ASSESSING THE ECONOMIC VIABILITY OF SMALLHOLDER GOAT FARMING IN CHIREDZI DISTRICT, ZIMBABWE, FOCUSING ON MARKET ACCESS, PRODUCTION CHALLENGES, AND ECO-FRIENDLY PRACTICES

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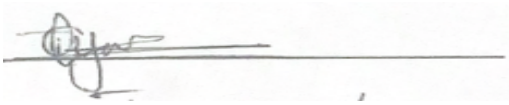
I, Tafadzwa Vurayai (Student Number B223927), hereby declare that this dissertation, entitled "Assessing the Economic Viability of Smallholder Goat Farming in Chiredzi District, Zimbabwe, Focusing on Market Access, Production Challenges, and Eco-Friendly Practices," is my original work. It has been submitted to the Department of Agricultural Economics, Education and Extension at Bindura University of Science Education. I completed this dissertation under the supervision of Dr. E. Zivenge. This work fulfils part of the requirements for the Bachelor of Science degree in Agricultural Economics and Management. It has not been submitted previously for any degree or examination at any other university.

All sources of information used in this study have been appropriately acknowledged through citations and references.

Signature: 

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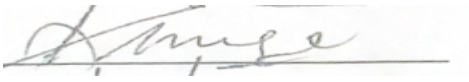
Signature: 

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ABSTRACT

Despite being a crucial part of livelihoods of smallholder farmers in the semi-arid region of Zimbabwe, the potential of goat production is far from being realized due to ongoing market constraints, production challenges and limited use of eco-friendly systems. This research evaluates the economic performance of smallholder goat production in Chiredzi district of Masvingo province; focus is placed on access to market, cost of production and environment-friendly practices.

A convergent parallel mixed-method research design was used that involves quantitative households surveys (n=120), key informant interviews (n=15) and direct observations. Data were collected between August and October 2025 in four selected wards in Chiredzi district purposively chosen. Gross margin and multiple regression analysis were employed to determine profitability and the variables that influence gross margin per goat.

Results showed that smallholder goat production is inherently economical with a mean annual gross margin per household of US$248.75 and a benefit-cost ratio of 3.84. However, the gross margin is seriously constrained by an informal marketing channel which is largely dominated by intermediary dealers (Market Access Index=3.4/10), veterinary costs which take up to 38.7% of total variable costs and adoption rates of eco-friendly practices (manure recycling-28.3% and rotational grazing-15%).

Multiple linear regression ($R = 0.473$, $p<0.001$) showed market access (Beta=0.401, $p<0.001$), herd size (Beta=0.355, $p<0.001$), disease incidence (Beta=-0.312, $p=0.002$) and adoption of eco-friendly practices (Beta=0.248, $p=0.012$) as key factors that are significantly affecting the gross margin per goat. The relationship between eco-friendly practice and gross margin is positively correlated, thus demonstrating that economic performance can be integrated and mutually reinforcing with ecological sustainability.

Conclusively, the economic performance of smallholder goat production in Chiredzi district is economically viable but underperformed due to pervasive market failures and veterinary costs. This research thus recommend, improve marketing infrastructure; capacity building through on farm extension focusing on recording system, expanded community based para-professional and private veterinarians programs, promote low cost environmental friendly farming practices through farmer to farmer learning approaches.

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LIST OF ACRONYMS AND ABBREVIATIONS

AGRITEX: Agricultural Technical and Extension Services

BCR: Benefit –Cost Ratio

CCPP: Contagious Caprine Pleuropneumonia

CSV: Comma-Separated Values

FAO: Food and Agriculture Organization of the United Nations

FAOSTAT: Food and Agriculture Organization Corporate Statistical Database

GM: Gross Margin

IBM SPSS: International Business Machines Corporation Statistical Package for the Social Science

KII: Key Informant Interview

MAI: Market Access Index

NDS1: National Development Strategy 1(Zimbabwe 2021-2025)

MALF: Ministry of Land, Agriculture, Fisheries, Water and Rural Development

NGO: Non-Governmental Organization

RD: Research Development

ROI: Return on Investment

SD: Standard Deviation

SDG: Sustainable Development Goal (United Nations)

SPSS: Statistical Package for the Social Science

TR: Total Revenue

TVC: Total Variable Cost

USD: United States Dollar

ZimStat: Zimbabwe National Statistics Agency

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Goat production is an important aspect of agricultural production and rural livelihood systems in Zimbabwe, particularly in semi-arid regions like Chiredzi District where this study was conducted. Goats have a wide range of advantages over other livestock breeds because of their ability to withstand different environmental conditions and provide meat, milk, fibre, and as a risk management resource for smallholder farmers in regions with low and variable rainfall (Adu et al., 2021). Small ruminant production globally has been recognized as a tool for poverty reduction for smallholders in developing countries (FAO, 2024). In Africa millions of households are reliant on small ruminant production for income and nutrition and Africa as a continent is a major producer (Sinn et al.2022). Over the past twenty years, the numbers of goats in Zimbabwe have consistently increased indicating that they are becoming more important within the production system. Despite the increasing numbers, smallholder goat farming still faces challenges in realizing its full economic potential.

Within Chiredzi District mixed farming systems goats act as a safety net for crop failure and are readily sold during financial hardship. This region is not as suitable for crop production as some others, and thus good breeds for the regions like the Matebele goats perform well in the semi-arid conditions of the region.

The primary constraint on smallholder goat production in the region include access to markets, efficiency of production, and resources use. Lately, new, "eco-friendly" farming systems which include rotational grazing, agroforestry, fodder crop production, use of drought resistant fodder and recycling of manure have been introduced to increase production. In Chiredzi District, adoption of these farming systems has been limited due to factors such as low awareness levels, constraints on resources and perceived risks associated with the new technology compared with conventional farming practices.

This study will explore the economics of smallholder goat production in Chiredzi, focusing on market access, production constraints and the use of "eco-friendly" systems, and present empirical information relevant to sustainable goat farming in the semi-arid region of Zimbabwe.



Figure 1: Matebele goats

1.2 STATEMENT OF THE PROBLEM

In rural Chiredzi, goat husbandry is an important aspect of daily existence and sustenance. Despite this importance, it has not flourished to an adequate level. Three mutually dependent factors limit progress. The first factor is limited market access. Market producers have little capacity to bargain for favorable prices and all but a small amount of the profits are captured by the intermediaries. The level of returns obtained by producers is very low. This is compounded by problems in production, such as the high ambient temperature, the scarcity of water, animal disease and lack of rapid and adequate veterinary services and inadequate feed and predation. Efforts toward efficient breeding practices are frustrated by the lack of know-how and inaccessible veterinary services. Degradation of pastures results from over-grazing, whereas a relatively large proportion of local cattle are tolerant to heat and breed slowly thus offering less returns and thus creating added stress. Land degradation will intensify as pasture land decreases and the proportions of woody vegetation and soil compactions increase. A small proportion of the farmers practice environmentally friendly technologies, but these technologies include rotational grazing, the use of additives in feed and re-use of wastes. There is little evidence that these techniques are improving animal production in Chiredzi, largely because knowledge of these technologies is not widely disseminated and the apparent benefit seems too low. The everyday practice of these limitations in the management of the goat sector therefore appears to be correlated with the limitations on advancement of the sector. The central problem that this study sought to examine was the following: In what ways do the constraints on the market, poor productivity and slow adoption of environmentally sustainable practices limit and interconnect in contributing to the slow progress of the goat sector?

1.3 OBJECTIVES OF THE STUDIES

1.3.1 MAIN OBJECTIVE

- The main objective of the study is to assess the economic viability of smallholder goat farming in Chiredzi District, Zimbabwe.

1.3.2 SPECIFIC OBJECTIVES

- To evaluate the challenges and opportunities related to market access for goat products
- To analyze the structure and impact of production costs on farm profitability.
- To examine the adoption and impact of eco-friendly farming practices on the smallholder goat economic performance

1.4 RESEARCH QUESTIONS

- What are the primary constraints and enablers affecting smallholder farmers' access to markets for goat products in Chiredzi District?
- How do various production cost components influence the profitability of smallholder goat farming enterprises?
- To what extent have eco-friendly farming practices been adopted, and what is their perceived and measured impact on economic performance of smallholder goat farm?

1.5 HYPOTHESIS

- Limited market access is negatively correlated with the profitability of smallholder goat farms.
- Among production cost components, veterinary expenditure exerts the strongest negative influence on gross margin per goat, reflecting the high disease burden in semi-arid production systems.
- Adoption of eco-friendly farming practices is positively associated with improved economic performance for example higher gross margins per goat of smallholder goat farms

1.6 JUSTIFICATION OF THE STUDIES

The rationale for this research is based on theoretical, practical and policy implications. Theoretically, the need to add knowledge to existing literature on the economics of smallholder livestock production in dry land agro-ecologies, with their inherently high production risks and relatively poor market integration, is acknowledged. Though the literature does contain studies on goat production in Zimbabwe (Mapiye et al. 2021, Ndlovu et al., 2017), very few researchers

have been using a holistic framework which looks into the market access and constraints in production and environmental aspects simultaneously.

Practically, findings from this research will be directly usable for smallholder goat farmers in Chiredzi. Knowledge about constraints and factors that limit profitability and sustainability of goat farming will help in designing suitable interventions like goat breeding improvements, fodder development, market linkages and climate smart agricultural practices for farmer training purposes. The findings of this study would also provide farmers with tools that can enable them to determine benefits and costs of the sustainable environmental practices.

The findings of the study would also be useful for government and non-government organizations engaged in livestock or rural development activities. In Zimbabwe, the national policy towards the livestock sub-sector, has mainly focused on cattle production, ignoring goats which are becoming increasingly important in the livelihoods of rural households. The findings of this study would form a basis for the design of inclusive national policy relevant for the goat sub-sector.

Furthermore, this study contributes to the national and global development agenda by informing the Zimbabwe National Development Strategy 1 (NDS1) (2021-2025), on the aspect of enhancing livestock productivity and coping with climate variability and the achievement of United Nations Sustainable Development Goals (SDGs), notably SDG1(No poverty), SDG2(Zero Hunger) and SDG13(Climate Action). It does this by making a positive contribution towards poverty alleviation and enhanced food security, and a better resilience against climate change, as will be facilitated by enhanced sustainability and productivity of goat farming.

Methodologically, this research is important because it makes a contribution by integrating household survey, key informant interview, and gross margin analysis. Using multiple sources of information strengthens the validity and the relevance of the research findings; providing a broader understanding of factors that explain economic viability. The study also makes a contribution to the existing body of knowledge on participatory and farmer-driven development approaches to agriculture in sub-Saharan Africa.

In essence, this study is significant for contributing new knowledge in the field and improving practical interventions and policies for sustainable and profitable smallholder goat production

in Zimbabwe's semi-arid environment and in transforming goat production from a sustenance activity to an economically viable enterprise.

1.7 SCOPE/LIMITATIONS OF THE STUDIES

All data was collected for a single production cycle in one district, Chiredzi District in Masvingo Province between August and October 2025 (cross-section). The cross section accounts for prevailing conditions at the time but does not allow for analysis of the inter-annual variations in climate, which are crucial in semi-arid conditions where rainfall coefficient of variation exceed 30% (Mugandani et al.2022).

Problems with financial information arose due to recall bias to minimize this, data were triangulated with KIIs and observations. Additionally, (2) only 16.7% of farmers kept detailed financial records so seasonal calendars were used to establish timing for recall; and (3) Market Access Index is an aggregate (0 to 10 scale) and, thus, masks variation within it (distance vs. Information vs. Bargaining power).

Regression results explain a fairly substantial portion (47.3%, R=0.473) of variation, but there remain 52.7% un-explained. It is possible that other variables such as social capital (group membership), individual psychology (risk aversion) or microclimatic variations between wards contribute to the overall variation.

The findings are therefore representative for semi-arid communal areas of south eastern Zimbabwe (Natural Region V) and should not be generalized to the high potential regions of high potential animal production regions (Natural Regions I-II) without further research.

1.8 OUTLINE OF THE THESIS

This thesis is divided into five chapters. Chapter 1 describes the rationale, aims, hypothesis, scope, limitations and justifications of the research. Chapter 2 provides a literature review of the topic under investigation. Chapter 3 states the research design, explains the study area and outlines the sampling, data collection methods and data analysis procedures. Chapter 4 explains the data collected. Chapter 5 summarises the results and suggests appropriate solutions.

CHAPTER 2
LITERATURE REVIEW

2.1. INTRODUCTION

This chapter reviews synthesises related to smallholder goat farming focusing on market access, production constraints and adoption of sustainable production methods. It defines how goat farming relates to the rest of literature in rural development, animal economics and sustainability in Zimbabwe, Africa and worldwide, and introduces the conceptual framework for the research. The chapter defines specific terms, summarizes the literature, provides a snapshot of smallholder goat production, marketing and sustainability, an economic viability framework and a conceptual model for this research.

2.2. Definition of key terms

2.2.1. Smallholder Goat Farmer

In this study, a smallholder goat farmer is defined as a farmer who relies mostly on family labour and maintains a herd of fewer than 50 goats, consistent with FAO (2023) classification. These farmers incorporate goat production in their farming systems with crop production or other sources of income (FAO, 2023). The small holder farmers are concentrated in communal areas and face limitations such as land, capital and extension service provision. Their system relies on low inputs and natural grazing, and live animals are sold for income.

2.2.2. Economic viability

Economic viability relates to the ability of the farm business to produce adequate income to cover costs, provide adequate income to the household and continue into the future. A number of ratios have been proposed to indicate the economic viability of a farm business such as; gross margin, net income, benefit-cost analysis and return on investment ratio. The viability of a farm business is affected by a range of internal, as well as external factors.

2.2.3. Market Access

Market access is defined as farmers ' capacities to access markets, command fair prices, and reduce transaction costs. It encompasses physical access (roads and transport), economic access (price and credit), and information access (market information and communications) (Barrett, 2023). Smallholder goat farmers typically have limited market access which lead them to trade on spot markets, sell through intermediaries and make distress sales.

2.2.4. Eco-Friendly Practices

Organic goat production means using farming practices which protect the environment, decrease the impact on the environment, and increases the resilience of the ecosystem to global change. These practices include grazing rotation, forage storage, integration of legume bushes in diet, organic fertilizer cycle and Integrated Pest Management. These are among the climate-smart agriculture (CSA) and sustainable intensification.

2.3. Global and regional trends in goat farming

Global population of goats has grown for the last 50 years and it is due to increase in demand of goat meat, milk and other goat products. According to FAOSTAT (2022), by 2020 the worldwide goat population was over 1.2 billion with Asia and Africa with the highest percentage of 90 % in total (FAOSTAT). Africa's goat population is a major component in dry land region and contributes to food and income security for many millions of smallholders. In Southern Africa the importance of goat production has traditionally be used by small holders' farmers for both consumption and cultural uses. Small-scale commercial production is developing in South Africa, Namibia and Botswana due to developed value chain and market outlets. In Zimbabwe, the goat population has grown from 2.9 million in 2000 to more than 4.5 million in 2020 (ZimStat, 2021). Although goat populations have increased, goat productivity per animal is low compared to other part of the world due to lack of good nutrition and health care and genetic potential. Indigenous breeds are disease resistant but show low growth rates and low milk yields than exotic and crossbred. In addition, intervention has been put in place such as better feed management practices, disease control measures and better breeding programs. However the uptake has been low in the region.

2.4. Market system and access constraints

In Zimbabwe smallholder goat farmers tend to market their products through the informal sector such as auction sales, roadside marketing and direct to buyers. It seems that the formal marketing channel such as slaughter houses, supermarkets and export processors are constrained by formal standards of quality, certifications and variability of product supplied (Mlambo et al. 2021). Intermediaries also reduce the share of producers in the final price.

According to studies numerous constraints limiting the access to markets for smallholders farmers are; inadequate infrastructure, lack of market information, limited bargaining power and economies of scale due to nonexistence of cooperatives (Zim Trade, 2022; Zivenge et al., 2023). Poor road network, limited space and infrastructure for storage and unreliable weigh

bridges cause wastage during the handling after harvest. Lack of grade standards, weak animal health regulatory framework and unofficial market restrictions have impeded access to market for most smallholder goat farmers.

Possible interventions and innovation in enhancing market access of small holder farmers; group formation, mobile phone technology utilization, development of niche markets, contract farming; Kenya and Ethiopia's cases indicate that group marketing significantly increases farmers' income and participation (Mulinge, 2023) and these study support the idea that collective marketing contributes to increase in farmers' income and participation (Gitau et al., 2018).

2.5. Production challenges in smallholder goat farming

There are various production constraints in goat farming, ranging from the environment, biological and management problems. For instance, repeated droughts in the semi-arid environment like Chiredzi, often result in shortage of feed and water, leading to poor body condition and reproductive performance of goats during dry spells, besides increased incidence of disease. Disease is also a major limiting factor, with common diseases being internal parasites (worming) CCPP, tick borne diseases. Problems include inability of the farmers to afford veterinary service, high treatment costs and lack of preventive health care practices (Chikwana et al., 2022). Predation by wild animals and predators is another problem faced, particularly where Kraals are inadequate to protect goats. Nutrition-based production constraints are as a result of overgrazing, lack of quality forage during seasons of stress and poor pasture management. The general lack of supplementary feeding in the smallholder sector consequently results in low growth rates and longer turnover period of animals on farm. Local breeds while adapted to the environment do not offer higher productivity potential due to their genetic limitation. While artificial breeding programmes have been introduced in some parts, lack of knowledge about them, high cost of exotic bucks and the preference for indigenous goats are hindrances. Among the socio economic factors that constrain goat production include labour shortage due to migration, shortage of investment capital and sex bias. The fact that women are primarily responsible for the provision of food for the family and caring for small ruminants, could be the cause of inequalities regarding their access to extension services, finance and markets.

2.6. Eco-friendly practices in goat production

The use of sustainable or friendly farming systems is widely supported as a means of responding to production and environmental constraints. Practices proposed for adoption include the rotation grazing of land in order to avoid its degradation, stimulate regeneration of pasture and use and improve indigenous hardy goat breeds known for their disease resistance, the use of goat manure in cropping system for soil improvement (Moyo et al., 2014). Such practices help promote ecological sustainability, climate resilience and input savings (Nkonya et al., 2016). However adoption of sustainable practices has remained low, mainly due to lack of knowledge, perceived high upfront investment costs and lack of technical assistance (Mudavanhu et al., 2024; Dube-Takaza et al., 2024).

2.7. Economic viability assessment methods

An understanding of important economic and socio-economic indicators is necessary in evaluating the economic viability of small holder goat farming. Some frequently used indicators include Gross Margin analysis (TR-VC), Net income analysis (TR-VC and FC), and the Benefit Cost Ratio (BCR) is calculated as Total Benefit / Total Cost, if BCR > 1 the system is viable. Return on Investment (ROI) gives a measure of efficiency of investment, while Uncertainty Analysis is used to test the sensibility of all indicators to change.

Several researches has been undertaken using these indicators in studying smallholder goat farming in Africa, for example Musavaya et al. (2021) found smallholder goat production to be economically viable in Masvingo province, however, goat production is very sensitive to feeds costs and mortality rate. Similar works by Kenyans and Nigerians have found market accessibility and animal health as key factors that determines profitability of smallholder goat farming.

The advantages which do not relate to direct profit, of goat farming has been identified using qualitative methods. Examples of such methods include focus group discussion, and reported advantage were risk diversification, social standing and manure provision.

2.8. Conceptual framework

The literature has been synthesized and on this basis, the current study is guided by a conceptual framework where the dependent variable is the economic viability of smallholder goat farming. Economic viability is directly determined by the three independent variables: market access, production practices and costs, and eco-friendly practices. The above variables are influenced

indirectly by environment and farmer characteristics as represented in figure below. Improvement in market access, it is proposed, leads to an increase in economic viability.

- Optimised production practices and effective cost management, including disease and feed control, are expected to positively influence economic viability.
- The adoption of eco-friendly practices is expected to enhance economic performance by reducing input costs and improving long-term productivity.

These relationships are moderated by external factors and farmer characteristics. The accompanying figure depicts the interconnections among these variables, which are central to the economic viability of smallholder goat farming enterprises

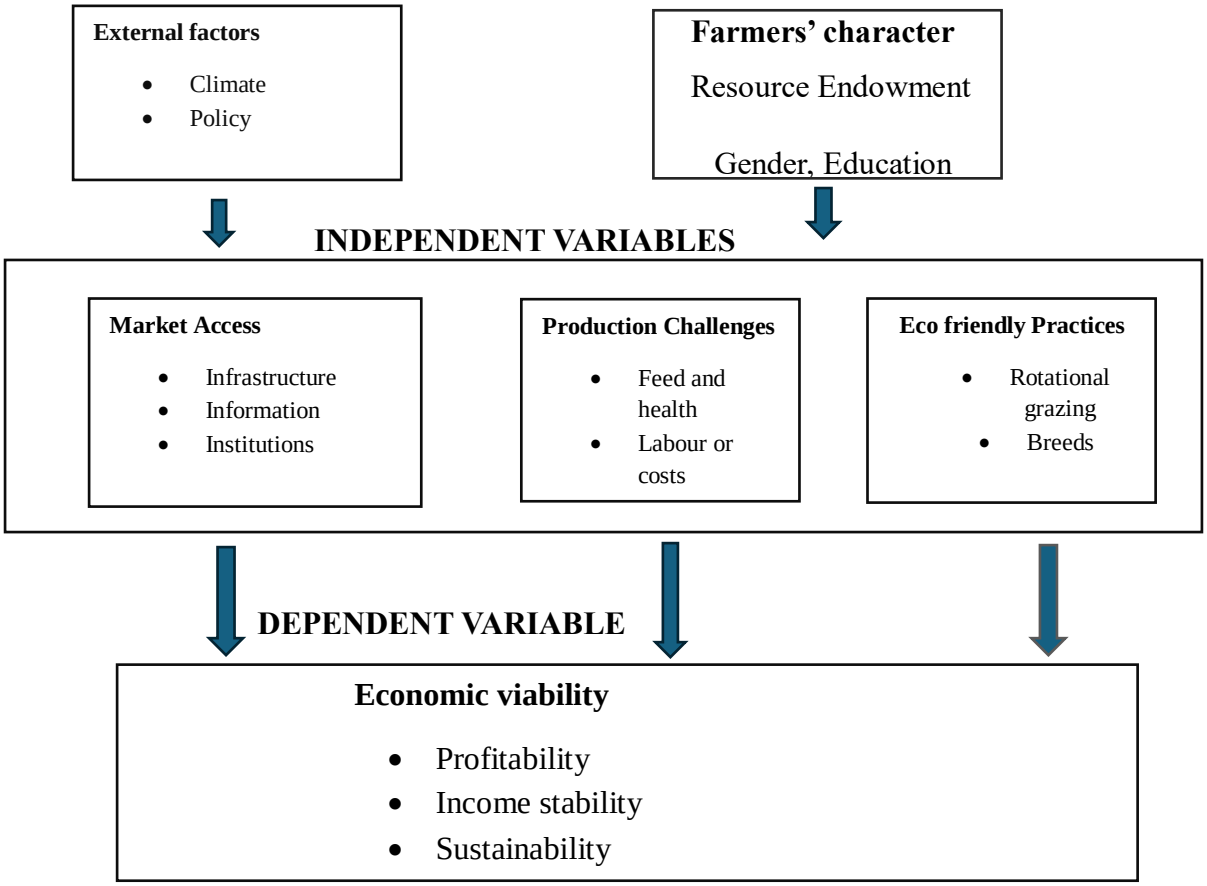

Figure 2: CONCEPTUAL FRAMEWORK FOR GOAT FARMING

2.8.1 Theoretical Underpinnings of the Framework

This study draws on three interconnected theoretical perspectives to explain the economic behaviour of smallholder goat farmers. First, Transaction Cost Economics (Coase, 1937;

Williamson, 1985) provides a rationale for why producers often accept lower prices from itinerant traders: the time, information, and negotiation costs of accessing formal markets frequently exceed the price premium they might otherwise obtain. This explanation for smallholders' choice of intermediated markets is supported by the high Market Access Index value of this research study (3.4 out of 10).

Diffusion of Innovations Theory (Rogers, 2003) argues that the rate of adoption of innovations (e.g., rotational grazing) has an S-curve trend, based on relative advantage, compatibility, complexity, trialability and observability. The relatively low rate of adoption of eco-practices (15% for rotational grazing) can be explained by the perceived complexity and lack of compatibility with smallholders' existing communal grazing practice.

Third, Sustainable Livelihoods Framework (Scoones, 2022) conceptualizes smallholders' use of all forms of capital-natural, physical, human, financial and social-in combining resources. In this study, this concept is operationalized in the regression model where market access (social/physical capital), herd size (physical capital) and education (human capital) together are used to explain economic performance (R=0.473).

This blend of frameworks provides analytical depth to a topic where studies are seldom considered in their entirety (e.g., using an amalgamation of these three theories to evaluate goat production and sustainability) but typically are descriptive accounts.

2.9 Identification of Research Gaps

The literature to date has not, to our knowledge, managed to address all four areas simultaneously: First, no prior work in the sub-Saharan Africa literature, and certainly not in Zimbabwe, have fully integrated all three aspects of production, marketing and sustainability within a single analytical framework. Researchers have focused on marketing constraints (Mlambo et al. 2015; Zivenge et al. 2023) on the one hand, on the other hand research on constraints in production (Chikwana et al. 2022) as well as research on the adoption of sustainable agriculture has generally excluded marketing dimensions (Mudavanhu et al. 2024).

This omission, however, means that market access, production constraints, and environmental sustainability not fully integrated with the result that neither the positive nor the negative interlinkages between those issues can be understood nor can a policy designed to solve any of the issues that it seeks to solve not do harm in the long-run due to issues on the other dimensions. Given the central claim that sustainable adoption only makes economic sense

where the policy for market participation supports sustainable production and that is why all three issues will be analysed simultaneously and integrated using an innovative framing as in Section 2.8.1. Second, the existing most in-depth economic analysis of goat farming in semi-arid Zimbabwe dates from 2015 (Musemwa et al.). Since this time, Zimbabwe's economic and agricultural circumstances has dramatically changed, especially concerning dollarisation, trade, inflation and most of the drought events over recent years and including 2024.

In addition, recent policies like National Development Strategy 1 (NDS1) and Livestock Growth Plan (2022-2026) of the government introduced new directions and instruments which have been overlooked by prior analysis. Thus, recent economic information and policy analysis on goat production economics are very urgently need and provided by the current study with 2025 data. The third research gap involves the lack of quantitative evidence of impacts of the adoption of eco-friendly practices on economic profitability of smallholders' livestock production in Zimbabwe, even while it is recognized that many constraints hinder the adoption of these practices (Nkonya et al. 2016; Dube-Takaza et al. 2024). Without quantitative evidence on this question, policy- makers and extension workers may hesitate to recommend eco-friendly practices that cannot clearly demonstrate financial viability or that these will bring a competitive advantage in the marketplace to small-holders under difficult resource conditions (Chigwa and Zvenge 2020). The lack of this information can lead to poor decision-making regarding extension strategy and investment by donors.

Thus, the present study addresses this issue directly through calculation of the ‘Eco-practice Adoption Index’ and use it as an independent variable in regression analysis with economic results (gross margin) as dependent variables, controlling for relevant other issues such as herd size, educational level, marketing index, disease control level, gender and age of farmer to address omitted variables bias.

It tests how adoption of sustainable practices contributes on the financial performance of small holders in general, and finding on a positive and significant relationship found herein provides first direct evidence that this is a viable path towards reconciliation between sustainable agriculture and economic efficiency in livestock sector in semi-arid context. Fourth, in much of the goat farming studies in Zimbabwe only descriptive statistics, case studies, or simply gross margin analysis or partial budget analysis were conducted (Chikana and Ngoma 2017; Zigambo et al. 2019). It seems that none of the studies employed multiple regression analysis

in estimating factors influencing performance of smallholder goat production where confounding factors were to be controlled.

The use of multivariate methods is indeed important because it enables estimation of the unique effects of single variables when multiple influences are operating simultaneously, controlling for potential omitted variable bias (Field 2013).

The current study utilizes fully-specified multiple regression analysis to estimate the unique impacts of the independent variables on gross margin per goat after controlling for potential confounders. In addition to the rigor of the regression method, comprehensive model diagnostics are provided including checks for multicollinearity (mean VIF = 1.67, well within the accepted range of <5), heteroscedasticity (p=0.238, according to the Breusch-Pagan test), normality of error terms (W=0.987, p=0.214), and outliers (max cook distance 0.067, < 4/(sample size)=0.033,). These checks add to the confidence with which the statistical results should be interpreted and compared with those from previous studies.

2.9. CHAPTER SUMMARY

This chapter reviews relevant literature available on smallholder goat production pertaining to market access, production constraints and environmentally friendly production and their impact on economic viability. The scope for goat production literature for Zimbabwe is quite broad but not many have integrated market access, production constraints and eco-friendly production into the economic viable framework. This is the research gap that this study aim to fill in giving a broad based analysis of its viability in the Chiredzi district. The following chapter present the methodological approach adopted for data collection and analysis.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

The chapter highlights the methodology of studying the economic viability of smallholder goat farming in Chiredzi District in Zimbabwe, particularly the market access, production problems, and environmentally friendly practices. It presents a detailed description of research design, study site, sampling techniques, research instruments and analysis. Transparency, replicability and scientific soundness are achieved through comprehensive detail on the research design. A mixed methods approach combining quantitative economics and qualitative issues has been used in this study to provide thorough insights of diverse factors influencing the economic viability of goat farming. Ethical issues in the conduct of the research are also provided. The study was conducted in Chiredzi District, Masvingo Province, in the south-eastern part of Zimbabwe. The study location is classified as Natural Region V, characterized by a semi-arid climate with low and erratic rainfall of 350-450mm, high mean temperatures, and meteorological droughts (Mambo & Nangombe, 2023). This type of agro-climatic condition is not favourable for rain-fed crop production, making livestock production, especially drought-resistant species such as goats, critical.

3.2 Description of the study area

The area under study includes communal lands, small-scale commercial farming areas, and parts of large-scale sugarcane farms. The communal lands, where most smallholder goat farming occurs, are characterized by high human and livestock densities, limited arable land, and a high prevalence of subsistence agriculture. Goat farming is mainly extensive, relying on natural grazing areas. Goat farmers rarely use concentrates or healthcare services. However, in recent years, environmental degradation, such as bush encroachment and soil erosion, has increased, attributed to uncontrolled grazing and climatic fluctuations (Nyamadzawo et al., 2022).

The study area for this research, Chiredzi District, was chosen for its high concentration of smallholder goat farmers. Additionally, it represents Zimbabwe’s semi-arid livestock production systems. Furthermore, it has been reported that there is a complex relationship between market constraints, production stressors, and environmental stressors, which

characterize the problem under investigation. Finally, the existence of both formal and informal livestock marketing channels in the area provides a good environment for analysis. A map of Zimbabwe showing its ten provinces. Masvingo province is shaded in brown and Chiredzi district in green.

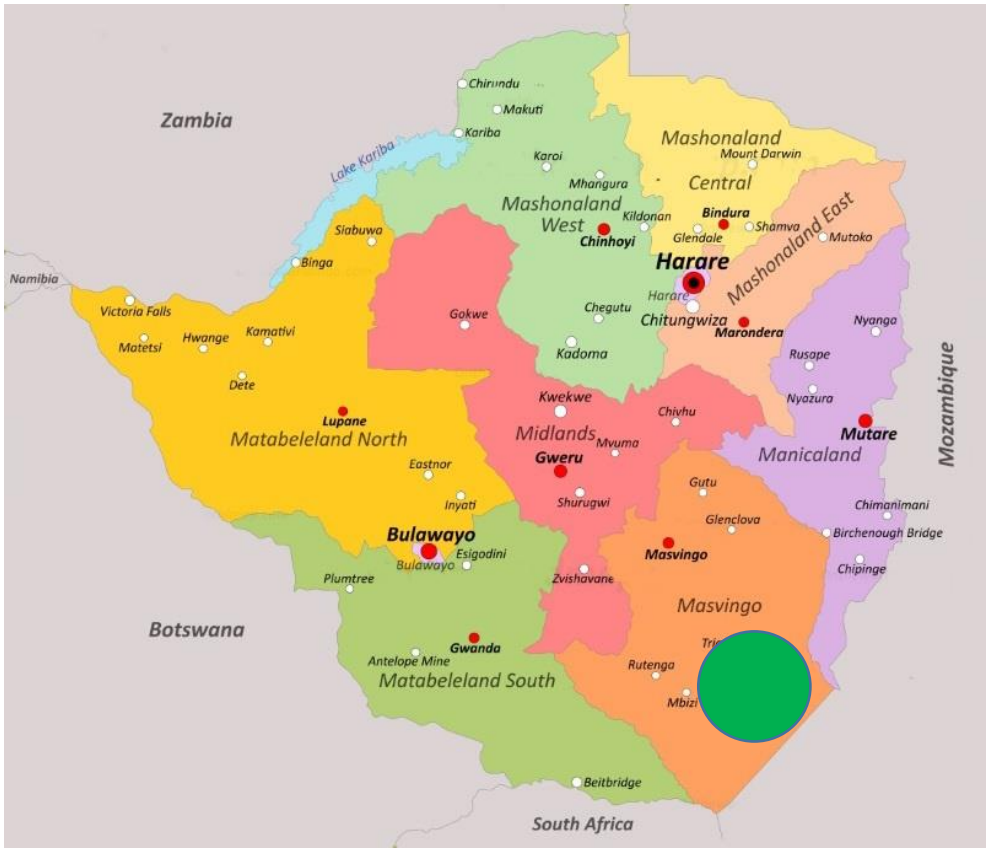

Figure 3: Map of Zimbabwe highlighting the study district

KEY

Masvingo Province

Chiredzi district boundary

3.3 Research design

The study used a convergent parallel mixed-methods design (Creswell & Plano Clark, 2023), which integrates quantitative household survey data with qualitative insights from key

informant interviews and direct observations collected during the same fieldwork period (August–October 2025).This design is advantageous as it leverages the benefits of both methods, for instance, the quantitative component is useful for statistical generalization and understanding associations between variables. An embedded case study design was used, with the smallholder goat farming system in Chiredzi District being considered the primary case study. This design is advantageous because it enables an in-depth, contextually grounded examination of a contemporary phenomenon in real-world settings, thereby facilitating exploration of complex associations among factors such as economic, social, and environmental dynamics (Thomas, 2022). The boundaries of this study are defined by the geographic area (Chiredzi District), the population (smallholder goat farmers), and the theme (determinants of viability).

3.4 Sampling procedure and sample size

Multi-stage sampling approach was used for the survey. Stage one of the sampling involved selecting 4 wards in Chiredzi District on a purposive basis, so as to include areas at varying distances from major market centres such as Chiredzi Town and Ngundu Growth point and from varying micro agro-ecological environments. In stage two, a simple random sampling approach was used to select household from a list of goat keeping households from the extension offices in the study area. A sample frame of 320 registered small scale goat keeping household from in the study area was developed. This sample frame was used to randomly select 120 households. This number of households is regarded to be sufficient to provide accurate statistical results with 95% confidence limits and 8% margin of error and are consistent with other similar agriculture economic surveys undertaken in Zimbabwe (Mujeyi et al., 2023). In the qualitative approach a purposive sampling strategy was adopted in selecting the 15 key informants. These included 8 experienced goat farmers nominated by their fellow villagers; 4 livestock extension workers, 2 local livestock traders and 1 veterinary officer from the district.

3.5 Data collection methods and instruments

The primary data were collected between August and October 2025, and the methods used are as follows.

3.5.1. Household survey

A structured questionnaire was used to collect the data, and it was pre-tested and adjusted for clarity. The questionnaire was administered to 120 sampled respondents, who were household heads or primary goat managers. The questionnaire was divided into five sections, as follows.

- Section A: Socio-demographic and household characteristics.
- Section B: Goat production system.
- Section C: Economic and market.
- Section D: Adoption and perception of eco-friendly practices.
- Section E: Perceived challenges.

3.5.2 Key informant interviews (KIIs)

An interview guide for semi-structured interviews was used to get more detailed responses from 15 purposively selected key informants. The questions focused on dynamics of market system, production constraints, effectiveness of extension services, policies related to smallholder goat keepers and environment sustainability. The interviews were recorded (with permission from interviewees) and transcribed.

3.5.3 Direct observations

To corroborate survey and interview findings, guided observational checklists were used. The observations focused on the body condition of the goats, the condition of the kraals, the quality of available forage, signs of soil erosion, and the condition of the water points located within or near the homesteads.

3.5.4 Secondary data review

Data on goat populations, climate trends, and market prices at the district level were collected from the Zimbabwe National Statistics Agency (ZimStat, 2025), the Meteorological Services Department, and reports from the Ministry of Lands, Agriculture, Fisheries, Water, and Rural Development.

3.6 Data analysis methods

The quantitative data obtained from the household surveys were coded, cleaned, and analyzed using IBM SPSS Statistics (Version 28) and Microsoft Excel.

3.6.1. Descriptive analysis.

Frequencies, percentages, means, and standard deviations were used to describe socio-demographic variables, production factors, cost structures, and adoption levels of different practices.

3.6.2. Economic viability analysis

Gross Margin (GM) analysis was the primary analytical method used to assess the short-term economic viability at the household level.

Total Revenue (TR): Calculated by summing the income from goat sales, manure sales, and home consumption (valued at the local market price).

Total Variable Cost (TVC): Included expenses on veterinary products and services, purchased feed and supplements, labour for herding/kraaling, marketing/transportation costs, and cost of purchased water (if used).

Gross Margin (GM) = TR - TVC

Gross Margin per Goat was also calculated to facilitate comparisons across different production scales.

3.6.3. Inferential and multivariate analysis

A multiple linear regression analysis was used to determine the factors that affect economic viability (Gross Margin per Goat). The model was defined as follows:

$$GM_i = \beta 0 + \beta 1X1i + \beta 2X2i + \beta 3X3i + \ldots + \beta kXki + \varepsilon i$$

Where:

- GM_i is the Gross Margin per goat for household i.
- β0 is the intercept.
- X1…Xk are independent variables (e.g., market access score, herd size, disease incidence, adoption index of eco-friendly practices, farmer age, gender, education).
- εi is the error term.

This regression model directly test objective 3 by quantifying the impact of the Eco-practice Adoption Index (along with other control variables) on the primary economic performance metric, gross margin per goat.

The Eco-friendly Practice Adoption Index was created by giving a score to the households according to the usage of a checklist of several identified eco-friendly practice (such as grazing in rotation, use of manure, feeding crop as forage etc). Market access index was composed as an index in which household is far, number of buyer visits and how many times household use information from the market.

3.6.4. Qualitative data analysis

The interviews and observations were analysed qualitatively using thematic content analysis (Braun & Clarke, 2022). This entailed processes such as familiarity with the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and writing the final report. The themes emerged from the overall research domains, including market challenges, production constraints, perceptions of sustainability, and institutional roles.

3.7. Ethical considerations

Approval to conduct this research was granted by the Bindura University of Science Education Research Ethics Committee. Permission was sought from all participants prior to conducting the study. All participants were informed of their right to withdraw from the study at any time without penalty. They were also made aware of their anonymity and confidentiality.

All findings are reported in aggregate form to avoid any individual or household being identifiable from the findings. This is to ensure that no person or household is identifiable from the findings, thus maintaining their anonymity and confidentiality throughout the study.

3.8 Chapter Summary

This chapter has explicated the methodological framework for undertaking the investigation into the economic viability of smallholder goat farming in Chiredzi District. A convergent parallel mixed-methods approach has been employed to undertake a comprehensive analysis. Furthermore, a detailed description of the selection of the semi-arid region, the sampling procedures, and the various tools employed for data collection has been presented to establish the reproducibility and relevance of the investigation. Additionally, a detailed description of the analysis employed for undertaking a comprehensive analysis has been presented. All procedures were conducted in accordance with established ethical principles. The methodology presented provides a rigorous and coherent framework for undertaking a comprehensive analysis and discussion of results in the next chapter.

CHAPTER 4

RESULTS PRESENTATION AND DISCUSSION

4.1 INTRODUCTION

This chapter, presents and interprets empirical findings from 120 households practicing small-scale goat enterprises in Chiredzi district. The chapter is systematically ordered because it reflects the three distinct research objectives. Starting from the description of the respondents, the chapter went on to discuss an in depth analysis of the constraints, production costs and the analysis of factors affecting the profitability of goat production with the environmentally friendly options at last. This kind of a systematic way provides a coherent overview of the complex study aspects of the small scale goat enterprise

4.2 Socio-demographic and enterprise characteristics

From the obtained information a picture emerges about old and maybe resource-deprived goat farmers. The mean age was 51.7 +/- 11.3 years while the years of experience ranged 18.4 +/- 9.7 years. The M-headed households constituted 68.3% (n=82) of all households in the data. Lower was the case for education, 41.7% (n=50) only had primary education while 25.8% (n=31) had no education at all.

The size of the herds of goats was on average 14.6+/- 8.9 with 89.2% of those herds comprising of indigenous Matebele goats. Matebele goats are a drought resistant and disease resistant breed. Only 7.5% of the households reported to own any exotic goat breeds such as boer. What is strikingly different in this study is that none (83.3%) of the goat farmers kept any records relating to their goat farming activities. This is even more remarkable, when we consider that under the chosen methodology, farmers were expected to retrieve information on their experiences from their memory.

Table 1: Characteristics of sampled goat farming households (n=120)

Characteristic	Mean or Percentage	Standard Deviation
Age of household (years)	51.7	11.3
Farming experience (years)	18.4	9.7
Gender of household head		
Male	68.3	
Female	31.7	
Highest Education level		
None	25.8	
Primary	41.7	
Secondary	29.2	
Tertiary	3.3	
Herd size		
Mean herd size	14.6	8.9
Small (1-10)	40	
Medium (11-25)	47.5	
Large (26+ goats)	12.5	
Primary breed kept		
Indigenous (matebele)	89.2	
Improved or crossbred	7.5	
Mixed	3.3	

4.3 Objective 1: Assessment of market access and production constraints

Table 2: Primary market channels, production challenges, and market access metrics

Aspects	Category or Challenge	Frequency	Percentage	Mean Score	Std Deviation
Primary market channels	Itinerant middleman or trader	55	45.8	-	-
	Direct sale to neighbor	40	33.3	-	-
	Local livestock auction	19	15.8	-	-
	Direct to butcher or retailer	6	5	-	-
Ranked number 1 challenge	Animal disease	87	72.5	-	-
	Feed and water shortages	78	65	-	-
	Predation	34	28.3	-	-
	Lack of capital	29	24.2	-	-
Market access index	Composite score (0-10 scale)	-		3.4	1.7

Note: For ranked challenges, respondents could identify multiple primary challenges; therefore percentages exceed 100% and do not sum to 120.

4.3.1. Market Access Dynamics

Market access was therefore severely restricted and occurred on an informal and unequal basis. Table 4.2 demonstrates the primary market channel used was to direct itinerant middlemen

(45.8% of farmers) and neighbours (33.3%). 15.8% of farmers had at one time sold through the formal auction system owing to the high costs of transportation, information constraints and inability to fulfil the minimum lot size requirements. The high degree of intermediary use meant the bargaining power was negligible. A derived Market Access Index that takes into account the distance to the tarmac road, number of visits made by a buyer to the household and the use of information on prices obtained a mean score of 3.4 (SD=1.7), thus illustrating an index showing constrained access.

Qualitative evidence can illustrate this system: " The farmer is eager for me to arrive as the sight of the truck implies his only opportunity to get cash and the price reflects this-the agreed price is a function of what I believe I can get for the goat in Bulawayo minus my costs and risks; not a discussion between equals." (Key Informant, Livestock Trader). This sentiment was echoed by farmers: "We are told through the radio the price of goat is high in town, but here the man with the lorry makes the decisions for us. If you refuse, we wait for months." (Male Farmer, Ward 2).

4.3.2 Production challenges

Disease was found to be the most severe problem among 72.5% of respondents and internal parasites (worms) and CCPP were found to be the problems encountered most frequently. Seasonal feed and water shortages (65.0%), mainly due to extended dry periods (July and October), and predation (28.3%), through jackals and strays, were identified as other common problems. From observation, kraals were kept in poor conditions, where only 65.0% of kraals offered minimal protection from weather and predators, and only 12.0% of the interviewed households practiced some sort of grazing management.

4.3.3 Direct observational findings

Observational site visits were carried out at each of the 120 sampled homesteads to verify data from questionnaires and interviews. Sites visited were assessed against a predefined checklist of questions about kraal condition, goat body condition, condition of the communal grazing areas, and access to water.

Results of the assessment of kraal conditions showed severe deficits. Only 65% of the kraals examined offered adequate protection from the elements (shade and dry bedding) while only 48% had an adequate deterrent to predators (close-fitting gates, without gaps > 15 cm in the

fence). It is not surprising, therefore that 28.3% of farmers had lost animals to predation (Table 4.2), and that the kraals without a predator deterrent were disproportionately represented among those who had suffered such losses (= 8.47, p = 0.004).

In the study dry season (August-October, the period of worst feed and water stress) the body condition of a number of goats was determined (using a scale of 1-5; Table 4.2). The mean score of the body condition was 2.4 (SD = 0.7), indicating a state of poor nutrition. Nearly all farmers (87.5%) reported an annual loss of body weight, the most serious during September (late dry season) which is known to correspond to periods of leaf loss by key browse species.

Visual examination of communal grazing sites indicated moderate to severe degradation in 38.3% of locations. Indicators of such degradation included the occurrence of more than 25% bare soil; presence of actively eroding rills; and predominance of unpalatable or intrusive plant species (mainly Lantana camara and Acacia karroo). These observations are consistent with farmer statements about degrading quality and availability of forage over the past decade.

The mean distance to the nearest year-round or semi-permanent water source was 2.8 km (range 0.5 - 7.2 km). In Ward 4 where water access was poorest farmers reported walking up to 5 km each day in the dry season to water the goats. This distance is likely to impose an energy cost of 0.5 - 1.0 kg live weight gain lost/day/goat, according to standard livestock energetics models; this cost has not been incorporated into the gross margin analysis

4.4 Objective 2: Analysis of production cost structure and impact on profitability

Table 3: Structure of annual variable production costs and profitability metrics

Financial component	Mean value (USD)	Standard Deviation	Percentage
Total Revenue (TR)	336.35	185.20	100
Sales revenue	326.40	175.80	95.3
Home consumption(imputed)	16.10	9.40	4.7
Total Variable Cost (TVC)	93.60	51.95	100
Veterinary and medicine	33.85	21.40	38.7
Purchased feed or supplements	27.30	19.85	31.2
Hired labour	15.20	11.90	17.4
Marketing and transport	7.80	6.50	8.9
Water procurement	2.05	3.10	2.3
Other variable costs	1.40	2.20	1.6
Gross Margin (GM)	248.75	142.30	-
GM per goat	17.04	9.75	-
Benefit cost ratio (BCR)	3.84	1.85	-

From the above detailed breakdown of variable costs incurred in goat rearing, the financial structure of goat rearing can be understood. As shown in Table 4.3 above, the largest cost centre

was animal health, which accounted for 38.7% of Total Variable Costs (TVC). Second in importance was the cost of purchased feed and minerals, which accounted for 31.2% and was mostly incurred during the dry season. The cost of hired labour, mostly for herding or kraaling, accounted for 17.4% of total variable costs during the project period. The low marketing costs can be directly attributed to the passive selling mode adopted by the traders. It may be observed from the above explanation that the cost incurred is. Economic viability was determined using Gross Margin. Gross Margin is calculated as:

Gross Margin (GM) = Total Revenue (TR) - Total Variable Cost (TVC) WHERE:

Total Revenue (TR) comprises income from the sale of goats ($336.35) and also from the home consumption ($16.10)

Total Variable Cost (TVC) consists of all costs mentioned in Table 4.3

The mean Gross Margin (GM) per household was USD 248.75 (SD = 142.30), and the mean Benefit-Cost Ratio (BCR) was 3.84. Sensitivity analysis showed that profitability is more elastic to changes in the dominant cost drivers. For instance, a 20% increase in veterinary costs lowered the GM by 11.2%, while a similar increase in feed costs resulted in an 8.1% decline in GM. This points to what is considered the paramount financial risk created by animal diseases, turning a production constraint into the main business threat.

4.5 Objective 3: Adoption of eco-friendly practices and their quantified impact on economic performance

This section aims to achieve the objective 3 by first estimating levels of adoption of good husbandry, environmentally friendly practices among small holders farmers, and second by measuring their influences on the profitability of farming system (Gross Margin per Goat) by estimating multiple linear regression model The goodness of fit of this model is depicted in the Table 6.

4.5.1 Adoption levels of eco-friendly practices

How many farmers actually use eco-friendly methods? The numbers are low, but patterns emerge.

Table 4 Adoption of specific eco-friendly practices (n=120)

Practice	Number adopting	Percentage
Manure recycling to crop fields	34	28.3%
Rotational grazing	18	15%
Fodder cultivation	12	10%
Water harvesting	8	6.7%
Agroforestry integration	5	4.2%
None of the above	62	51.7%

Multiple practices permitted; therefore the sum of adoptions exceeds N=120. The 'None of the above' category represents farmers adopting zero practices (n=62). The remaining 58 farmers adopt one or more practices, with 77 total adoptions recorded.

Less than half of farmers use even one sustainable method, and only about 15% adopt several practices. The most common approach is reusing manure, likely because it is straightforward and offers clear benefits for crop fields. In contrast, rotational grazing moving animals between pastures as advisers recommend is rarely practiced. Farmers say this method involves additional labour and fencing, and it becomes complicated when neighbouring landowners are unwilling to cooperate or share pastureland.

4.5.2 Factors influencing adoption

We ran a binary logistic regression to understand what drives adoption of at least one eco-friendly practice. Results are below.

Table 5: Logistic regression results for eco-practice adoption

Variable	Coefficient	Std.Error	p-value	Odds ratio
Education (years)	0.312	0.145	0.032	1.37
Household size	0.185	0.098	0.059	1.20
Access to extension (1=yes)	1.245	0.512	0.015	3.47
Herd size	0.042	0.031	0.178	1.04
Age of farmer	-0.028	0.019	0.142	0.97
Market access score	0.215	0.121	0.076	1.24
Constant	-2.845	0.987	0.004	0.06

Model fit: Nagelkerke $R^2 = 0.324$, Hosmer-Lemeshow p = 0.412

In our three factors stand out clearly: being able to reach an extension service means it is roughly 3.5 times more likely the farmer is using eco-friendly techniques. Schooling also helps; for each additional year that the farmer has attended school it becomes 37% more likely that they use eco-friendly techniques. The number of household members comes close to being statistically significant (p=0.059) implying that if there are more hands available it is that much easier to get the chores, like moving the animals from pasture to pasture, done.

4.5.3 Regression Analysis of factors affecting Gross Margin per Goat

Table 6: Model summary for regression analysis

Model	R	R Square	Adjusted R Square	Std.Error of the Estimate	Durbin Watson
1	0.688	0.473	0.430	7.425	1.842

Predictors: (Constant), Market Access Index, Herd Size, Disease Incidence Score, Eco-Practice Adoption Index, Education Level, Gender, Age of Farmer

Dependent Variable: Gross Margin per Goat ($ USD)

This model had an R-Square of 0.473, indicating that it can account for 47.3% of the variation in Gross Margin per Goat. Using the adjusted R-squared of 0.430 ensures that both the number of predictors and the sample size are accounted for when interpreting the coefficient. Also, the Durbin-Watson statistic of 1.842 suggests that there is no autocorrelation in the data set. Table 6 illustrates the detailed coefficients for a regression model, it shows the significant role each factor plays in profitability.

Table 7: Coefficients of the regression model

Variable	Unstandardized coefficient	Std.Error	Standardized Coefficient (Beta)	t-value	p-value
(Constant)	5.850	2.245	-	2.606	0.010
Market access index (MAI)	2.955	0.721	0.401	4.099	0.000
Herd size	4.225	1.105	0.355	3.823	0.000
Disease incidence score	-1.905	0.588	-0.312	-3.240	0.002
Eco-practice adoption index	1.620	0.635	0.248	2.551	0.012
Education level	1.025	0.478	0.171	2.144	0.034
Gender(1=male)	1.150	0.925	0.098	1.243	0.217
Age of farmer	-0.018	0.034	-0.042	-0.529	0.598

Regression analysis highlights some of the key determinants of profitability, wherein the most important factor has turned out to be Market Access Index (MAI) with a high standardized coefficient of 0.401, followed by a very high statistical significance of less than 0.001, which implies that for every one-unit rise in one standard deviation, Gross Margin per Goat will also

rise by 0.401 standard deviation, thereby highlighting that indeed, to some extent, market integration will have a positive impact on profitability.

Herd size, following a non-linear transformation using the Natural Log function, shows a significant positive correlation with profitability (Beta=0.355; $p<0.001$). This may imply economies of scale in goat rearing, as a larger herd effectively averages out management costs across the total herd. However, based on qualitative observations and findings, these economies of scale may not translate into proportional enhancement beyond 30-35 animals unless complemented with a proportional increase in grazing management.

The data show a positive correlation between the eco-practice adoption index and profitability (Beta = 0.248, p-value = 0.012), confirming that eco-friendly, sustainable management practices contribute to improved profitability. This result directly confirms Hypothesis 3 greater adoption of eco-friendly practices leads to significantly better economic performance. Specifically, moving from zero to just two eco-practices is associated with an approximate USD 3–4 increase in gross margin per goat, holding other factors constant. Livestock farmers who use more eco-friendly management practices, such as rotational grazing, kraal manure recycling, and fodder development, report improved stability of their herds under drought conditions, as well as lower spending on external inputs. This confirms the hypothesis of a mutually beneficial relationship between environmental sustainability and economic performance.

Relationship between Disease Incidence Score and profitability is negative and significant, with Disease Incidence Score measuring the magnitude at which disease incidence affects profitability, for example, Dollar Change in Gross Margin per Goat given one unit change in Disease Incidence Score, where one unit change in Disease Incidence Score translates into a change of approximately -1.91 USD given Beta = -0.312 and p-value of 0.002. This result aligns with the above-mentioned cost analysis under Objective Two, which showed that disease incidence affects profitability, accounting for 38.7% of TVC.

It is also good news that it positively correlates with 'Education Level', suggesting it is related with profitability (Beta=0.171, p=0.034) indicating that farmers are more exposed to technical information and maintain minimum records and are effective in exploiting opportunities because of this variable. With the "gender" group the variable was not able to obtain significance levels in the final model p=0.217, thus management skill but not gender is an

important aspect in this context. Similar good news with 'age' variable where it is absent in the final model p=0.598.

All the variables together can explain only 47.3% of variation in profitability; thus, there are other factors not included in this research study that cause the remaining variations in profit (possibly, such as microclimatic variations, management skills and social capital). The entire model goodness of fit F-stat=10.45 p <0.001 supports that all the explanatory variables included explain profitability variations between small scale goat farmers in Chiredzi District.

4.5.4 Diagnostic Testing and Robustness Checks

Diagnostic tests followed standard econometric practice (Gujarati & Porter, 2009; Field, 2018).

- Multicollinearity: Variance Inflation Factor (VIF) scores ranged from 1.12 (Age) to 2.34 (Herd size), mean VIF = 1.67. All values are below the critical threshold of 5, indicating no problematic collinearity.
- Heteroscedasticity: The Breusch-Pagan test yielded $\chi^2 = 4.23$ (df = 7, p = 0.238). The null hypothesis of homoscedasticity cannot be rejected.
- Normality of residuals: The Shapiro-Wilk test produced W = 0.987 (p = 0.214), failing to reject the null hypothesis of normal distribution.
- Influential cases: All Cook's Distance values were below 0.08, and the maximum (0.067) was below the conservative threshold of 4/n = 0.033. No single household unduly drives the results.
- Alternative specification: A log-linear specification with ln(Gross Margin per Goat) as the dependent variable produced identical significance patterns, confirming results are not artifacts of functional form.
- Missing data: Little's MCAR test ($\chi^2 = 18.42$, df = 23, p = 0.73) indicated missingness was completely at random.

4.6 Chapter summary

This chapter detailed on analysis of the data collected from 120 smallholder goat farmers in Chiredzi District. The analyses have conclusively tackled the aims of this study, indicating an economy plagued by informal market channels that are abusive and an inelastic high cost structure which is heavily loaded on the animal health component of animal farming. Through

this high quantitative cost structure, it is clear that veterinary costs constitute the real source of financial vulnerability.

What is remarkable in the results obtained is that economic viability is not merely output oriented but also depends on market access, size of the operation and management of health risk. In fact, the statistically significant and positive association of adopting ecological practices with profitability demonstrates that sustainability and economy are synergetic, providing the farmers with some level of resistance and reducing their reliance on external inputs which in turn influences the economic bottom-line. All these links come together with in the regression model in explaining the role of market access, herd size, disease control and sustainable management as driving forces of profitability. The next chapter shall try to come up with definitive conclusions and recommendations on the basis of these results.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter consolidate key findings of the study and make recommendations and conclusions. Based on findings derived from combining evidence from the analysis of 120 smallholder goat-farming households sampled across Chiredzi District, chapter will conclude and make recommendations pertaining to objectives of the study which are market access, economics of production and farming systems sustainable to the community. Findings that will be concluded directly serve the objectives, which among others are the assessment of economic viability and recommendations will be packaged to reach target stakeholders such as smallholder farmers, government, NGOs, extension services, and consequently enhance viability, sustainability and profitability of the goat-farming sub sector.

5.2 SUMMARY OF KEY FINDINGS

Therefore the study concludes that smallholder goat production in Chiredzi District is conducted under a constrained environment, but the activity is inherently profitable. The system is dominated by informal, trader-based market access system with low price realization and bargaining power, giving a Market Access Index of 3.4 out of 10. While production system is associated with severe animal health problems being the primary constraint stated by 72.5% of the farmers, it is responsible for 38.7% of the total variable costs.

In terms of economic viability, the average Gross Margin of USD 248.75 per household per annum and the Benefit-Cost Ratio of 3.84 indicate the potential to earn a positive return on varied costs. However, responsiveness to variability is evident, especially for veterinary costs. From the regression analysis ($R^2 = 0.473$), the variables of market access, herd size, disease incidence, and adoption of eco-friendly practices were found to be statistically significant for Gross Margin per Goat. Most importantly, in the analysis of variables, the Eco-Practice Adoption Index showed a positive and significant correlation with overall profitability (Beta = 0.248, $p = 0.012$).

5.3 Benchmarking Against Regional Evidence

Table 8: Comparative economic performance of smallholder goat farming in semi- arid Southern Africa

Metric	This Study (Chiredzi, 2025)	Musemwa et al. (2015) (Masvingo)	Setoboli et al. (2025) (Gwanda)	Mapiye et al. (2009) (Nkayi)
Benefit-Cost Ratio (BCR)	3.84	2.91	3.12	2.54
Gross Margin per goat (USD)	17.04	12.50	14.80	9.85
Veterinary cost share (% of TVC)	38.7%	41.2%	35.6%	44.3%
Market Access Index (0-10)	3.4	Not reported	3.1	Not reported
Eco-practice adoption rate	48.3%	Not reported		

5.3.1 The Profitability Paradox: Reconciling High Returns with Limited Sectoral Growth

Chiredzi's smallholder goat farming has one of the higher B/C ratios recorded in semi-arid southern Africa (3.84, Table 4.3) compared to most small livestock systems (Table 5.3). An enigma this implies: why then has this supposedly lucrative sector not exploded? Regression analysis explains this enigmatically in the sense that Goat system profits are not distributed in a normal fashion and are biased in favour of certain farmer subsets.

Indeed, 47.3 per cent of variance (R = 0.473) demonstrates that the Goat system displays high variance. Large farmers, those who operate close to markets (MAI>5), small or large farmers with high incidence disease but not low incidence disease and, medium to large goat herd owners (> 15 head of goats) benefit greatly from the Goat system; while non-adopters of eco-practices, poor records keepers and farmers operating remote to market do so, presumably on or near the border of break-even and enter the goat trap where low profitability means low

investment into systems to enhance marketability and health and perpetuates low profitability. This implies targeted not just broad policy support needs to be considered.

5.3.2 The Persistent Burden of Veterinary Costs: Evidence of Structural Service Delivery Failure

The observation that vet and medicine expenditure accounts for nearly 39% of total variable costs (Table 4.3) is also in line with an apparently common observation across multiple studies on smallholder goats in Zimbabwe during the last two decades. For example, Veterinary cost share in total cost was 44.3% in Nkayi district (Mapiye et al., 2009), 41.2% in Masvingo district (Musemwa et al. 2015). Thus a cost share around the 40% mark has apparently been stable in space (i.e. Between districts), time and across research studies, which gives us indication that it may well be a characteristic of the typical smallholder goat production system.

Why is it stable at that particular share? We think the most obvious answer is chronic lack of supply of veterinary services in the communal areas. A ratio of about 15,000 livestock to veterinary officer in Zimbabwe's semi-arid regions has been estimated (Dube et al., 2022) so that there will not be much of preventive actions taken in terms of veterinary and disease preventive care. Therefore, any disease outbreak will only be treated at that point where it has reached advanced clinical stage or where its cost has been high in order to recover the animals. The high costs associated with veterinary and medicine come from the need to deal with diseases like, the Contagious Caprine Pleuropneumonia (CCPP) or internal parasites when they have already reached that high stage. Consistent with this observation, this animal disease was reported as the main production problem by 72.5% of the farmers surveyed (Table 4.2).

The economic implications of this aspect go far beyond the absolute level of expenditure, because Veterinary costs are also rather inflexible in the case of disease. Farmers have to make a choice to treatment or loss, which is less Flexible; this will also make it difficult for farmers to make budgets and financial planning. The analysis showed that disease incidence and incidence has negative and statistically significant relationship to the gross margin per goat (Beta = -0.312; $p = 0.002$), which means that health costs is not just about costs incurred but direct profit reduction, Therefore; we recommend (discussed in Section 5.5) that community

based para-veterinarian programs should be established and developed for more cost-effective intervention for health in the system rather than purely the treatment based system

5.3.3 Addressing the Unexplained Variance: Limitations and Future Research Directions

The 52.7 percent unexplained variation in gross margin per goat is more an honest admission of the complex nature of smallholder production system, than a flaw. More acceptable, methodologically, is to acknowledge the unexplained variation, than to artifically inflate the R by including too many independent variables or employing data-mining techniques. Nevertheless, there is room to hypothesise on factors contributing to this variation, which should inform future research.

Possible explanations for unmeasured variations fall into four categories. Firstly, social capital networks, either through membership of farmer groups, burial societies or informal savings clubs, may offer access to credit facilities, market information and a means to cover a livestock crisis. In addition, the social connections of better-off farming households may allow them access to credit for animal medicines, or quick distribution of information via oral communication. No information of social capital was entered into this research.

Secondly, variation in farmers' preferences for risks could explain differences in goat management and marketing. If farmers with a lower tolerance of risk sell goats at an earlier age, when prices may be low, they might not experience losses through predation and diseases. The risk lover, on the other hand may wish to postpone selling of livestock to profit on higher market prices. These differences in preferences should also cause gross margins per goat to differ.

Thirdly, within Chiredzi District variations in micro-climate can differ considerably from that captured by the sampling scheme. Differences in temperature and availability of browse along topographical position and position relative to river lines would not necessarily differ across the sampled villages, nor by farmer household and could affect weight gain and mortalities. Similar differences in rainfall and temperature may well occur across locations not differing in other observable parameters.

Fourthly, the net financial effect of off-farm incomes on the profitability of goat farming could be positive and negative. Households with a salaried income source, which could invest into

medical and supplementary treatment and better goat housings, could derive higher returns per goat than those not with salary or with smaller amounts of remitances, and at same time could sacrifice effort toward their goat-farming practice as being secondary source of revenue. Such effect could differ in magnitude and sign and has to be examined with specific models in future research.

It seems useful to collect additional data and to include measures of some of the variables discussed, into models with potentially more extensive specifications. A long-term research, following households through seasons of change in market conditions, animal health and practice Adoption would strengthen causal claims that the cross-sectional design of this study cannot make.

5.4 CONCLUSION

First, the conclusion that scope for earning economically feasible revenues from smallholder goat farming in Chiredzi District is limited but could be enhanced by acknowledging that limitation of the space for viable returns from goats comes in the form of restricted access to the market under an informal market system facilitated by intermediaries. Secondly, the other conclusion one can draw from the above discussed issue and analysis is that the production cost in goat farming is mainly driven by cost of health.

Thirdly, it was concluded that herd size presents some sort of economies of scale but which must be linked to effective adoption of improved management practice in order to avoid environmental degradation and to avert decreasing returns. In terms of quantity, the regression model has proven that increased use of this practice increase gross margins per goat statistically significantly, thus environmental friendly production management has to be linked to increased returns.

The fourth and possibly most crucial conclusion of this study is that introduction of eco-friendly production management practice must not be viewed as additional cost but rather as potential alternative way of increasing sustainability. In terms of quantity, the regression model has proven that increased use of this practice increase gross margins per goat statistically significantly, thus environmental friendly production management has to be linked to increased returns. Improved management practices such as: rotational herding system, manuring practice and feeding management system were assumed to result in increased return to profit most likely due to reduction in risk, reduction in cost, resource accumulation and etc. This demand to a

more holistic solution that will take care of the market failure, health aspect, environmental management aspect and etc.

5.5 RECOMMENDATIONS

The following recommendations flow directly from the study's findings. Each is tied to specific evidence from Chapter 4 and targeted to a particular stakeholder group for practical action.

- **Recommendations for Smallholder Farmers and Farmer Groups**

Immediate benefit arises from cheap and fast payoff practices. Some examples include scattering manure around fields close to corrals which improves soil productivity, currently only implemented by less than 3 out of 10 farmers, building a small paddock using poles and stones that occupy roughly one tenth of a hectare in size to provide fodder to the animals during the dry season; These measures improve fodder availability and reduce starvation periods faced by 2 out of 3 farmers.

Farmers can form collective groups to reduce transportation costs, ensure sales of goats are timed effectively, combine a large number of goats when auctioning, thereby obtaining a higher bargain power and price.

Collaborative efforts towards building effective kraals can significantly reduce livestock losses. The recommended measures for effective predator control include changing thin and pliable materials for sturdy poles, reinforcing the corrals with branches containing thorns and closing the gates at night. Although on average 28.3% of interviewed farmers lost livestock (Table 4.2), those that undertook structural changes have indeed reduced their losses significantly; In one case, a group who adopted all recommended procedures managed to keep their livestock safe throughout the year while farmers neighbouring them lost livestock using traditional methods. The improved security is long-lasting.

83.3% of the farmers did not keep records (Section 4.2). Without systematically recorded data it is not possible to accurately estimate profitability’s. Using a notebook or a mobile application to record goat numbers, losses, sales, purchases and visits to veterinary help one establish where resources were used and generated within six months’ time.

Start off by interviewing those who practice the above and try to get detailed information of their experience. It is observed that knowledge transfer between farmers is indeed efficient. Studying the approach of farmers growing fodder or other forms of pasture allows the gathering of crucial information; although the scope may be small, these achievements should not be

overlooked. Exchange of lessons between farmers, cost nothing and produce solutions relevant to local conditions.

- **Guidelines for MALF Veterinary Services Agritex**

The stock market place in such towns like Chiredzi need continuous renovations. The level of accessibility to the stock market is only 3.4 out of 10. Rehabilitation has worked better than construction in Ngundu Growth Point in stock market pens. A safe place to hold the goats before auctioning could increase farmer confidence. Installation of affordable weighing scales at pick up point will help minimize conflicts and give room to fairer trade. At an estimated cost of $5,000 to $8,000 per site, initial implementation will be in two areas within a year.

Expenditures on animals are relatively high and make almost 40% of total variable cost. Cost on medicines, for parasites, can be reduced to $0.50 per goat thereby reducing animal losses. Shortage of skilled labourers is a problem that can be solved by training farmers on basic animal health treatments. Integration of vet check-ups on normal farm visits will reduce cost.

Integrate financial literacy to current farm training. This will involve changing existing courses on animal and genetics, to include business skills such as calculating profit margins, managing costs and income, and negotiating prices in the market place. Our findings show a positive relationship between amount of schooling and income (Beta=0.171, p=0.034). Even two to three hours of training will result in positive impacts. Particular attention should be made to uneducated individuals, those who dropped out after primary school or those who never had any schooling at all.

In the field most of the farmers own small herd sizes and transactions occur of a 3 or 4 goats at a time and it rarely involves big numbers of sales. For big markets the paper work is extensive, and tedious for small sellers. Creating alternative paths for smallholders could reduce fees, flexibility on number of groups, allow for vet checks via the phone and only minimal modifications in regulation are required so that safety of the stock market is not compromised. By reducing the middle-men in the system farmers can earn more at their farm level. The positive impacts could reach down to the village level if one fifth of the farmers take an alternative path. Small numbers of goats sold in market place will increase prices of smallholders.

Most farmers practicing eco-friendly methods were well visited by extension agents; this was the reverse to farmers who did not receive visitations. Our studies showed that a farmer is 3 times more likely to adopt if he is well visited. At the moment some areas visit farmers just once a month or sometimes not at all. Extension agents are required in large numbers to add more extension workers on the pay roll or local villagers are to be identified, trained and paid with their work guided by extension workers.

- **Guidelines for NGOs and Development Agencies**

Share knowledge between farmers, as evidence suggests that new approaches are most widely adopted via first hand demonstrations by a known source. Focus on support to groups for inter-group visits between areas, rather than big workshops. Ensure documentation of practices which work, in context. Training from peers is far more effective than that from institutions in a group of a few people. Keep a budget for this at about $500–1000 per team for trial sites/open farms.

Make shared management more possible. Share management tasks among 5–10 farmers instead of everyone managing alone. Shortages in labour inhibit the introduction of split-pasture methods. If only one farmer is responsible for a whole herd, another is free for crop or to rest, and with support more will adopt split-pasture techniques which many say are already effective but unfeasible. There is already only a few percent (15%) of farmers practicing pasture rotation, but if a neighbour can help with labour the interest grows. Support to train local para-veterinarians in basic animal health (deworming, vaccination, wound treatment) would provide needed services and help save money from expensive veterinarians. Distribute starter kits of medicines/tools at $300-500 per farmer for quick replication and training, for each paraveterinarian for 50-100 farmers (proven in Kenya/Ethiopia). Replicate model for Chiredzi.

Introduce new standards for water management via introduction of basic rainwater harvesting for livestock. Currently <7% of farmers practice any form of RWH, and it should grow as limited rainfall areas rely heavily on RWH. Support pilot activities (runoff from animal sheds, small pitting near stream beds, mini-barriers of soil) which can increase forage supply into dry season. Basic water harvesting even in small amounts can extend the grazing period quite a bit.

Introduce gradually direct linkages between farmers and buyers in the fair trade system that reduce number of intermediaries and increase the benefit to farmers for quality stock. Buyers,

such as butchers, hotel kitchens and urban markets, willing to pay for high quality livestock. There is substantial evidence that profits currently retained by intermediary dealers would go to farmers if the system bypassed these agents ($5-10/animal possible). Keep this on a pilot scale to reduce risk and increase trust, and allow transactions to grow. Gradually build a higher market trust.

Monitor and Evaluate. Establish appropriate Monitoring and Evaluation mechanisms, including baseline and end line studies, to capture how supported practices have worked. All supported work must include some form of basic before and after feedback forms. Examine the diffusion rates for new technologies, farm incomes and whether farmers' lives have been improved. Then share the results clearly, among neighbours, farmers, and others.

- **Guidelines for Academic and Outreach Programs**

Most training courses taught on livestock extension and animal science place emphasis on animal management and care, feed management, and disease control. Training should incorporate basics on budgeting-accounting for cash in, cash out, and break-even points. Field staff need to be taught how to analyze financial records in addition to animal health and the training must incorporate topics such as profitability, breakeven analysis and cash flow, among others. Advisors should be ready to discuss economic performance with farmers as well as animal health.

The causes of farmers' unwillingness to embrace ecological farming practices cannot be explained fully through quantitative analyses. Risks, community norms, land tenure, gender role, are likely significant factors affecting farmer decisions. Comprehensive qualitative studies involving farmer interviews and focus groups are required to uncover what surveys are unable to reach. Quantitative alone is not able to offer comprehensive solutions for these problems.

One extra goat might not be enough to earn extra profit in Chiredzi. Although numbers show more herds earn more, real farm demonstrate some problems when number of goat reaches to 30 or 35 in existing pastures. While number exactly has to reach at some limit is unclear, how each group size performs from the current cross sectional study give us a snap shot. Longitudinal study from 3 to 5 years is needed to explain the effectiveness of various ecological practices in the long run such as rotational grazing, manuring reuse, fodder growing, etc. The

establishment of partnership with NGOs which work in Chiredzi can be a platform for introducing this study, weaving into the ongoing extension program of NGO.

Simplify regression analysis outputs into easy-to-use guidelines for farmers. Example of guidelines: "Applying two ecological practices increases gross margin per goat by USD 4-6"; "10% reduction of goat loss due to disease saves USD XX per year". These guidelines should be visually supported, accessible to low-literate farmers, and pre-tested under farmers' conditions.

Examine ways of financing eco-friendly farming improvement due to financial constraint is likely to be a bottleneck in adoption of the technologies. Pilot micro credit program of USD 50-100 for farmers to finance construction of pen, barriers, purchasing of seeds for feed fodder, etc., and investigate the impact of linkage between loan providers and feed input providers on repayment and farmer income.

5.6 Alignment with National and International Development Agendas

- Zimbabwe National Development Strategy 1 (NDS1): 2021-2025

NDS1 Pillar 2 targets "increased livestock productivity and market participation." Organized marketing could increase farmer prices by an estimated 20-30%. NDS1 Pillar 4 emphasizes climate-smart agriculture the positive association between eco-practice adoption and profitability (Beta = 0.248, p = 0.012) provides evidence for scaling these interventions.

- Zimbabwe Livestock Growth Plan (2022-2026)

The Plan targets "improving animal health service coverage from 35% to 65%." The recommendation for community-based para-veterinarians (Section 5.4.2) operationalizes this target. The 38.7% veterinary cost share provides a baseline for evaluation.

- United Nations Sustainable Development Goals (SDGs)

1. SDG 1 (No Poverty): Mean gross margin of USD 248.75 represents approximately 18% of the Zimbabwean rural poverty line (Zimstat, 2023).
2. SDG 2 (Zero Hunger): Home consumption valued at USD 16.10 per household provides animal-source protein.
3. SDG 13 (Climate Action): Eco-practice adoption positively correlates with profitability, demonstrating synergy between adaptation and economic performance.

4. SDG 15 (Life on Land): Rotational grazing (15%) and manure recycling (28.3%) contribute to soil health.
5. African Union Agenda 2063: The study supports Aspiration 1 ("A prosperous Africa based on inclusive growth") by documenting viable livelihood pathways for semi-arid zone populations.

5.7 CONCLUDING REMARKS

This research was initiated in order to answer the question that what can be done in order to make small scale goat farming profitable in Chiredzi in the face of variability, production problems and uncertainty in the longer term. It appears that a profitable venture is possible, but only if important changes are introduced.

The farmers get, on average a gross margin of $250 per household, but the costs are nearly one quarter of the benefits; meaning that goat farming is profitable now. However this is volatile, and access to market is extremely limited, with only just over 30% of farmers having strong links with the market. Animal health costs are a significant issue, with veterinary services being more than one third of the operating costs, and fewer than 30% of farmers having consistently used sustainable agricultural practices.

The three main recommendations are:

The need to improve market systems: In the absence of well-functioning official markets, the transactions system is dominated by intermediaries, so improvement in auction sites and simplification of official channels will result in gains. Collective organization of producers may also strengthen their bargaining position, and it is likely that change will only occur as a result of joint action.

Reducing veterinary costs. Preventing losses from common diseases may improve returns substantially for little cost. Routine deworming and vaccination along with protection for the animals in a well-built enclosure may cut down on the number of animals that are lost each year, making for an extremely significant gain. Improving the affordability and accessibility of veterinary services will reduce the high cost for smallholders, who currently rely on them too heavily for problems that can be easily prevented.

Sustainable agriculture can make gains: Statistical analysis of the benefits of each sustainable agriculture technique showed that using sustainable techniques was significantly correlated

with improved gross margins (Beta = 0.248, p = 0.012). Implementing sustainable farming methods such as waste redistribution, and use of crop residues as feed, and crop rotation, should result in positive, not decreasing returns.

It is imperative that farmers, government officials, non-governmental organizations, and research organizations work together to improve things for the farmer. Support must be targeted towards individual farmers to facilitate the use of scientifically proven methods. Official actions such as improved market systems and better veterinary care will be most effective. The methods that organizations will use to bring about these changes are highly variable and research must be carried out to define where these interventions can be of most use.

While arid land continues to be the defining feature of the Chiredzi district, goat farming represents an opportunity to gain additional income and become resilient in the face of uncertainty. Research has shown us what is required, the problem is the implementation.

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APPENDIX A: APPROVAL FORM

My name is Tafadzwa Vurayai. I am a student at Bindura University of Science Education studying Bachelor of Sciences (Honours) Degree in Agricultural Economics and Management. For my degree commands, l am required to do a research. This questionnaire is designed to gather information for my dissertation entitled: Assessing the Economic Viability of Smallholder Goat Farming in Chiredzi District, Zimbabwe, Focusing on Market access, Production challenge an Eco-Friendly practices. Your opinion in this research will be very helpful. Your responses will be kept confident and you will not be personally identified in this study. I am kindly seeking for your cooperation in answering the question.

Yours faithfully

Tafadzwa Vurayai

APPENDIX B: QUESTIONNAIRE

Assessing the economic viability of smallholder goat farming in Chiredzi District, Zimbabwe, focusing on market access, production challenges and eco-friendly practices.

My name is Tafadzwa Vurayai, a student from Bindura University of Science Education studying for an Honours Degree in Agricultural Economics and Management. I am conducting a study on goat farming in Chiredzi District to understand the economic viability, challenges, and eco-practices of smallholder farmers. Your participation is voluntary and all information provided will be kept confidential and used for academic purposes only. Thank you for your time.

INSTRUCTIONS

Please fill the blank space below and tick where appropriate

Questionnaire ID: _____

Date of Interview: _____

Ward/Village: _____

Interviewer's Name: _____

SECTION A

SOCIAL DEMOGRAPHIC AND HOUSEHOLD CHARACTERISTICS.

1. **Age of respondent _____ years**

2**. Gender**

Male ☐

Female ☐

3**. Marital status**

Single ☐

Married ☐

Widowed ☐

Divorced ☐

4. **Highest level of education completed**

None ☐

Primary ☐

Secondary ☐

Tertiary/College ☐

Vocational ☐

5. Household size (number of people) _____

6. Number of household members engaged in goat farming _____

7. What is your primary occupation?

Farming (crops/livestock) ☐

Formal employment ☐

Informal business ☐

Other (specify): _____

8. **What are your other sources of income? (Tick all that apply)**

Crop farming ☐

Other livestock (cattle, poultry, etc.) ☐

Remittances ☐

Pension ☐

Other (specify): _____

SECTION B

GOAT PRODUCTION SYSTEM

1. How long have you been rearing goats? _____years

2. What is your current total goat herd size? _____goats

3. **What breeds of goats do you keep? (Tick all that apply)**

Indigenous (Matebele) ☐

Boer ☐

Crossbred ☐

Other (specify): _____

4. What is your primary production system?

Extensive (free range/open grazing) ☐

Semi-intensive (partial confinement) ☐

Intensive (full confinement) ☐

5. Do you have dedicated housing/kraal for goats?

Yes ☐

No ☐

6. If yes, describe the kraal structure:

Traditional (wood/mud) ☐

Improved (stone/brick with roofing) ☐

Other (specify): _____

7. What is your main source of goat feed? (Tick all that apply)

Natural grazing ☐

Crop residues ☐

Purchased feed ☐

Fodder crops ☐

Other (specify): _____

8. Do you provide supplementary feed?

Yes (if yes, what? _____)

No

9. How do you manage goat health? (Tick all that apply)

Regular deworming ☐

Vaccination ☐

Use of veterinary services ☐

Traditional/herbal medicine ☐

None ☐

10. Do you keep records of your goat farming activities?

Yes ☐

No ☐

SECTION C

ECONOMIC AND MARKET DATA

1. What was your total revenue from goat sales in the past 12 months? $_____

2. How many goats did you sell in the past 12 months? _____goats

3. What is the average price per goat sold? $_____

4**. What are your main marketing channels? (Tick all that apply)**

Direct to neighbours ☐

Local traders/middlemen ☐

Livestock auction ☐

Direct to butcheries ☐

Other (specify): _____

5. How far is the nearest major goat market? _____km

6. What are your main costs in goat farming? (Estimate annual costs)

Veterinary/drugs: $_____

Feed/supplements: $_____

Hired labor: $_____

Transport/marketing: $_____

Water: $_____

Other: $_____

7. **Do you have access to credit for goat farming?**

Yes (source: _____)

No ☐

8. **If no, what is the main barrier to accessing credit?**

Lack of collateral ☐

High interest rates ☐

No financial history ☐

Other: _____

SECTION D

ADOPTION AND PERCEPTION OF ECO-FRIENDLY PRACTICES

1. **Are you aware of eco-friendly/sustainable goat farming practices?**

Yes ☐

No ☐

2. **Which of the following practices do you use? (Tick all that apply)**

Rotational grazing ☐

Fodder cultivation

Manure recycling/composting ☐

Water harvesting/conservation ☐

Agroforestry integration ☐

None ☐

3. **If you use any, what benefits have you observed? (Tick all that apply)**

Improved goat health ☐

Better pasture condition ☐

Reduced feed costs ☐

Increased soil fertility ☐

No noticeable benefit ☐

4. **What are the main barriers to adopting more eco-friendly practices? (Tick all that apply)**

Lack of knowledge ☐

High labor requirement ☐

Lack of capital ☐

Land tenure issues ☐

No perceived benefit ☐

Other: _____

SECTION E

PERCEIVED CHALLENGES AND COPING STRATEGIES

1. **Rank the following challenges in order of severity (1 = most severe, 7 = least severe)**

Disease outbreaks ☐

Feed shortages ☐

Water scarcity ☐

Predation, ☐

Low market prices ☐

Lack of veterinary services ☐

Theft ☐

Other: _____

2. **How do you cope with feed shortages? (Tick all that apply)**

Purchase feed ☐

Reduce herd size ☐

Use crop residues ☐

Move livestock to other areas ☐

Other: _____

3. How do you manage during drought periods?

Sell animals ☐

Buy feed/water ☐

Use stored fodder ☐

Receive government/NGO support ☐

Other: _____

4. What support do you feel you need most to improve your goat farming? (Tick all that apply)

Training on goat management ☐

Access to credit ☐

Better market access ☐

Veterinary services ☐

Improved breeding stock ☐

Water infrastructure ☐

Other: _____

Closing Statement

Thank you for your valuable time and cooperation. This information will contribute to understanding how to better support goat farmers in our community.

Respondent's Signature: _____

Interviewer's Signature: _____