

**ASSESSING THE IMPACT OF TECHNOLOGICAL ADVANCEMENTS AND
GLOBALIZATION ON THE CONSERVATION AND SUSTAINABILITY OF
INDIGENOUS CHICKEN BREEDS IN MUREHWA DISTRICT OF
MASHONALAND EAST PROVINCE IN ZIMBABWE.**

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**A dissertation submitted in partial fulfilment of the requirements of the Bachelor of
Science honours degree in Animal Health and Production**

June 2025

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Dedication

I dedicate this project to my family and children

Acknowledgement

Firstly, I would like to thank the Almighty God for giving me this opportunity to carry out this project. Secondly, my heartfelt gratitude to my Supervisor, Mr A.Pagute for nurturing me, giving untiring supervision, guidance and recommendation for undertaking this project. My sincere gratitude also goes to the farmers, extension workers and veterinary assistants, for giving me valuable information concerning this project. All the entire team at Department of Animal science also gives support through their pool of knowledge poured unto me as well. Not forgetting my family and friends who also support me in carrying out this Degree course.

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Abstract

This study examined the conservation strategies for indigenous chicken breeds in Zimbabwe, assessing the influence of technological advancements and global market pressures. It also gathered insights from local farmers and agricultural experts to identify challenges and opportunities, culminating in practical recommendations to enhance sustainability and conservation efforts. The predominant conservation methods identified include in-situ practices, where indigenous chickens are maintained within their natural environments, and community-based breeding programs focusing on collaborative selection and breeding. Ex-situ conservation efforts, such as cryopreservation, are limited due to resource constraints and technical challenges. Technological advancements have had a dual impact. While the introduction of exotic breeds has led to the replacement of indigenous chickens, threatening genetic diversity, technologies like incubators and improved feeding systems offer potential benefits if appropriately adapted and adopted. Farmers face challenges such as disease prevalence, limited access to structured markets, inadequate extension services, and competition from exotic breeds. However, opportunities exist in the form of growing demand for organic and free-range products, integration of indigenous knowledge in farming practices, and value addition through processing indigenous chicken products.

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CHAPTER 1

1.1 Introduction

This study focusses on the impact of technological advancement and globalization on conservation of indigenous chicken breeds in Murehwa district, Zimbabwe. Indigenous chickens (*Gallus domesticus*) are local breeds of chickens that are adapted to their specific environments over generations. These breeds are typically well suited to the local climate, have diverse diet, and are often raised in traditional farming systems. They are sometimes referred to as traditional, scavenging, backyard, village, locally of family chickens.

Indigenous chickens are important animal genetic resources amongst resource limited rural communities of southern Africa. They play an important role in traditional and religious ceremonies of rural households, they are important in customary rites such as gift payments (Muchadeyi F.C 2012). They also provides inexpensive protein substitute like meat and eggs, which is why they are essential to food security, (Sithole et al, 2025). However there have been reports that some breeds are in danger of going extinct, hence the need for conservation. This is normally due to inbreeding, poor housing, diseases, parasites, poor feeding, and the absence of conservation strategies.

Globally, currently there are three globally accessible data bases containing information on chickens, however none of these provides comprehensive system for systematically classifying chickens in developing countries in terms of their present day uses, potential for the future and distribution within and across countries. Addressing the gaps in information on indigenous chickens genetic resources should primarily be the focus on the Domestic Animal Genetic Resources Information System (DAGRIS), which is a virtually library on indigenous animal genetic resources in developing countries, delivering systematic information on diversity, distribution and classification of domestic chickens in the tropics, (Dessie, 2012)

Zimbabwe is amongst the global south countries mostly affected by climate change which triggers farmers to practice subsistence farming to curb hunger, food insecurity and poverty. Moreover with these facts in mind, indigenous chickens have also a fundamental role in

mitigating food insecurity for the rural population of Zimbabwe since they are adapted to the local environment. Indigenous free range species remain predominant in rural Africa despite the introduction of exotic breeds, because farmers have not been able to acquire high quality inputs that exotic breeds require. Hence rural households rely on indigenous free range chickens which usually have no regular health control program and often may not require complex shelter system, (Maumburudze, 2016).

1.2 Background Information

Indigenous chickens, commonly referred to as "roadrunners" in Zimbabwe, play a pivotal role in rural livelihoods by providing affordable protein sources and serving as a means of income generation. Despite their significance, these breeds face challenges due to technological advancements and global market pressures that favor exotic breeds with higher productivity. This study aims to explore existing conservation strategies for indigenous chicken breeds in Zimbabwe, assess the impact of technological and global market dynamics, gather insights from stakeholders, and formulate practical recommendations to enhance the sustainability and conservation of these breeds.

In Zimbabwe, indigenous chickens are integral to the socio-economic fabric of rural communities. They are valued for their adaptability to local conditions, resistance to diseases, and cultural significance. Traditional conservation strategies, such as selective breeding and the use of ethno veterinary practices, have been employed by farmers to maintain these breeds. However, the introduction of exotic breeds, driven by technological advancements and global market demands for uniformity and high productivity, has led to a decline in indigenous chicken populations.

The Zimbabwe Free Range Poultry Association (ZFRPA) has been instrumental in promoting sustainable free-range poultry production and marketing. Their efforts include training farmers on disease management using indigenous knowledge systems and encouraging the use of natural feed systems. Despite these initiatives, challenges persist, including limited access to modern technologies, inadequate policy support, and competition from imported poultry products.

Understanding the interplay between traditional conservation methods, technological advancements, and global market pressures is crucial for developing strategies that ensure the sustainability and conservation of indigenous chicken breeds in Zimbabwe.

1.3 Statement of the Problem

The conservation of indigenous chicken breeds in Zimbabwe is under threat due to the increasing preference for exotic breeds, which are perceived to offer higher productivity and meet global market standards. This shift undermines traditional conservation strategies and poses risks to the genetic diversity and cultural heritage associated with indigenous chickens. Moreover, smallholder farmers face challenges in adopting new technologies and accessing markets, further exacerbating the decline of indigenous breeds. There is a pressing need to evaluate existing conservation strategies, understand the challenges and opportunities presented by technological advancement and globalization, and develop practical recommendations to enhance the sustainability and conservation of indigenous chickens.

1.4 Justification of the Study

The primary aim of this study is to investigate and evaluate the current conservation strategies employed for indigenous chicken breeds in Zimbabwe, particularly in the face of technological advancements and global market pressures. The research seeks to gather insights from local farmers and agricultural experts regarding the challenges and opportunities presented by these external factors. Based on these insights, the study intends to formulate practical recommendations to enhance the sustainability and conservation of indigenous chickens, integrating beneficial technologies and addressing global market trends.

1.5 Objectives of the study

The main aim of the study were to examine the existing conservation strategies for indigenous chicken breeds in Zimbabwe affected by technological advancements and global market pressures as well as the practical measures that can be implemented to enhance their sustainability and conservation.

The specific objectives were:

1. To identify the existing conservation strategies for indigenous chicken breeds and evaluate how they are affected by technological advances and global market pressures.
2. To gather insights from local farmers, agricultural experts on the challenges and opportunities presented by technological advancement and globalisation.
3. To formulate practical recommendations for enhancing the sustainability and conservation of indigenous chickens while integrating beneficial technologies and addressing global market trends.

1.6 Hypothesis

The study is guided by the following hypothesis:

The integration of appropriate technologies and supportive policies can enhance the sustainability and conservation of indigenous chicken breeds in Zimbabwe, despite the challenges posed by technological advancements and global market pressures.

CHAPTER 2: LITERATURE REVIEW

2.1 Background information

Globally, technological advancements have revolutionised agriculture through precision farming, biotechnology, and digital platforms. Precision agriculture enables farmers to optimise inputs and increase yields, while biotechnology offers improved crop varieties resistant to pests and diseases (FAO, 2019). Digital platforms facilitate access to market information, weather forecasts, and farming advice, enhancing decision-making processes, (Nhara et al, 2020).

Technological advancements, such as the introduction of exotic breeds and intensive farming systems, have led to the marginalization of indigenous chickens. Exotic breeds often offer higher productivity, making them more appealing to commercial farmers. This shift has resulted in reduced attention to indigenous breeds, threatening their conservation. Moreover, global market demands favor uniformity and high-output breeds, further sidelining indigenous varieties. Efforts to conserve indigenous chickens have included community-based breeding programs and the establishment of gene banks. (Christopher M et al 2024)

However, these initiatives often lack sufficient funding and technical support. Additionally, the absence of comprehensive policies to protect and promote indigenous breeds exacerbates the situation. Moreover, these technologies often require substantial investment and technical expertise, posing challenges for smallholder farmers in developing countries. Additionally, globalization has opened new markets but also increased competition, exposing farmers to volatile prices and stringent quality standards (World Bank, 2020).

In African countries, there has been a little effort on conservation of indigenous chickens. Indigenous chickens in Zimbabwe form an integral part of communal poultry production and almost every household in the communal areas owns this species of chickens (Mc Ainsh et al 2004). Various studies have shown that women and children own most chickens (Muchadeyi 2007). They are an essential component of agriculture and rural livelihood among 80% of small scale farmers in Sub Saharian Africa. However, in the past decade, significant losses of

indigenous chicken animal genetic resources resulting from poultry diseases , imported exotic breeds, poor market access and uncontrolled crossbreeding have been reported(Christopher M et al 2024). Road runner chicken breeds available in zimbabwe includes Boschveld, Sasso, Light Sussex, Brahma, Black Australorps, Buff Orpington, Koekoeks, Rhodes Island, Jersey giants, lohman Brown, Leghorn, New Hampshire and Kuroiler. Naked neck chickens with normal frizzle feathers are reported to be found in Nigeria, Ethiopia and Southern as explained by Adelake et al, 2011. Characteristics of these indigenous breeds: the native breed chickens are the reservoir of genomes and major genes for improvement of high yielding exotic germplasm for tropical adaptability and diseases resistance (Padhi, 2016). Indigenous breeds have better adaptability to to the harsh climate, scarce feed resources and a high level of diseases tolerance compared to exotic breeds (Nhara et al, 2020).

In Sub-Saharan Africa, technological adoption in agriculture varies widely. While some regions have embraced innovations like mobile-based advisory services and improved seed varieties, others lag due to infrastructural deficits and limited financial resources. Farmers often rely on traditional knowledge, which, while valuable, may not suffice in addressing contemporary challenges such as climate change and market fluctuations (AGRA, 2021). Regional initiatives aim to bridge these gaps. For instance, the Alliance for a Green Revolution in Africa (AGRA) promotes the adoption of sustainable agricultural technologies and practices. Despite these efforts, barriers such as inadequate extension services and limited access to credit persist, hindering widespread technological adoption (AGRA, 2021).

In Zimbabwe, production systems for indigenous chickens vary widely, reflecting the diverse farming practices and socio-economic conditions. These includes free-range systems, semi-intensive system, intensive system, backyard production and community based systems. On free range system, chickens are allowed to roam freely during the day, foraging for food. It incur low inputs costs but vulnerable to predators. Also semi-intensive system is a combination of free ranging and controlled feeding where chickens are housed at night. There is protection from predators under this system but requires more management and resources for housing. Furthermore on intensive system, chickens are raised in confined spaces with controlled feeding and management practices. There is high productivity and better diseases control but with high costs for feed and management. On backyard production, few indigenous chickens

are kept mainly for subsistence. Community based system are organised groups or cooperatives which manage poultry collectively. The choice of a production system often impacts the health productivity and economic viability of chicken farming in Zimbabwe.

2.2 Importance of conservation and sustainability of indigenous chickens

Indigenous chickens contributes significantly to the economy of Zimbabwe through livelihood support, food security, cultural significance, low input farming, biodiversity, local markets and export potential. Many rural households of Zimbabwe rely on indigenous chickens for their livelihoods as a source of income through the sale of the birds and eggs. Chickens are used as buffers or banks in cases where they are sold to pay school fees, medical costs village taxes and other uncertainties. Indigenous chickens are crucial source of proteins, helping to improve food security in communities where other sources of animal protein may be scarce. Village chickens provide cheap, readily harvestable protein enriched white meat and eggs with high quality digestible protein for immediate home consumption and for income generation (Dolberg and Petersen, 2000; Mpiye and Sibanda, 2005). The sale of indigenous chickens stimulates local economies by creating jobs in poultry farming, processing and marketing. They also require minimal resources compared to exotic breeds making them accessible to smallholder farmers. This low input requirement help sustain farming practices in resource limiting settings.

They have multiple non cash outputs such as manure, traditional purposes, home consumption social obligations and status. Indigenous chicken plays a crucial role in cultural practices, ceremonies and traditional events which adds to their economic value beyond mere financial transactions such as marriage feast, weddings, and funerals. In some cases farmers give birds and eggs as gifts to visitors and relatives, and as a starting capital for youth and newly married women as well as token of appreciation for services rendered (Kusina and Kusina, 1999). They are also used to strengthen relationships with in-laws and to maintain family contacts entrusting them to other family members (Muchadeyi et al., 2004). Cocks are used as alarm clocks in rural areas. Manure from chickens is applied in vegetable gardens and is regarded to be of high value for vegetables in comparison to goat or cattle manure (Maphosa , et al., 2004). Chicken litter, offals and feathers can be used as ruminant feed to supplement protein

They also contribute to the genetic diversity of poultry which is important for resilience against diseases and climate change. Indigenous chickens are an important reservoir of genomes that may be used in future to produce hybrid birds since most strains have superior genetic constitution that has not been fully exploited (Pedersen, 2002). There is also potential for the export of indigenous chicken products which could improve foreign exchange earnings for the country. (Tlou et al, 2020)

2.3 Technological advancements and globalisation in conservation of Indigenous chickens

Conservation strategies are generally grouped into in-situ and ex-situ strategies. In situ conservation is characterised by traditional production systems where breeds are maintained in their environment or on farm, while ex-situ conservation involves maintaining breeds outside their traditional production systems using technological advances such as cryopreservation. In-situ conservation is known for allowing the species to thrive in their natural environments, maintains ecological interactions, and evolutionary processes, cost effective and encourages public participation in conservation efforts, Sithole et al 2025. Ex-situ on the other hand entails preserving threatened species, varieties or breeds of animals outside their natural habitat through invitro or invivo methods. In vivo conservation typically takes place in a controlled setting while invitro preservation focuses on storing gametes and utilizing advanced reproductive biotechnologies (Sithole et al, 2025). Due to the issue of globalisation, there is an increased demand for high yield commercial breeds at the expense of indigenous breeds. Cross breeding is also leading to dilution of indigenous populations. Also consumer preferences is influenced by global food trends. (Maphosa , et al., 2004). Technological advancement available for conservation includes genetic mapping, cryopreservation and data management. Ex situ conservation programmes may have some challenges in developing countries. However their main focuses are cryopreservation and reproduction technologies for the conservation of genetic resources. These are biotechnological tools that create gene banks as physical repositories where samples of genetic resource (semen, embryos, live animals, oocytes, tissues, and DNA) are preserved. This can be supported by data banks where information related to characteristics of a species is stored in a systematic manner (Tlou et al, 2020)

2.4 Traditional conservation methods of indigenous chickens

Traditional conservation methods of indigenous chickens plays a critical role in biodiversity preservation, cultural heritage, ecosystem balance, health and nutrition, resilience to diseases, research and diseases. On biodiversity preservation, indigenous chickens contribute to genetic diversity which is essential for the resilience of poultry populations. Conserving these breeds helps maintain a variety of traits that can be vital for adaptation to the changing environment. (Tlou et al, 2020) Also many indigenous chickens' breeds are integral to the cultural practices and traditions of local communities. Preserving these breeds supports cultural identity and heritage fostering community pride. They also provide a sustainable source of food and income for many rural households especially in developing regions. Traditional conservation methods often promote ecological balance by integrating chicken rearing with local practices. This can enhance soil fertility and pest control benefiting overall agricultural productivity. (Maphosa, et al., 2004). Furthermore on health and nutrition, indigenous chicken breeds are typically raised in free range system leading to healthier birds and more nutritious meat and eggs. This contributes to food security and improved nutrition for local populations (Tlou et al, 2020). Also indigenous breeds have a higher resistance to local diseases compared to commercial strains. Conserving these breeds can help sustain poultry production in areas prone to disease outbreaks. Traditional breeds can serve as a genetic reservoir for breeding programs aimed at improving poultry production. Research into these breeds can lead to the development of more sustainable farming.

The traditional approach to indigenous chicken conservation in Zimbabwe done through free range systems where chickens are allowed to scavenge for food, which helped maintain their natural behaviours and genetic diversity. Community-based breeding programs were also used and this was done by selection of breeding stock based on desirable traits, exchanged breeding roosters between households to prevent inbreeding. (Christopher M et al 2024) Traditional knowledge and practices in maintaining the health status of the chickens also plays a critical role in conservation of indigenous breeds. (Maphosa, et al., 2004). Use of local herbs and plants treats and prevent occurrence of diseases. Cultural taboos and beliefs protects certain breeds or traits for traditional ceremonies. Use of specific breeds or colours for traditional ceremonies assist in the preservation of certain breeds (Tlou et al, 2020). Mixed farming systems also contributes to the conservation of indigenous chickens through pest control, fertilisation, and

complementary role of different livestock species. Local markets and trade, cultural and religious significance.

2.5 Challenges and Opportunities

Local farmers and agricultural experts in Zimbabwe face a complex landscape shaped by technological advancements and globalization. While modern technologies offer opportunities for improved productivity and disease management, they also present challenges for smallholder farmers. One significant challenge is the accessibility and affordability of new technologies. Many small-scale farmers lack the financial resources and technical knowledge to adopt advanced farming equipment or improved breeding techniques. Furthermore, globalization has introduced competitive pressures, with imported poultry products often being cheaper than locally produced ones, undermining the market for indigenous chickens. (Christopher M et al 2024)

Limited access to finance restricts farmers' ability to invest in modern technologies. Infrastructural deficits, such as inadequate electricity and internet connectivity, further impede the utilization of digital tools (Zim Advocate, 2024). Additionally, a lack of technical expertise and training hampers effective technology use among farmers (Arum Visuals, 2024). Despite these challenges, opportunities exist. Technological advancements can be harnessed to improve indigenous chicken production through better disease control, nutrition, and breeding practices. (Tlou et al, 2020) Globalization also opens up new markets for unique, organic, and free-range poultry products, which indigenous chickens can fulfill. By capitalizing on the unique qualities of indigenous breeds, such as their adaptability and flavor, farmers can carve out niche markets both locally and internationally.

Globalization offers Zimbabwean farmers access to international markets, presenting opportunities for increased income and economic growth. For example, the growing demand for blueberries has encouraged farmers to expand production for export (Reuters, 2024). However, challenges such as stringent quality standards, limited access to financing, and land tenure insecurity hinder farmers' ability to capitalize on these opportunities (Reuters, 2024).

Agricultural experts and institutions play a crucial role in facilitating technological adoption and navigating global market dynamics. Organizations like the Zimbabwe Farmers Union (ZFU) provide training, access to technology, and market linkages for farmers (Arum Visuals, 2024). Government initiatives, such as the new land policy allowing farmers to use land as collateral, aim to improve access to finance and stimulate investment in agriculture (AP News, 2024).

In conclusion, technological advancements and globalization present both challenges and opportunities for Zimbabwean farmers and agricultural experts. While innovations in agriculture can enhance productivity and market access, barriers such as limited financing, infrastructural deficits, and skill gaps must be addressed. (Tlou et al, 2020). Collaborative efforts among farmers, experts, institutions, and policymakers are essential to harness the benefits of technology and globalization for sustainable agricultural development in Zimbabwe.

2.6 Recommendations for Enhancing Sustainability and Conservation

Globally, the conservation of indigenous poultry breeds has gained attention due to their unique genetic traits and adaptability. Technological advancements have introduced methods like cryoconservation, where germ cells from chicken embryos are isolated and frozen, allowing for the preservation and restoration of genetic diversity. This approach has been successfully implemented by institutions like the International Livestock Research Institute (ILRI), providing a strategic tool for safeguarding endangered poultry breeds.

Furthermore, genomic technologies have enabled the identification of genetic markers associated with disease resistance and productivity traits. These advancements facilitate selective breeding programs aimed at enhancing the resilience and performance of indigenous chickens, ensuring their competitiveness in evolving markets. (Christopher M et al 2024). In Sub-Saharan Africa, indigenous chickens play a vital role in food security and income generation. However, challenges such as high mortality rates due to diseases like Newcastle disease, inadequate housing, and limited access to veterinary services hinder their productivity.

Community-based interventions have shown promise in addressing these challenges. For instance, in Benin, simulation models indicate that while exotic breeds may offer higher productivity, indigenous chickens can be more profitable due to niche market preferences. Vaccination campaigns and improved management practices have been effective in reducing mortality rates and enhancing income, though their impact on conservation is nuanced. (Maphosa, et al., 2004).

Additionally, ecological niche modeling and landscape genomics have been employed to understand the genetic diversity and adaptability of indigenous chickens. These tools assist in developing conservation strategies that align with environmental conditions and local farming systems. In Zimbabwe, indigenous chickens are predominantly reared by smallholder farmers and are valued for their adaptability and cultural significance. However, their populations are declining due to factors such as disease outbreaks, lack of structured breeding programs, and competition from commercial hybrid. (Maphosa, et al., 2004).

Efforts to commercialize indigenous chickens have been explored, with studies in Makoni District highlighting the potential for income generation. Constraints such as inadequate feed, poor housing, and limited market access have been identified. Recommendations include adopting holistic approaches that combine improved husbandry practices, feed supplementation, and market incentives to enhance productivity and sustainability.

Moreover, participation in indigenous chicken markets has been linked to improved food and nutrition security among smallholder farmers in districts like Chiredzi and Mwenezi. Engagement in value chains and contract arrangements with private firms are suggested to bolster market participation and resilience. (Maphosa, et al., 2004).

2.7 Practical Recommendations

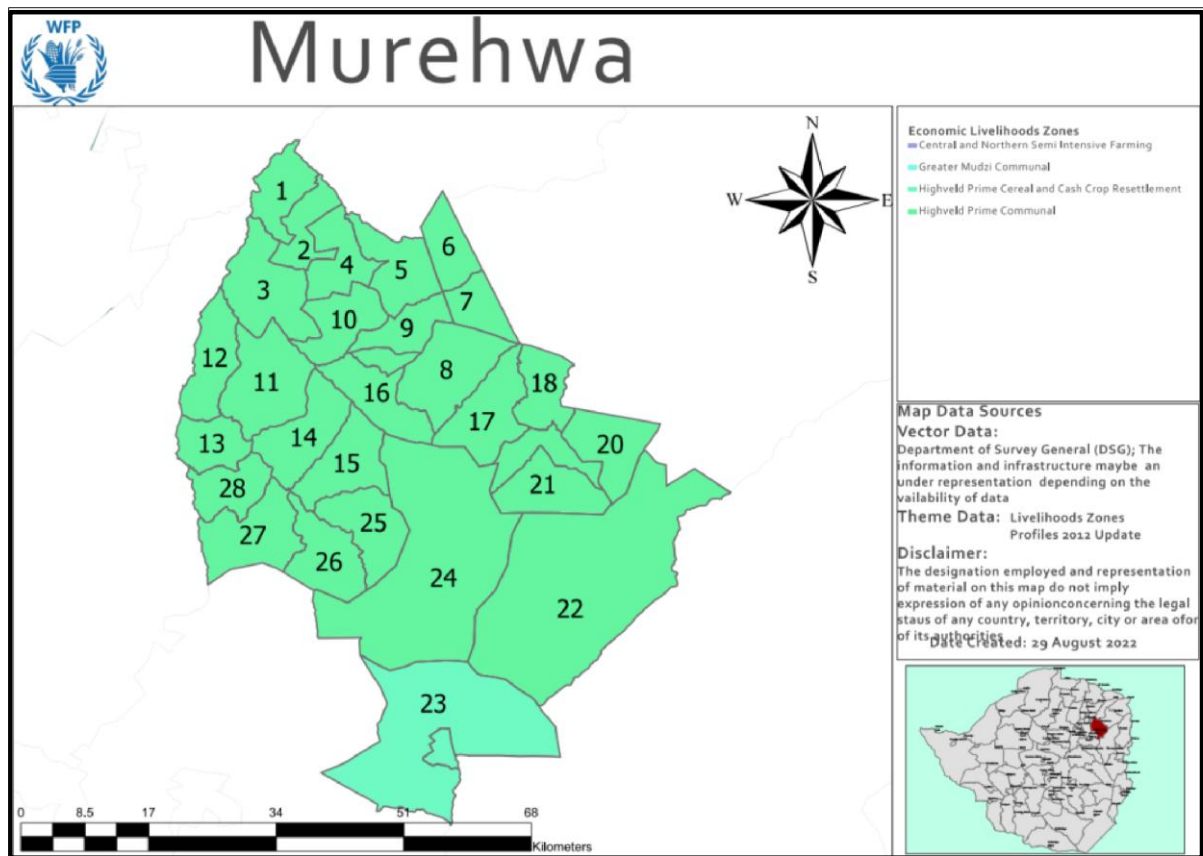
To enhance the sustainability and conservation of indigenous chickens in Zimbabwe, a multifaceted approach is necessary. Firstly, there should be increased investment in research and development focused on indigenous breeds, including genetic studies and the development

of improved management practices tailored to local conditions. Secondly, capacity-building programs are essential to equip farmers with the knowledge and skills needed to adopt beneficial technologies. These programs should be accessible and consider the socio-economic realities of smallholder farmers. Thirdly, policy frameworks must be established or strengthened to support the conservation of indigenous breeds. This includes creating incentives for farmers to maintain indigenous chickens and integrating indigenous breed conservation into national agricultural strategies. Lastly, efforts should be made to develop and promote markets for indigenous chicken products. Marketing campaigns can highlight the unique qualities of these products, appealing to health-conscious consumers and those interested in traditional and organic foods. (Maphosa, et al., 2004). By creating a strong market demand, farmers will have economic incentives to continue raising indigenous chickens, thereby supporting their conservation.

CHAPTER 3: Method and Materials

3.1 Description of the study area

The study was done in the area of Murehwa District. Murehwa district is one of the nine districts in Mashonaland East province which is 90km to the North east of Harare along the Nyamapanda Highway. It shares boundaries with Uzumba-Maramba –Pfungwe(UMP) to the North, Mutoko to the East, Makoni (Manicaland Province) to the south east, Marondera to the South and South west, and lastly Goromonzi to the West. The area comprises of natural regions IIA and IIB and receives annual rainfall of 750mm to 1000mm. The vegetation in the district is predominantly Miombo Woodlands with occasional grasslands according to the agro ecological region. In wards bordering Manicaland, the predominant vegetation is terminalia and Acacia wooded grasslands. Along the rivers, the vegetation is predominantly Syzigium and Ficus species.



WARD NUMBERS IN MUREHWA DISTRICTS

3.2 Study design

This outlines the research design and methodology employed to achieve the study's objectives. It details the research approach, data collection methods, sampling techniques, data analysis

procedures, and ethical considerations. A qualitative research design was adopted to explore the complex socio-cultural, economic, and technological factors influencing the conservation of indigenous chicken breeds in Zimbabwe. This approach facilitates an in-depth understanding of participants' experiences, perceptions, and practices, aligning with the study's exploratory nature. The study employed a participatory action research (PAR) framework, emphasizing collaboration with stakeholders to identify issues and develop solutions. This approach is particularly suitable for agricultural research involving local communities, as it promotes empowerment and contextual relevance (Chambers, 1994).

3.3 Population and Sampling

3.3.1 Target Population

The target population included:

- Smallholder farmers engaged in indigenous chicken rearing.
- Agricultural experts, including extension officers, veterinarians, and researchers.

3.3.2 Sampling Technique

Purposive sampling was employed to select participants with relevant experience and knowledge. Snowball sampling was also utilized, where initial participants referred other potential participants, enhancing the diversity and richness of data.

3.3.3 Sample Size

The sample comprised 30 smallholder farmers and 10 agricultural experts. The sample size was determined based on data saturation, where additional interviews yielded no new information.

3.4 Data Collection Methods

3.4.1 Semi-Structured Interviews

Semi-structured interviews were conducted with farmers and agricultural experts to gather detailed information on conservation practices, technological adoption, and market dynamics. This method allows flexibility to explore emerging themes while maintaining focus on research objectives.

3.4.2 Focus Group Discussions (FGDs)

FGDs were held with groups of farmers to facilitate discussion on shared experiences, challenges, and strategies. This method encourages interaction and the emergence of collective insights.

3.4.3 Participant Observation

The researcher engaged in participant observation by visiting farms and observing indigenous chicken rearing practices, housing, feeding, and disease management. This method provided contextual understanding and validated information obtained through interviews.

3.4.4 Document Analysis

Relevant documents, including policy papers, agricultural reports, and market analyses, were reviewed to contextualize findings and understand broader systemic factors influencing indigenous chicken conservation.

3.5 Data Analysis

Data were analyzed using thematic analysis, involving transcription of interviews and FGDs, and coding of data to identify patterns and themes. Categorization of themes aligned with research objectives, and interpretation of findings in relation to existing literature and theoretical frameworks were also done.

CHAPTER 4: Results

4.1 Introduction

The data were collected through semi-structured interviews, focus group discussions, participant observations, and document analysis. The findings are organized thematically, with supporting tables and figures to illustrate key points.

4.2 Existing Conservation Strategies and Their Susceptibility to Technological Advances and Global Market Pressures

4.2.1 Conservation Strategies Identified

The study identified several conservation strategies employed by farmers and institutions. These include traditional rearing practices where indigenous chickens are maintained within their natural environments (in-situ conservation). In addition, there are limited efforts in cryopreservation and genetic resource banking (ex-situ conservation). Furthermore, there are collaborative efforts among farmers to select and breed chickens with desirable traits (community-based breeding programs).

Table 4.1: Conservation Strategies Employed

Strategy	Description	Prevalence (%)
In-situ conservation	Traditional rearing in natural environments	85%
Community-based breeding	Collaborative selection and breeding	60%
Ex-situ conservation	Genetic banking	15%
Institutional breeding programs	Research-led breeding initiatives	25%

The study identified that the majority of smallholder farmers in Zimbabwe employ in-situ conservation methods, maintaining indigenous chickens within their natural environments. This approach leverages traditional knowledge and practices, ensuring the preservation of

genetic diversity and adaptation to local conditions. Community-based breeding programs also play a significant role, with farmers collaboratively selecting and breeding chickens exhibiting desirable traits.

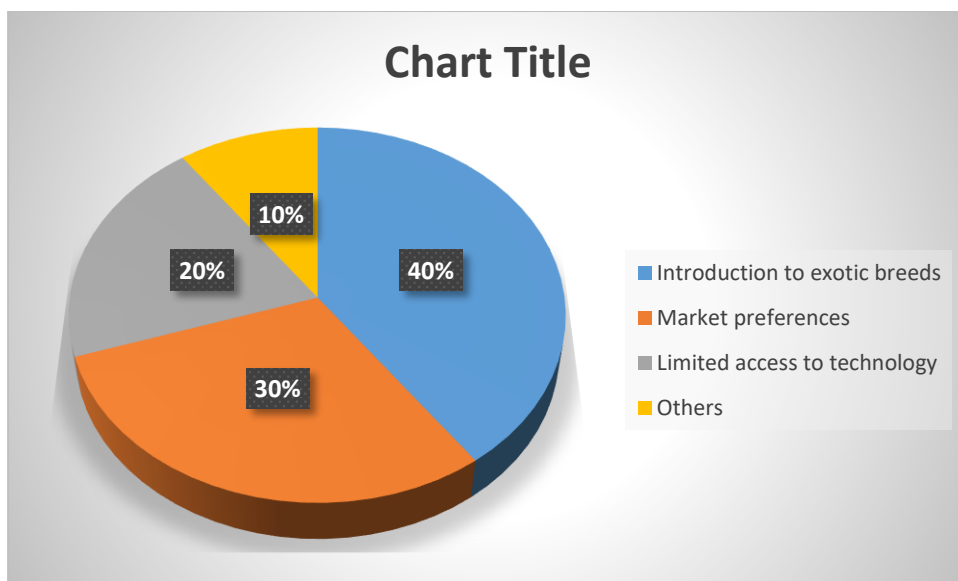
However, ex-situ conservation efforts, such as cryopreservation and institutional breeding programs, are limited. The scarcity of these initiatives may be attributed to resource constraints and limited technical expertise.

4.2.2 Impact of Technological Advances and Global Market Pressures

Technological advancements and global market dynamics have influenced conservation strategies. The availability of high-yielding exotic breeds has led some farmers to replace indigenous chickens, threatening genetic diversity. Consumer demand for uniform, fast-growing chickens has also marginalized indigenous breeds. In addition, smallholder farmers often lack access to technologies that could enhance indigenous chicken productivity. The lack of structured markets and value chains for indigenous chickens further exacerbates their vulnerability to market pressures.

Technological advancements have had a dual impact on indigenous chicken conservation. On one hand, the introduction of exotic breeds, which are often perceived as more productive, has led some farmers to replace indigenous chickens, thereby threatening genetic diversity. On the other hand, technologies such as incubators and improved feeding systems have the potential to enhance the productivity of indigenous breeds if appropriately adapted and adopted.

Figure 1: Factors Affecting Indigenous Chicken Conservation



A pie chart illustrating the proportion of farmers affected by various factors

4.3 Challenges and Opportunities Presented by Technological Advancement and Globalization

4.3.1 Challenges Identified

Participants highlighted several challenges. There are often outbreaks of diseases like Newcastle disease due to inadequate vaccination programs. There is also lack of structured markets, which makes it difficult in accessing markets that value indigenous chickens. Furthermore, there is limited extension services on improved practices.

Table 4.2: Challenges Faced by Farmers

Challenge	Frequency Mentioned (%)
Disease prevalence	70%
Lack of structured markets	65%
Limited extension services	60%

4.3.2 Opportunities Identified

Despite challenges, several opportunities were noted. There is growing demand for organic and free-range products. Moreover, there is a room for utilizing traditional practices in disease management and feeding. There is also potential for value addition that is processing indigenous chicken products to meet market demands.

Table 4.2: Opportunities for Indigenous Chicken Farmers

OPPORTUNITY	COVERAGE
Niche markets	40%
Integration of indigenous knowledge	35%
Value addition	25%

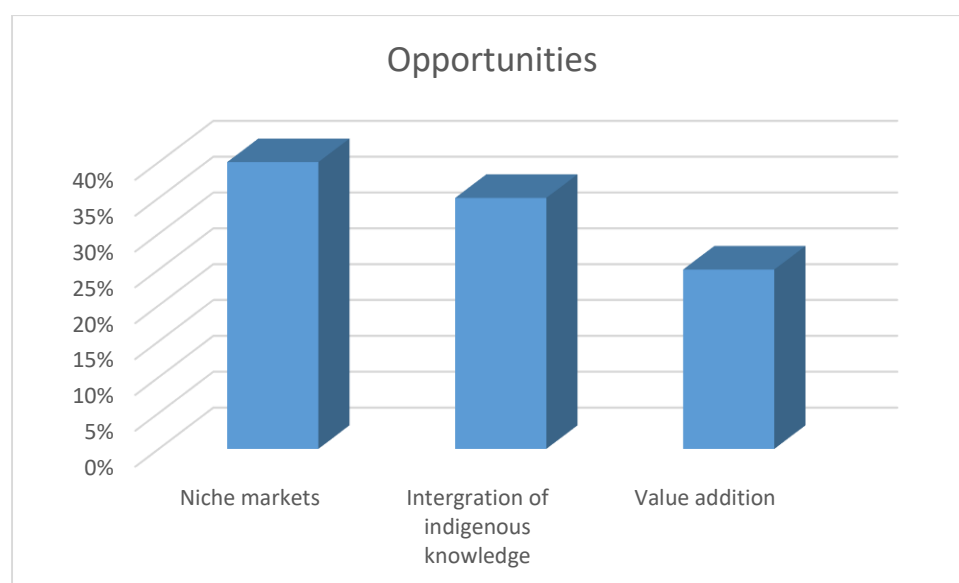


Figure 2: A bar graph showing opportunities

4.3.3 Challenges Faced by Farmers

Farmers reported several challenges impacting indigenous chicken production. There are common outbreaks of diseases like Newcastle disease are common, with limited access to

vaccines and veterinary services. The absence of structured markets and value chains for indigenous chickens also limits farmers' ability to commercialize their products. In addition, inadequate extension services hinder farmers' access to information on best practices and technological innovations. Furthermore, the availability of exotic breeds, often promoted for their higher productivity, poses a threat to the conservation of indigenous chickens.

4.3.4 Opportunities for Enhancement

Despite these challenges, several opportunities exist to bolster indigenous chicken production. There is a growing demand for organic and free-range poultry products, which indigenous chickens can fulfill. There is also a room for utilizing traditional practices in disease management and feeding can enhance sustainability. Furthermore, processing indigenous chicken products can increase their market value and appeal.

CHAPTER 5: Discussion

5.1 Enhancing Sustainability and Conservation

Based on the findings, some recommendations were proposed. There is need to strengthen community-based breeding programs, which encourage collaborative selection and breeding to preserve desirable traits. There is also the need to improve access to veterinary services, in order to enhance disease control through vaccination and training. Moreover, there is need to develop structured markets that establish value chains that recognize and reward the unique qualities of indigenous chickens. In addition, there is need to promote integration of indigenous knowledge, that is incorporate traditional practices into modern farming techniques. There is also the need to establish value chains that recognize the unique qualities of indigenous chickens can improve market access and profitability. Farmers can incorporate traditional practices into modern farming techniques to enhance sustainability and cultural relevance. They can even utilize alternative protein sources, such as insect-based feeds, to address feed shortages and improve nutrition.

Table 5.1: Proposed Recommendations and Expected Outcomes

Recommendation	Expected Outcome
Strengthen breeding programs	Preservation of genetic diversity
Improve veterinary services	Reduced mortality and increased productivity
Develop structured markets	Enhanced income for farmers

Based on the analysis, the following recommendations are proposed to enhance the sustainability and conservation of indigenous chickens:

5.2 Challenges

The study reveals that while indigenous chicken conservation faces challenges from technological and market pressures, there are significant opportunities to enhance sustainability through community engagement, integration of indigenous knowledge, and development of supportive policies and markets. Diseases like Newcastle disease due to inadequate vaccination

programs. There is also lack of structured markets, which makes it difficult in accessing markets that value indigenous chickens. Furthermore, there is limited extension services on improved practices.

CHAPTER 6: Conclusion and recommendations

6.1 Conclusion

This study examined the conservation strategies for indigenous chicken breeds in Zimbabwe, assessing the influence of technological advancements and global market pressures. It also gathered insights from local farmers and agricultural experts to identify challenges and opportunities, culminating in practical recommendations to enhance sustainability and conservation efforts. The predominant conservation methods identified include in-situ practices, where indigenous chickens are maintained within their natural environments, and community-based breeding programs focusing on collaborative selection and breeding. Ex-situ conservation efforts, such as cryopreservation, are limited due to resource constraints and technical challenges. Technological advancements have had a dual impact. While the introduction of exotic breeds has led to the replacement of indigenous chickens, threatening genetic diversity, technologies like incubators and improved feeding systems offer potential benefits if appropriately adapted and adopted. Farmers face challenges such as disease prevalence, limited access to structured markets, inadequate extension services, and competition from exotic breeds. However, opportunities exist in the form of growing demand for organic and free-range products, integration of indigenous knowledge in farming practices, and value addition through processing indigenous chicken products.

6.2 Recommendations

The study proposes strengthening community-based breeding programs, enhancing veterinary services, developing structured markets, promoting the integration of indigenous knowledge, and adopting sustainable feeding practices. These recommendations aim to improve the sustainability and conservation of indigenous chickens while integrating beneficial technologies and addressing global market trends.

1. Encourage collaborative selection and breeding among farmers to preserve desirable traits and maintain genetic diversity. Provide training and resources to farmer groups to facilitate effective breeding practices

2. Improve access to vaccines and veterinary care to reduce mortality rates and increase flock health. Establish mobile veterinary clinics and training programs for local animal health workers
3. Establish value chains that recognize the unique qualities of indigenous chickens to improve market access and profitability. Create cooperatives and partnerships with retailers to promote indigenous chicken products
4. Incorporate traditional practices into modern farming techniques to enhance sustainability and cultural relevance. Document indigenous knowledge and provide platforms for knowledge exchange among farmers
5. Utilize alternative protein sources, such as insect-based feeds, to address feed shortages and improve nutrition. Train farmers on producing and incorporating alternative feeds into their poultry diets.

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