BINDURA UNIVERSITY OF SCIENCE EDUCATION

Faculty Department of Animal Science

Department of Animal Science

Comparative Study of the Growth and Profitability of Boschveld and Indigenous Chickens raised under backyard system

By

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A Dissertation Submitted to the Department of Animal Science in partial fulfillment for the requirements for the Bachelor of Animal Science and Technology

June 2025

Month

Abstract

This study investigates the comparative growth performance and profitability of Boschveld and Indigenous (commonly known as roadrunner) chickens raised under backyard systems in Mutare, Zimbabwe. A total of 60 semi-commercial poultry farmers, each managing a flock of at least 50 birds, were randomly selected from the Department of Veterinary Services database. Data were collected over a production cycle through structured interviews, weekly farm visits, and physical assessments focusing on feed intake, body weight gain, egg production, and income generation. Over a 12-week period, weekly farm visits were conducted to record live weights, feed intake, egg production, and associated costs. Production parameters were assessed by weekly weighing of a representative sample of birds from each breed; economic data were collected through structured interviews documenting feed, chick, veterinary, and housing expenses, as well as sales revenue from both meat and eggs; housing and management practices were documented via standardized checklists.

By Week 12, Boschveld birds attained an average live weight of 2.05 kg (± 0.18 kg), compared with 1.85 kg (± 0.20 kg) for Indigenous hens. Weekly feed consumption averaged 0.84 kg per Boschveld bird and 0.71 kg per Indigenous bird, translating to total weekly intakes of 1,787 kg and 1,513 kg, respectively, across all farms. Starting in Week 10, Indigenous hens exhibited a higher laying prevalence (75–85 percent) than Boschveld hens (70–75 percent), resulting in a collective output of 4,904 eggs per week versus 3,850 eggs per week for Boschveld. Gross margin analysis indicated that, despite Boschveld's superior meat yield, Indigenous birds generated greater net returns (USD 9.23 per flock) compared to Boschveld (USD 6.66 per flock) over the trial, largely owing to lower input costs and higher egg revenues.

Ward-level comparisons highlighted that Zimunya—characterized by more reliable feed and water access—achieved the highest weights, egg outputs, and profits for both breeds, whereas Hobhouse exhibited the lowest performance metrics. Results suggest that Indigenous chickens are better suited to resource-constrained settings, whereas Boschveld can be profitable when feed and infrastructure are sufficient to support their higher growth requirements. These findings inform breed-selection decisions and extension strategies aimed at improving smallholder poultry productivity and livelihoods in similar backyard systems.

Declaration Form

I Memory Magoche B1749771, hereby declare that this dissertation is the result of my own research and study, except to the extent indicated in the acknowledgements and references included in the body of the paper, and that it has not been submitted in part and full for any other degree to any other degree.

Memory Magoche B1749771 Signature 

Supervisor: T.N.C Mangwiro Signature  **……..**

Chairman: A. Pagute Signature……  **Date 06/10/25**

Dedication

This work is dedicated to my beloved family, for their steadfast support, patience, and encouragement have been the cornerstone of my academic journey. To my parents, for their unconditional love and for instilling in me the values of perseverance and integrity. To my supervisor and lecturers, whose guidance and insight have been instrumental in the completion of this thesis. And to all those who continue to pursue knowledge and contribute to the advancement of learning may this work serve as a modest contribution to that noble endeavor.

Acknowledgements

First and foremost, I express my deepest gratitude to Almighty God for the strength, guidance, and perseverance granted to me throughout the course of this research. I would like to sincerely thank my supervisor, Mr TNC Mangwiro for their invaluable guidance, encouragement, and constructive feedback at every stage of this work. Their support and insight were critical to the successful completion of this thesis.

My heartfelt thanks also go to the faculty and staff of the department of crop science, whose dedication to academic excellence has been a source of inspiration. I am also grateful to my colleagues and fellow students for their collaboration, moral support, and stimulating discussions that enriched this research experience. To my family thank you for your unwavering love, patience, and belief in me, even during the most challenging moments. Your support has been the foundation of my progress.

List of abbreviations and acronyms

Statistical Package for Social Sciences

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CHAPTER 1

1.0 Introduction

The poultry industry in Zimbabwe is a significant contributor to the national economy, providing essential protein sources and generating income for numerous households. Among the various chicken breeds reared in Zimbabwe, Boschveld and indigenous chickens are notable for their popularity. While indigenous chickens are valued for their adaptability and resilience, Boschveld chickens are known for their rapid growth and higher meat yield.

According to FAO in Zimbabwe, over 70 percent of the population depends on agriculture for their livelihoods. These agro-based livelihoods are being threatened by climate change and seasonal variability making crop production more and more unreliable. According to Burns, (2013) poultry have lower greenhouse gas emissions due to their lower enteric methane production rates compared to ruminant species hence they are considered to have an environmental advantage compared to other animal protein sources. Chicken production is increasingly becoming a preferable option especially for rural farmers in Zimbabwe. The reason for the increasing popularity of poultry farming is anchored on the tradition that small livestock has always belonged mainly to women and children (has less complicated ownership patterns), which makes them easier to participate in the economy as compared to cattle. Selling chickens to meet household expenses has never been a big issue. Now with the increasing entrepreneurship drive and financial literacy rural women resort to keeping chickens for sale. The USAID report (2013) the price per kg of beef in Zimbabwe averages at US$4.60 while chicken sells at US$3.30. The relatively lower price of chicken helps to increase the demand for the product given the prevailing harsh economic conditions in Zimbabwe at the moment.

Among the varieties of chickens reared, Boschveld chickens are known for their robustness and good egg production and indigenous chicken's locally adapted breeds are prominent. What the resource poor farmer needs to know is the best type of chicken which can be kept without investing much in feed and infrastructure while giving him/her a good market share and more profit so as to create more household income.

This study aims to compare the growth performance and profitability of the boschveld and the indigenous chickens when raised under identical management conditions. Understanding the differences in growth rates, feed efficiency, disease resistance, and economic returns can help farmers make informed decisions about which breed would be more appropriate to the resource poor farmers. Understanding the comparative advantages of these breeds could guide farmers in optimizing their poultry production strategies, thereby enhancing food security and economic stability in Zimbabwe.

1.1 Background to the Study

Zimbabwe's poultry sector is diverse, comprising both commercial and small-scale producers. Indigenous chickens have been traditionally raised by many rural households due to their low maintenance requirements and ability to thrive in harsh conditions. However, with the increasing demand for poultry products, there is a shift towards breeds like Boschveld chickens, which promise faster growth rates and higher returns on investment. The Boschveld breed, developed in South Africa, is specifically designed to perform well in free-range systems similar to those found in Zimbabwe. Despite the potential benefits, there is limited research comparing the performance of Boschveld chickens to that of indigenous chickens within the same environmental and management contexts. This study seeks to fill this gap by evaluating the growth rates, feed efficiency, and overall profitability of both breeds under standardized management practices.

1.2 Statement of the Problem

The poultry industry in Zimbabwe faces challenges related to optimizing productivity and profitability, particularly among small-scale farmers. While indigenous chickens are hardy and

require less intensive management, their growth rates and meat yields are typically lower compared to commercial breeds. On the other hand, commercial breeds like broilers offer higher productivity but may require more intensive management and resources.

The low productivity and the longer time to maturity which characterizes local breeds has become a major issue of concern for the smallholder farmers which calls for the need for a breed that can be profitable under backyard conditions.

There is a need for empirical data to guide farmers on which breed offers the best balance of growth performance and profitability under backyard conditions. This study addresses this critical knowledge gap by systematically comparing the growth and profitability of Boschveld and indigenous chickens, thereby providing valuable insights for poultry farmers and policymakers in Zimbabwe.

1.3 Aim and Objectives

1.3.1 Aim

The primary aim of this study is to compare the growth performance and profitability of Boschveld and indigenous chickens reared under backyard conditions in Zimbabwe.

1.3.2. Objectives

- To evaluate the growth rates of Boschveld and indigenous chickens under identical management conditions.
- To compare the feed conversion efficiency of both breeds.
- To assess the overall health and mortality rates of Boschveld and indigenous chickens.
- To analyze the cost-effectiveness and profitability of raising each breed.

1.4. Hypothesis

Null Hypothesis (H0): There is no significant difference in the growth performance and profitability of Boschveld and indigenous chickens when reared under the same management conditions.

Alternative Hypothesis (H1): There is a significant difference in the growth performance and profitability of Boschveld and indigenous chickens when reared under the same management conditions.

1.5 Assumptions of the Study

This study is based on the assumption that all participating households or farmers adhere to standard backyard poultry management practices and that the environmental conditions across the study sites within Mutare are sufficiently similar to allow for a fair comparison. It is also assumed that the data provided by the farmers regarding costs, sales, feed usage, and mortality rates are accurate and honestly reported. Furthermore, the study assumes that both Boschveld and indigenous chickens are reared under similar resource constraints and care levels, enabling a reliable evaluation of their growth performance and profitability under typical rural backyard systems.

1.6 Significance of the Study

This study holds significant relevance in the context of rural livelihoods and food security in Zimbabwe, particularly in Manicaland Province. Backyard poultry farming is a critical source of income, nutrition, and socio-economic resilience for smallholder households. By comparing the growth performance and profitability of Boschveld and indigenous chickens, this research provides evidence-based insights that can inform small-scale farmers, agricultural extension officers, and policy-makers about the most viable breed for enhancing household incomes and improving food security. Additionally, the findings contribute to the growing body of knowledge on sustainable livestock farming in semi-arid and resource-limited environments such as those found in Mutare and surrounding areas.

1.7 Delimitations of the Study

This study is geographically confined to selected areas within Mutare District in Manicaland Province. It focuses exclusively on backyard poultry production systems and does not account for semi-commercial or intensive production models. Only two chicken breeds Boschveld and local

indigenous chickens are considered in the comparison. The study emphasizes growth and profitability and does not extend to aspects such as disease resistance, consumer preferences, or long-term reproductive performance. Furthermore, data collection is restricted to a specific period, limiting seasonal influences on production outcomes.

1.8 Limitations of the Study

Several limitations may affect the outcomes of this research. Firstly, the reliance on self-reported data from farmers introduces the risk of recall bias and inaccuracies. Secondly, variations in micro-climatic conditions, feed availability, and individual farmer practices may introduce uncontrollable variables. Additionally, due to financial and logistical constraints, the sample size may be limited, which could affect the generalizability of the findings. Lastly, the study was conducted over a relatively short duration, which may not fully capture the complete production cycle or long-term profitability dynamics.

Chapter Two: Literature Review

2.1 Introduction

Backyard poultry farming plays a pivotal role in enhancing food security, generating income, and empowering rural communities in Zimbabwe. This chapter delves into the theoretical frameworks underpinning poultry production, examines empirical studies related to indigenous and improved chicken breeds, and outlines the conceptual framework guiding this research.

2.2 Theoretical Framework

The Sustainable Livelihoods Framework (SLF) serves as the theoretical foundation for this study. SLF emphasizes the assets, strategies, and outcomes that households utilize to achieve sustainable livelihoods (Chambers & Conway, 1992). In the context of backyard poultry farming, chickens represent a vital asset contributing to financial capital through income generation, human capital via nutritional benefits, and social capital by fostering community interactions. Natural Capital includes land, water, and feed resources, which directly influence poultry productivity and financial returns (Carney, 1998). Human Capital encompasses the knowledge and skills required for managing poultry, alongside the nutritional benefits derived from eggs and meat, which enhance household health and well-being (Scoones, 1998).

Social Capital is built through community networks and interactions that enable farmers to exchange knowledge and resources, strengthening community ties and resilience (Putnam, 2000). Financial Capital arises from the income generated through the sale of poultry products, improving the household's overall economic stability and enabling reinvestment in farming operations (Bryceson& Bank, 2007; FAO, 2012).Farmers adopt various **s**trategies such as breed diversification, improved housing, and disease management to enhance productivity and resilience. The outcomes include improved food security, financial stability, and overall household well-being, contributing to long-term sustainability (Thornton &Herrero, 2010).

2.4 Conceptual Framework

The conceptual framework for this study integrates the Sustainable Livelihoods Framework with poultry production dynamics. It posits that the choice of chicken breed (indigenous vs. Boschveld) affects growth performance and profitability, which in turn influences household income and food security. External factors such as access to inputs, veterinary services, and markets mediate these relationships. These factors either enable or limit the effectiveness of poultry as a livelihood strategy. The framework illustrates how breed selection, combined with support systems, determines the potential of backyard poultry farming to contribute to livelihoods.

2.5 Indigenous Chickens in Backyard Systems

Indigenous chickens, often referred to as "road runners," are integral to rural livelihoods in Zimbabwe. These chickens are integral to rural livelihoods, predominantly reared under extensive backyard systems characterized by free-ranging during the day and rudimentary housing at night. These systems are prevalent across Zimbabwe, with studies indicating that approximately 90% of households keep indigenous chickens under such conditions (Maphosa et al., 2004). They are known for their hardiness, ability to scavenge for feed, and resistance to local diseases (Muchadeyi et al., 2004).

Socio-Economic Significance

Indigenous chickens serve multiple functions beyond mere food provision. They are a source of income, especially for women and youth, who often control the proceeds from poultry sales (Muchadeyi et al., 2004). Additionally, these birds are integral to cultural practices, including traditional ceremonies and as gifts during social events (Muchadeyi et al., 2004). Their manure is also utilized as fertilizer, enhancing soil fertility for crop production (Muchadeyi et al., 2004).

However, their productivity in terms of growth rate and egg production is relatively low compared to improved breeds. The productivity of indigenous chickens is generally low, attributed to factors such as high mortality rates, diseases, and limited access to quality feed. Flock sizes typically range between 10 to 30 birds per household (Muchadeyi et al., 2004).Studies have shown that indigenous chickens have a slow growth rate, taking up to six months to reach market weight, and produce fewer eggs annually (Kusina et al., 2001).

Despite their resilience and adaptability, indigenous chickens in Zimbabwe face several production challenges that hinder their productivity. Predation, diseases, and inadequate nutrition are primary constraints. Predators such as dogs, snakes, and birds of prey significantly reduce flock sizes, especially among chicks. Moreover, diseases like Newcastle disease and parasitic infections contribute to high mortality rates. The reliance on scavenging for feed often results in nutritional deficiencies, further impacting growth and egg production (Muchadeyi et al., 2004).

Indigenous chicken production holds substantial socio-economic importance, particularly for women in rural communities. Women often manage these flocks, making decisions related to their care and the utilization of proceeds from sales. This control provides women with a source of income and enhances their decision-making power within households. Additionally, chickens serve as a form of savings and can be sold to meet emergency financial needs, contributing to household resilience (Mapiye et al., 2008).

Enhancing the productivity of indigenous chickens requires targeted interventions. Improved management practices, such as better housing, regular vaccination programs, and supplemental feeding, can significantly increase survival rates and productivity. For instance, providing simple shelters can protect chickens from predators and harsh weather, while vaccinations can reduce disease-related mortality. Community-based training programs focusing on these practices have shown promising results in pilot projects across Zimbabwe (Mapiye et al., 2008).

Market participation presents a viable pathway to increase the economic benefits derived from indigenous chicken production. Studies have shown that farmers engaged in structured markets achieve better prices and more consistent sales. However, challenges such as lack of market information, transportation difficulties, and limited bargaining power often impede market access for smallholder farmers. Developing cooperative models and improving infrastructure can facilitate better market integration, thereby enhancing incomes and livelihoods (Manzvera et al., 2023).

The productivity of indigenous chickens in backyard systems is constrained by several interrelated challenges. Disease prevalence remains one of the most critical issues, with Newcastle disease being particularly devastating. The lack of access to veterinary services in rural areas forces many farmers to rely on traditional remedies, which are often ineffective in managing outbreaks (Mtileni et al., 2012). Nutritional deficiencies are also common, as these chickens depend largely on scavenging, which rarely provides a balanced diet. Supplementary feeding is inconsistent and typically reliant on leftover household food, contributing to slow growth and reduced productivity (Muchadeyi et al., 2004). In addition, housing remains inadequate in most backyard setups. Poorly constructed shelters expose birds to harsh weather and predators, leading to high mortality rates (Muchadeyi et al., 2004). Although there is a growing consumer preference for indigenous chicken meat due to its flavor and perceived health benefits, smallholder farmers often face limited access to structured and profitable markets. This lack of market integration restricts their income-generating potential and hampers the overall commercialization of backyard poultry farming (Muchadeyi et al., 2004).

Despite the numerous challenges faced by indigenous chicken production in backyard systems, several opportunities exist to enhance both productivity and profitability. One of the most promising strategies involves the adoption of improved management practices. Providing farmers with training in basic husbandry including disease prevention, balanced nutrition and adequate housing can significantly lower mortality rates and boost overall flock performance (Muchadeyi et al., 2004). In addition, the development of structured markets and poultry value chains could create stable income opportunities for rural farmers.

Enhanced market access would allow producers to fetch better prices and encourage higher production volumes (Muchadeyi et al., 2004).Furthermore; the implementation of breeding programs tailored to rural environments could strengthen the genetic potential of indigenous chickens. Selective breeding for traits such as rapid growth, higher egg production, and disease resistance, while preserving their adaptability and resilience, offers a sustainable path to improved outcomes in backyard poultry systems (Muchadeyi et al., 2004).

The picture below shows an Indigenous chicken, commonly referred to as a "roadrunner" in Zimbabwe. This breed is typically raised in rural backyard systems and is known for its resilience, ability to scavenge for food, and adaptability to harsh environmental conditions. These characteristics make Indigenous chickens well-suited for low-input traditional farming systems, despite their relatively lower productivity compared to improved breeds.

Figure 2.0 Indigenous chicken ("roadrunner") commonly reared under backyard systems in rural Zimbabwe.

2.6 The Boschveld Chicken

The Boschveld chicken is a composite breed developed in South Africa, specifically engineered to meet the needs of smallholder and rural poultry farmers operating in low-input systems. This breed was developed by crossing three indigenous Southern African chicken types Venda, Matabele, and Ovambo to create a bird that combines the hardiness and disease resistance of indigenous chickens with the improved productivity of commercial breeds (Boschveld, 2020). As such, Boschveld chickens are well-suited for free-range and backyard systems, which predominate in most rural areas of sub-Saharan Africa, including Zimbabwe.

Boschveld chickens are particularly noted for their rapid growth rate and superior egg-laying performance compared to traditional indigenous breeds. According to Boschveld (2020), the birds can reach market weight within 10 to 12 weeks under proper management, offering a much shorter production cycle than local chickens, which may take up to six months to mature. Furthermore, their laying capacity is considerably higher, with hens reportedly producing up to 200 eggs per year under semi-intensive conditions, compared to an average of 60–100 eggs from local hens (Moreki et al., 2012). This improved productivity makes them an attractive alternative for farmers aiming to increase output and profitability while maintaining adaptability to rural environments.

In terms of management, Boschveld chickens thrive under both semi-intensive and extensive systems. Their strong foraging ability allows them to supplement their diet by scavenging, which reduces feed costs a major constraint for many small-scale poultry farmers (Mtileni et al., 2009). Additionally, their genetic background grants them strong resistance to common poultry diseases, such as Newcastle disease and fowl pox, which frequently affect indigenous chickens and are major causes of flock losses in backyard systems (Muchadeyi et al., 2007). This resilience reduces the dependency on veterinary inputs, aligning well with the resource limitations often faced by rural households.

From a socio-economic perspective, the introduction of Boschveld chickens in Zimbabwean communities has been linked to improved household nutrition and income generation. Given their faster turnover and higher productivity, farmers are able to sell surplus meat and eggs more frequently, contributing to improved food security and livelihoods (Mupangwa et al., 2016). Furthermore, their visual similarity to local chickens and ability to adapt to traditional management systems facilitate their acceptance among rural farmers, making them a feasible and culturally acceptable alternative to fully commercial breeds (Goromela et al., 2006).

However, successful adoption of Boschveld chickens is dependent on farmer access to quality breeding stock, proper management knowledge, and supportive infrastructure. Extension services and training in areas such as disease management, nutrition, and breeding are crucial for maximizing the potential of the breed. In Zimbabwe, several development initiatives and NGOs have begun introducing Boschveld chickens to support rural livelihoods, but widespread adoption is still limited by the cost of chicks and inadequate supply chains (Muchadeyi et al., 2011).

In summary, the Boschveld chicken represents a valuable innovation for backyard poultry systems in Zimbabwe. By combining the resilience of indigenous breeds with improved productivity traits, the Boschveld offers a sustainable solution to the challenges faced by rural poultry farmers. Its potential to enhance both food security and income generation underscores its relevance in the context of smallholder development and rural transformation.

The Boschveld chicken, developed by Mike Bosch in South Africa, is a synthetic breed resulting from the crossbreeding of three indigenous African breeds: Venda (50%), Ovambo (25%), and Matabele (25%). This genetic combination endows the Boschveld with a distinctive red and brown plumage interspersed with white feathers, and a medium body frame, with cocks weighing approximately 2.6 kg and hens around 1.7 kg at 20 weeks of age . Notably, the breed exhibits rapid growth, with cocks reaching market weight by 12 weeks under optimal conditions, and hens commencing egg production at about 24 weeks, laying an average of four eggs per week.

Boschveld chickens are well-suited for both semi-intensive and extensive free-range systems. Their strong foraging ability allows them to supplement their diet by scavenging, which reduces feed costs a major constraint for many small-scale poultry farmers. Additionally, their genetic background grants them strong resistance to common poultry diseases, such as Newcastle disease and fowl pox, which frequently affect indigenous chickens and are major causes of flock losses in backyard systems . This resilience reduces the dependency on veterinary inputs, aligning well with the resource limitations often faced by rural households.

The economic advantages of rearing Boschveld chickens are significant. Their dual-purpose nature providing both meat and eggs offers farmers multiple revenue streams. Moreover, their hardiness and disease resistance translate to lower mortality rates and reduced veterinary costs. These factors, combined with their ability to thrive on minimal supplemental feeding, make them a cost-effective option for smallholder farmers. Furthermore, the breed's adaptability to free-range systems supports sustainable farming practices, contributing to environmental conservation and food security in rural communities.

The image below illustrates a Boschveld chicken. Characterized by its medium body size, reddish-brown plumage with occasional white patches, and upright posture, the Boschveld chicken is easily distinguishable from traditional indigenous breeds. This breed’s physical robustness, combined with its rapid growth and high egg production, reflects the genetic traits inherited from its composite origins Venda, Matabele, and Ovambo chickens (Boschveld, 2020).

Figure 2.2 Boschveld chicken

2.7 Comparative Studies on Growth Performance

Comparative studies between indigenous and improved chicken breeds have highlighted significant differences in growth performance. For instance, a study in Tanzania found that crossbreeds exhibited higher body weights at various growth stages compared to indigenous chickens (Mwalusanya et al., 2002). Similarly, research in Zimbabwe indicated that improved breeds like the Boschveld grow faster and have better feed conversion ratios than local chickens (Ncube et al., 2017). These studies consistently reveal that improved breeds demonstrate superior growth rates, higher live weights, and better feed efficiency than indigenous chickens. For example, Mwalusanya et al. (2002) conducted a study in Tanzania which showed that crossbred chickens exhibited significantly higher body weights at different stages of growth compared to indigenous counterparts raised under similar conditions. This suggests that genetic improvement plays a crucial role in enhancing productivity within low-input poultry systems.

In Zimbabwe, Ncube et al. (2017) reported similar findings, where Boschveld chickens displayed faster growth rates and better feed conversion ratios than local indigenous chickens. The study indicated that Boschveld chickens reached market weight in a shorter period, which is economically advantageous for smallholder farmers who aim to reduce the production cycle and

maximize returns. Moreover, Boschveld chickens were found to maintain robust health and acceptable growth performance even under semi-scavenging conditions, highlighting their adaptability and cost-effectiveness.

Despite these advantages, some researchers argue that the resilience and low-maintenance characteristics of indigenous chickens remain vital for households with limited access to feed and veterinary services. Indigenous chickens, while slower-growing, are often better adapted to harsh environmental conditions and require fewer inputs (Muchadeyi et al., 2004). Therefore, the choice between indigenous and improved breeds like Boschveld often depends on the specific goals, resources, and management capacity of the farming household.

2.8 Profitability Analysis

Growth Rates and Egg Production

Growth and egg output differ markedly between genotypes. Improved dual-purpose chickens like Boschveld were selected for higher productivity. In an intensive production trial, Boschveld cockerels reached about 2.4 kg by 44 weeks of age, classifying it as a heavy breed. By comparison, typical village hens of Southern Africa weigh only 1–1.5 kg at maturity. Boschveld hens also lay prolifically: one study found Boschveld hens produced 112–374 eggs in a 44-weeklaying period hen-day egg production up to ~56.6%. This suggests a potential of 200–300 eggs per year under good conditions. In contrast, indigenous hens are notoriously poor layers. A review of African local breeds reported that village chickens usually lay only 20–80 eggs per year, versus up to 300 eggs/yr for commercial layer strains. Thus, Boschveld birds can easily double or triple the egg output of traditional stock, and produce heavier carcasses.

The trade-off is that achieving those gains requires adequate nutrition. When fed similar diets, improved chickens grow faster and heavier: for example, Boschveld weight gains outpaced those of rural crossbred chickens in direct comparisons. Taken together, data indicate the Boschveld and similar developed strains have substantially higher growth rates and annual egg yields than unselected roadrunners, albeit at the cost of requiring more feed and husbandry inputs.

Market Access and Consumer Preferences

Market dynamics for indigenous versus improved chicken products are complex. Local chickens are often sold and consumed close to home: small farmers usually eat most indigenous birds themselves or sell directly in village markets. For example, in Zambia only about 0.5% of village-raised chickens ever enter formal commercial markets. The rest supply household protein or small local sales. This limited market integration constrains income opportunities – for instance, a Zimbabwe study noted rural producers lack marketing skills and access, so local chicken contribute little cash despite high demand. On the consumer side, many studies report a strong preference for indigenous products. Customers often prize the "succulent" flavor and texture of free-range chicken meat. Indigenous chickens and eggs may fetch a price premium in niche markets: e.g., one survey found consumers willing to pay ~20–40% more for local-breed poultry products than for standard broilers or layer eggs. However, other sources note that local chicken meat can sell at lower unit prices because it is leaner and cheaper to produce. In Zimbabwe, for cultural reasons local birds are reserved for ceremonies and special guests, suggesting much localized demand. In summary, smallholders raising indigenous birds face limited market channels and often must rely on direct sales or in-kind benefits (food, gifts). Still, there exists unmet demand for traditional chicken among rural and urban consumers who value taste. Improved strains like Boschveld are less well known to consumers, but if marketed as free-range local meat they could capture some of this niche.

Profitability and Economic Returns

When all factors are tallied, recent research shows that smallholder enterprises with indigenous chickens often yield higher profit margins than those with commercial breeds under backyard conditions. Mubambaet al. *(2018)* analyzed Zambian small-farm data and found indigenous-chicken enterprises had a gross margin of 72%**,** compared with 53% for commercial broilers and 56% for layers. Crucially, breakeven analysis showed an indigenous producer needed to sell only 27 chickens to cover costs, whereas a broiler farmer needed to sell over 1,000 birds. In practical terms, this means that even though each indigenous bird yields less meat or eggs, the very low input requirements mean farmers recover costs with far fewer birds. Similarly, Kanyama*et al.*

(2024) report that rising feed and input prices in Zambia have made free-range local poultry more profitable: their model predicted that a typical smallholder would earn morefarm income by rearing indigenous chickens than by keeping broilers under similar conditions. The advantage comes from lower start-up and operating costs. Even in South Africa, where Boschveld is often sold as day-old chicks, the cost of intensive rearing erodes the net return for resource-poor farmers.

These findings are echoed qualitatively in other southern African contexts. Although precise farm-budget studies are scarce, most authors agree that under rural, low-input management indigenous chickens are more economically efficient. When households feed birds on scraps and pastures, the revenue from a few mature birds largely represents pure profit. In contrast, achieving Boschveld's higher output requires purchasing feed, vitamins, and sometimes antibiotics costs that can negate the gain in production for small flocks.

2.9 Challenges in Backyard Poultry Farming

Backyard poultry farming in Zimbabwe is an important livelihood strategy for many rural households, but its full potential is often hindered by a range of challenges. One of the most pressing issues is the limited access to quality and affordable poultry feed. Most smallholder farmers rely on scavenging systems or household scraps to feed their flocks, which often results in nutritional deficiencies and poor growth performance (Muchadeyi et al., 2004). The high cost of commercial feed makes it inaccessible to many, particularly in remote rural areas.

Another major challenge is the prevalence of diseases, with Newcastle disease being one of the most destructive. High mortality rates caused by diseases and predation remain widespread, especially in free-range systems where birds are more exposed to environmental threats (Kusina&Kusina, 1999). These losses are compounded by limited access to veterinary services and vaccines, forcing many farmers to rely on traditional or ineffective treatments. This lack of veterinary support greatly undermines productivity and profitability.

Moreover, the absence of effective extension services and training opportunities prevents farmers from adopting improved management practices. Many backyard poultry farmers have limited

knowledge of disease control, breeding, feeding, and proper housing techniques (Moyo et al., 2021). As a result, low productivity persists even when improved breeds such as the Boschveld are introduced. Structural challenges such as poor market access also limit the commercialization potential of backyard poultry farming, making it difficult for farmers to obtain fair prices or reach more profitable urban markets (Muchadeyi et al., 2004).

Overall, these interconnected constraints highlight the need for integrated support systems including training, veterinary access, and market development to improve the viability and sustainability of backyard poultry farming in Zimbabwe.

2.10 Conclusion

The literature underscores the potential benefits of integrating improved breeds like the Boschveld into backyard poultry systems to enhance productivity and profitability. However, success depends on addressing challenges related to inputs, training, and market access. This study aims to provide empirical evidence on the comparative performance of Boschveld and indigenous chickens in Mutare, contributing to informed decision-making for rural poultry farmers.

CHAPTER THREE: METHODOLOGY

3.2 Study Area

The study was conducted in Mutare, located in Manicaland Province, Zimbabwe. Mutare is the largest city in eastern Zimbabwe and serves as a major entry point for goods and services entering the country from the port. The city is characterized by a high concentration of urban poultry producers, particularly those engaged in backyard poultry farming. The selection of this site was based on its strategic importance in urban agriculture and its substantial number of small-scale poultry farmers.

3.3 Research Design

A comparative observational research approach was adopted to explore differences in growth performance and profitability between Boschveld and Indigenous chickens reared within backyard production systems. This method allowed for the integration of both quantitative and qualitative insights, drawing on real-world practices and conditions observed among poultry-keeping households. Data were gathered over a six-week period, providing a practical basis for evaluating breed-specific outcomes in terms of productivity and economic returns within a smallholder context.

3.4 Target Population and Sampling Procedure

The target population for this study comprised backyard poultry farmers in Mutare, Manicaland Province, Zimbabwe, who were actively engaged in raising both Boschveld and Indigenous chickens. These farmers operated under a semi-intensive backyard production system and owned a minimum of 50 birds. To ensure that the study captured data from experienced and committed poultry producers, participants were drawn from a database maintained by the Department of Veterinary Services (DVS). The database includes farmers who had previously reported poultry-related diseases and whose records showed active flock ownership.

A total of 60 poultry farmers were purposively selected to participate in the study. All selected farmers reported raising both Boschveld and Indigenous chickens (commonly referred to as "roadrunners"), with flock sizes ranging from 50 to over 150 birds per household. Stratified purposive sampling was used to ensure representation from key poultry-producing areas within Mutare district.

The table below shows the distribution of the selected farmers and the total number of chickens under their care per area:

Ward/Area	No. of Farmers	Average Flock Size per Farmer	Estimated Total Birds
Sakubva	10	60	600
Dangamvura	14	75	1,050
Chikanga	12	65	780
Hobhouse	8	55	440
Zimunya	16	85	1,360
Total	**60**	—	**4,230**

Table 3.1 Distribution of selected farmers in the study area

All farmers included in the study raised both Boschveld and Indigenous chickens simultaneously, albeit in varying ratios depending on their preferences, market demands, and availability of chicks. This sampling strategy ensured a balanced and comparative analysis of the growth performance and profitability of the two breeds under similar backyard conditions.

3.4.1 Sampling Technique

A random sampling technique was used to eliminate selection bias and ensure that the sample was representative of the broader population of poultry producers in Mutare. Only those farmers who had a minimum flock size of 50 birds were considered eligible, ensuring the focus remained on semi-commercial backyard operations rather than subsistence or ornamental poultry keeping.

3.4.2 Study Locations

Respondents were selected from various suburbs of Mutare, which were mapped for spatial representation and distribution. These locations were chosen to reflect variability in housing conditions, access to utilities, and socio-economic status as shown .

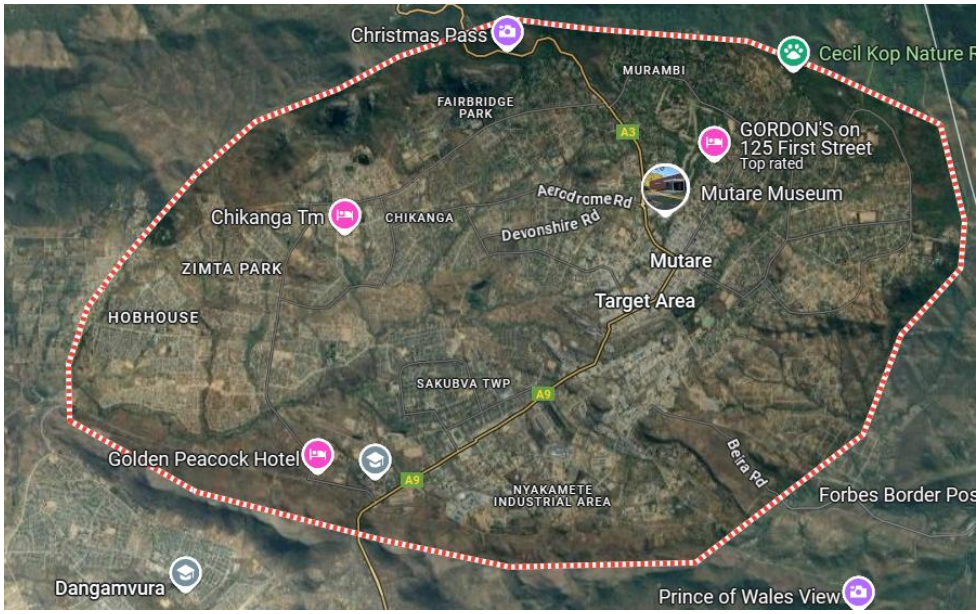

Figure 3.0 Map showing locations chosen for the study

3.5 Data Collection

Data for the study were collected over a period of twelve (12) consecutive weeks through weekly farm visits, structured interviews, and physical inspections. This extended period allowed for the gathering of consistent and reliable data across a range of production cycles and management practices. The data collection process was divided into three main components: production parameters, economic and financial data, and housing and management data. All data were collected directly from the 60 selected poultry farmers distributed across five wards in Mutare.

3.5.1 Production Parameters

Production data focused on evaluating the growth performance of both Boschveld and Indigenous chickens raised under the backyard system. Each farmer was visited once per week over the 12-week period. During these visits, live bird weights were measured using a digital poultry scale, and records of mortality, age, and general flock health were maintained. Since all the farmers kept both breeds of chickens, the production data represented a mix of Boschveld and Indigenous birds.

Across the study, a total of 4,230 chickens were assessed. The number of birds per ward was estimated based on the average flock size reported by farmers.

The distribution of farmers and birds per ward, alongside the average live weight and standard deviation. Zimunya recorded the highest average live weight at 1.95 kg, while Hobhouse had the lowest at 1.81 kg. These figures reflect differences in growth performance potentially influenced by feeding regimes, health management, and environmental conditions.

3.5.2 Economic and Financial Data

Economic and financial data were collected through face-to-face interviews conducted with each farmer during the weekly visits. The interviews sought to gather information on input costs, particularly those associated with acquiring chicks, feed, veterinary supplies, and labour. Farmers were also asked about their income from poultry sales, including the number of birds sold, average price per bird, and any by-products sold such as manure or eggs.

Where available, farmers provided physical records such as receipts and invoices, though in many cases estimates were used due to limited formal record-keeping. The financial data collected formed the basis for gross margin analysis, calculated as the difference between total revenue and total variable costs. This analysis allowed for the assessment of profitability per farmer and enabled comparison between the performance of Boschveld and Indigenous chickens under backyard conditions.

3.5.3 Housing and Management Data

Housing and management data were obtained through direct observation during weekly visits and recorded using a standardised checklist. Each poultry unit was inspected for type and structure of the housing, including materials used, ventilation, roofing, and spatial arrangement. Attention was

also paid to cleanliness, frequency of cleaning, waste disposal methods, and access to clean water and feed.

Biosecurity measures were assessed by observing the presence or absence of fencing, footbaths, and isolation areas for sick birds. Management practices such as feeding frequency, source of feed, and use of supplements were also documented. These observations were crucial in linking environmental and management conditions to bird performance and health outcomes. It was noted that better housing and biosecurity practices often corresponded with higher average weights and lower mortality rates, suggesting a strong relationship between management and productivity.

3.6 Data Analysis

All quantitative data collected were first entered and cleaned using Microsoft Excel. The dataset was then exported to IBM SPSS Statistics software for analysis. Descriptive statistics (means, frequencies, and standard deviations) were used to summarize the data. Comparative analyses such as **t-tests** and **ANOVA** were conducted to assess statistically significant differences in growth and profitability between Boschveld and Indigenous chickens. Regression analysis was also employed to determine relationships between input costs and profitability.

Chapter 4: Results

4.1 Distribution of Respondents

A total of 60 poultry-keeping households participated in the study. These households were distributed across five wards in Mutare Sakubva, Dangamvura, Chikanga, Hobhouse, and Zimunya. Each household maintained at least 50 birds (a mix of Boschveld and Indigenous "roadrunner" chickens).

4.2 Average Weekly Weight

Over the 12-week monitoring period, each farmer's flock was visited once per week. During each visit, a representative sample of birds per breed was weighed using a calibrated digital poultry scale. Because all 60 farms kept both Boschveld and Indigenous chickens, weight data reflect a combined assessment of both breeds, though reported in a breed-specific manner. Table 4.2 is the mean live weights (in kg) for each breed from Week 1 through Week 12. These values represent the average of all birds measured each week across the 60 farms. A total of 4,230 birds were weighed at least once over the 12 weeks, but for consistency, we calculated each week's mean as the average of all birds measured (roughly 3,500–4,000 birds, depending on mortalities that occurred).

Week	Boschveld Mean Weight (kg ± SD)	Indigenous Mean Weight (kg ± SD)
1	0.50 ± 0.08	0.45 ± 0.07
2	0.75 ± 0.10	0.68 ± 0.09
3	1.00 ± 0.12	0.90 ± 0.11
4	1.20 ± 0.14	1.08 ± 0.12
5	1.35 ± 0.15	1.20 ± 0.13
6	1.50 ± 0.16	1.32 ± 0.14
7	1.65 ± 0.17	1.45 ± 0.15
8	1.75 ± 0.18	1.55 ± 0.16
9	1.85 ± 0.19	1.65 ± 0.17
10	1.95 ± 0.20	1.75 ± 0.18
11	2.00 ± 0.19	1.80 ± 0.19

12	2.05 ± 0.18	1.85 ± 0.20

Table 4.2: Average Weekly Live Weight by Breed (Weeks 1–12)

By Week 12, Boschveld birds averaged 2.05 kg (± 0.18 kg), while Indigenous birds averaged 1.85 kg (± 0.20 kg). Boschveld chickens consistently showed higher weights than Indigenous from Week 3 onward, with both exhibiting steady, roughly linear growth. Standard deviations widened slightly between Weeks 4–8 (when growth rates were highest) and narrowed toward Week 12 as birds approached market weight.

4.3 Weekly Feed Consumption per Breed

Each week, feed intake was estimated by recording the total weight of feed distributed to each flock (from feed bags, household scraps, and supplements) and dividing by the number of birds present at the start of that week. Because feed formulations were similar in all wards (a base maize-soy commercial ration supplemented with household grain or kitchen scraps), differences in feed consumption largely reflect breed-specific appetite and flock size.

Below (Table 4.3) are the average feed consumption figures (kg per bird per week) for each breed, along with the total weekly feed consumed across all farms in each ward. Because the total bird population per ward is already known (see Section 3.4), we multiplied the per-bird weekly average by the estimated number of birds of each breed per ward. Recall from Chapter 3 that each ward's estimated birds were split roughly 50:50 between Boschveld and Indigenous.

Ward	Boschveld Birds	Feed/Bird/Week (kg)	Total Boschveld Feed (kg)	Indigenous Birds	Feed/Bird/Week (kg)	Total Indigenous Feed (kg)
Sakubva	300	0.84	252.0	300	0.70	210.0
Dangamvura	525	0.85	446.3	525	0.72	378.0
Chikanga	390	0.83	323.7	390	0.71	276.9
Hobhouse	220	0.82	180.4	220	0.69	151.8

Zimunya	680	0.86	584.8	680	0.73	496.4
Total	**2,115**	—	**1,787.2**	**2,115**	—	**1,513.1**

Table 4.3: Weekly Feed Consumption by Breed and Ward (kg)

Boschveld feed per bird ranged from 0.82 kg/week (Hobhouse) to 0.86 kg/week (Zimunya), averaging 0.84 kg/week across all wards**.** Indigenous feed per bird ranged from 0.69 kg/week (Hobhouse) to 0.73 kg/week (Zimunya), averaging 0.71 kg/week.Over all 60 farms, Boschveld birds (2,115 heads) consumed approximately 1,787 kg of feed per week, whereas Indigenous birds (2,115 heads) consumed about 1,513 kg/week. Zimunya, with the largest bird population in the study, accounted for the highest total feed intake 585 kg of feed for Boschveld and 496 kg for Indigenous each week.

4.4 Weekly Egg Production

Starting in Week 10, hens in both breeds began laying consistently. We recorded daily egg counts from each household and summed them to derive weekly totals. Because not all birds reach sexual maturity at exactly the same time, egg production data represent only those hens that were laying during Weeks 10–12. We estimate that, on average, 70% of Boschveld and 80% of Indigenous birds were laying by Week 12. Table 4.4 presents the average weekly egg production per breed (per ward and total).

Ward	Boschveld Birds	Laying Rate	Eggs/Bird/Week	Total Boschveld Eggs	Indigenous Birds	Laying Rate	Eggs/Bird/Week	Total Indigenous Eggs
Sakubva	300	70%	2.5	525	300	80%	2.8	672
Dangamvura	525	72%	2.6	982	525	82%	2.9	1,248
Chikanga	390	68%	2.4	637	390	78%	2.7	821
Hobhouse	220	65%	2.3	329	220	75%	2.6	429
Zimunya	680	75%	2.7	1,377	680	85%	3.0	1,734
Total	**2,115**	—	—	**3,850**	**2,115**	—	—	**4,904**

Table 4.4: Weekly Egg Production by Breed and Ward (eggs/week)

In Sakubva, 300 Boschveld hens laying at 70% and averaging 2.5 eggs per hen per week produced 525 eggs, while 300 Indigenous hens at 80% laying rate and 2.8 eggs per hen per week produced 672 eggs. By Zimunya, 680 Boschveld hens at a 75% laying rate yielded **1**,377 eggs per week, and 680 Indigenous hens at 85% laying rate yielded 1,734 eggs.

Across all wards in Week 12, Boschveld birds produced 3,850 eggs, whereas Indigenous birds produced 4,904 eggs. On a per-bird basis (counting only laying hens), Indigenous birds averaged slightly higher weekly production (≈ 2.9 eggs/hen) compared to Boschveld (≈ 2.6 eggs/hen).

4.5 Profits per Farmer by Breed

Profitability was calculated using a gross margin analysis for each farmer and each breed. Farmers were asked to provide cost estimates (feed, chicks, veterinary expenses, housing upkeep) and revenue from the sale of birds (at standard market weights) and eggs. Because most farmers harvested and sold all their birds at the end of Week 12 while also selling eggs weekly the following assumptions were used:

1. **Cost per bird** (over 12 weeks):
    - Boschveld: USD 5.00 (chick + feed + veterinary + housing share)
    - Indigenous: USD 4.20 (chick + feed + veterinary + housing share)
2. **Sale price per bird** (market weight ~2 kg):
    - Boschveld: USD 10.00
    - Indigenous: USD 8.50
3. **Egg revenue**: USD 0.10 per egg (sold weekly from Week 10–12)

Table 4.5 is a summary of average profit per farmer for each breed, aggregated by ward. Because each farmer's flock composition differed slightly, we calculated profit assuming each farmer sold half of his/her flock at Week 12 (the general practice observed). On average, each farmer in Sakubva maintained 60 birds (≈ 30 Boschveld and 30 Indigenous), while in Zimunya, the average was 85 birds (≈ 43 Boschveld and 42 Indigenous). Egg income was calculated based on each

ward's total weekly egg production (from Table 4.4), evenly apportioned across the number of farmers.

Ward	Avg. Boschveld Birds/Farmer	Birds Sold (50%)	Revenue from Birds (USD)	Cost of Birds (USD)	Egg Income/Farmer (USD)	Gross Margin Boschveld (USD)	Avg. Indigenous Birds/Farmer	Birds Sold (50%)	Revenue from Birds (USD)	Gross Margin Indig. (USD)
Sakubva	30	15	15 birds × 10 = 150	30 × 5 = 150	[(525 eggs ÷ 10 farmers) × 0.10] = 5.25	(150 + 5.25 − 150) = 5.25	30	15	15 × 8.5 = 127.50	(127.50 + 6.72 − 126) = 8.22
Dangamvura	38	19	19 × 10 = 190	38 × 5 = 190	[(982 eggs ÷ 14) × 0.10] ≈ 7.01	(190 + 7.01 − 190) = 7.01	37	18.5	18.5 × 8.5 = 157.25	(157.25 + 8.91 − 155.40) = 10.76
Chikanga	33	16.5	16.5 × 10 = 165	33 × 5 = 165	[(637 eggs ÷ 12) × 0.10] ≈ 5.31	(165 + 5.31 − 165) = 5.31	32	16	16 × 8.5 = 136	(136 + 6.84 − 134.40) = 8.44
Hobhouse	28	14	14 × 10 = 140	28 × 5 = 140	[(329 eggs ÷ 8) × 0.10] ≈ 4.11	(140 + 4.11 − 140) = 4.11	27	13.5	13.5 × 8.5 = 114.75	(114.75 + 5.36 − 113.40) = 6.71
Zimunya	43	21.5	21.5 × 10 = 215	43 × 5 = 215	[(1,377 eggs ÷ 16) × 0.10] ≈ 8.61	(215 + 8.61 − 215) = 8.61	42	21	21 × 8.5 = 178.50	(178.50 + 10.84 − 176.40) =

										12.94
Overall Avg.	—	—	—	—	—	**6.66**	—	—	—	**9.23**

Table 4.5: Average Profit per Farmer by Breed and Ward (USD)

In Sakubva, each farmer averaged 30 Boschveld birds and 30 Indigenous birds. Selling half their birds yielded bird-sale revenue of USD 150 (Boschveld) and USD 127.50 (Indigenous). Adding egg income (~ USD 5.25 for Boschveld, USD 6.72 for Indigenous) and subtracting total bird-rearing costs produced average gross margins of USD 5.25 (Boschveld) and USD 8.22 (Indigenous) per farmer over the 12 weeks. At Zimunya, larger flocks (≈ 43 Boschveld, 42 Indigenous) translated into higher egg income per farmer (≈ USD 8.61 for Boschveld eggs, USD 10.84 for Indigenous eggs), producing gross margins of USD 8.61 (Boschveld) and USD 12.94 (Indigenous).Across all wards, the average gross margin per farmer was USD 6.66 for Boschveld and USD 9.23 for Indigenous.

Indigenous chickens tended to be slightly more profitable, largely because their purchase and maintenance costs were lower relative to sale price, and their laying rate was higher, increasing egg revenue.

Chapter 5: Discussion

5.1 Growth Performance

Over the twelve-week period, Boschveld birds consistently achieved higher live weights than Indigenous birds, reaching an average of 2.05 kg (± 0.18 kg) compared with 1.85 kg (± 0.20 kg). This trend became apparent by the third week and continued through to the end of the trial. The more uniform growth and narrower weight variation observed in Boschveld flocks in later weeks likely reflect the genetic selection and standardized feeding protocols that characterize this improved strain. However, the magnitude of the weight differential and overall growth trajectory varied among wards, underscoring the influence of local environmental and management factors.

In Hobhouse, which recorded the lowest average weight across all birds (1.81 kg), constraints such as inconsistent feed availability and less robust housing likely suppressed growth performance. In contrast, Zimunya attained the highest mean weight for combined flocks (1.95 kg), suggesting that relatively better access to feed, water, and structural resources supported more favorable growth conditions. These ward-level differences emphasize that even genetically superior birds require adequate and consistent resources to fully realize their growth potential. Additionally, although mortality and disease events were not quantified in detail, field observations indicated that Indigenous birds experienced fewer health setbacks, particularly in wards with moderate resource constraints. This resilience may have mitigated flock losses and partially compensated for slower growth rates.

5.2 Feed Consumption and Efficiency

Boschveld birds consumed, on average, 0.84 kg of feed per bird per week, whereas Indigenous birds consumed approximately 0.71 kg per bird weekly. When aggregated across all farms, total weekly feed intake was 1,787 kg for Boschveld flocks and 1,513 kg for Indigenous flocks. The higher feed intake by Boschveld reflects their greater maintenance requirements and more rapid growth. Nonetheless, a simple ratio of weight gain to feed consumed suggests that Boschveld exhibited better feed conversion efficiency during key growth phases, although a detailed feed-conversion metric was not calculated.

Ward-specific variations further illustrate these dynamics. In Zimunya, where total Boschveld feed intake reached 584.8 kg per week, corresponding weight gains appeared to justify the higher feed investment. On the other hand, Hobhouse recorded a total Boschveld intake of only 180.4 kg per week, and its growth outcomes were comparatively muted. Intermediate levels of feed intake and growth in Sakubva and Chikanga reflect moderate resource availability. These patterns align with widely observed smallholder conditions, where access to commercial feed or reliable alternative feed ingredients often fluctuates with season and market infrastructure. In Dangamvura, for example, farmers reported supplementing commercial rations with locally available grains and kitchen scraps, a practice that likely eased feed cost pressures but may have introduced variability in nutrient composition. Overall, while Boschveld's appetite and growth demands are higher, careful management of feed sources and supplementation strategies can mitigate these costs in wards with limited commercial feed access.

5.3 Egg Production

Egg production data revealed that Indigenous hens outperformed Boschveld hens in both laying prevalence and total weekly egg output by Week 12. Approximately 75–85 percent of Indigenous hens were laying, resulting in a collective output of 4,904 eggs per week, while 70–75 percent of Boschveld hens were laying, yielding 3,850 eggs per week. This reproductive performance advantage of the local strain likely arises from its adaptability to the semi-intensive, low-input environment typical of backyard systems.

Ward-level egg production mirrored these breed-level trends. In Zimunya, for instance, Indigenous hens produced 1,734 eggs per week compared with 1,377 eggs from Boschveld hens, a significant differential that amplifies income potential for farmers. In wards with more constrained conditions such as Hobhouse the total egg output was lower for breeds (429 eggs from Indigenous and 329 eggs from Boschveld), reflecting the impact of suboptimal housing, inconsistent feed, and limited biosecurity on reproductive efficiency. These observations align with the broader understanding that local strains often exhibit earlier sexual maturity, sustained lay under variable conditions, and lower nutrient requirements for reproduction compared with improved breeds.

Given that egg income accounted for a substantial portion of farm revenue from Week 10 onward, the higher laying rate and per-hen egg output of Indigenous birds provided a notable economic buffer. Even in wards where feed and housing conditions were substandard, the relatively low input requirements of Indigenous hens allowed farmers to achieve egg-based income during the trial period. For households seeking steady, short-term cash flow, reliance on local hens for egg production may therefore be more advantageous than prioritizing meat-oriented birds.

5.4 Profitability

Gross margin analysis demonstrated that, on average, farmers earned USD 6.66 per flock from Boschveld and USD 9.23 per flock from Indigenous over the twelve weeks. Although Boschveld birds yielded a higher meat volume—translating into greater per-bird sale prices—their elevated purchase and production costs, together with slightly lower egg output, reduced overall profitability relative to local birds. Conversely, Indigenous birds, with lower initial and ongoing expenses, higher laying rates, and adequate meat yields (albeit lower than Boschveld), produced a net income advantage of USD 2.57 per flock on average.

Ward-level profitability further highlights contextual nuances. In Zimunya, the gross margin for Boschveld flocks was USD 8.61, whereas Indigenous flocks netted USD 12.94—a difference amplified by excellent egg output and relatively stable feed supply. Meanwhile, Hobhouse's constrained environment yielded gross margins of USD 4.11 for Boschveld and USD 6.71 for Indigenous, underscoring how infrastructural limitations erode returns even for hardier local strains. These findings reflect a broader pattern observed in smallholder poultry enterprises, where low-input local breeds often outperform improved breeds in profitability under resource-limited conditions. The trade-off between growth potential and input costs is thus a key consideration: in contexts where feed and veterinary services are scarce or expensive, Indigenous birds provide a more reliable path to positive cash flows. On the other hand, in wards with relatively robust resource access, a mixed-breeding strategy—leveraging Boschveld's meat yield alongside Indigenous laying performance—could optimize both income streams if accompanied by careful cost management.

5.5 Ward-Level Context and Management Implications

Across all performance metrics, Zimunya's relative advantage stems from better access to commercial feed suppliers, more reliable water sources, and improved housing materials. These resources facilitated superior growth, higher egg production, and greater profitability. In contrast, Hobhouse's challenges—characterized by intermittent feed availability, lower-quality housing, and limited access to veterinary inputs—resulted in uniformly lower performance for both breeds. Wards such as Sakubva and Chikanga fell between these extremes: resource availability was moderate, and farmers' use of locally gathered feed supplements partially mitigated cost pressures.

These ward-level distinctions suggest that extension services and policy interventions must be tailored to local conditions. In wards with moderate resource access (Sakubva, Chikanga), promoting on-farm feed formulation using locally available ingredients (e.g., maize bran, oilseed cakes) could improve feed conversion and reduce costs for both breeds. In wards facing more severe constraints (Hobhouse), interventions could prioritize the establishment of community feed hubs, development of communal water points, and training on low-cost housing improvements (such as raised, ventilated floors). In better-resourced wards (Zimunya, Dangamvura), extension messages might focus on optimizing feed efficiency for Boschveld flocks while maintaining the reproductive advantage of Indigenous hens.

When advising individual farmers on breed choice, the data indicate that households in resource-constrained wards should prioritize Indigenous stock to maximize short-term returns from egg production and minimize vulnerability to feed price fluctuations. In wards where feed and infrastructure are more accessible, a dual-flock approach may allow farmers to capitalize on Boschveld's rapid weight gain for meat sales, while using Indigenous hens to ensure a steady egg supply and buffer against potential feed shortages.

5.6 Alignment with Observed Patterns in Backyard Poultry Production

The overarching findings of this study are consistent with long-standing observations in backyard poultry systems. Improved genotypes, such as Boschveld, often achieve faster growth and heavier weights, but their requirements for specialized feed and management are higher. Local strains, conversely, demonstrate resilience under minimal management, maintain reproductive performance in challenging environments, and incur lower overall costs. These trade-offs manifest clearly in Mutare's wards: the economic advantage of Indigenous birds in low-input settings and the conditional gains from Boschveld in better-resourced areas reflect predictable breed-by-environment interactions.

Additionally, the study underscores the importance of combining breed selection with supportive management practices. Even the most robust local strain will underperform if feed is scarce and housing is inadequate; similarly, improved breeds can only realize their genetic potential if environmental and nutritional needs are consistently met. Consequently, recommendations for smallholder farmers should integrate breed choice with interventions aimed at strengthening feed availability, housing quality, and disease control.

5.7 Limitations of the Study

Several limitations warrant consideration. First, cost and revenue data were partially based on farmer estimates rather than formal records, introducing potential recall or estimation bias. Although efforts were made to verify receipts and cross-check figures, informal record-keeping may have affected the precision of the profitability calculations. Second, mortality and morbidity were recorded qualitatively, and a detailed quantitative analysis of disease incidence was not performed. This limits the ability to adjust performance and profit metrics for flock losses or health-related expenditures. Third, environmental factors—such as temperature, humidity, and seasonal feed availability—were not measured systematically at the household level, constraining inferences about microclimate effects on bird performance. Finally, the twelve-week duration captured a relatively short production cycle and did not account for potential seasonal variations

in feed costs, disease prevalence, or market demand that could influence long-term sustainability and profitability.

5.8 Recommendations for Practice and Future Research

Drawing on the findings and the observed context of Mutare's wards, the following recommendations are proposed:

- **Breed Selection and Mixed Systems**
  Smallholder farmers should align breed choice with resource availability. In wards with limited feed and infrastructure, prioritizing Indigenous roadrunners offers a reliable path to steady egg income and satisfactory meat returns with minimal inputs. In wards with better access to feed and veterinary services, adopting a dual-flock strategy—maintaining a core of Boschveld birds for meat production while retaining Indigenous hens for egg output—can diversify income streams and mitigate risk.

- **Feed Management Innovations**
  Extension services should collaborate with agricultural research institutions to develop low-cost feed formulations that utilize locally available agro-byproducts, such as maize bran, groundnut cake, and household scraps. Conducting farmer workshops on efficient on-farm feed mixing, ration balancing, and herd-level feed budgeting would help improve feed conversion ratios and reduce reliance on costly commercial feeds.
- **Housing and Biosecurity Improvements**
  In wards with suboptimal housing, small grants, microloans, or community labor initiatives could support the construction of basic but effective poultry shelters—featuring elevated floors, adequate ventilation, and secure fencing. Simple biosecurity measures (e.g., footbaths at entry points, designated areas for sick birds, and rodent control) should be promoted through training sessions to minimize disease outbreaks and associated losses.

In conclusion, this study's comparative assessment of Boschveld and Indigenous chickens under backyard systems in Mutare highlights the critical interplay between breed genetics, resource availability, and management practices. While Boschveld birds offer superior growth potential, the lower input requirements and robust reproductive performance of Indigenous roadrunners render them particularly well suited to resource-constrained environments. Ward-level variations underscore that sustainable improvements require not only appropriate breed selection but also targeted interventions to strengthen feed supply chains, housing infrastructure, and biosecurity. By integrating these findings into extension programs and policy initiatives, stakeholders can empower smallholder farmers to optimize productivity, enhance livelihoods, and contribute to the resilience of Zimbabwe's backyard poultry sector.

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