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Faculty of Agriculture and Environmental Science

Department of Agricultural Economics, Education and Extension.

Effects of Indigenous Knowledge on Agricultural Extension delivery in Ward 7 of Norton, Zimbabwe.

BY

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B223056B

A Dissertation Submitted in Partial Fulfilment of the Requirements for the Bachelor of Agricultural Science Honours Degree in Agricultural Economics and Management.

June 2026

Release Form

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Dedication.

I want to express my gratitude to my family, parents and especially my sisters. Thank you for pushing me and continuing to provide me with the financial and emotional support that I needed. Thank you for having faith in me. I appreciate all the love I received and it has contributed to my accomplishment of this degree.

Acknowledgement.

I would like to start with thanks to God for your presence at all times and in all situations, for I alone, surely could not undertake this project. Thank you to Dr Govere and Dr Chimvuramabwe for supervision and consultancy. May strong and sincere gratitude be extended to Bindura University of Science Education for giving me your first opening into higher learning (your admission).

Abstract

This study investigates the influence of indigenous knowledge on extension services in agriculture in ward 7 of Norton, Zimbabwe. Farmers usually depend on local wisdom, but policy does not recognize it in formal extension services which affects the efficiency and effectiveness of service delivery. This research examines how traditional knowledge and skills affect the execution and the efficiency of extension services. The focus is in the area of production, control of pests and sustainable agriculture. First-hand information was collected from both extension staff and farmers through interviews, surveys, observations and focus group discussions. The data were analysed using qualitative and quantitative techniques to measure the role of native or local knowledge in enhancing extension service delivery. The study outlines that formal integration of indigenous knowledge was identified as one of the key factor that enhances the adoption of extension services and timely implementation of the services, which in turn, enhances agricultural productivity. However, the study notes that the lack of codification of local/traditional practices hinders the operationalization of local practices in extension service. The research concludes that the amalgamation of extension services and indigenous knowledge will enhance the agricultural productivity and promote sustainable development of rural communities in Norton and other regions in Zimbabwe. For future research, it is recommended that similar studies be conducted in other districts and provinces throughout the country where this research could not cover due to financial restrains and limited time, it helps to assess whether the effects witnessed in ward 7 of Norton are consistent in different agricultural and social cultural backgrounds. Increasing the geographical range of research offers a wider understanding of how local wisdom can be thoroughly integrated into extension delivery services nationwide.

Keywords: Indigenous knowledge, extension delivery, local knowledge integration, Norton ward 7, indigenous practices, scientific extension services.

List of Acronyms and Abbreviations

IKAI	Indigenous knowledge Adoption Index’
FAO	Food and Agricultural Organisation.
IK	Indigenous Knowledge.
ARDAS	Agricultural Rural and Advisory Service
AGRITEX	Agricultural Technical and Extension Services
NGO	Non-Governmental Organisation.
FGDs	Focus Group Discussions

List of Tables

Table 1: Data Collection for Specific Research Objectives.

Table 2: Variables and Indicators.

Table 3: Data Analysis Methods for Specific Research Objectives.

Table 4: Indigenous Knowledge Adoption Index.

Table 5: Socio-demographic characteristics of surveyed households (N = 120)

Table 6: Distribution of IKAI scores among households (N=120)

Table 7: Integration practices used by households (N=120)

Table 8: Multiple regression results (N = 120).

List of Figures

Fig 1: Conceptual and Theoretical Frameworks

Fig 2: Map of Zimbabwe highlighting location of Norton.

Fig. 3: Thematic analysis of focus group discussion and interviews**.**

Fig .4: Proportion of households using specific indigenous practices

Table of Contents

Release Form i

Approval Form. ii

Dedication. iii

Acknowledgement. iii

Abstract. iv

List of Acronyms and Abbreviations v

List of Tables v

List of Figures vi

CHAPTER 1, INTRODUCTION 1

1.1 Background of the study 1

1.2 Statement of the Problem 4

1.3 Research Questions. 5

1.3.1 Main question: 5

1.3.2 Specific questions: 5

1.4. OBJECTIVES OF THE STUDY 6

1.4.1 Main objective: 6

1.4.2 Specific objectives: 6

1.5. Significance/Justification of the Study. 6

CHAPTER 2: LETERATURE REVIEW. 11

2.1 Introduction. 11

2.2 Conceptual Framework. 11

2.3.2 Theory Application in Farming Knowledge 13

2.4 Indigenous knowledge shapes farming ways in Zimbabwe 15

2.5 Indigenous Knowledge Meets Farm Advice 16

2.6 Indigenous knowledge and its impact on farm output and crop performance 18
2.7 Economic value of indigenous knowledge and resources. 19
2.8 Farmers Struggle with the Local Knowledge and Resources Available 21
2.9 Opportunities for indigenous knowledge in farming extension delivery 22
2.10 Observations from Norton and some other regions of Zimbabwe. 24
2.11 Thinking about the methods of past studies 25
2.12 Synthesis and relevance to current research. 28
2.13 Conclusion. 29
CHAPTER 3: RESEARCH METHODOLOGY. 31
3.0 INTRODUCTION 31
3.1 DESCRIPTION OF THE STUDY AREA. 31
3.2 Research Design 32
3.2.1 Quantitative Approach. 33
3.2.2 Qualitative Approach. 33
3.3 Data Collection Methods. 33
3.3.1 Data Collection Procedures: 35
Sampling and Sample Size 35
3.3.2 Data Collection Instruments (Measurement Techniques) 36
Strengths and Limitations of the Methodology 37
3.3.3 Variables of the Study. 37
3.3.4 Types of Data: 39
3.4 Data Analysis Methods. 39
3.4.1 Measurement of Indigenous Knowledge Use 41
3.4.2 Justification for Selection of Methods. 42
3.5 Ethical Consideration and Limitations 43

3.5.1 Limitations 43
3.5.2 Chapter Summary 44
CHAPTER 4: RESULTS AND DISCUSSION 44
4.0 INTRODUCTION 44
4.1 Presentation of Results 44
4.1.1 Socio-Demographic Attributes of Respondents. 45
4.1.2 Levels and Patterns of Indigenous Knowledge Use. 45
4.1.2 Qualitative Findings. 46
4.1.3 Integration of Indigenous Knowledge and Extension Service. 48
4.1.4 Factors Influencing the Use of Indigenous Knowledge in Extension Delivery. 49
4.2 Interpretation and Discussion. 50
4.2.1 Social Demographic Characteristic of Respondents 50
4.2.2 Level and Pattern of Indigenous Knowledge Use. 51
4.2.3 Integration of Indigenous and Extension Advise/Practice 52
4.2.4 Factors Influencing the Use of Indigenous Knowledge 53
4.2.5 Qualitative Findings (Thematic Analysis) 53
CHAPTER 5: Conclusions and Recommendations. 54
5.0 Introduction. 54
5.2 Conclusions. 54
5.2.1 Indigenous knowledge used by Farmers 54
5.2.2 Combining traditional and modern methods 54
5.2.3 Factors inducing use of local or native knowledge 54
5.2.4 Obstacles in Integration of Indigenous knowledge in extension delivery in Norton 55
5.2.5 Importance of Local wisdom in viable Agriculture. 55

5.2.6 Overall Conclusion. 55
5.2.7 Limitations of the Conclusions. 55
5.3 Recommendations. 56
5.3.1 Comprehensive Strategy Frameworks 56
5.3.2 Training and Education 56
5.3.3 Formal Support 56
5.3.4 Community Arrangement. 56
5.3.5 Recommendations for future research 57
5.3.6 Final Remarks 57
5.4 REFERENCES. 58
APPENDIX 62
QUESTIONAIRE, INTERVIEW AND FOCUS GROUP DISCUSSION GUIDE 62
HOUSEHOLD QUESTIONNAIRE 62

CHAPTER 1, INTRODUCTION

1.1 Background of the study

Indigenous knowledge pertains to a body of practice acquired by people from their ancestral domain via lived interaction and preserved via storytelling and memory (McCarter & Gavin, 2019). It includes all the processes and strategies overseen by farmers in regard to their production such as crop and soil management, water management, and pest/disease management, seed treatment and the social rules revolving around the distribution and utilization of the resources (Berkes, 2022; Nyanga *et al*., 2023).

Considering, Zimbabwe and many countries in Southern Africa, farmers primarily depend on farming methods such as contour ridging, intercropping, planting basins, and zai pits, which are quite effective. Traditional farming methods have also been employed to address challenges presented by erratic rainfall and poor soil fertility, coupled with the absence of financial resources for purchasing farming inputs (Mutekwa & Chazovachii, 2019). These elements cannot be viewed separately, as they are interwoven with a community's combined and conscious use of their traditional knowledge and systems. This makes it possible for community members to grow food and sell it as a source of income (Murimbika *et al*,. 2019).

Indigenous knowledge was once regarded as primitive and archaic, but this attitude has altered in recent years. Researchers and extension workers regard it as a branch of science and thus as a complementary body of knowledge when designing acceptable agricultural interventions (Gdgil *et al.*, 2020; Sillitoe, 2021). Indigenous knowledge integrated with formal agricultural practice brings mutual benefits to both the source and the recipients of the knowledge. Farmers are more amenable to innovations when indigenous knowledge is integrated, thus conserving local resources. Farmers feel they have more control over the innovations and changes in their farms (Pretty, 2019; Hellin & Higman, 2020). For this reason, there are more projects that adopt the use of farmer field schools or farmer to farmer training approaches to promote mutual learning among farmers (Braun *et al*., 2023). In countries like Zimbabwe where there are critical shortages of state agricultural extension workers, the community based approaches are more

appropriate as they are built on what already exists, and are more economically feasible (Mujeyi & Mutsvangwa, 2016).

As stated, challenges are associated with integrating indigenous knowledge into formal agricultural extension systems. For example, indigenous knowledge is perceived differently by scientists and the farm communities. The extension system is characterized by a power imbalance wherein extension workers are more dominant than the farmers. Moreover, the system imposes a high degree of uniformity, such that a given extension system will provide a single method or a single prescribed solution, while other local methods are neglected or ignored (Sillitoe, 2019; Van den Ban & Hawkins, 2020). Agricultural extension training tends not to emphasize the importance of local knowledge of farmers, and when success is assessed, it is primarily based on measurable outputs, such as the level of agricultural yield, with no consideration as to whether or not the methods are appropriate for the local context (Roling & Engel, 2020). Some traditional methods may be incompatible with the current climate or may not function well in current market conditions. Therefore, it is vital to integrate the indigenous knowledge to agricultural extension services or scientific research in order to achieve the best outcomes (Tschakert & Dietrich, 2022).

Furthermore, Norton is uniquely situated close to the capital Harare and local markets. It is also close to local farmers that integrate both local agricultural methods and modern extension advice or scientific knowledge within their daily farming activities. Some of the methods that they utilize include traditional farming methods like saving indigenous seeds, using local plants for pesticides and sharing irrigation systems. However, they would utilize chemical fertilizers and hybrid seeds if these were accessible to them (Mujuru *et al.*, 2021; Gandiwa & Zisadza, 2023).

In addition, research from Zimbabwe and its neighbors shows that local knowledge determines how extension services are implemented. Water-saving and conservation approaches are developed by local farmers before extension officers communicate these approaches to them (Scoones *et al.*, 2022). Farmers save money by using local plants as a cheaper alternative to

chemical pest control. Agricultural extension services have to assess the pest control methods and pest control approaches to develop the best method and provide guidance on how to implement the pest control approaches (Nyirenda *et al.*, 2022; Ncube *et al.*, 2018). Local knowledge systems also include local seed systems that help sustain seed supply and crop diversity. These seed systems are not recognized by government policies. Current government restriction policies circumvent local systems and extension services to promote certified seeds (Sperling et al., 2008).

Overall, the government has a predominant role in Zimbabwe's agricultural policies, but it also allows the involvement of nongovernmental organizations, private firms, and farmer associations while formulating policies (Mwanza *et al.*, 2021). Due to the government's limited resources for extension services, more officers from NGOs step in, as well as community organizers, and they usually collaborate with indigenous knowledge (DAI, 2022). Once national policies begin to include and verify the community's traditional knowledge and innovations, it theoretically allows access to local knowledge and resources for agricultural extension services (Government of Zimbabwe, 2019). Unfortunately, local knowledge is not documented and is hard to include in a training service or outreach in a meaningful way to the community.

Research has shown that indigenous knowledge is resourceful, but few have tried to understand the role indigenous knowledge plays in extension outcomes in areas such as Norton a in Zimbabwe. More research is needed to describe what type of indigenous knowledge is being used by farmers and to what extent indigenous knowledge is incorporated in agricultural extension services. There is also a need to understand what constrains the inclusion of indigenous knowledge in agricultural extension services (DAI, 2022). This should be followed by assessing the influence of indigenous knowledge on farmers' adoption of the technology, on farmers' productivity, on farmers' ability to cope with stress and on farmers' satisfaction. Once the results to these questions are available, it will be easier and cheaper to come up with agricultural extension services that are in harmony with the indigenous knowledge of the farmers (Mwanza *et al.*, 2021). This will guarantee acceptance of extension services and will help communities similar to Norton to achieve more sustainable means of livelihood.

1.2 Statement of the Problem

Knowledge of support systems based on practical situations helps farmers increase production, but many projects designed to aid farmers collapse because they ignore these practical situations. Each area has its own farming systems that best suit the soil, and what works in one area may fail in another (FAO, 2019).

First, smallholder farmers in Norton know their land better than anyone else. Even so, agricultural extension workers and agricultural development institutions purposely neglect to integrate them into their programs. Farmers in Norton depend on local knowledge, which is passed on through generations and is not accepted by agricultural extension and development programs. Knowledge includes planting seeds at different times in relation to shifting rain seasons; using ash to block harmful microorganisms and intercropping to name a few. Most programs advocated for means, which disregards local knowledge, have claimed the local means of farming are outdated or inferior. In addition, Norton farmers face many challenges including poor soil, lack of water and even pests which is constituting a growing problem for many farmers (Mlambo *et al*. 2021). Noteworthy is that many farmers devise strategies to counter pests and even attempt to block poor soil or water using different methods. Even so, their challenges remain unaddressed by extension services, since what they devise remains unregulated or unapproved for formal use. Knowledge exchange remains superficial due to little engagement towards constructive means, and many agricultural extension services fail to capture essential local conditions which leaves most extension services inoperable and farmers fully still opting out.

In addition, overlooking indigenous knowledge means that extension services are less likely to influence agricultural practices among farmers, resulting in the persistence of unproductive farming practices. Local knowledge is essential to modify support services to meet the preferences of farmers, thereby increasing the rate of adoption of the practices. Integration of

local Knowledge yields improved relationships, which encourages greater participation by farmers in the adoption of the practices.

Furthermore, the challenge of Combining indigenous knowledge and formal farm advisory services in the Norton area is significant. Farmers and advisors may actually listen to one another if there is room for discussion. When experience and proven practices come together, innovative and applicable solutions emerge. Incremental improvements rather than drastic transformations to align rational insights with entrenched practices contribute to increased productivity. Progress is the result of new practices and trust rooted within the farming community and soil.

Bridging this gap is necessary for achieving better crops, but Improved nutrition and food security for the community of Norton also hinges on it. Sustainable livelihoods for farming families depend on these interconnected solutions. The system is only as strong as the weakest link.

1.3 Research Questions.

1.3.1 Main question:

- What are the impacts of indigenous knowledge on agricultural extension delivery in Ward 7 of Norton, Zimbabwe?

1.3.2 Specific questions:

1. What are the indigenous knowledge systems used by farmers in Ward 7 of Norton, Zimbabwe?
2. What are the major systems used to incorporate indigenous knowledge in agricultural extension delivery Ward 7 of Norton, Zimbabwe?
3. What are the ways farmers in Ward 7 of Norton combine their indigenous knowledge and agricultural extension services to build productive and adaptive systems?

4. What are the barriers to the combination of indigenous knowledge and extension services faced by farmers Ward 7 of Norton, Zimbabwe?
5. What are the ways to enhance the integration of indigenous knowledge and extension services Ward 7 of Norton, Zimbabwe?

1.4. OBJECTIVES OF THE STUDY

1.4.1 Main objective:

- To determine the impacts of indigenous knowledge on the provision of agricultural extension services Ward 7 of Norton, Zimbabwe?

1.4.2 Specific objectives:

1. To describe the indigenous knowledge systems used by farmers Ward 7 of Norton, Zimbabwe.
2. To describe the levels and types of indigenous knowledge in farming Ward 7 of Norton, Zimbabwe.
3. To analyze the ways of combining indigenous knowledge with agricultural extension services Ward 7 of Norton, Zimbabwe.
4. To identify the barriers faced by farmers in Ward 7 of Norton in utilizing indigenous knowledge and integrated extension services.
5. To propose methods to facilitate the integration of indigenous knowledge and extension services Ward 7 of Norton, Zimbabwe.

1.5. Significance/Justification of the Study.

Understanding farm support initiatives in Ward 7 of Norton, Zimbabwe, by looking at indigenous knowledge and resources is important theoretically and practically. Support programs remain critical components of initiatives to increase rural productivity and improve food security and living conditions in rural Zimbabwe. However, these programs are being continually challenged by limited government budgets, a shortage of trained personnel, inefficient transport

and communication systems, and changes in laws and markets, all of which limit the effectiveness of outreach efforts (Anderson & Feder, 2020; Swanson & Rajalahti, 2019). In the absence of official assistance, people turn to their local coping strategies and resources to adapt to new challenges, innovate, and sustain agriculture (Berkes, 2018). Research in Norton may help answer the question of whether these resources increase the demand for farm advisory services.

Located at the intersection of urban and rural areas, Norton is a strategically important location for study. Farmers in the region have to balance their rural and urban lifestyles. Farmers often incorporate traditional methods with cash cropping and external employment (Mujuru *et al*., 2021). Because of this scenario, the agricultural extension workers face different challenges. Looking at Norton illustrates the changes in farming seen across Zimbabwe and the rest of the world. Understanding these farming methods will allow the development of better systems to support flexible urban-rural areas.

It starts with a gap, a missing connection between standardized science and grassroots innovation, now brought together through policy. A crucial transformation in development thought has incorporated a participatory approach, considering farmers' perspectives, and is increasingly evident in outreach. However, change is slow and teaching aids typically adhere to a rigid toolkit of seeds, chemicals, and fertilizers. The community's knowledge of their environment rarely fits into these frameworks, and advisors often receive no support or incentive for their efforts to capture and utilize this knowledge. Research conducted in Ward 7 of Norton draws attention to the bottleneck in the system and the opportunities created by it. This includes some of the training improvements, innovation status for growers, and the rural educational learning guides. These offer many small, tangible solutions for organizations to implement without burdening their existing systems and stretching their available resources.

One importance of these initiatives is their recognition of the need for resilience as well as sustainability. In Zimbabwe, soil fertility, intermittent supply of farm inputs, and climate change

have increased the pressures on farming systems. Rather than relying predominantly on external systems, farmers have adapted their practice to incorporate techniques such as intercropping, soil moisture conservation, and the use of indigenous pest control systems, which offer some protection from negative impacts, and require little in the way of external farm inputs. These practices remain because they are flexible and resilient under stress (Nyirenda *et al.,* 2019).

The careful documentation of what specific practices and local knowledge systems have been shown to be resilient, how they have adapted across generations, and where rural outreach and service support can be strengthened, contribute to the pathways offered. These routes seek to balance environmental stewardship and productivity within the community, while being affordable.

Adding to that, this research focuses on something that has not received enough attention, which is how existing research is lacking field data. While there has been some new attention to tracking local knowledge systems in Zimbabwe, most of the results either engage in some general knowledge capture for the country as a whole, or target rural farming households. Areas like Norton, which is close to the urban center, are left out of analysis, and these areas have gained some importance in population and trade dispersal. Data from this type of analysis can help articulate the ways traditional knowledge systems complement the state systems by providing the official agricultural support and policy that are both necessary in order to advocate for local knowledge systems, as well as design integration frameworks, usage frameworks, and on-the-ground impact frameworks.

One other reason this study is important is because of its potential to improve some of the technical skills in the field. Integrative community knowledge systems through fieldwork and direct engagement with community members and local farmers are used to design and implement research systems that are useful to study local and traditional knowledge systems. When community members are engaged in the data collection process, this has the potential to improve

their ability to document and adapt the information; the participatory approach increases the likelihood of research systems being useful to effect positive change.

It is ethically important to conduct this type of research, as local communities will see meaningful benefits. When extension systems come to appreciate farmers' skills and knowledge, the solutions they develop become more culturally relevant, less expensive, and more sustainable over the long term. By incorporating existing practices, extension systems are able to offer farmers more relevant information. Extension workers are able to more easily disseminate their knowledge, even in the absence of funding, due to the easy-to-use, applicable, and localized tools they possess. As a result, decisions made by the authorities are able to more accurately portray the actual state of affairs and strike a balance of equity and constructive progress.

Considering the economically advantageous opportunities available, the research being conducted on localized knowledge and the available resources used to organize and manage farming outreach in the Norton area is logical, since there is a widespread and highly recognized need for significant improvement in the efficient management of farming outreach services. There is an obvious lack of research on farming on the urban city edge. This makes studying this area even more important. There is a good chance advances in knowledge of this area will create improvements for farmers and agricultural advisors. Small changes in the way assistance is offered to farmers will be more likely to occur as a result. These changes will also contribute to larger conversations on the knowledge systems utilized to promote rural development. It is especially important to support research like this in Zimbabwe and similar areas.

A universal restriction encircles each research project, including this one, which is examining the role of local knowledge in shaping farming outreach in Norton. Such boundaries provide a guide for interpreting research findings and indicate where considerations for further studies should be directed. The boundaries of the present study inspire researchers to continue their work where they left off.

This study purposes a work in the Norton area for a number of reasons. First, Norton is a rural area experiencing urbanization and a farming community that is surrounded by a city. Because of this, Norton's community has a unique way of combining the traditional rural farming ways with the newer urban methods and ideas. The research and results are based on the way the community of Norton both (1) grows their food and (2) exchanges/ sells their resources and goods in that community. Because of the differences in rural farming communities, from the ways the community is connected to a city to the ways the community steers clear from urbanization, the results of this research may not be the same if other rural communities engage in the same study. Insights also gain value through their specificity, targeting a limited area of study and presenting the research in similar rural farming communities.

While the method efficiently recruits informed sources, there is a risk of over-representing easily-accessed voices. Targeted and referral-based recruitment means that workshop attendees, village heads, or similar ‘gatekeepers’ may dominate the input. Meanwhile, less vocal, more dispersed, or more isolated members, like the elder population, may not be heard. The method may be incentivized to recruit more rapidly using more accessible or ‘trusted’ sources; however, under-representing the more silent or less accessible contributors is a major risk of this technique. As a compromise, the key project stakeholders may be contacted first in order to recruit the necessary support and resources needed to reach under-represented women farmers, younger farmers, and those who are more isolated. The goal involves being more equally represented across income and social stratums, even if this is difficult to achieve.

As it relates to social stratification in the context of fieldwork, something that stands out is the link to the more difficult to achieve temporal social integration. Considering the annual cycles which structure most agricultural production, something else to note is how outreach may be occurring at new points in time to fit in as seasonal or cyclical time constraints that integrate project work. Additionally, because fieldwork is often highly time-constrained, it may only capture one season

by exploration of ties linking traditional insight to harvest results, financial effects, and advice sharing. Obstacles appear later in the flow. Ways forward emerge near the close, offering grounded options for weaving local insight more fully into advisory work.

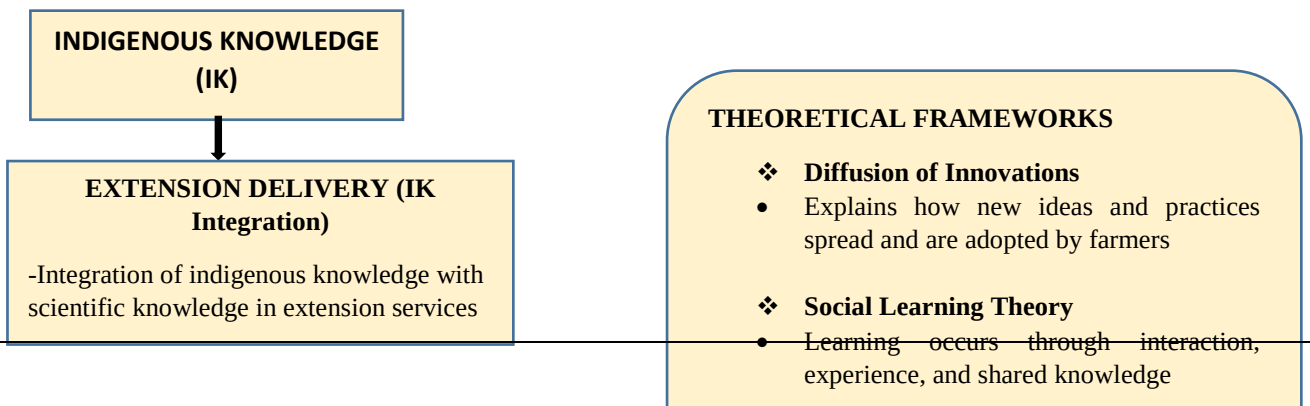
CHAPTER 2: LETERATURE REVIEW.

2.1 Introduction.

This chapter analyzes literature concerned with the effect of indigenous knowledge and resource endowment in promoting farm extension initiatives. A combination of theory, empirical evidence, and policy discourse constitutes an argument around farm practices, practices of growers, and conditions surrounding field officers. Informed by research objectives, this chapter is presented chronologically. First, there is a discussion about the conceptual framework or nature of indigenous knowledge and resource endowment. Then follows a theoretical framework for indigenous knowledge integration with the formal agricultural support system. This is followed by a review of indigenous practices in Zimbabwe. Thereafter, attention is drawn to the linkages between traditional knowledge and the outcome of harvest, finances, and advice dissemination.

2.2 Conceptual Framework.

The study is based on the idea that integrating indigenous knowledge influences how effective extension services are. This indicated by the following diagram (figure 1).



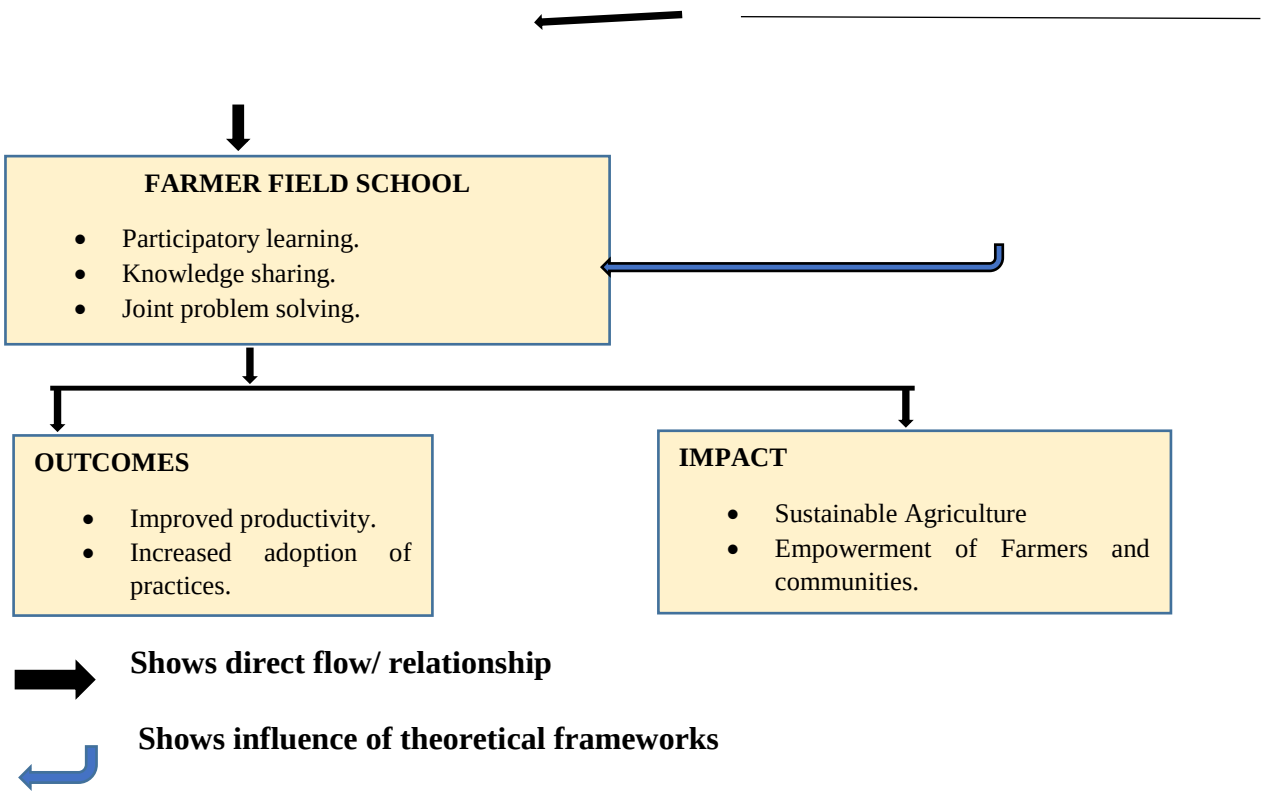


Fig 1: Conceptual and Theoretical Frameworks

The integration of indigenous knowledge uses participatory methods combined with caring and responsive learning environments. This offers means to strengthen the scope and reach of extension services and results in sustainable agricultural development (Nyandoro & Myeza, 2019).

Community knowledge is held by elders and is based on long term experience and knowledge of specific geographical areas. For example, timing of specific planting may depend on which birds migrate and arrive; knowledge of which leaves are useful for making insects stay away; the texture of soil and its readiness for plowing (tillage). This knowledge is not rigid or static. It develops over time and relies on observation, patience, and communication (Agrawal, 2021; Sillitoe, 2022). This type of knowledge includes the selection of quality seeds, the preservation

of water, the sharing of seeds, the management of crop pests and the sharing of the harvest in times of need (Warren, 2023; Salami, 2021).

This knowledge also initiates practices that use local resources. These may be native plants that help deter pests, animal waste that is mixed with compost, seeds that have been cultivated over time to withstand environmental stresses, or tools that are made by hand. These practices see greater use over time because farmers prioritize eating over experiencing losses in their agricultural practices (Nyandoro & Myeza, 2019).

The other significant advantage of indigenous knowledge is the adaptability that accompanies. These practices of indigenous farmers develop over time, for example, in response to the emergence of new pests, new agricultural prices, or unexpected shifts in weather (Berkes, 2020). These practices develop fluidly, and extension services are encouraged to be flexible, as treating this knowledge as an outdated custom prevents the development of significant collaborative solutions that this community favors.

2.3.2 Theory Application in Farming Knowledge

Using varying theoretical frameworks, we can understand the relevance of Indigenous Knowledge in Farming Outreach. We can also identify areas of conflict using these frameworks in the relationship between the communities' understanding and the formal system.

Using theory more effectively on modern farming challenges can show how science and use of traditional knowledge can coexist, and, at times, when they can address challenges in farming in a complementary way and at the same time (Röling & Jiggins, 2020). Rather than dealing with the two knowledge systems separately, some of these approaches have placed both knowledge systems in the same framework, where the knowledge of the farmers can be placed alongside the scientific knowledge. More often than not, this integration leads to solutions that take into account the community's value systems and their specific soil and climate conditions (Sumberg

& Thompson, 2022). Genuine improvements are seen through the interaction of researchers and the farming communities, and the integration of both dynamically evolving systems. This explains the difference between formal teaching and the learning that takes place from engaging in the activity.

This knowledge can be further shared through established social networks from one farmer to another (Chambers, 2020; FAO, 2023). Such a system is not formal or theoretical in nature. Reliance on example, participation, and informal or social systems as communication channels can shift systems in such a way that practical farming advice is exchanged for theory. Moreover, solutions become more creative the more the advice integrates indigenous knowledge systems.

Resilience within social-ecological systems is enhanced through the addition of Indigenous Knowledge. Indigenous Knowledge provides the means to adapt to change through the use of quick-maturing plants and the use of patterns or designs that help reduce the impact of a crop failure (Berkes & Ross, 2023). When outreach programs incorporate such knowledge, communities have shown that they are better able to adapt and deal with disruptions. This is especially important where rapid changes are occurring, such as in the outskirts of cities or in fragile areas that experience the most pressure from nature and the market.

Indigenous knowledge must also take into account the power relations which concern it. This can be approached from a non-economic point of view in order to shed light on the institutions that determine which knowledge is considered legitimate. In many areas of Africa, government-sponsored farming programs have been based on market-oriented, science-based programs, and as a result, much of the local knowledge has been ignored. (Scoones & Thompson, 2023). The impact of these programs on local farmers' willingness to share traditional practices with extension workers is clear, as is their impact in determining the outreach topics. When control inequalities are recognized, it is possible to develop more effective and just approaches (Moyo et al 2021).

When applying these systems and frameworks, we can see that we need to move beyond the evaluation of indigenous knowledge based solely on the data of agricultural outputs. More importantly, the focus should be on the evaluation of relationships and the associated connectivity. The question to be concerned with is: which of the stakeholders has the most to gain from the integration of indigenous and scientific knowledge. Community empowerment and the long-term sustainability of the ecosystem must also be addressed (Berkes & Ross, 2023).

2.4 Indigenous knowledge shapes farming ways in Zimbabwe

Smallholder farmers in Zimbabwe, like others, have developed farming practices that have evolved after many years of observation. Manure is well managed as is compost, and adds to the field to help keep it fertile. Moisture stays in soil for longer when soil is covered with mulch or litter after harvesting (Moyo et al 2021). There is an underground network of roots, and that, coupled with the legume, helps to naturally increase the soil nutrients. There are many ways used to help collect water, like planting basins and earthen ridges, to improve collection when rain is scarce, which is the case for many farmers. Others rely on seeds they have saved from the previous year, and select seeds that have good taste, that are known to survive and store well, rather than those that have the highest yield.

Even with an increase in the ability to know about the weather, or foretelling the kind of weather that is coming, many people still rely on traditional ways to tell when to sow seeds. There are ways to tell the best time to start harvesting and for this, many elders rely on the flowering of insects and watch for it closely. Traditionally applied ash helps seedlings, and pests are deterred when crops are planted in rows. Pathways of pests are disrupted by the ways that crops are arranged and planted. There are Plant-based ways to treat crops that are integrated into the daily treatment of crops. Changing the arrangement of crops planted seasonally helps to limit pathogens that take root in the soil. Certain birds can tell when the season is changing and can do so better than man made instruments. Good management practices are used to keep pests at bay.

There is a selection of crops that are early flowering. This helps them to escape the notice of seasonal pests. This knowledge is still passed down and used alongside modern ways. These practices are used because they are able to sync with the seasonal rhythms (Fender & Silverman, 2022)

Chagonda and Muchapondwa (2023) noted that when fertilizer and certified seeds are prohibitively expensive, rural Zimbabwean farmers forgo the expensive methods and work from traditional methods by using compost and manure. Other farmers use local perennial plants instead. Farmer produce in combination with inherited methods provides many businesses with the means to survive. Rural land provides the ability to perform invaluable subsistence farming. This helps to feed farmers' families and sell the surplus to provide the money needed for traditional farming methods. Chitapi (2020) believes inherited farming methods help farmers adapt to the economic situation of Zimbabwe and the seasonal agricultural disruptions resulting from climate change.

2.5 Indigenous Knowledge Meets Farm Advice

How extension services acknowledge (or fail to acknowledge) indigenous knowledge noticeably impacts rural agency and farming efficiency. Traditionally, advisory ward programs enforced a one-way communication method to fulfill farming recommendations. Programs were based on the belief that the official recommendations were more rational than the farmers' suggestions. The programs typically offered improved seed and chemical fertilizer packages (Fender & Silverman, 2023). The programs tended to be dominated by an authority that circumvented and neglected the insights of the farmer community, thereby creating a poor relationship between the two parties and impeding communication.

The latest advisory techniques moved away from extension methods. These techniques incorporated a community learning focus, with field officers immersing themselves in local farming communities to gain insights and co-create solutions with farmers (Davis, 2021; FAO,

2023). In the southern African region, positive results started occurring when experts began respecting farmers' knowledge and started building a framework on how the field-tested innovations would fit in these contexts (Mupangwa *et al.*, 2019).

On top of that, bringing things together or creating synergies does not happen on its own. There are several barriers that stem from how systems are constructed and from the way people think that can make real connections difficult. Sometimes, to meet certain objectives, extension services push commercial products as their performance reviews often hinge on them. Because of that, local knowledge is often dismissed for cheaper options. The rewards in the system often prefer newer modes over the older, traditional systems. What is rewarded in the system may prefer guidance and structures that are formally sanctioned, over what is locally practiced (Mudege, 2022).

Extension service workers who do not receive training in methods such as participatory facilitation, have a background based on scientific agronomy. They are unable to draw out and articulate the knowledge of farmers (Mujeyi et al., 2020). Their background also places them at a deficit of skills that incorporate and prioritize active listening in the local context. This makes collaboration difficult. The lack of use of ethnographic techniques is a barrier to meaningful exchange. Profound shifts in perspectives and priorities only occur when professionals learn to stop, look, and then respond.

Participatory methods that rely on steady commitment, such as on-farm experiments, learning circles, or training workshops, still encounter obstacles. A lack of consistent funding of outreach activities makes widespread implementation difficult, as previously noted (Davis, 2018).

Moreover, some initiatives integrated indigenous knowledge, while others totally ignored them. Mupangwa *et al.* (2014) noted that Farmer's Field School introduction of locally valued practices increased participation and improved pest control. In contrast, misinterpreting the daily farming

constraints, and the total neglect of traditional seeds by extension personnel, resulted in low participation (Mushonga, 2019).

2.6 Indigenous knowledge and its impact on farm output and crop performance

Productivity and indigenous knowledge are positively related, but the relationship is not clear. There are times when practices that are based on indigenous knowledge help sustain harvest during lean seasons by reducing reliance on costly external inputs. However, farm output in optimal conditions may be low, hence the value of these practices needs to be demonstrated through context-specific focused comparisons.

Farmers can lessen soil erosion and improve land productivity in dry and unfavorable weather by using zai pits to trap and retain moisture in the ground, covering the soil with planted cover and building barriers along the slope (Harris *et al.*, 2020). In Zimbabwe, fields that have been treated with either animal manure or decomposed plant matter are especially improved by seeding in-line with locally observed seasonal indicators, and they yield to the treated fields. (Mutenje *et al*., 2021).

When integrated with smart farming practices and applied repeatedly during critical insect development stages, plant-based pest management systems can be very effective. Farmers who study their crops and employ treatment correctly will see results. Utilizing wood ash along with neem and lippia leaves reduces pest damage. The success of these systems is dependent upon the formulation of the systems and the pest that is being targeted. Some crops are responsive and some are not, even in the same growing areas. The conditions in the areas also affect the success of the systems. Mathezire and Nyakurwa documented these results in a wider research study in 2020.

Consistent results are achieved when farmers use local seeds, even when local seeds yield less than other seeds. Farming in uncertain situations is more about the ability of the crop to

withstand the elements (such as prolonged drought) than the yield. The daily eating experience also has a functional role, with flavor taking precedence over complete functionality. Farmers also consider the quality of dry season storage. All of these factors impact crop selection far beyond the single greatest yield. This study shows the impact of seasonal carryover on farmers over single-season income (Sperling & Gukurume *et al.*, 2020).

One major conclusion of previous research is that using a combination of science-based approaches and indigenous knowledge is always preferable to using either alone. Using high-quality seeds and traditional cover and companion plantings can work synergetically for greater results (Sumberg & Thompson, 2012). Because of this, an advisory service that combines methods, as opposed to replacing them, can be expected to improve the farming practices of Norton's farmers

2.7 Economic value of indigenous knowledge and resources.

Indigenous knowledge also reduces the amount that a household is required to spend at the beginning. These methods can buffer against extreme weather and help maintain yields of food and preserve supplies, even when conditions are adverse. In some areas, older types of crops can be sold for a higher price, especially if they are sold in niche markets, which adds even more value. Many people are constrained by tight budgets and inconsistent supply channels, creating serious value for them (Harris *et al.*, 2020).

Additionally, saving money is an obvious benefit to farmers relying less on purchased inputs. Instead of buying fertilizers, families using kraal manure or homemade compost spend significantly less. Seed saved from the previous harvests further reduces costs, eliminating the need to buy hybrid seeds. The need for chemical pesticides is also reduced because of naturally available alternatives. In Zimbabwe, erratic markets tend to limit available farm inputs. In these circumstances, reduced expenditures allow families to afford food and other basic needs. The savings are particularly important during challenging periods, as supported by research (Dube & Makadho, 2020).

Furthermore, some of the indigenous crops have increasing value due to their taste and the longer shelf life or due to their significance in the culture. Therefore, because of these features, the individuals in the cities who are looking for novelty may purchase them for a higher price. Farmers obtain these clienteles through developing relationships with local traders or small businesses that add some processing to the food. Still, getting these products to market is a struggle due to poor roads and inadequate storage facilities. Unequal market access means that some growers who are able to meet the demand are left with no opportunity to sell. The profit from this community knowledge-based practice is highly reliant on these extra farm links (Sibanda *et al.,* 2020).

Risk management creates a foundation for stability. In the case of poor cultivation conditions, enhanced skills have helped harvests be more consistent, lowering the risk of total loss. In these challenging conditions, families are able to avoid the loss of financial stability. These protective measures are often reflected as zero change in annual profitability, but their impact lasts for multiple years (Thornton *et al*., 2018).

Adding to that, depending on human labor more than capital, some of the older farming techniques are very labor intensive. These techniques include hand weeding and composting, which relocate monetary costs to the costs of labor hours. Current tasks at home additionally pile up for those members of the household who are already engaged in labor in the fields. As daily chores consume women and children, these members of the household have to complete a disproportionate amount of the farming labor. This disproportionate effect of farming labor on the family members should be considered in outreach programs (Mathias and Nyikahadzoi, 2021).

Research in the regions of Zimbabwe, highlights the fact that while the use of indigenous knowledge does not substantially increase the earnings of small to medium scale farmers, it does lower the costs and provide indirect supports that improve the farmers resilience to changing conditions over time (Sibanda *et al.,* 2020).

2.8 Farmers Struggle with the Local Knowledge and Resources Available

Over the years, there have also been a number of challenges threatening the long term sustainability of traditional farming methods. These include the migration of the younger generations to urban areas and the adoption of more modern forms of employment which has decreased their participation in deep teaching of indigenous knowledge. When formal schooling moves away from community based education, vital traditions and environmental cues start to fade away from the community (Mathias and Nyikahadzoi, 2020). As seen in Norton, which is on the periphery of urban sprawl, the divide between the older and younger generations is becoming more distinct each year with the migration and changing aspirations of the younger generations.

Moreover, when organizations neglect traditional knowledge, it gets marginalized in policy and research where it remains undocumented and unsupported by official structures. These practices struggle to attract funding or to be more widely disseminated. Given that many of these extension services operate under tight budgets, they usually capitalize on validated technologies and ignore local practices. Recognition is important; indigenous practices, even effective ones, remain unrecognized without it. (Mujeyi *et al.,* 2020) point out that these kinds of biases tends to erode necessary knowledge in silence.

In some cases, small practices become difficult to sustain when larger scales are targeted. Indigenous knowledge becomes particularly useful in smaller family plots of land, but often fails when practices are expected to industrialize. An example of this is the use of plant-based insect controls. Their efficacy becomes inconsistent and flexible, requiring a great deal of standardization before they can be used on a larger scale. Without standardization, practices that are intended to be used within a profit-maximizing framework are difficult to adapt, as explained by Mathezire and Nyakurwa (2020).

Furthermore in changing climates, insect behavior changes as well, because traditional knowledge developed under prior weather conditions is often too rigid, and the new rapid

changes in environment do not show the old patterns. As new insect species make an appearance, formerly effective and reliable practices become fail-safe without modifications. When ecosystems begin to behave in a way that is foreign to what has been experience, the system of knowledge based on observation is crucial. Adjusting and updating these practices helps reinforce their effectiveness and ensures they remain relevant in changing environments (Berkes & Ross, 2013).

More so, entering larger markets is not simple, even when beneficial products based on indigenous knowledge are developed. The requirements for certification often favor homogenous products over locally and regionally tailored offerings. Quality assurance typically builds on assumptions about the ways in which products are made, which often do not align with small-scale production. Buyers are generally inclined toward products that are consistent with their prior experience and are likely to exhibit limited acceptance of products developed from indigenous knowledge. These characteristics are evident in most of the research on trade challenges (Sibanda *et al.,* 2020).

Additionally, there are variations in access. Gendered knowledge indicates how and what people are willing to share. Women may have knowledge on which seeds to plant, how to store food, and the family meal plan, but their contributions are rarely captured when farming guidelines are developed. Participation is uneven and as a result, local knowledge is not adequately valued (Nyandoro & Myeza, 2021). Land is further divided, settlement pushes into farms, and people are looking for work outside farming. Daily activities are reorganized as income shifts outside farming.

2.9 Opportunities for indigenous knowledge in farming extension delivery.

While there are many challenges in agriculture, there are promising examples that demonstrate how to integrate indigenous knowledge in a practical way. These methods are built on respect for

and incorporation of local customs, and concentrated on shared innovations. Even small scale changes within an institution can contribute to positive and sustainable change.

Collaboration with farmers often yields valuable insights that are not observable with only a scientific approach. In the process of testing concepts, the integration of advisors and scientists helps recognition of traditional knowledge and the development of novel solutions. Trials and coordinated decisions about which varieties to plant, organized by the farming community, help innovations that are better matched to existing conditions and that have a greater rate of adoption (Chambers, 2020; FAO, 2022). In places like Norton, small plots of land designed as working 'Native Soil' laboratories with improved seeds can serve as interactive learning environments.

Extension agents also develop a new form of interaction because of the training. They begin employing a new handson approach involving group discussions and active participation. They learn the importance of deep active listening, documenting practices with care, and valuing the local knowledge of the people they serve. A notable example is the direct participation of local farmers in some programs as a decentralized form of extension work, where they freely exchange local knowledge to the community. The presence of trusted facilitators improves indirect support to the target communities. It is clear that this approach transforms and improves the quality and speed of the information flow (Davis, 2019; Mujeyi *et al.*, 2020).

In providing opportunities for the local market, agricultural businesses growing local products and crops benefit. Knowledge keepers are more inclined to offer support when better selling, improved processing, and graded standards are applied. More income from native markets in city-based markets and from specialized buyers who value local produce and native seeds for their availability, variety, durability, or long shelf life is reported by them (Sibanda *et al*., 2020).

Adding on, young people from different ethnic groups associate tradition with obsolete art. However, when community traditions and indigenous knowledge are used as tools to offer jobs,

tradition is kept alive. Training instead of offering labor for different farming tasks can combine the use of tools and farming technology with the local community. Smart tools can replace labor for farming tasks, making room for jobs community members are interested in. The community is more inclined to accept tools and farming technologies when they are used to package age-old community traditions in a more relevant manner. The community prefers farming tasks to using tools that merely aim to document or transmit age-old traditions such as the oral traditions. It is essential that there is a result or outcome when the community invests time or effort in performing farming tasks (Mathias & Nyikahadzoi, 2021).

In the agricultural sector, the combination of old farming techniques with modern science-based farming techniques to extend farming practices to the community is very popular. The best example is the combination of improved seeds with organic fertilizers accepted by the local community. The use of community based farming techniques can be effective when combined with modern farming research techniques such as mapping and using appropriate science-based farming methods. There are numerous pathways that have been documented by research based farming systems that support the use of combinations of techniques from different farming practices (Sumberg & Thompson, 2022).

Starting with a small scope to create a small solution based on practical needs instead of overblown tech advancement promises can result in more successful solutions. Given that farm life combines economic needs with the task of feeding the family, working with farmers to develop practical and place-based solutions is likely to be more successful.

2.10 Observations from Norton and some other regions of Zimbabwe.

Although there is not a lot of information that can be used to study Norton, the studies that describe the peripheries such as Mashonaland West can be helpful to create a parallel. In these areas, dense cultivation of small plots is the norm and these plots combine market oriented plants and plants that are for home consumption. In these areas, many farmers rely on their traditional

knowledge to keep the soil healthy and to manage pests without incurring too much cost (Chitapi *et al.*, 2020).

In areas similar to Norton, families usually have a diverse collection of income earning methods. Where access to formal agricultural inputs is restricted or too expensive, crop yields are the result of self-made compost, constructed animal pens, intercropping, and traditional fast growing seeds (Chagonda & Muchapondwa, 2020). The main elements that allow for the persistence of traditional knowledge in these areas are the informal networks of farmers, community savings, and informal seed exchange.

A recent review of Mashonaland West described households relying more on self-made plant-based solutions, farmyard waste, and wood ash when the economic situation worsened and access to commercially available solutions became impossible (Chagonda & Muchapondwa, 2020). In the absence of constant support from agricultural extension officers, the community became the main driver of the adoption and promotion of agricultural practices.

Farmers situated on the edges of cities often suffer from gaps in outreach coverage. Aid and assistance are funneled toward rural villages and large estates, presuming that these areas have quicker access to markets and easier supply chains. Due to these assumptions, those living on the outskirts of cities and small-scale farmers find that they are isolated from official channels and are instead forced to rely on informal networks. In the case of Norton, this explains both the large supply of informal networks and the large supply of local networks. These informal networks contain a great deal of local knowledge, and along with this there is a great deal of potential and desire to work with extension workers (Sibanda *et al.*, 2020).

2.11 Thinking about the methods of past studies

When focusing on indigenous knowledge and local resources, the influence on reach and output is emphasized through careful research design. There is much to be gained from the integration

of a variety of methods during research in order to capture both quantitative and qualitative dimensions that are meaningful to participants of the research.

In terms of local knowledge, observing the day to day activities of participants, developing group discussions, personal accounts, and collaborating with participants to conduct village-wide assessments, bring forth the hidden dimensions of traditional knowledge and the longstanding practices and customs of communities (Chambers, 2019; Sillitoe, 2020).

To start with, quantitative measures can show some elements. Yield numbers and the data collected on investment, in combination with assessments of family finances, can provide insight into the role that local knowledge systems play in increasing returns. When traditional practices and recently developed methods are brought into the same field experiments, the final outcomes gain legitimacy, especially considering that these practices are systematized along with a variety of other practices (Sibanda *et al.*, 2020). Thus, the case for mixed methods research is further strengthened by the integration of these methods.

Additionally, when farmers assist in record keeping and method ratings, their relationship with the process deepens. Findings are then based on the local community rather than outside assumptions. Incorporating farmers turns routine record keeping and method ratings into a process that is more applicable to the community, as the farmers are connected to the process and find meaning in it.

More so, knowledge that is divided by gender must be treated with a gendered approach. Using Indigenous Knowledge, which is often gendered, women may be involved in seed storage and harvesting, while men may be involved in ploughing and planting. Methods will deal with the gendered aspect of the work. Including the planning and reviewing perspectives of women will lead to more correct findings (Phiri *et al*, 2021; AGRITEX, 2022).

Furthermore, as an example of combining all the above, in Norton, multiple methods will be used to capture the social patterns that shape the spreads of Indigenous Knowledge and the differentiated farm outputs and economic results(Ncube, 2020). Figuring what have previous researchers not been studying remains a question. The response is a description of what the current research is. Knowledge traditions in Norton remain flexible and adaptive to new demands of the urban-rural interface, a reality that research in Norton has yet to document.

The true picture is still largely unrecorded. A handful of studies estimate the costs and benefits of indigenous knowledge practices to the peripheries of Zimbabwe's urban centers. The hidden costs and benefits cannot be identified without accounting for the time invested. Real impacts that support policymakers depend on these calculations (Makoni & Gumbo, 2020).

While participatory approaches can be supported, there is still uncertainty regarding the actual embedded indigenous knowledge of agricultural extension activities within the everyday practice of funding, materials, and limited extension resources. It is difficult to document what is adaptable to different circumstances. Unfettered enthusiasm will result in significant variance where some programs adjust staffing and others modify reporting structures without clear objectives. Without an accurate empirical basis, reproducing practices will be an exercise in futility (Ricardo & Thompson, 2022).

Moreover, Young people will determine how certain forms of traditional knowledge change. In rural areas of some developing countries, research is focusing on whether young people appreciate or reject these traditional practices (Agrawal, 2021; Chibaya & Moyo, 2022). Preservation practices without the involvement of these young people may ignore their input and the changes that are unwittingly occurring (Ncube, 2020).

Despite being important, there still not enough evidence to indicate how the indigenous people of Norton adjust to changing weather patterns (Mutenje & Dube, 2024). Nevertheless, knowledge of these adaptations becomes important when developing agricultural systems designed to

sustain environmental stress (Phiri *et al*, 2021; AGRITEX, 2022). Finding methods and strategies to address these challenges would provide valuable direction for extension services, city planning groups and rural development organizations aiming to create supportive and sustainable practice (Chikowo *et al*, 2023)

2.12 Synthesis and relevance to current research.

Reflecting on these writings shows a few practical implications for studying Norton. Participatory practices of the community involve indigenous people, as do traditional signs and collaborations (Musiyiwa & Mhishi, 2021). Meanwhile, different methods develop within and across generations and during these sessions, women set different priorities than men. Recording and observing community practices of change such as plant cycles or animal behavior can be beneficial (Moyo & Nyoni, 2023). Participation illustrates who has knowledge, how they have it, where they have it, and why they have it. It becomes important when it is documented by those who participate in and experience it every day (Chikokwe *et al.*, 2025)

Startin with, evaluating productivity effects requires direct assessment on farms over multiple time periods (Mapfumo *et al*, 2024). The critical factor is the long term consistency, beyond a single season. When assessing the economic results of an initiative, financial factors are important, but not the only important factors. It is equally important to assess the changes in the work load, new market opportunities, and decreased exposure to the vulnerability of shocks (Mutenje & Dube, 2024). A framework that is anchored on smallholder farmers offers a valuable opportunity to connect on-farm and off-farm decisions to the ways households manage their daily needs and their expenditure patterns (Sithole, 2022).

To begin addressing an issue that farmers cite as important, their loss of traditional knowledge, overwork, and the failure of responsive institutions requires intervention for each of these concerns {Makoni & Gumbo, 2020). Extension workers' perspectives also assisted in identifying deeper structural concerns. (AGRITEX, 2022; Chibaya & Moyo, 2022). Thus, because local

knowledge will never fully capture every layer, it must be integrated to identify that which hinders development the most (Mapfumo *et al*., 2023). When field staff also identify gaps and obstacles, it is multi-layered. Thus, the lived experiences of farmers is integrated with the organizational structures.

The collaboratively developed recommendations clearly state that changes and adaptations must value the most pertinent factors for farmers, while also considering the constraints of local systems (Chikokwe *et al.,* 2025). Soon, adaptations will include initiatives like farmer field schools to capture traditional knowledge through onsite experimentation (Musiyiwa & Mhishi, 2021). Rather than the previous large-scale changes, small-scale, localized, and focused adaptations will increase the 'tool-box' of the facilitators with the much needed capacity to collaborate. Action has primacy over theory within this context. If left to the facilitators' daily experiences, these ideas will be more resilient than if they rely on the distant policy frameworks (Phiri *et al.,* 2021). The design will be entirely feasible, as these methods are intended to be implementable immediately. Adapt the structures by learning through practicing the work (Moyo & Nyoni, 2023).

Overall, the role of indigenous knowledge in farming in Norton requires explanation. From the ground, people's opinions reflect patterns missing in the data. The spread of different farming practices relies on one's experience of the practice. Thus the value of listening cannot be overstated (Sithole, 2022). The combination of interviews and questionnaires brings better comprehension of the topic. We view sustainable farming through the lens of local people. There is a slight shift in the definition of evidence when narratives become the focus of the analysis (Mapfumo *et al*., 2024).

2.13 Conclusion.

Locally relevant and indigenous knowledge and resources are of great value to family farmers in Zimbabwe. These traditions create practical options to help local people cope and create adaptive

strategies to deal with shocks, especially when external resources are limited or too expensive. However, if such knowledge is to improve productivity, profitability, and sustainability, then farm advisory services require a higher level of involvement beyond integrating these practices to make them more relevant to the farming communities. This would involve active participation of farmers, training extension workers on the skills necessary for guiding participatory research and documenting results, establishing markets for local products and developing policies that value participatory research and iterative improvement (Moyo & Nyoni, 2023).

A new evaluation of the evidence suggests that valuing Indigenous Knowledge in farming areas outside of cities is important for Norton, but there are still gaps. Less detailed records exist when specific places are referenced. Economic evaluations tend to be more superficial and fail to capture actual implications (Makoni & Gumbo, 2020). Younger farmers and changes in knowledge sharing practices within organizations are other gaps. This document addresses these gaps by mapping locally practiced methods. It assesses the results of these methods in both farming and financial outcomes. Barriers to the adoption of these farming methods are identified through the perspectives from farmers and outreach workers. From this, practical methods are developed to incorporate Indigenous Knowledge more actively in advisory services.

This work indicates that imagination, creativity, and everyday experience of farmers are invaluable to the early and sustained adoption of knowledge. Trust and collaboration enable the spread of innovations. Simply focusing on an endpoint is insufficient for determining the full potential of a knowledge system. This work places emphasis on the opinions of farmers and revealed that the combination of Indigenous Knowledge and formal extension services in Norton and other areas of Zimbabwe have the potential to improve the livelihoods of farmers and increase the adaptability of farming systems (Musiyiwa & Mhishi, 2021).

CHAPTER 3: RESEARCH METHODOLOGY.

3.0 INTRODUCTION.

This chapter focuses on the procedures used for the fieldwork to evaluate the impact of local knowledge on agricultural extension service in Ward 7 of Norton, Chegutu District, Zimbabwe. It examines issues such as management of pests, soil fertility, seed diversity, and water management, among other concerns farmers face. It presents the research methodology, study location, sampling procedures, data collection methods, and data analysis. Furthermore, it describes the mechanisms put in place to uphold the ethical standards of the research.

This study adopted a mixed-methods approach, integrating both quantitative and qualitative methods. This type of framework provided flexibility and an in-depth understanding of the relationship between indigenous knowledge and agricultural extension services, as well as insight into the services that farmers utilize.

Norton is located in the Chegutu District, Mashonaland West Province, and is classified as being in Natural Region 2b. The location has a moderate to good rainfall and supports the cultivation of maize, vegetables and the growing of small livestock. However, dry spells can have a detrimental effect on productivity in the region (Mambo & Nangombe, 2023; Nyamadzawo *et al*., 2022).

3.1 DESCRIPTION OF THE STUDY AREA.

This study centers on Norton, which encompasses communal lands, small-scale commercial farms, and peri-urban areas. The majority of the households are smallholder farmers that practice a mixed cropping system along with small livestock farming. The farmers of this region practice a hybrid of indigenous and modern farming methods to manage soil fertility, pests, water, and the selection of seed varieties and other factors relevant to their farming context (Chagonda *et al*., 2021, Moyo *et al.,* 2020).

Norton was selected as a study site because it has many smallholder farmers who frequently contact extension services. Semi-intensive farming in Zimbabwe makes use of indigenous knowledge regarding farming decisions. The study site is shown in the image bellow (Figure 2)



Fig 2: Map of Zimbabwe highlighting location of ward 7 of Norton.

Source: ResearchGate, Zimbabwe

3.2 Research Design.

This study implemented a sophisticated mixed-methods design. Quantitative and qualitative data were analyzed separately, then interpreted together. This design provided the study with measurable outcomes in addition to the experiences of the farmers and offered insight into the adoption of indigenous knowledge and its influence on extension services.

3.2.1 Quantitative Approach.

This study utilized a quantitative approach to collect data from 120 smallholder farmers using structured questionnaires. Data on social demographics, farming, and the extent of the adoption of indigenous knowledge was captured. This offered the study the opportunity to discover the extent of adoption and the factors affecting it.

3.2.2 Qualitative Approach.

This study employed semi-structured interviews in combination with FGDs to capture the benefits and barriers to the adoption of Indigenous knowledge and extension integration, and the integration strategies. This study investigated a sample 120 households with 25 key informants, including 13 farmers, 4 extension workers, and 8 community elders.

The mixed-method approach evaluated the phenomenon from two angles, the quantitative and the qualitative. This approach was validated by comparing patterns and lived experiences and thus ensured community and household participation (Phiri *et al.*, 2021).

3.3 Data Collection Methods.

The methods of data collection designed for each of the research objectives, incorporated a range of methods from questionnaires to focus groups and observations, to capture both quantitative and qualitative data. These methods are summarized in Table 1 below.

Table 1: Data Collection for Specific Research Objectives.

Specific Research Objective	**Data concepts/ variables or indicators**	**Data collection methods/tools**	**Respondents/Subjects**
1. To describe the indigenous knowledge systems used by farmers in	• Types of practices; Soil fertility, pest control, seed diversity, water	• Questionnaires, focus group discussions, key informant	• 120 households, 25 key informants, 3

ward 7 of Norton	management.	interviews, observation checklist.	focus group discussions.
2. To describe the levels and types of indigenous knowledge in farming in ward 7 of Norton.	• IKAI score; Social demographic factors such as age, gender, education, and farming experience.	• Questionnaires, focus group discussions, observation checklists.	• 120 households, 25 key informants, 3 focus group discussions.
3. To analyze the ways of combining indigenous knowledge with agricultural extension services in ward 7 of Norton.	• Frequency of hybrid practices (for example, combining manure with synthetic fertilizer), farmers' perception of integration.	• Questionnaires, focus group discussions and Interviews	• 120 households, 25 key informants, 3 focus group discussions.
4.To identify the barriers faced by farmers in ward 7 of Norton in utilizing indigenous knowledge and integrated extension services.	• Reported challenges; limited inputs, inadequate training, institutional constraints.	• Focus group discussions, interviews, and observation checklists.	• 25 key informants, 3 focus group discussions.
5.To propose methods to facilitate the	• Suggested improvements: training, policy	• Focus group discussions, interviews,	• 25 key informants, 3 focus group

integration of indigenous knowledge and extension services in ward 7 of Norton	support, integration with extension services.	Participatory ranking exercise.	discussions.

Source: Modified from data collection methods used for collecting primary data**.**

3.3.1 Data Collection Procedures:

Sampling and Sample Size

A purposive and stratified sampling method was adopted, creating diverse groups of male and female headed households of varying ages and farming experience. The key informants were selected purposively for their knowledge and engagement in Extension services and Indigenous Knowledge practices. The method offered data that was representative and selected based on expertise.

An embedded case study design was adopted with the smallholder farmers in ward 7 area of Norton as the primary case. It offered a close examination of the direct role Indigenous Knowledge plays in Extension delivery and the influence of the socio-economic and environmental dimensions of farming (Mujeyi, 2022). The study was limited in its scope by its geographic focus (Norton), its focus on smallholder farmers (population) and its focus on the role of Indigenous Knowledge in Extension services (thematic focus).

- ***Household survey***: Farmers engaged in active farming and practicing Indigenous farming methods were purposefully sampled (N=120). This method of sampling enabled the representation of varied social demographic groups and farming experience and provided gender equity.

- ***Key Informants***: The sample for the deep interviews was purposive and consisted of farmers, Extension workers and community elders (N=25). They were selected for their community expertise and leadership.

Focus Group Discussions (FGD)

Three FGDs, each with 10-member sample, were conducted. Groups were formed based on gender and age. This ensured the knowledge and insights shared across generations was captured, and gender priorities were addressed. The groups shared their insights on the different constructs as per the objectives of the study, including pest management, soil fertility, and the combination of local knowledge with extension services (Musiyiwa & Mhishi, 2021; Sithole, 2022).

3.3.2 Data Collection Instruments (Measurement Techniques)

Structured Questionnaires:

This was a survey created to obtain demographic information, years in farming, and use of indigenous knowledge. It consisted of closed questions, e.g. a Likert scale, and open questions.

Semi-Structured Interviews:

This captured the use of indigenous knowledge for extension services and the related challenges and opportunities. The focus of the interviews was on the different elements of training, advisory services, and modern agriculture.

Focus Group Discussions:

This promoted and supported participation in the community to discuss intergenerational knowledge transfer, gender, and the community presenting their solutions.

Observation Checklists:

This captured the use of indigenous knowledge as related to the application of dung/manure, pest control, selection of seeds, and the management of water. It also verified the use of practices from the questionnaires.

Strengths and Limitations of the Methodology

- ***Strengths:*** The use of a mixed-method strategy offered not only the quantitative element but also the qualitative element to describe the data. The age- and gender-focused observations also verified the use of questionnaires.

- ***Limitations***: With purposive sampling, used in this study, generalizability of the information may be limited. For this study, some participants may have over reported the degree of their adoption of indigenous practices due to social appeal preference. Also, the time bounds of this study limited the number of focus group discussions.

3.3.3 Variables of the Study.

The table below lists the dependent, independent, and control variables, the methods of measuring the variables, and specifies the type of data presented (Table 2).

Table 2: Variables and Indicators.

Variable Type	Variable	Description	Remarks
Dependent	• Level of indigenous knowledge use (IKAI).	• Measures household adoption of indigenous practices,	• Measured using a structured index; ranges 0-12
Independent	• Education level	• Years of	• Self-reported

	(X1)	schooling of household heads.	by household head
Independent	• Access to extension services (X2)	• 1 = Yes • 0 = No	• Obtained via questionnaire
Independent	• Farming experience(X3)	• Number of years in farming.	• Continuous variable in years.
Independent	• Training participation (X4)	• 1 = Participated. • 0 = Not participated.	• Includes workshops, farmer field schools.
Independent	• Perceived usefulness of indigenous practices (X5)	• Likert scale 1- 5 (1=not useful, 5=very useful)	• Subjective rating by respondent.
Control	• Gender of household head.	• Male/Female	• Self-reported
Control	• Household size	• Number of members	• Continuous variable
Control	• Primary crops cultivated	• List of main crops.	• For background and comparative analysis

Source: Modified from variables and indicators of the study.

3.3.4 Types of Data:

- ***Primary Data*:** Questionnaire responses, key informant interviews, focus group discussions, and field observations.
- ***Secondary Data*:** Published literature, government extension reports, and previous studies on indigenous knowledge (AGRITEX, 2022; Mapfumo *et al*., 2023)

3.4 Data Analysis Methods.

Data collection took place over the course of 6 weeks and involved the use of questionnaires in the format of face-to-face interviews to improve both response clarity and response completeness. The focus group discussions and interviews were recorded and, after receiving the participants' consent, were transcribed and coded for analysis. Other data collection methods included the use of photographs and the notebook to describe the self-reported activities of the participants. This method of data collection was intended to strengthen the triangulation of data and to reduce the reporting bias (Chikowo *et al*., 2023).

The data collected for this study was analyzed with care and caution in relation to the particular research aims and objectives. The integration of both quantitative and qualitative techniques and methods was to facilitate the study of the extent to which indigenous knowledge is incorporated into, and the influence it may have, on the agricultural extension services. The table presented below also shows the various methods of data analysis in relation to the particular research aims and objectives (Table 3).

Table 3: Data Analysis Methods for Specific Research Objectives.

Specific Research Objective	**Hypothesis /Theory/ Concepts.**	**Variables / Indicators**	**Data Analysis Tools**
1. To describe the indigenous knowledge	• Indigenous knowledge Adoption.	• Types of practices; ➢ Soil fertility,	• Descriptive statistics(frequency,

systems used by farmers of ward 7 in Norton	• Theory: Diffusion of innovations.	pest control, seed diversity, water management.	percentage), Thematic analysis (focus group discussions &interviews)
2. To describe the levels and types of indigenous knowledge in farming of ward 7 in Norton.	• Indigenous knowledge Adoption Index (IKAI), Adoption Theory.	• IKAI score; Social demographic factors such as age, gender, education, and farming experience.	• IKAI calculations, descriptive statistics (mean, standard deviation, tables), charts, graphs.
3. To analyse the ways of combining indigenous knowledge with agricultural extension services of ward 7 in Norton.	• Complementarity Theory; Integrated Knowledge Systems.	• Frequency of hybrid practices (for example, combining manure with synthetic fertilizer), farmers' perception of integration.	• Descriptive statistics, thematic analysis of interviews and focus group discussions.
4. To identify the barriers faced by farmers of ward 7 in Norton in utilizing indigenous	• Barriers to Adoption Theory; Social Ecological Systems.	• Reported challenges; limited inputs, inadequate training, institutional constraints.	• Thematic analysis (interviews and FGDs), NVivo coding.

knowledge and integrated extension services.			
5.To propose methods to facilitate the integration of indigenous knowledge and extension services of ward 7 in Norton	• Participatory Development Theory; Community based Approach.	• Suggested improvements: training, policy support, integration with extension services.	• Regression analysis, thematic analysis, getting familiar with themes.

Source: Modified from data analysis methods for research objectives.

3.4.1 Measurement of Indigenous Knowledge Use

An Indigenous Knowledge Adoption Index (IKAI) was constructed based on four key domains which is, pest management, soil fertility management, seed diversity, and water management. Scoring ranged from 0 (not used) to 3 (regularly used) per domain, yielding a maximum possible score of 12. Households were categorized as shown by the table below (Table 4)

Table 4: Indigenous Knowledge Adoption Index.

IKAI Score Range	**Interpretation**
0 – 5	• Very low
4 – 6	• Low
7 – 9	• Moderate
10 – 12	• High

An Indigenous Knowledge Adoption Index (IKAI) was calculated by scoring each household based on their use of traditional pest control, soil fertility, water management, and seed selection practices.

Multiple regression was used to find the factors influencing the use of indigenous knowledge in extension delivery including educational level, farming experience, access to extension, training participation, and perceived usefulness (Chikanya *et al*., 2022). The following regression equation was used;

- **$Yi = \beta 0 + \beta 1*X1i + \beta 2*X2i + \beta 3*X3i + \ldots + \beta k*Xki + \varepsilon i.$**

Where:

- **Yi** = Level of indigenous knowledge use in extension delivery for household i
- **β0** = Intercept
- **X1 ... Xk** = Independent variables (e.g., farmer education, access to extension, years of farming experience, adoption of indigenous practices)
- **εi** = Error term.

3.4.2 Justification for Selection of Methods.

Objectives 1 & 2:

Descriptive statistics and thematic analysis create concise summaries of methods and integration patterns. They also capture context and motivations, so they were selected for this purpose.

Objective 2:

The Indigenous Knowledge Adoption Index (IKAI) and cross-tabulations were selected, as they measure adoption and reveal patterns in a way that maintains simplicity for ease of understanding in terms of household level variability.

Objectives 4 & 5:

Challenges and Improvements: Thematic analysis for challenges and improvements was preferred to quantitative methods because challenges and solutions are context-specific and complex, requiring deep understanding, which participatory ranking provides.

Thematic analysis focused on the perceptions of extension services, the effectiveness of the indigenous practices, the challenges of integrating traditional knowledge, and the provision of formal institutional support. Triangulation of quantitative and qualitative data was employed to enhance validity and provide an all-encompassing understanding of the research objectives (Chikanya *et al.,* 2022; Mutenje & Dube, 2024).

3.5 Ethical Consideration and Limitations

Ethical clearance was obtained from the Bindura University of Science Education Research Ethics Committee. During the study, participants were assured that their informed consent was obtained and they could withdraw from the study at any time without any consequences. Their privacy was upheld, and all data were de-identified.

3.5.1 Limitations

All research designs and methodologies comprise some limitations. In this study, one of the clear drawbacks was using a purposive sample. Due to this, the findings of the study may be confined to the limitations of ward 7 area of Norton and be inapplicable beyond the city. Some of the responses may have also been affected by the social desirability bias. This is because some of the respondents may have overstated or understated their engagement with the indigenous practices. The focus of the study was also affected by time, as there was a limit to the number of group discussions scheduled. This implies that some views may have been left out. The combination of other research methods such as the use of questionnaires, focus group discussions, interviews and observations, mitigated the drawbacks and improved the reliability of the results.

3.5.2 Chapter Summary

The current chapter describes the methodological framework of the research carried out on indigenous knowledge and extension services in Norton. The framework makes use of a mixed approach which integrates the use of surveys, interviewing, and observation to understand the integration of indigenous knowledge and extension services. This section has also described the sampling methods, data collection, and analysis methods, as well as the steps taken to address ethical concerns. The framework also provides a basis for the analyses and discussions that follow in the subsequent chapter.

CHAPTER 4: RESULTS AND DISCUSSION

4.0 INTRODUCTION

The current chapter describes the findings of the impact of indigenous knowledge on extension services in Norton, Chegutu District, Zimbabwe. Primary data was collected using questionnaires and targeted a total of 120 smallholder farming households in Ward 7 of Norton. The findings have also been enriched by the observations and informal discussions that targeted a total of 25 key respondents that included: 13 farmers, 4 extension officers, and 8 village elders. Given the objectives of the research, the results have been presented in a manner that allows for the analysis of the data through the use of descriptive statistics as well as comparative analysis, as discussed in the previous chapter.

4.1 Presentation of Results

Through a range of basic statistical methods, a unique score termed as the Indigenous Knowledge Adoption Index (IKAI), and multiple regression analysis, numbers were examined to see which among these were most significant in explaining the role of indigenous knowledge in extension service uptake. Numbers were given life by people's narratives, providing a spatial-

temporal context and filling gaps and providing thickness where enumeration alone was not sufficient.

4.1.1 Socio-Demographic Attributes of Respondents.

63% of the sampled 120 households were headed by women, while the remaining by men. The mean age of householders was 47.6 Years (SD=11.3). Most householders were between 36 and 55 years, making up 58% of the total. 72% had attained primary while 18% and 10% had secondary and tertiary respectively. The mean years of farming experience was 18.7. This data is displayed clearly in the table below. (Table 5)

Table 5: Socio-demographic characteristics of surveyed households (N = 120)

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	44	36.7
	Female	76	63.3
Age (years)	≤ 35	19	15.8
	36 – 55	70	58.3
	≥56	31	25.8
Educational level	No formal education	12	10.0
	Primary	86	71.7
	Secondary	18	15.0
	Tertiary	4	3.3
Farming experience (years)	≤ 10	32	26.7
	11-20	41	34.2
	≥ 21	47	39.1

Source: Primary Data (2026)

4.1.2 Levels and Patterns of Indigenous Knowledge Use.

An Indigenous Knowledge Adoption Index (IKAI) was used constructed based on four key factors, pest management, soil fertility management, seed diversity and water management. Each factor was scored from 0 (not used) to 3 (regularly used), making a maximum possible score of

12.The IKAI scores ranged from 2 to 12 with a mean of 8.21 (SD=2.31). This shows a moderately high of indigenous knowledge use among farmers in Norton, Chegutu District Zimbabwe. Interpretation of the IKAI scores is shown by the table below (table 6).

Table 6: Distribution of IKAI scores among households (N=120)

IKAI Score Range	Frequency	Percentage (%)	Interpretation
0 – 3	4	3.3	Very low
4 – 6	18	15.0	Low
7 – 9	62	51.7	Moderate
10 – 12	36	30.0	High
Total	**120**	**100.0**	

Mean IKAI = 8.21 Standard Deviation = 2.31 Minimum = 2 Maximum = 1

4.1.2 Qualitative Findings.

Thematic Analysis (Focus Group Discussions & interviews)

Focus group discussions and interviews with farmers, extension officers and community elders revealed five major themes displayed below in (Figure 3).

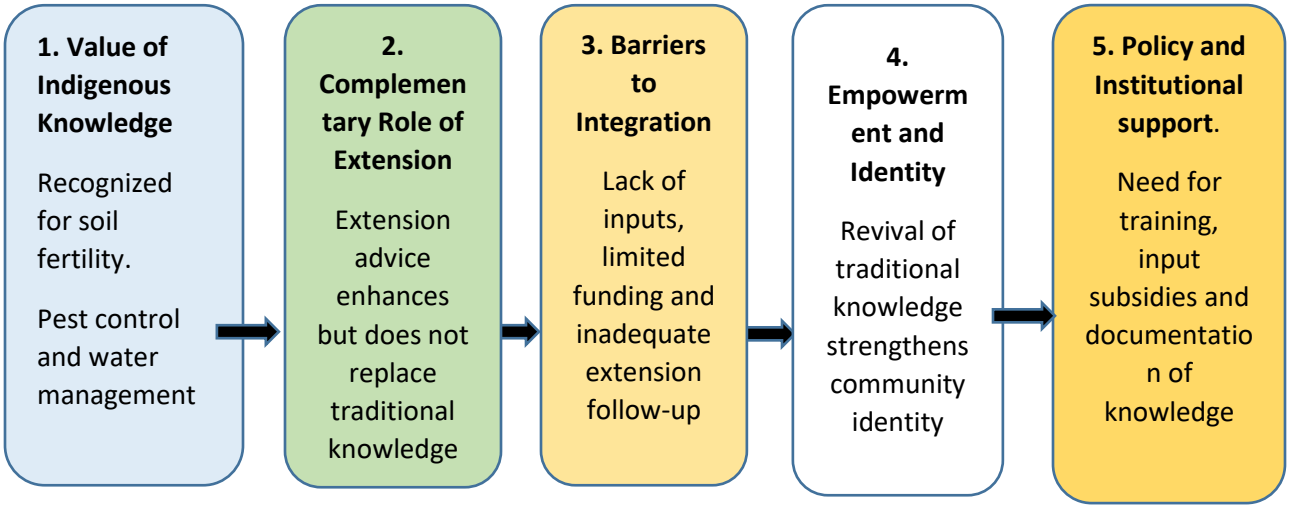


Figure 3: Thematic Analysis (Focus Group Discussions & interviews)

Source: Primary Data (2026)

Figure: 4 below indicates the proportion of households using specific indigenous knowledge in Norton, Zimbabwe.

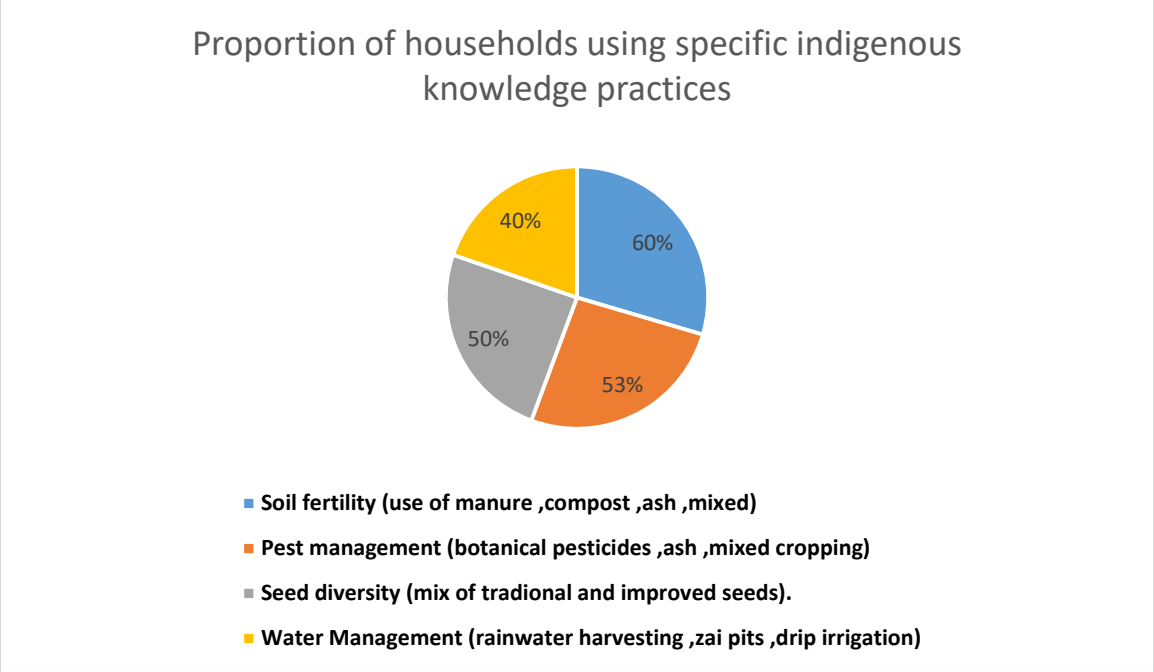


Figure 4: Proportion of households using specific indigenous practices**.**

Source: Primary Data (2026)

This figure indicates that the majority of farmers use indigenous knowledge for soil fertility (60%) and pest management (53%), while seed diversity (50%) and water management (40%) are also widely practised.

4.1.3 Integration of Indigenous Knowledge and Extension Service.

Farmers confirmed that they combine indigenous knowledge with modern inputs and technologies for better productivity and resilience. The following (table 7) summarises the most common integration practices.

Table 7: Integration practices used by households (N=120)

INTERGRATION PRACTICE	**FREQUENCY**	**PERCENTAGE (%)**
Mixing manure with synthetic fertilizer.	72	60.0
Half hybrid and half traditional seeds'	60	50.0
Use of botanical pesticides before chemicals.	64	53.3
Rainwater harvesting + drip irrigation.	48	40.0
Use of compost + mineral fertilizers.	68	56.7

Source: Primary Data (Primary Data)

These findings/data confirm that farmers adopt hybridity approach, mixing traditional and modern methods to enhance productivity, reduce costs and maintain environmental sustainability. Highlighting the influencing effect of indigenous knowledge on extension delivery.

4.1.4 Factors Influencing the Use of Indigenous Knowledge in Extension Delivery.

Multiple Regression Analysis.

A multiple regression analysis was conducted to determine the factors that influence the level of indigenous knowledge use in extension delivery in Norton, Chegutu District Zimbabwe. The dependant variable was the Indigenous Knowledge Adoption Index (IKAI) (Galton ,1886).

Equation of the model:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e_i$$

Where:

Y_i = Level of indigenous knowledge use in extension delivery (IKAI for household i).

X_1 = Educational level of famers (household in years).

X_2 = Access to extension services (1=Yes, 0=NO)

X_3 = Years of farming experience.

X_4 = Participation in farmer training (1=Yes , 0=No)

X_5 = Perceived usefulness of indigenous practices (1-5 Likert Scale).

e_i = Error term.

The following Table 8 indicates results obtained from the multiple regression analysis.

Table 8: Multiple regression results (N = 120).

Independent Variable	Coefficient (β)	Std. Error	t-value	p-value	Interpretation
Constant	1.245	1.102	1.13	0.261	…….

Education level (X_1)	0.132	0.045	2.93	0.0004	**Significant (+)**
Access to extension (X_2)	0.876	0.231	3.79	0.0000	**Significant(+)**
Farming experience (X_3)	0.041	0.018	2.28	0.025	**Significant(+)**
Training participation (X_4)	0.563	0.221	2.55	0.012	**Significant(+)**
Perceived usefulness (X_5)	0.688	0.117	5.88	0.000	**Significant(+)**

R = 0.782 R^2 **= 0.6** **Adjusted R^3 = 0.993** **F (5.114) = 35.72** $p < 0.001$

Source: Primary Data (2026)

The model accounts for 59.3% of the variation of the indigenous knowledge use for the households. The indigenous knowledge adoption index (IKAI) positively and significantly relates to the use of extension services, the perceived benefit of indigenous practices, education, farming experience, and participation in training.

4.2 Interpretation and Discussion.

4.2.1 Social Demographic Characteristic of Respondents.

The social demographic profile of respondents demonstrates the importance of women in smallholder agriculture in Norton. In this study, female headed households were 63.3%, while male headed households were 36.7%. This is a common phenomenon in Zimbabwean households and most rural African households, where women tend to be the primary holders of

farming knowledge and the main managers of everyday agriculture (Chagonda, 2017; Mapfumo *et al.*, 2018). The distribution of age also shows that the majority of household heads (58.3%) were in the age group of 36 to 55. They were followed by the under 35 years' age group (15.8%) and those aged 56 and above (25.8%). This points to the theory that indigenous knowledge is acquired through lived experience, observation, and inter-generational transmission, as opposed to formal teaching. Experience is coupled with farming, with 26.7% of respondents indicating that they had less than ten years of farming, while 34.2% had 11 to 20 years, and 39.1% had 21 years and over. The wide range of experience enhances awareness of prevailing farming conditions, as well as knowledge of seasonal variations and working methods that have proven reliable and effective over the years.

Education levels suggest further insights. Respondents with primary, secondary, or no formal education made up 71.7%, 15%, and 10% respectively, with tertiary training respondents accounting for 3.3% of the population. These statistics illustrate that the predominant formal schooling level of the respondents is primary, with secondary schooling respondents making up a small percentage. Because of these statistics, we can assume that the majority of respondents are primary school leavers, or in some instances, illiterate, and that the majority of indigenous knowledge is applied and preserved by farmers with little formal education. Even so, formal education somehow helps lagging farmers in the integration of modern farming practices. This is similar to the findings in the studies of (Moyo *et al*., 2019; Nyanga *et al.*, 2016) which concluded that farmers with higher education are in better positions to adopt hybrid practices of farming, which incorporates modern as well as traditional farming practices.

4.2.2 Level and Pattern of Indigenous Knowledge Use.

The Adoption Index of Indigenous Knowledge (IKAI) used to assess the application of indigenous knowledge in the areas of soil fertility, pest management, seed diversity, and water management showed an average score of 8.21 (SD = 2.31). Most respondents reported that farmers moderately rely on indigenous knowledge (51.7% scored between 7 and 9), and 30% of farmers scored between 10 and 12, indicating a high level of indigenous knowledge use. 15% of respondents scored between 4 and 6, indicating a low level of indigenous knowledge use, and only 3.3% of respondents scored between 0 and 3, indicating a very low level of use. These

results indicate that indigenous knowledge is of primary importance of farming in Norton, which is in line with the findings of Chagonda (2017) and Agrawal (2021) which found that in most smallholder farming areas, where modern farming resources (extension services) are limited, the use of traditional farming methods is predominant.

Analysing specific activities, half of the respondents said they used traditional soil fertility management practices of composting, manure application, crop rotation, etc. It was also noted that 53% adopted indigenous pest management practices such as the use of botanical pesticides and application of ash. Also, 50% of farmers practiced seed diversity, which included both traditional and improved seed varieties. Lastly, 40% managed water through rainwater harvesting, zai pits, and drip irrigation. These findings supported the study by Mapfumo *et al.* (2022) where such practices were common among communal farmers in Zimbabwe, and highlighted their importance in building resilience and sustainable production. The continued prevalence of such practices also demonstrates the flexibility and practicality of the indigenous knowledge systems among the farming communities in Norton.

4.2.3 Integration of Indigenous and Extension Advise/Practice

The most notable finding in the study was how much farmers, in general, combined both indigenous and extension modern practices. For instance, 60% of respondents demonstrated a combination of both manure and synthetic fertilizers while 53.3% used botanical pesticides and later used chemicals, while 50% engaged in the use of mixed seed. Also, 40% of farmers combined rainwater harvesting with drip irrigation while 56.7% applied a combination of compost and mineral fertilizers. Such knowledge systems incorporation is indicative of the (practical hybridization) concept of African smallholder farmers (Munyati *et al*., 2017; Chagonda, 2023). In this instance, the integration of modern and indigenous practices can enhance farmer productivity while reducing the negative impact on the environment, as traditional systems are more dynamic to emerging technologies.

4.2.4 Factors Influencing the Use of Indigenous Knowledge

Regression analysis shed new light on the use of indigenous knowledge and the associated factors. The positive association of Education ($\beta = 0.132$, $p = 0.004$) indicated that the higher the education levels, the more likely the workers are to combine modern extension practices with indigenous practices. The most significant positive predictor of integrating indigenous knowledge was the availability of extension services ($\beta = 0.876$, $p < 0.001$). There were positive associations of farming experience ($\beta = 0.041$, $p = 0.025$) and participation in training ($\beta = 0.563$, $p = 0.012$) on the use of indigenous knowledge. The use of indigenous practices was positively influenced by the farmers' perception of the usefulness of indigenous practices ($\beta = 0.688$, $p < 0.001$) and the other personal and institutional factors that were included in the study. Effectively, the model accounted for 59.3% of the variations in the use of indigenous knowledge, with the Adjusted $R^2 = 0.993$. The findings by Nyanga *et al.* (2022) and Mapfumo *et al*. (2018) are supported by the findings of this study as they emphasized the role of extension services, experience and training in enhancing traditional agriculture methods.

4.2.5 Qualitative Findings (Thematic Analysis)

Qualitative data enhanced understanding of indigenous knowledge with respect to additional contextual and cultural dimensions. Analyzing data from interviews and focus group discussions revealed five prominent features. First, indigenous knowledge was seen to contribute to fertility of soil, control of pests and conservation of water. Second, extension services were seen to augment traditional practices without any substitution. Third, inadequate inputs, insufficient follow-up and limited funding were seen to constrain wider practice. Fourth, social cohesion and self-confidence of the farmers were seen to relate to the sense of community and self-empowerment. Finally, respondents voiced the necessity of policy and institutional backing to record, bear with, and promote these practices. These features are in line with the existing literature that identifies social, cultural, and institutional dimensions as crucial to the application of indigenous knowledge (Nyanga 2023; Moyo *et al*. 2019).

CHAPTER 5: Conclusions and Recommendations.

5.0 Introduction.

The purpose of this research was to analyse Indigenous knowledge (IK) and its impact on agricultural extension delivery systems in ward 7 of Norton, Chegutu District, Zimbabwe. The study employed mixed methods with quantitative surveys and structured qualitative interviews. Surveys were issued to 120 smallholder farmers, and qualitative interviews were conducted with 25 key informants (extension officers, farmers, and community elders). The study analysed the 'how and why' of the application of IK, integration with extension services, and the influence of socio-demographic and institutional factors. The study demonstrates that traditional knowledge continues to play a critical role in local farming, extension services and has a great potential to enhance the resilience of farming communities by improving the extension services' productivity and sustainability.

5.2 Conclusions.

5.2.1 Indigenous knowledge used by Farmers

Farmers in Ward 7 of Norton use indigenous knowledge on soil fertility and pest control. They rely on methods like composting, intercropping and using natural pest control methods. This confirms the relevance of traditional practices to extension work in Norton.

5.2.2 Combining traditional and modern methods

There exists a hybrid farming approach, as many households integrate both traditional and modern extension methods. This gives them opportunity to benefit from both local wisdom and modern scientific advice leading to improved production and adaptive capability. Hybrid farming approach has been known worldwide as best farming practice in viable agronomic growth.

5.2.3 Factors inducing use of local or native knowledge

Education, extension services, perceived benefits, farming experience, and training are the key factors of indigenous knowledge use, according to regression analysis. This shows that knowledge factors and institutional factors are both important.

5.2.4 Obstacles in Integration of Indigenous knowledge in extension delivery in Norton

The IKAI scores show adoption of indigenous practices is moderate to high among most households, demonstrating that indigenous practices are vital in the farming activities of the residents of ward 7 of Norton, Chegutu District. However, there challenges such as limited recognition in extension advice and low access to extension workers that halts integration of local wisdom into extension programs. Therefore, it is vital that new policies and programs are designed for Norton, which integrate not only modern agriculture, but also training on local indigenous practices.

5.2.5 Importance of Local wisdom in viable Agriculture.

Indigenous knowledge in Norton (Ward 7) is a farming practice and a way to boost cultural confidence among the people and strengthen cohesion in the farming community. Overall, it is crucial in Norton for agricultural extension delivery. Enhanced by education and training, along with modern extension practices, Indigenous knowledge fosters improved productivity and sustainability. Integration of Indigenous knowledge in future extension practices creates culturally adaptable and ecologically sustainable farming systems.

5.2.6 Overall Conclusion.

Findings from this study demonstrated that indigenous knowledge proved to be beneficial beyond short-term gains in the agricultural sector. Combining extension services with traditional practices creates the opportunity for farmers to boost yields, enhance soil health, manage pests, and conserve water while reducing expensive agricultural inputs. Munyati *et al*. (2017) argued that indigenous knowledge is as important as modern scientific knowledge. This study substantiates that indigenous knowledge should be seen as complementary.

5.2.7 Limitations of the Conclusions.

The conclusions have their own limitations, despite being valuable. They are based from a sample size consisted of 120 households in Ward 7, which does not speak to the different

practices across Norton. The data was self-reported and can be prone to a lot of bias. They are also focused on only 4 segments of the indigenous knowledge construct and can be missing other practices. Nevertheless, despite the limitations, they indicate significant potential for leveraging indigenous knowledge in smallholder farming systems, and provides opportunities for policy and practical interventions.

5.3 Recommendations.

5.3.1 Comprehensive Strategy Frameworks

Agricultural strategies and policy frameworks should consider local wisdom as fragment of agronomic programs. Integration of indigenous knowledge in training programs, farmer field schools and works shows respect for traditional ways of farming and ensures that they are functional along with modern extension methods.

5.3.2 Training and Education

Constant teachings that combines modern ways with local wisdom should be offered to farmers through workshops, field demonstrations and knowledge sharing platforms to enable the practical use of indigenous knowledge in agricultural production.

5.3.3 Formal Support

Platforms should be provided by agricultural bodies for detailing and sharing indigenous knowledge. Knowledge sharing can be encouraged through mentorship programs among community elders and young farmers in ward 7 of Norton.

5.3.4 Community Arrangement.

Local discussion about agricultural improvements should be led by local community members. Farmers' cooperatives and farmer field schools can improve information sharing, helps coming up with viable solutions and increase the adoption rate of agricultural extension programs. Farmers feel more in control opens up for new scientific ideas from extension programs.

5.3.5 Recommendations for future research

Similar studies should be conducted in other districts and provinces throughout the country where this research could not cover due to financial restrains and limited time. This helps to assess whether the effects witnessed in ward 7 of Norton are consistent in different agricultural and social cultural backgrounds. Increasing the geographical range of research offers a wider understanding of how local wisdom can be thoroughly integrated into extension delivery services nationwide

Overall, from this research, several action points are suggested. These include incorporating indigenous knowledge in advisory programs provided by extension services and demonstrating new ways to integrate tradition with modernity. Farmer field schools, demonstration plots, and peer-to-peer learning networks build capacity and support the use of indigenous knowledge. Input subsidies and formal recognition of indigenous practices in national policy and framework for agriculture would support the use of indigenous knowledge. There are no limits to what can be studied next.

5.3.6 Final Remarks

Indigenous knowledge will always be critical to smallholder farming in Norton. When combined with extension services, indigenous knowledge enhances agricultural productivity, environmental sustainability, and community cohesion. Its importance and existence should be acknowledged by policymakers, extension officers, and researchers. Indigenous knowledge should be institutionalized and policy-embedded. This will allow indigenous knowledge to continue dominating the agricultural development in Ward 7 of Norton, the Chegutu District in Zimbabwe, and the rest of the country. In this way, both the practical and the cultural advantages of indigenous knowledge will be preserved for the benefit of the coming generations.

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APPENDIX

QUESTIONAIRE, INTERVIEW AND FOCUS GROUP DISCUSSION GUIDE

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Faculty of Agricultural and Environmental Science

Department of Agricultural Economics, Education and Extension

HOUSEHOLD QUESTIONNAIRE

Research Topic:

Effects of Indigenous Knowledge on Extension Delivery in ward 7 of Norton.

INSTRUCTIONS TO RESPONDENTS

This questionnaire is designed to gather information on the effects indigenous knowledge on extension delivery in ward 7 of Norton. Your honest responses are vital to the success of this study. Please note the following:

- This questionnaire is strictly for academic purposes and all responses will be treated with the strictest confidentiality.
- Do NOT write your name anywhere on this questionnaire.
- Please tick (x) the box that best describes your situation.
- Please answer ALL questions as honestly as possible. There are no right or wrong answers.

SECTION A: Demographic Information

Gender
☐ Male ☐ Female ☐ Prefer not to say

Age group
☐ Below 20 ☐ 21–30 ☐ 31–40 ☐ 41–50 ☐ Above 50

Farming experience
☐ 0–5 years ☐ 6–10 ☐ 11–20 ☐ Above 20

Type of farming
☐ Crop ☐ Livestock ☐ Mixed

SECTION B: Indigenous and Contemporary Farming Methods

Do you use indigenous (traditional) farming methods?
☐ **Yes** ☐ **No**

Do you use modern farming methods (fertilizers, improved seeds, chemicals)?
☐ **Yes** ☐ **No**

How would you describe your farming approach?
☐ Mostly traditional
☐ Mostly modern
☐ A combination of both

Which indigenous practices do you use? (Select all that apply)
☐ Manure application
☐ Ash/plant-based pest control
☐ Mixed cropping
☐ Rainwater harvesting
☐ Other: _____

Which modern practices do you use?
☐ Chemical fertilizers
☐ Improved seed varieties
☐ Pesticides/herbicides
☐ Irrigation systems
☐ Other: _____

SECTION C: Integration of Indigenous and Modern Methods

Do you combine indigenous and modern farming methods?
☐ Yes ☐ No

If yes, which combinations do you use? (Tick all that apply)

Practice	Yes	No
Mixing manure with synthetic fertilizers	☐	☐
Growing hybrid and traditional seeds together	☐	☐
Using indigenous pest control with chemicals	☐	☐
Combining rainwater harvesting with irrigation	☐	☐

Why do you combine these methods?
☐ Reduce costs
☐ Improve soil fertility
☐ Increase yields
☐ Reduce environmental damage
☐ Adapt to climate change
☐ Other: _____

SECTION D: Effects on Farming Outcomes

(1 = Strongly Disagree, 5 = Strongly Agree)

Statement	1	2	3	4	5
Combining methods improves soil fertility	☐	☐	☐	☐	☐
It increases crop yields	☐	☐	☐	☐	☐
It reduces farming costs	☐	☐	☐	☐	☐
It improves resilience to drought and climate change	☐	☐	☐	☐	☐
It reduces environmental damage	☐	☐	☐	☐	☐

SECTION E: Pest, Soil, Seed, and Water Management

How do you manage soil fertility?
☐ Organic only ☐ Chemical only ☐ Both

How do you manage pests?
☐ Indigenous methods ☐ Chemicals ☐ Both

What type of seeds do you grow?
☐ Traditional ☐ Hybrid ☐ Both

How do you manage water?
☐ Rain-fed ☐ Irrigation ☐ Both

SECTION F: Indigenous Knowledge and Extension Services

Do extension officers recognize indigenous knowledge?
☐ Yes ☐ No ☐ Not sure

Extension services in your area:
☐ Use mostly modern knowledge
☐ Use both indigenous and modern knowledge
☐ Ignore indigenous knowledge

To what extent do you agree:

Statement	1	2	3	4	5
Indigenous knowledge improves extension services	☐	☐	☐	☐	☐
Extension officers respect farmers' knowledge	☐	☐	☐	☐	☐
Blending knowledge improves understanding	☐	☐	☐	☐	☐
It increases adoption of new practices	☐	☐	☐	☐	☐

SECTION G: Social and Cultural Effects

Has using indigenous knowledge improved respect for elders?
☐ Yes ☐ No

Do younger farmers learn from older farmers?
☐ Yes ☐ No

Does combining knowledge reduce dependence on expensive inputs?
☐ Yes ☐ No

Does it empower farmers to make independent decisions?
☐ Yes ☐ No

SECTION H: Recommendations and Policy

What support do you need most? (Tick all that apply)
☐ Training on combining methods
☐ Subsidies for organic inputs
☐ Access to extension services
☐ Documentation of indigenous knowledge

Should extension services integrate indigenous knowledge?
☐ Yes ☐ No

Would you support farmer–researcher collaboration?
☐ Yes ☐ No

SECTION I: Open-Ended Questions

How can indigenous knowledge improve extension delivery?

_____

What challenges do you face when combining methods?

_____

What improvements would you suggest for extension services in Norton?

_____

THANK YOU FOR YOUR PARTICIPATION

Your time and honest responses are greatly appreciated and will contribute meaningfully to this research.

SEMI-STRUCTURED INTERVIEW GUIDE

My name is Cripshenzi Dungu (Registration Number: B223056B), a final year student studying Bachelor of Agricultural Science Honours in Agricultural Economics and Management at Bindura University of Science Education. I am carrying out a study titled:

"Effects of Indigenous Knowledge on Agricultural Extension Delivery in ward 7 of Norton, Zimbabwe."

This research is conducted as part of my degree requirements, it is meant to explore how indigenous knowledge influences agricultural extension services and how it can be successfully integrated to advance farming practices. Participation in this study is voluntary, and all responses will be kept confidential and used strictly for academic purposes. Personal recordings will be kept confidential to avoid identification. You may also request that recording be stopped be stopped at any time.

The interview will take about 30–40 minutes. Your honest and accurate responses will be highly appreciated.

Section A: Background Information

1. What is your current position and your involvement with agricultural extension work?

2. How many years have you worked with farmers in this area?

3. Which farming groups or societies do you support?

Section B: Indigenous Knowledge Practices

4. What types of indigenous knowledge are mostly used by farmers in this community?

5. Which farming activities are mostly practiced with indigenous knowledge (e.g., pest control, soil management, crop production)?

6. How do farmers obtain or pass on indigenous knowledge within the community?

Section C: Agricultural Extension Delivery

7. How do you rate extension service delivered to farmers in this area?

8. To what extent do extension officers incorporate or acknowledge indigenous knowledge in their work?

9. What challenges do you encounter when trying to include indigenous knowledge in extension services?

Section D: Effects on Farming Outcomes

10. In what ways does indigenous knowledge affect farmers' productivity and farming decisions?

11. What advantages do farmers experience when combining indigenous knowledge with modern extension practices?

12. Are there any disadvantages or limitations associated with using indigenous knowledge?

Section E: Integration and Support Systems

13. What can be done to improve the integration of indigenous knowledge into extension services?

14. How do government departments, NGOs, or other institutions support this integration process?

15. What kind of training or resources are needed to improve cooperation between farmers and extension officers?

Section F: Recommendations

16. What measures would you suggest to strengthen the use of indigenous knowledge in extension delivery?

17. How can communication between farmers and extension workers be improved?

18. What improvements should be made to enhance agricultural extension services in this area?

FOCUS GROUP DISCUSSION GUIDE

My name is Cripshenzi Dungu (Reg. Number: B223056B), a final year student studying Bachelor of Agricultural Science Honours in Agricultural Economics and Management at Bindura University of Science Education. I am carrying out a research study titled:

"Effects of Indigenous Knowledge on Agricultural Extension Delivery in Norton, Zimbabwe."

This discussion is part of my academic research. The main idea is to learn from farmers' experiences on how indigenous knowledge is used in farming and how it is related with agricultural extension services. Participation is voluntary, and everything shared will remain confidential and used only for academic purposes. No names will be recorded.

The discussion will take about 45 - 60 minutes. Everyone is encouraged to share their views freely, and all opinions are important.

Section A: Background Information

1. Can each person briefly introduce themselves and explain what type of farming they do?

2. How long have you been involved in farming in this area?

3. What are the main crops and common farming activities in your community?

Section B: Indigenous Knowledge in Farming

4. What traditional or local farming methods do you normally use?

5. How do these practices help you in areas like crop production, pest control, or soil fertility?

6. Where or from whom do you usually learn these farming practices?

Section C: Agricultural Extension Services

7. What kind of support or advice do you receive from extension officers?

8. How often do extension officers visit or engage with farmers in this area?

9. Do extension officers respect or consider the traditional methods you use? Please explain your experience.

Section D: Combining Indigenous and Modern Methods

10. In what ways do you combine traditional knowledge with modern farming techniques?

11. What benefits have you seen from using both methods together?

12. Have you experienced any disagreements between traditional practices and modern extension advice?

Section E: Challenges Faced

13. What difficulties do you face when using indigenous knowledge in farming?

14. What are the main challenges in accessing extension services in your area?

15. How have changes in weather or the environment affected your traditional farming practices?

Section F: Views and Experiences

16. How do you think indigenous knowledge affects food production and farm success?

17. Do you believe indigenous knowledge is still useful in today's farming? Why or why not?

18. What changes have you noticed in farming practices over the years?

Section G: Suggestions and Improvements

19. What do you propose should be done to better combine indigenous knowledge with extension services?

20. How can extension officers improve the support they give to farmers?

21. What advice would you give to government or agricultural organisations about farming support in your area?

End of Focus Group Discussion Guide