaging/leakage affected 22.70%, while inconsistent results between batches were noted by 11.4% (5/44). Suspected counterfeit/adulterated products were identified by 4.5% (2/44) and adverse health effects on birds by 2.3% (1/44). No farmers reported expired products.

Among those who took action, the most common response was stopped using the product, reported by 25.0% of the farmers 56.8% of those who encountered poor quality, indicating that most farmers discontinue use when quality issues are detected. Warned other farmers was the second most common action, taken by 21.0% (47.7%) of affected farmers, demonstrating peer-to-peer information sharing. Continued using it (no alternative) was reported by 11.0% (25.0% of affected farmers), suggesting some farmers feel they have no choice. Returned to supplier was done by 8.0% (18.2% of affected farmers). Notably, no farmer reported the issue to authorities, highlighting a significant gap in formal complaint mechanisms.

4.3.5 Perceptions of Effectiveness of Feed Additives

Majority of farmers rated additives as “very effective” (51.0%) or “effective” (44.0%), indicating that 95.0% of farmers perceive feed additives as providing meaningful benefits. Only 2.0% rated additives as “slightly effective” and 3.0% were unspecified. No farmers rated them as “not effective”. This overwhelming positive perception aligns with earlier findings that 97.0% of farmers believe additives greatly improve bird performance.

4.3.6 Confidence in Quality and Government Regulation

Regarding confidence in quality, equal proportions of farmers were “confident” (47.0%) and “very confident” (47.0%), with only 3.0% neutral and 3.0% unspecified. No farmers expressed being “not confident” or “very confident”, indicating that farmers maintain high trust in feed additive quality.

Concerning government regulation adequacy, the largest proportion (50.0%) held a neutral position, indicating uncertainty or lack of awareness. Inadequate and very inadequate ratings were given by 29.0% and 13.0%, respectively, meaning 42.0% viewed government regulation negatively. Only 2.0% rated regulation as “adequate”, 3.0% as “very adequate”, and 1.0% responded “I don’t know”, with 2.0% unspecified. These findings suggest that most farmers are either unsure about or dissatisfied with government regulation of feed additives.

4.4 Follow-up Interview Willingness

Majority of farmers (99%) expressed willingness to participate in a potential follow-up interview. This exceptionally high response rate indicates strong farmer engagement and interest in the research topic, providing valuable opportunities for more in-depth qualitative research in the future.

4.5 Challenges Faced by Farmers in Using Feed Additive

The findings revealed that high cost was the most dominant challenge, reported by 93.0% of respondents. This overwhelming majority indicates that affordability is a critical barrier to feed additive utilization among farmers in Kasangati Town Council. Limited availability affected 19.0% of farmers, suggesting that while accessibility is a concern for some, it is not as widespread as cost-related issues. Poor quality products were cited by 6.0% of farmers, indicating that a

minority have directly experienced quality issues. Lack of knowledge on usage was the least reported challenge, affecting only 1.0% of farmers, suggesting that most farmers possess adequate knowledge on how to use feed additive adoption in the study area.

CHAPTER FIVE

DISCUSSIONS OF KEY FINDINGS

5.0 Discussion

5.1 Types of Feed Additives Used and Patterns of Utilization

The findings of the present study demonstrate that vitamins, growth promoters, and minerals constituted the three most widely used additive categories, adopted by 99.0%, 96.9%, and 92.8% of valid respondents respectively. This pattern is consistent with the broader literature, which recognizes nutritional supplementation and performance enhancement as central priorities for smallholder poultry producers seeking to improve flock productivity under resource-constrained conditions(Upadhayay and Vishwa 2014). The near-universal uptake of vitamins and minerals reflects the well-established understanding among farmers that micronutrient deficiencies directly impair growth, immunity and egg production outcomes (Świątkiewicz, Arczewska-Włosek et al. 2014).

Of particular significance to this study is the very high prevalence of growth promoter use (96.9%), which emerged as the second most commonly used additive category. It is noteworthy that 90.4% of growth promoter users applied them on a daily basis, a pattern that raises important public health concerns. Prolonged sub-therapeutic use of synthetic growth promoters has been associated with the development of antimicrobial resistance (AMR), the accumulation of hormone residues in poultry products, and potential health risks to consumers(Van Boeckel, Brower et al. 2015). These concerns are compounded by the finding that herbal additives, used by 20.6% of farmers and exclusively on a daily basis, lack standardized dosing protocols and scientific validation for locally sourced plant-based formulations, raising indirect risks related to contaminants such as heavy metals or pesticide residues. Similarly, while antibiotics were used by only 10.3% of farmers, all antibiotic users applied them daily a critical public health concern, given that daily unsupervised antibiotic use in poultry is a leading driver of AMR and poses direct risks to human health through the food chain(Van Boeckel, Brower et al. 2015).

In contrast, probiotics were utilized by only 5.2% of farmers and no farmer reported using antioxidants, suggesting limited awareness of the functional and safety profiles of these evidence-based alternatives. It is widely established in the literature that probiotics, prebiotics, organic acids,

phytogenic additives, and enzymes represent effective non-antibiotic alternatives capable of supporting gut health, improving feed conversion, and reducing dependence on growth promoters and antibiotics without the associated AMR risks (Żbikowski, Michalczuk et al. 2024, Alabi and Adedokun 2025). The low uptake of these categories in the study area therefore represents a missed opportunity for both farm productivity and public health protection.

The complete absence of antioxidant uses among respondents warrants attention. It is well established that antioxidants reduce oxidative stress, preserve meat quality, and support immune function in poultry(Surai 2021). This finding suggests that awareness of this additive category remain negligible in the study area, likely attributed to limited exposures through extension and agro-veterinary advisory channels.

It is further noted that pigments (carotenoids) and emulsifiers, both reviewed in the literature as commercially relevant additive categories, were not captured as distinct options in the study instrument and are therefore absent from the utilization data. This is acknowledged as a limitation of the instrument design.

5.1.1 Factors Influencing Feed Additive Utilization

Multiple response analysis revealed that expected benefits for birds was the most influential driver of utilization decisions, cited by 99.0% of farmers, consistent with the broader evidence base, which establishes that performance expectations constitute the primary motivation for feed additive adoption among smallholder poultry producers(Nampanzira, Kizza et al. 2025). The co-dominance of price as the second most cited factor (90.6%), alongside its identification as the primary challenge (93.0%), reflects a nuanced cost-benefit calculus in which affordability and perceived return on investment are simultaneously weighed. It is noteworthy that advice from agro-veterinary personnel and extension officers was cited by 59.4% of farmer, confirming that professional institutional guidance continues to shape farmer behavior even in peri-urban settings. Peer recommendations were cited by 47.9% of respondents, underscoring the role of horizontal knowledge transfer in sustaining additive use norms.

5.2 Farmers' perceptions regarding the quality of poultry feed additives.

The findings of the study with respect to the second objective reveal a market environment characterized by striking tension between high expressed confidence in feed additive quality and

a substantial documented prevalence of quality failures. The data clearly show that farmers in Kasangati Town Council hold strongly positive overall perceptions of feed additive quality: 77.0% of farmers rated the quality of available additives as very high, 18.0% rated them as high, and no farmer assigned a poor or very poor rating. These perceptions were reinforced by farmers' assessments of effectiveness, with 51.0% rating additives as very effective and 44.0% as effective a combined satisfaction rate of 95.0%. Furthermore, 97.0% of farmers reported that feed additives greatly improved bird performance, and 47.0% each were confident and very confident in the quality of products accessible on the local market. Taken at face value, these figures paint a picture of a well-functioning input market characterized by high farmer satisfaction and strong product confidence.

It is, however, essential to set this picture alongside the equally significant finding that 44.0% of farmers had received what they suspected to be fake or poor-quality feed additives, and that 44.0% reported having directly encountered ineffective or substandard products. This apparent contradiction widespread satisfaction coexisting with widespread quality failure warrants careful interpretation and underscores the complexity of quality perception in agricultural input markets.

A closer examination of the evidence from this study suggests that the high overall quality ratings reported by farmers do not necessarily reflect the absence of quality problems, but rather reflect a tendency among farmers to evaluate market quality holistically, based on aggregated positive experiences, rather than to revise their overall assessments download following individual negative encounters. In this regard, it is noteworthy that the most commonly observed manifestation of poor quality was no improvement in bird performance, reported by 83.6% of the 44 farmers who encountered quality problems a finding which implies that ineffectiveness, rather than overt harm, constitutes the primary form of quality failure in this market. The second most common indicator was unusual smell or color, cited by 54.5% of affected farmers, while poor packaging or leakage and inconsistent results between batches were cited by 22.7% and 11.4% respectively.

The fact that adverse health effects on birds were reported by only 2.5% of affected farmers is, in one sense, reassuring; in another, it may reflect limitations in farmers' ability to detect or attribute health consequences to specific additive use. These findings collectively point to a market in which substandard products are widespread but their harms are often subtle and diffuse, making them

difficult to definitively attribute to particular products or suppliers, and thereby less likely to trigger formal corrective responses.

The findings of the study with respect to farmers' label-checking practices expose important gaps in the quality assurance behaviors of farmers that amplify their vulnerability to poor-quality products. It is evident from the findings that while expiry date verification (94.0%) and manufacturer identification (92.0%) are near-universal practices, attention to dosage instructions was reported by only 15.0% of farmers. Furthermore, no farmer reported checking batch numbers, registration or license numbers, or storage instructions all of which are critical markers of product legitimacy and regulatory compliance. The pattern of label-checking observed in this study suggests that farmers have developed a selective and heuristic approach to product evaluation that prioritizes freshness and source accountability over technical compliance. While the approach is rational given the cognitive demands of comprehensive label-reading, it creates significant exposure to products that may be properly dated and appropriately branded but nonetheless fail to deliver correct active ingredient concentrations or appropriate formulation standards. The finding that 60.0% of farmers checked labels only sometimes rather than always further compounds this vulnerability. These observations point to a clear need for structured farmer education programs focused not merely on the importance of label reading, but on the specific information elements that carry the greatest diagnostic value in distinguishing genuine, quality-assured products from counterfeits and substandard alternatives.

Perhaps the most significant governance-related finding of this study pertains to the complete absence of formal reporting behavior among farmers who encountered poor-quality products. Despite 44.0% of farmers having experienced quality failures, and despite 25.0% of affected continuing to use substandard products in the absence of alternatives, not a single farmer reported the matter to a regulatory authority. The most common responses were to stop using the product (56.8% of affected farmers) and to warn other farmers informally (47.7%), reflecting a reliance on individual exit and peer-based information sharing rather than institutional recourse. This finding is consistent with the broader perception pattern observed in the study, whereby 42.0% of farmers rated government regulation as inadequate or very inadequate, and a further 50.0% held a neutral position a distribution that, interpreted conservatively, suggests that at least 92.0%of farmers either doubt or are uncertain about the effectiveness of existing regulatory oversight. The enactment of

the Animal Feeds Act's impact will be contingent not only on the robustness of its enforcement provisions, but on the development of accessible, farmer-friendly complaint and reporting mechanisms, and on sustained investment in public awareness campaigns that help farmers their rights and the channels through which they can seek redress. The evidence from the study suggests that without these complementary measures, regulatory instruments alone are likely to translate into improved market quality outcomes for smallholder poultry farmers.

5.3 CONCLUSIONS

Based on the findings of this study, the following conclusions were made;

1. Vitamins, growth promoters and minerals were the most commonly used feed additives among poultry farmers in Kasangati Town council, while probiotics were rarely used and no farmer reported using antioxidants. Most farmers used feed additives occasionally rather than routinely.
2. Expected benefits to birds and the price of feed additives were the major factors influencing utilization. Professional advice from Agro-Veterinary personnel and extension officers also played an important role, while the high cost of additives was the main challenge limiting their use.
3. Growth promoters were widely used, with 96.5% of additive users reporting their use and 90.4% of growth promoter users applying them daily.
   These patterns indicate a need for greater guidance on responsible and appropriate additive use.
4. Farmers generally had positive perception of feed additive quality.
   However, 44.0% reported having encountered suspected fake or poor-quality products, showing that positive perceptions did not eliminate concerns about product quality.
   Farmers mainly assessed expiry dates and manufacturers instructions, while non reported checking batch numbers, registration or license numbers or storage instructions. This indicates inadequate comprehensive assessment of product quality and legitimacy.
5. None of the farmers who encountered poor quality additives reported the problem to regulatory authorities.in addition,42.0% perceived government regulations as inadequate or very inadequate, while 50% were neutral. This indicates a gap in formal complaint reporting and farmer awareness of regulatory mechanisms.

5.4 RECOMMENDATIONS

1. Veterinary extension officers should train farmers on the correct selection, dosage and responsible use of feed additives, particularly growth promoters and antibiotics.
2. Feed additive suppliers and relevant stakeholders should explore measures to reduce the cost of essential feed additives.
3. On quality assessment, farmers should be trained to check complete product -label information, including dosage, batch numbers, registration details, expiry dates and storage instructions.
4. MAAIF and UNBS should strengthen market surveillance and quality testing of g=feed additives to control counter faint and substandard products.
5. Accessible channels should be established to enable farmers to report suspected poor quality or counterfeit feed additives.
6. Farmers should be sensitized about the animal feed act,2024 and the institutions responsible for feed additive quality regulation.

5.4.8 Contributions to Knowledge

This study makes several contributions to existing knowledge. First, it provides contemporary empirical evidence on factors influencing feed additive utilization among small-scale poultry farmers in a peri-urban context in Uganda. Second, it documents farmers' perceptions and experiences with feed additive quality, including specific quality problems and actions taken. Third, it identifies gaps in regulatory enforcement and farmer reporting behavior. Fourth, it establishes baseline data that can be used to evaluate the impact of the Animal Feeds Act, 2024. Fifth, the high farmer willingness to participate in follow-up research (99.0%) indicates strong potential for longitudinal studies on this topic.

5.4.9 Limitations of the Study

This study had several limitations. First, the findings are based on self-reported data from farmers, which may be subject to recall bias and social desirability bias. Second, the study did not include laboratory testing of feed additive samples, meaning quality assessments were based on farmer perceptions rather than objective measures. Third, the cross-sectional design captures perceptions

at a single point in time, limiting the ability to track changes over time. Fourth, the study focused on selected parishes in Kasangati Town Council, which may limit generalizability to other areas with different market conditions and farming systems.

Despite these limitations, the study provides valuable insights into farmer experiences and perceptions that can inform policy and program interventions to improve feed additive quality and utilization in Uganda.

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APPENDIX;

QUESTIONNAIRE

FACTORS INFLUENCING UTILIZATION AND FARMERS' PERCEPTIONS ON QUALITY OF POULTRY FEED ADDITIVES IN KASANGATI TOWN COUNCIL, WAKISO DISTRICT

Researcher: Nankwanga Joyce, Makerere University

Supervisor: Dr. Sebulime Peregrine

Contact: 0703748427

Email: nankwanga0@gmail.com

Date: _____

PARTICIPANT INFORMATION AND CONSENT FORM

Dear Respondent,

I am a student at Makerere University conducting academic research on poultry feed additives in Kasangati Town Council, Wakiso District. The information you provide will be used for academic purposes only and will remain confidential. Your participation is voluntary and you may withdraw at any time.

By answering these questions, you agree to participate in the study.

Do you consent to participate?

YES

NO

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

Instructions: Please tick (✓) or fill in the appropriate response.

A1. Sex of respondent

Male

Female

A2. What is your age?

A3. Highest level of education completed

No formal education

Primary

Secondary

Certificate/Diploma

Bachelor's degree or higher

A4. How many years have you been practicing poultry farming?

A5. What type(s) of poultry do you keep? (Tick all that apply)

Broilers

Layers

Indigenous/Local chickens

Others (specify): _____

A6. What is your average flock size (number of birds)?

50-99 birds

100-300 birds

301-500 birds

More than 500 birds

SECTION B: FACTORS INFLUENCING UTILIZATION OF FEED ADDITIVES

Instructions: Please tick (✓) or fill in the appropriate response.

B1. Do you feed additives in your poultry farm?

Yes

No

B2. Which types of feed additives do you use? (Tick all that apply)

Vitamins

Minerals

Antibiotics

Probiotics

Enzymes

Growth promoters

Herbal additives

Amino acids

Antioxidants

Carotenoids

Emulsifiers

Others specify:_____

B3. How often do you use feed additives?

Daily

Weekly

Monthly

Occasionally (only when needed)

B4. Where do you usually obtain feed additives? (Tick all that apply)

Agro vet shops

Feed millers

Markets

Others (specify):_____

B5. What factors influence your decision to use feed additives? (Tick all that apply)

Price

Availability

Recommendations from farmers

Expected benefits for birds

Advice from Agro-vet/extension officer

To enhance bird health and immunity

Others (specify):_____

B6. Do you face any challenges in using feed additives? (Tick all that apply)

High cost

Limited availability

Lack of knowledge on usage

Poor quality products

Others (specify):_____

SECTION C: FARMERS' PERCEPTIONS ON QUALITY OF FEED ADDITIVES

Instructions: Please tick (✓) the response that best reflects your opinion.

C1. How would you rate the overall quality of the feed additiives you use?

Very high

High

Average

Low

Very low

C2. In your opinion, do feed additives improve bird performance?

Yes, greatly improve performance

Yes, slightly improve performance

No improvement

Not sure

C3. Have you ever received additives that you suspected were fake or of poor quality?

Yes

No

C4. How important is product quality when choosing feed additives?

Very important

Important

Moderately important

Slightly important

Not important at all

C5. What suggestions do you have to improve the quality and utilization of feed additives?

C6. Have you ever noticed any health problems in your birds after using feed additives?

Yes

No

SECTION D: PERCEPTIONS ON QUALITY, SAFETY, AND EFFECTIVENESS

Instructions: Please tick (✓) or fill in the appropriate response.

D1. Overall, how would you rate the quality of feed additives available to you?

Very good

Good

Fair

Poor

Very poor

D2. How often do you check packaging and labeling before purchasing additives?

Always

Often

Sometimes

Rarely

Never

D3. What information do you check on the product label? (Tick all that apply)

Expiry date

Manufacturer’s name and address

Ingredients/composition

Dosage instructions

Batch number

Registration/license number

Storage instructions

I don’t check labels

D4. Have you ever encountered poor-quality or ineffective feed additives?

Yes

No

D5. If yes, what problems did you observe? (Tick all that apply)

No improvement in bird performance

Adverse health effects on birds

Unusual smell or color

Expired product

Poor packaging/leakage

Suspected counterfeit/adulterated product

Inconsistent results between batches

Others (specify):_____

D6. What action did you take when you discovered poor-quality additives? (Tick all that apply)

Returned to supplier

Stopped using the product

Reported to authorities

Warned other farmers

Countinued using it (no alternative)

Others (specify):_____

D7. In your experience, how effective are feed additives in improving poultry performance?

Very effective

Effective

Slightly effective

Not effective

I don't know

SECTION E: OVERALL PERCEPTIONS, NON-USER PERSPECTIVES, AND SUGGESTIONS

Instructions: Please tick (✓) or fill in the appropriate response.

E1. If you DO NOT use feed additives (from B1), what are your main reasons? (Tick all that apply)

Too expensive/high cost

Lack of knowledge about their use

Perceived as ineffective

Fear of side effects/health risks

Not readily available in my area

My birds don't need them

Religious/cultural reasons

Others (specify):_____

E2. If you DO use feed additives, how confident are you in the quality of feed additives available on the market?

Very confident

Confident

Neutral

Not confident

Very unconfident

E3. In your opinion, how adequate is the government regulation of feed additives in Uganda?

Very adequate

Adequate

Neutral

Inadequate

Very inadequate

I don’t know

E4. What specific improvements would you suggest to enhance the feed additive market in Uganda?

E5. Are you willing to participate in apotential follow-up interview if needed?

Yes

No

END OF QUESTIONNAIRE

Thank you for your valuable time and participation!