

**THE ROLE OF SOCIAL NETWORKS IN KNOWLEDGE TRANSFER:
A STUDY OF THE SMALL AND MEDIUM SCALE AGRICULTURE
SECTOR IN ZAMBIA**

Thesis submitted in fulfilment of the requirement for the degree of

DOCTOR OF PHILOSOPHY (PHD)

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ABSTRACT

This thesis is a study of social networks in the Zambian small and medium scale farmer sector. The purpose of this study is to enhance our understanding of how the social networks function in transferring knowledge across the sector actors. Knowledge transfer in this context is important because knowledge leads to process improvement. Both the quantity and quality of agricultural produce are expected to increase as an outcome of process improvement. This will improve the country's food security position as well as improve economic welfare at household and national levels.

Social networks are investigated because sector actors have relied on them as channels for knowledge transfer interventions. What this study reveals, however, is that the social networks through which knowledge is transferred are not adequately understood. This may be among the reasons for intervention failure in knowledge transfer efforts in the sector. The main research problem for this thesis then is to understand the nature of the social networks of Zambian small and medium scale farmers. Additionally, the thesis attempts to explain the role of the social networks in knowledge transfer facilitation and hindrance.

The Zambian context and the small and medium scale farmer sector suffer a dearth of research. Consequently, too little is known about the context and this necessitates an exploratory approach to the study. For explorative purposes, the study is qualitative in nature. Qualitative research enables understanding of the study issue and this in turn may provide solutions to the research problems. An inductive research methodology is employed.

What has emerged from the findings of this study is that individual actor attributes play an influential role in social networks. The role of individual actor attributes has been linked to social network outcomes of either knowledge transfer facilitation or hindrance. Specifically,

the social identity of individual farmers is found to provide potential explanations for social network outcomes. This finding is unexpected and important because it provides a basis for questioning one of the key assumptions of social network theory. The key assumption that this study finding questions is that individual actor attributes are unimportant and must be ignored in social network theory applications.

This thesis presents evidence to support the consideration of social identity in social network theory applications. Understanding the influence of social identity on social networks may enhance our ability to predict and explain social network outcomes. It is on this basis of enhancing prediction that social network theory ought to be revisited.

In addition to the theoretical insights this thesis provides, the study makes contributions to literature and practice. The limitations of the study are acknowledged and explained. Directions for future research are presented.

PUBLICATIONS AND PRESENTATIONS ON THIS THESIS

Mwila, N. K. (2014). The Search for ‘Real’ Farmers- Questions Of Social Identity In Farmer-Based Organizations. Academy of Management (AoM) Annual Meeting, *The Power of Words*, 1-5 August, Philadelphia, Pennsylvania.

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Mwila, N. K. (2012). Knowledge Management for Process Improvement in Small and Medium Scale Agriculture. Agri-Business Congress, 5-6 September, Lusaka, Zambia.

DECLARATION

This thesis contains no material accepted for an award of any other degree or diploma in any university or other institution. To the best of my knowledge, it contains no material previously published or written by another person except where due reference is made in the text of this thesis.

Signed _____

Date _____

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DEDICATION

This thesis is dedicated

To Beatrice Nanyinza Mwila- My Mother, Phenomenal Woman

*Who has sacrificed everything to see me become more than I could have ever dreamed
myself capable of being*

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Background and Research Problem

The success rate of knowledge transfer interventions aimed at improving processes among small and medium scale farmers in Zambia is less than 4 percent (Chomba, 2004). For this study, a knowledge transfer intervention is a deliberate action implemented to enable the transmission of knowledge from sources to intended users (Alavi & Leidner, 2001). Success of these knowledge transfer intervention is defined as the receipt and implementation of the knowledge associated with the intervention (Alavi & Leidner, 2001). Intervention failure has been observed as being attributable to a number of issues. The main causes of intervention failure have been summarised by Bonaglia (2009) as being:

- Heavy dependence on funding from the international donor community and expatriate personnel;
- Unsupportive policy environments;
- Unpredictable financing;
- Weak capacity of local institutions to sustain interventions;
- Excessive reliance on stand-alone projects.

These issues seemingly contribute to the failure of knowledge transfer interventions by affecting the activity of social networks in the sector. Social networks are the main mechanisms through which knowledge is transferred to small and medium scale farmers in Zambia (van Stam, 2013). There appears, however, to be insufficient coordination among and between the public sector actors, private sector actors, the donor community and farmers (Kalusopa, 2003). This lack of coordination may be linked to how farmers are organised within the social structure and as a consequence how they access knowledge.

The literature on social networks in small and medium scale agriculture is vast in economics, sociology, anthropology and geography. The insights from this literature have had limited consideration in the management sciences. The management sciences could benefit from this literature's insights on interpersonal dynamics in various forms of organisation. Management sciences could further benefit from the contextual relevance of this literature that is lacking in many applications of management theory in agrarian economies.

Social network studies in Zambian agriculture have considered networks formed for financial purposes (van Bastelaer & Leathers, 2006); network adaptation due to environmental change (Cliggett, Colson, Hay, Scudder, & Unruh, 2007); network change due to HIV/AIDS (Barnett et al., 2006); sharing ideologies (Araki, 2001); differences in social networks of commercial and non-commercial farmers (A. D. Jones, 1966). It was observed that the themes of social structure and access to knowledge in the Zambian small and medium scale agriculture sector have not been adequately explored. These themes provide a theoretical challenge for this study. It is anticipated that by understanding these phenomena, we will progress in understanding reasons for knowledge transfer intervention failure and poor performance in the sector.

Small and medium scale farmers are essential players in the Zambian economy. This is because they are responsible for food security in the country (Walpole et al., 2013). The association between small and medium scale farmers and food security lies in their activity being largely targeted towards local consumption and local processing markets. This is in contrast to most commercial farmers who mainly target export commodity markets.

Previous studies have identified improvement in irrigation, transportation and marketing as being central to the success of small and medium scale agriculture in Zambia (Hiller, 2007;

Mwanaumo, 1999; Norwegian Agency for Development Cooperation, 2011). The relevance of these central activities is as follows:

Irrigation is important for increasing yields by as much as 400 percent on small and medium scale farms (Hiller, 2007). Parts of Zambia prone to drought are still arable where irrigation techniques are implemented. Furthermore, seasonal agricultural activities can be extended over longer periods where irrigation is well managed. Tools and techniques that are employed to improve irrigation tend to improve the overall agricultural process. This is through saving time and money in watering fields as well as improving the quality of yields. There are several options with regard to irrigation, but the knowledge of these alternatives is unbeknown to many small and medium scale farmers.

Farming plots tend to be located a distance away from the main urban commercial centres. This has created serious costs for farmers in getting their crop and animal produce to their desired markets. Systems that improve transportation improve the agricultural process by ensuring that agricultural produce is received in the consumer market in quality condition. Furthermore, improvements in transportation increase access to a variety of markets resulting in better profit outcomes for farmers. A few alternatives exist with regard to transportation, but again the knowledge of these alternatives does not reach many small and medium scale farmers.

Presenting produce to the market in a form that enhances the appeal of a product is a function of marketing. The marketing activities that are observed in the small and medium scale agriculture sector include produce preparation, produce processing, produce preservation, advertising and promotion. Examples of produce preparation are washing, cutting, peeling, skinning and deboning. Examples of produce processing are grain milling and seed oil extraction. Examples of preservation are salting, drying and packaging. Value adding by these

means has the potential to increase the profitability of small and medium scale farming. Many farmers however remain unaware of the range of marketing techniques available to them.

Knowledge of developments being made in these key areas seems to elude many Zambian small and medium scale farmers. However, some farmers have access to this knowledge and better still, a proportion of them play a role in transferring it to others as well (Kabwe, 2010). The reasons for this observed knowledge asymmetry and the different levels of access to knowledge need to be addressed. If some farmers have connections to knowledge whilst others do not, it is important to establish the following:

- What is the basis of social connections in the small and medium scale farmer sector?
- What are the criteria for farmer inclusion in these connections?
- What impact do these connections have on knowledge transfer?

Small and medium scale farmers heavily rely on external sources through social networks to access both opportunities and resources (Hite, 2005; Moore, 2011). Knowledge transfer is largely facilitated by farmers being able to tap into key social networks often characterised by having farmer-based organisations at their centres (Owen & Williams, 2012; Wennink & Heemskerk, 2006). Understanding the nature of these social networks is essential in determining their capabilities in facilitating or hindering effective knowledge transfer.

The necessity of social networks in affording access to various resources has been generally accepted in the literature (Granovetter, 1973). However, there are gaps in understanding the impact that social networks have on the transfer of knowledge as a resource in some industries like agriculture (García & Carter, 2009). The research on social networks tends to form a pattern of studies that has a dichotomous structure. Social network studies focus on the impact of the structure of social networks or the social network behaviour on a given resource, but rarely both (Rost, 2011). The separate studies of social network structure and social network

behaviour make social network outcomes difficult to predict. This study attempts to look at social networks in a more holistic manner that incorporates both the structural and behavioural accounts of the social network. It specifically considers the impact that social networks have on knowledge transfer outcomes in Zambia's small and medium scale farmer sector.

1.2 Research Questions

To address the research problem presented in section 1.1, Chapter 3 reviews the relevant literature. This culminates in a series of questions to be answered through the research process that can be broadly summarised as two research questions:

- 1. What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*
- 2. What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?*

In answering the research questions, the objective is to examine how the social networks facilitate or hinder knowledge transfer. Achieving this objective will enable some conclusions to be drawn about the possible underlying reasons for the failure of knowledge transfer interventions.

1.3 Research Objectives

The research objectives that will be achieved by answering the research questions above are as follows:

- Understand the experiences of Zambian small and medium scale farmers in accessing knowledge;
- Explain the nature of Zambian small and medium scale farmer networks and their impacts on knowledge transfer;
- Propose directions in which theories on networks should be developed to increase their predictive powers in contexts similar to the Zambian one.

1.4 Research Methodology and Methods

In order to answer the research questions posed in section 1.2 and achieve the stated objectives in section 1.3, the research is conducted using a qualitative approach discussed in detail in Chapter 4. The study design is inductive. The inductive research approach is used to make specific observations of the phenomena and identify patterns which may be useful in general theory development (Trochim, 2006).

The sampling techniques employed are purposive sampling and snowballing. The specifics of the sample obtained are explained in detail in Chapter 4.

The primary mode of data collection is through face-to-face interviews conducted in the field and field observations. Interviews consist of both open ended and semi-structured questions to try to answer the research questions. Emerging questions arising from the responses of participants are included.

Data collected is coded according to core categories developed from the data. Patterns are identified by labelling data categories as causal conditions, strategies, intervening conditions or consequences. A narrative is developed in order to answer the research questions by considering the data in terms of:

- The causes of the observed nature of the social network;
- The strategies used by network actors to navigate the social network;
- The intervening conditions affecting social network actor strategies;
- The knowledge transfer consequences of the causes, strategies and intervening conditions of the social network.

1.5 Intended Contributions of the Study

With the study of social network capabilities still in need of development (Rost, 2011), this study makes a contribution towards this development. Many social network theories have been developed around highly formalised network arrangements in developed market economy contexts, as discussed in the literature review of this thesis. It is a theory problem then to use social network theories to explain phenomena in agrarian economy contexts. Using the Zambian small and medium scale agriculture sector to exemplify an agrarian economy context, this study contributes to addressing such knowledge gaps.

There is insufficient academic research on the nature of farmer-to-farmer social networks of small and medium scale farmers in agrarian economy contexts, particularly on the African continent. The few related studies (BenYishay & Mobarak, 2013; Droppelmann, Mapila, Mazunda, Thangata, & Yauney, 2013; Hailu, 2009; Hogset, 2005; F. Lyon, 2000; Spielman, Davis, Negash, & Ayele, 2011; Udry & Conley, 2004) that examine social network behaviours in agriculture in African countries have not considered the Zambian context. This study therefore contributes the Zambian story to the literature. Given that behaviour tends to vary across countries (Dodd & Patra, 2002; Greve & Salaff, 2003; Hayton, George, & Zahra, 2002; Klyver, Hindle, & Meyer, 2008), this study provides an insight beneficial to scholars, business owners and policy makers interested in Zambia. A point is made here that although a

number of studies on social networks in African agriculture can be found, these studies have focussed on farmer relationships with other stakeholders and not necessarily farmer relationships among each other.

Part of the problem of insufficient research in small medium scale agriculture in Zambia is that reported data on agriculture tends to be misleading. This is because the contributions of small and medium farmers are not adequately represented. There is ambiguity in defining who can be counted as a farmer, with most definitions and reports ultimately excluding some small and medium scale farmers. This thesis contributes to an understanding of the issues that exclude smaller and medium scale farmers from policy consideration.

This thesis contributes to enhancing the present day understanding of the social network phenomenon in Zambian farming. This will contribute to more relevant scholarship in the field. It will also lead to the better design and management of government policies that address the needs of this sector of the Zambian economy.

1.6 Outline of the Study

This study is organised into seven chapters. This chapter, Chapter 1, introduces the thesis. It does so by providing a background to the study, illuminating the research problem, posing the research questions and stating the research objectives. It then gives a brief overview of the research methodology and methods as well as the intended contributions of this study.

Chapter 2 gives a detailed account of Zambia as the chosen context for the study. It provides a geographical, historical, political and societal background and goes into detail on the sites chosen for the study.

Chapter 3 reviews the key literature in social networks; this is the literature that provides a point of departure for the thesis. It examines knowledge transfer as an outcome of social network activities being studied. The chapter also reviews key issues in social identity which emerged as relevant to this study. The research is then situated in the literature and the research questions for the investigation of the phenomena are developed.

Chapter 4 presents the methodology that informs this study and the methods used to answer the research questions in the research context. The choices made are explained. This includes a discussion of inductive approaches and social network analysis as employed in this study. The data collection process and the steps taken to ensure trustworthiness and ethical standards of research are described.

Chapter 5 presents the findings and analysis of the research. It incorporates portions of transcripts of interviews conducted. It also includes analysis of the logs of observations and insights from a reflective diary kept during the data collection process. Categories for analysis are developed. The findings are analysed in light of the literature.

Chapter 6 is a discussion of the study's main findings regarding social identity in social networks. The theoretical implications of these findings are explained.

Chapter 7 concludes the research. It provides an overview of the chapters in this thesis. The possible practical contributions of the study are highlighted in this chapter. The limitations of the research are discussed and directions for future research proposed.

The thesis structure is as shown in Figure 1-1.

Chapter 1	• INTRODUCTION
Chapter 2	• ZAMBIA AS THE CONTEXT
Chapter 3	• LITERATURE REVIEW
Chapter 4	• METHOD AND METHODOLOGY
Chapter 5	• FINDINGS AND ANALYSIS
Chapter 6	• DISCUSSION
Chapter 7	• CONCLUSION

Figure 1-1: Outline of the Study

1.7 Summary

This chapter has set the foundation for this study. It has identified the research problem and presented the research questions to be answered. The objectives of the study have been illuminated. A brief overview of the study context, literature direction, research methods and methodology and direction for the analysis of findings has been given. The intended contributions of the study have been highlighted and the remainder of the thesis outlined.

CHAPTER TWO: ZAMBIA AS A CONTEXT

2.1 Introduction

This chapter provides the background on Zambia as the chosen context for this study. In particular, it looks at the state of agriculture in the rural-urban fringes of the province of Lusaka, where the field work was conducted. Following this introduction in section 2.1, section 2.2 provides geographical, historical and political as well as socio-economical information on Zambia. Section 2.3 looks at Lusaka and focusses on the regions of Lusaka North, Lusaka East and Lusaka West respectively as specific sites for this study. Section 2.4 looks at agricultural process improvement in Zambia and specifically at knowledge transfer around irrigation, transportation and marketing in sections 2.5, 2.6 and 2.7. Section 2.8 summarises the chapter. This chapter is organised as follows in Figure 2-1:

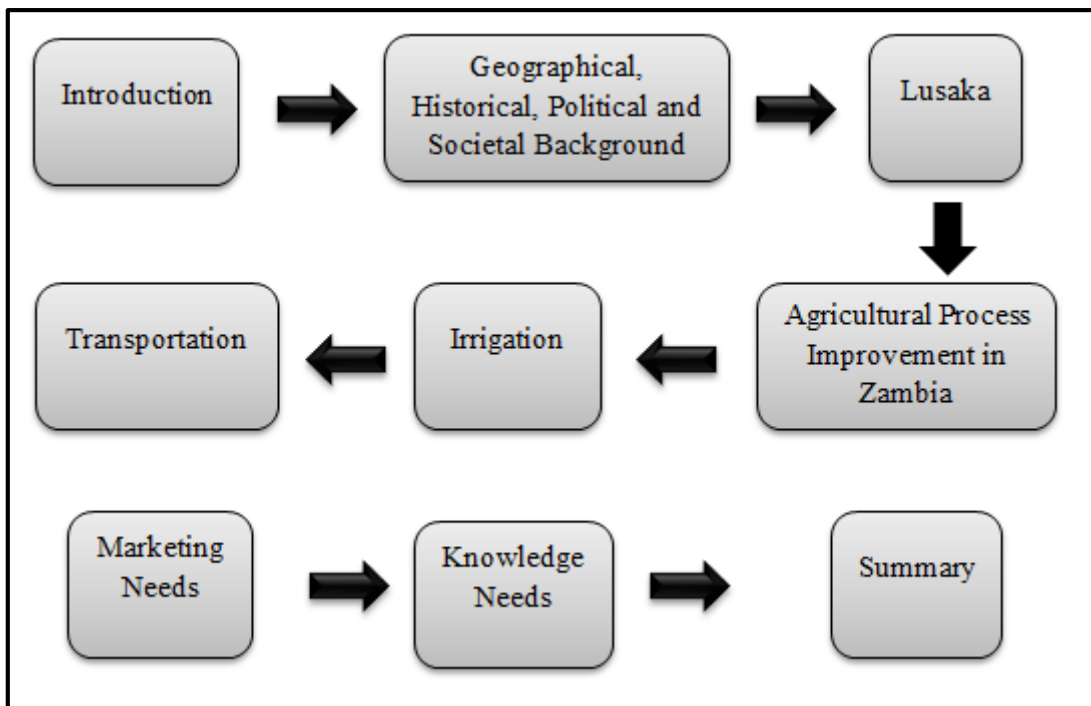


Figure 2- 1: Structure of Chapter 2

2.2 Geographical, Historical and Political and Socio-economic Background

2.2.1 Geographical Background

Located in central southern Africa, Zambia is a landlocked country occupying 75,261,800 hectares of which agricultural activities utilise 258,901 hectares (CountrySTAT, 2007). 45 percent of Zambia's land is arable. Of the available agricultural land about 7 percent is used in commercial activity, 44 percent is used in small holder farming and 49 percent unused (Simumba, 2007). Approximately 62 percent of the country's estimated population of 13,046,508 are involved in agriculture (CountrySTAT, 2007).

The country has four distinct agro-ecological regions (illustrated in Figure 2-2) based on relative rainfall and soil characteristics. Regions II and III are the most productive, region I is most vulnerable to drought and region IIb is the least productive (Sitko et al., 2011). Parts of Lusaka are in regions I and II. Lusaka consequently enjoys being situated in one of the most productive agricultural regions. 72 percent of Lusaka's rural population and 3 percent of its urban population is involved in agriculture (Simumba, 2007).

Zambia borders 8 countries namely; Angola, Botswana, Democratic Republic of Congo, Malawi, Mozambique, Namibia, Tanzania and Zimbabwe. The location of Lusaka Province in Zambia in relation to the country's other provinces and the countries that are bordered is shown in Figure 2-3. Figure 2-4 shows the position of Zambia in relation to the rest of the African continent.

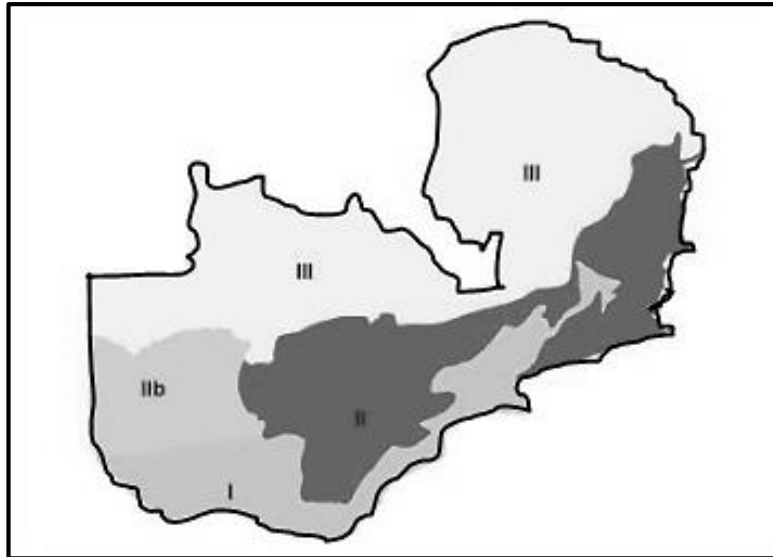


Figure 2- 2: Zambia's Agro-ecological Regions (Food and Agriculture Organisation)



Figure 2- 3: Location of Lusaka Province in Zambia (Ministry of Local Government and Housing)



Figure 2- 4: Zambia, Africa (2012)

Zambia has distinct rural and urban zones. A new zone has emerged over the years bordering the rural and urban zones. This is the zone referred to in this study as the rural-urban fringe. The population that exists on the rural-urban fringes is largely unaccounted for and undocumented in the farming statistics. This research however shows that the farming population on the rural-urban fringes warrants attention. This is because they have great potential to contribute more to the agricultural sector of the economy. The possible advantages of farming in the rural-urban fringe are outlined in the basic comparison of rural, urban and rural-urban farmers shown in Table 2-1.

Table 2- 1: Geographical Differences in Zambia's Farming Population (Author's Own)

	RURAL	URBAN	RURAL-URBAN
Land availability	Large	Limited	Large
Access to water	Poor	Good	Fair (but has great capacity for irrigation due to high ground water levels in the region)
Access to transport	Poor	Good	Fair (but has great capacity to access existing transport)
Access to markets	Poor	Good	Fair (but has capacity to serve multiple markets including cross-border markets)

2.2.2 Historical and Political Background

Zambia, then Northern Rhodesia, was colonised by the British South Africa Company and became a British Protectorate in 1889. It officially became a British colony in 1924 and gained its independence in 1964 (Horvath, 1999). Copper discovery in the present day Copperbelt Province saw the mass migration of men from all parts of the country to the Copperbelt. This migration was for the purpose of providing labour to the mines in exchange for wages. The copper mining boom of the early 1920s led to the development of urban areas around mining towns. These urban centres attracted further male migration (Byrne, 1994).

Women were prohibited from migrating to urban areas in the colonial era. They remained residing in the rural areas and became the key subsistence food producers. The dominance of women in small and medium scale agriculture is still evident with statistics estimating female representation in the sector at 60-80 percent (The Republic of Zambia, 2005). Economic hardship in the rural areas saw some women migrate to the urban areas, albeit illegally. The strategies migrant women developed for survival in the urban areas included urban horticulture and beer brewing (Glazer, 1997). These strategies required knowledge of undeveloped land, its fertility and how to access it. Further knowledge required was how to attract customers, the operations of police raids in detecting illegal economic activity as well

as urban savvy. Acquiring this knowledge primarily revolved around having a widespread network of kin and friends (Glazer, 1997). Agriculture in urban and rural-urban fringes emerged through these activities. Post-independence, urban and rural-urban agriculture has continued to thrive largely through networks that farmers develop.

The United Nations Independence Party (UNIP) was the first ruling political party of independent Zambia from 1964 to 1991 under Kenneth David Kaunda. The country became a one-party socialist state in 1972. The country suffered economic pressure due to a crash in copper prices in 1975. This crippled the economy because copper was, and still remains, the country's chief income earner. In addition to the economic problems brought about by the copper price crisis, the country faced political stress. This was due to international sanctions placed on Zambia in defiance to the country's one-party political climate in favour of multi-party democracy. The first multi-party elections were held in 1991 at which the Movement for Multi-party Democracy (MMD) won. The MMD ruled the country from 1991 to 2011 under three presidents; Frederick Titus Jacob Chiluba (deceased), Levy Patrick Mwanawasa (deceased) and Rupiah Bwezani Banda. In 2011, the Patriotic Front (PF) came to power under Michael Chilufya Sata (deceased). In 2015, Edgar Lungu of the PF became the president of Zambia.

The political transitions have had impacts on the agricultural sector as each successive government has placed different priorities on the sector. The UNIP government ran a socialist-oriented agricultural policy (Chunga, 2007) which resulted in a dominant role for the state (Wood & Shula, 1987). Colonial policies such as maize preference and centralised, monopolistic state marketing were maintained during the UNIP era (Chunga, 2007). Maize preference was a policy that focussed on maize production as the country's staple food crop (Kajoba, 2007). Centralised, monopolistic state marketing was a policy on the coordination of maize seed distribution, produce collection and produce buying by state agencies (Scott,

1995). The effects of colonial policies can still be seen today. One such effect is a lack of variety of produce from small and medium scale farmers. Another effect is overreliance of small and medium scale farmers on the marketing services provided by the Food Reserve Agency (FRA) of the government.

State control of the sector, however, was not entirely negative as it led to the integration of cooperative movements into state frameworks for agriculture production. Cooperatives were formed around rural regions to support farmers in their activities in specific commodities. The integration of cooperative movements enabled farmers from far lying areas to access state services such as farming inputs, warehouse facilities and a ready market (Chunga, 2007). More importantly, state control enabled the provision of agriculture extension services. This enabled technology transfer and process improvement in the sector and enhanced small and medium scale farmer activities through simple extension advice schemes (Chunga, 2007). Such schemes included knowledge circles where farmers were given new technologies to try and gathered regularly to share their experiences with others.

The MMD government liberalised and decentralised the agricultural sector (Chunga, 2007). Liberalisation and decentralisation made farmer access to markets more direct and also meant that it was now a farmer rather than a state prerogative to ensure knowledge access. The MMD's new policies however overlooked small and medium scale farmers as key actors in the sector. Liberalisation meant that small scale farmers had to find their own routes to market and to knowledge as these were no longer state controlled (Kajoba, 2007). Under the MMD government, knowledge transfer was modelled on the blueprint for action laid out by the Agricultural Sector Investment Programme (ASIP). This was designed and supported by the Swedish International Development Agency (SIDA) and the World Bank (Beintema, Castelo-Magalhaes, Elliot, & Mwala, 2004).

SIDA has been a major contributor to agricultural research in Zambia. It has been active in supporting the Zambia Seed Company (ZAMSEED); Zambia Agricultural Research Institute (ZARI); Golden Valley Agricultural Research Trust (GART) and several of SIDA's own projects (Beintema, et al., 2004). Despite SIDA's numerous efforts in the sector through ASIP, complete handovers of technologies and improvements to local farmers continue to be ineffective (Elliot & Perrault, 2006).

ASIP is a framework designed to coordinate government and donor assistance in harmonising activities in the agricultural sector (Chunga, 2007). It is this framework that has informed the majority of agricultural interventions in the sector commenced after the end of the socialist era. Evidence of duplicated activities and thus a wasting of resources in interventions is an indicator that the framework has failed (Chunga, 2007). This may be addressed by looking at the social network coordination in the sector.

Although the overall political climate is relatively stable in Zambia, the holders of political positions change quite regularly and in an unpredictable fashion. This includes positions in offices of the Ministry of Agriculture and Livestock which are responsible for distribution, extension and collection services. The politicisation of these positions has impacted the stability of policies as well as the confidence and trust farmers have in the affiliated offices. Key office holders change from time to time and this impedes relationship building and hence the trust and confidence of farmers in office holders. The impact of these changes on relationship building has also had an impact on data collection in this study and this is discussed in Chapter 4.

The official language of Zambia is English. In addition, more than 70 indigenous languages are spoken throughout the country. In Zambia, there are no official variations of English. This is unlike some other postcolonial countries which may have official languages that are a

hybrid of English and other local languages e.g. Pidgin English and Hinglish. In urban slang, it is not unusual however to find the use of local language words in English language structure. For example, in the Bemba language, the form of words does not change in the various tenses. The word 'cultivate' is 'byala'. In English 'cultivate' changes to 'cultivation, cultivating, cultivated...' whereas in Bemba, the context changes the tense of the word rather than the word itself 'uku byala, tule byala, twali byala'. In urban slang the words change as they do in English i.e. 'byalation, byalaling and byalad...' The literacy levels in the country according to the United Nations Children's Fund (UNICEF) stood at 71 percent of the adult population in 2011 (UNICEF, 2013).

2.2.3 Socio-economical Background

Copper mining has remained the dominant income earner for Zambia. However, with the volatility of copper prices on the world market, attention is increasingly turning towards other sectors of the economy including tourism and agriculture.

Agricultural activity by small and medium scale farmers in Zambia often consists of a mix of livestock ownership and crop cultivation (The Republic of Zambia, 2005). Other activities such as basic processing of agricultural outputs and market trade of produce are also commonplace among small and medium scale farmers in Zambia. In the rural-urban areas under investigation, leafy vegetables are the major commodity grown and poultry the major livestock reared.

Some changes in the country's economic system after the onset of multi-party democracy have impacted negatively on knowledge transfer to small and medium scale farmers. Some of these changes are the liberalisation of markets and privatisation (The Republic of Zambia, 2005). This is because these changes have resulted in extension systems by the Ministry of Agriculture and Livestock being directed primarily at emergent commercial farmers. The

reforms have limited smaller scale farmers in having the access to knowledge crucial to improving productivity (Byrne, 1994).

2.2.3.1 Considering Women

The prominence of women in farming has been presented in the discussion on the country's historical context. Women farming on a small and medium scale in Zambia are however constrained by a lack of adequate access to financial and knowledge resources. Furthermore, some traditional beliefs and customs in some tribes hinder the productivity of women in farming. For example, in some Zambian tribes, married women are not permitted to represent their households in public affairs. This is problematic because government organised agricultural meetings, for instance, are regarded as public affairs and women, who are the principal farmers, would not attend. The males of households would attend, especially where incentives are offered for attendance. As such, women following such customs would have to depend on indirect knowledge transfer from their husbands. Unfortunately, some women do not receive any information on meetings held at all. Such a channel of transfer may not be as effective as if they received knowledge first hand (DeLong, 2004).

However, the fair inclusion of small and medium scale farmers in the economy can be promoted by creating social networks that actively include women (Norwegian Agency for Development Cooperation, 2011). This is necessary because women represent the majority of smaller scale farmers. Social networks have been instrumental in accessing support since many female farmers in Zambia rarely own the land they cultivate. Many female farmers are ineligible for membership of most farmers associations and cooperatives, and; are excluded from government support (Norwegian Agency for Development Cooperation, 2011).

Other socio-economic issues affecting women are poverty and the prevalence of HIV/AIDS. Although 60.5 per cent of the Zambian population lives in poverty (The Republic of Zambia,

2012), Zambian women in farming are at a particular disadvantage as they comprise the 42.3 per cent of the total population that are considered extremely poor. Zambian women in farming are also the population suffering more from the brunt of HIV/AIDS (Pitamber, 2006).

2.2.3.2 Land Ownership

The challenges for women in owning land partly stem from the existence of a dual land tenure system in Zambia (Chileshe, 2005). The dual land tenure system in Zambia recognises customary and leasehold tenure. Customary land may cover as much as 94 percent of the country (Adams, 2003). Chiefs and traditional leaders are the custodians and administrators of customary land. They provide residential, arable and grazing land to members of a tribe based on their respective tribal customs and traditions. In many tribes in Zambia, with some exceptions, every male head of a household is entitled to land for his homestead, cultivation and grazing. His male children inherit this land upon his death. Many women, regardless of their marital status or age, can never acquire land on their own. They farm and survive by residing with their parents, husbands or sons. However, although fraught with many inadequacies beyond the scope of this thesis, some provision is made for conversion of customary land to leasehold land. This is under the 1995 Land Act, under which women have a right to leasehold title. Leasehold land is administered by the state. In an effort to address the problem of women marginalised under customary tenure systems, 30 percent of leasehold land is reserved for allocation to women (Adams, 2003).

Another issue gaining attention in efforts to address the challenges of small scale farmers is land purchases by new entrants in the sector (Hichaambwa & Chamberlin, 2014). New entrants include small and medium scale farmers without a prior farming background and large scale foreign investors (Chapoto et al., 2014). The emerging view is that new entrants in the sector, excluding commercial foreign investors, are purchasing land for speculative rather

than productive purposes (Sitko & Jayne, 2014b). New entrants, again excluding commercial foreign investors, typically earn wages from other sectors of employment. As a result, they have the capacity to acquire leasehold land, much of which lies in the rural-urban fringe. The presence of wage earning farmers appears to be a unique feature of the rural-urban fringe in contrast to agriculture-dependent smallholders in the rural areas and the commercial large scale farmers. Some scholars however argue that this land purchased by wage earner farmers could be used to improve food security if allocated to rural smallholders. The need for land in order to increase small scale farmer productivity and improve food security (Chapoto, et al., 2014) is not argued. However, what is argued is that the welfare of farmers may still be at risk even when they are able to acquire more land if the issue of knowledge transfer on how best to utilise available land is not addressed. This thesis finds, as other studies have (Sitko & Jayne, 2014b), that land underutilisation is a feature of all scales of farming in Zambia. So it seems then that the focus ought to be on maximising utilisation rather than further land acquisition.

2.2.3.3 Farm Association Membership

The membership of many formal farm associations in Zambia starts with the definition of who farmers are and the location of farming regions. Farmer definition in many associations is determined by the size of land farmed, commodities produced and formal farmer registration. This is problematic because many women tend to be excluded from such farmer definitions. This is because their activities are on a smaller scale and their commodities are mainly for local consumption. Additionally, many of them farm in areas that are not registered as farms with the Ministry of Lands. State designated farming blocs are recognised by many associations as the only farming regions. This poses a challenge because important agricultural activity is increasingly sprouting up in rural-urban zones not formally recognised

as farming regions. Furthermore, membership fees associated with some organisations tend to be too high for most women. Also, the meeting times can be incompatible with the other demands on women's time as they perform other tasks besides farming.

2.2.3.4 Government Support

Without deliberate efforts to target women in the government's agricultural outreach programs, women suffer from lack of government support. This is further compounded by the challenges in identifying women farmers highlighted in section 2.2.3.2 of this chapter.

2.3 Lusaka

Zambia is divided into ten provinces, namely: Luapula, Northern Province, Muchinga, Eastern Province, Central Province, Lusaka, Southern Province, Western Province, North-Western Province and Copperbelt. Lusaka Province hosts the national capital city, also called Lusaka, and the province accommodates the highest number of the country's residents (Kalumbi, 2012). The farming regions of the rural-urban fringes of Lusaka Province are the sites of this research project because of the following:

- There is presence of many small and medium scale farmers in these areas (personal observation);
- There is potential for farmers in these zones to maximise the value of their output through process improvement;
- The activities of these farmers are important to the economy of Lusaka and Zambia as a whole.

Lusaka was founded as a centre for cattle ranches, maize and tobacco farms in 1906 (van den Berg, 1984). Lusaka's residents have worked in and derived income from agriculture in various ways ranging from hobby to full-time farming (van den Berg, 1984). The best soils are found around the rural-urban fringes and, as such, intensive agriculture by both small and large scale farmers has taken precedence. These fringe areas are further supported by the existence of transport networks (van den Berg, 1984). At the time of Berg's study (1984), the majority of agricultural land use in Lusaka was for informal gardening. The registration of more agricultural enterprises in Lusaka over the last thirty years is, however, indicative of greater participation of farmers in agriculture for business. The rural-urban fringe zones of Lusaka that are sites for the study are shown in Figure 2-5.

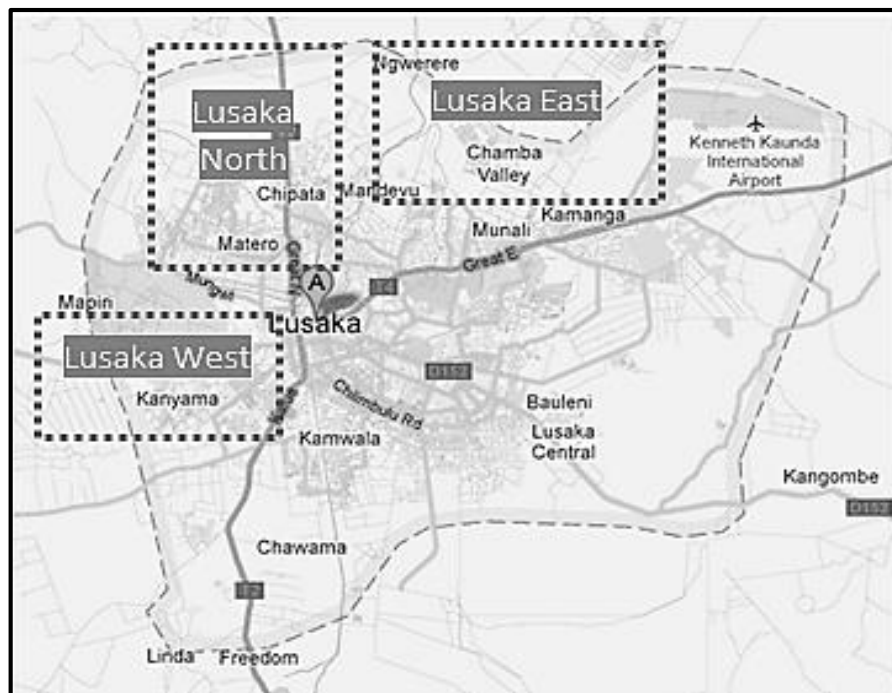


Figure 2- 5: Areas of the study in Lusaka, Zambia (2012)

2.3.1 Lusaka North

The Lusaka North region consists of settlements that sprung up around the Great North Road. It includes the rural-urban areas of Katuba, Kabangwe, Chikumbi and Mungule. The region begins 20 kilometres away from the capital city, Lusaka, and extends to the border of the Central Province of Zambia. The rural-urban areas are divided into zones and villages. Settlements tend to be scattered as they emerge around key centres such as schools, clinics or the roadside (Zulu, Barasa, Fleischhauer, & Goelz, 2006). The main activity of the people in the region is crop farming, mainly performed by women. This is supported by additional activities such as animal raising, handcrafts, running shops or restaurants (Zulu, et al., 2006). The main crop planted is maize. This is used for consumption and animal feeding, with the surplus being sold. Additionally, farmers with the capacity to irrigate also have vegetable gardens whose produce is primarily sold (Zulu, et al., 2006). Farming success is heavily dependent on the rainy season (November-March) as well as irrigation activities around rivers, dams and boreholes during the other seasons (Zulu, et al., 2006). The distance to these water points and the means of accessing water (by hand or by petrol pump) play a critical role in farming success.

2.3.2 Lusaka East

The Lusaka East region consists of settlements that sprung up around the Great East Road. It includes the rural-urban areas of Chamba Valley, Vorna Valley, Ngwerere, Silver Rest, Kanakantapa and Chongwe. The region begins 20 kilometres away from the capital city, Lusaka and extends to the border of the Eastern Province of Zambia. More than 20 percent of Lusaka Province's agricultural produce comes from this region (District Planning Unit, 2008). The major crops grown in the area are maize, cotton, groundnuts, cowpeas and sunflower. Generally, female farmers are in charge of food crops and the vegetable gardening of a range

of horticultural products for supply to markets in Lusaka City. Male farmers, on the other hand, grow the cash crops and engage in commercial farming. The farming system of the region is characterised by traditional management of crop and livestock farming.

2.3.3 Lusaka West

The main economic activity of the Lusaka West region is agriculture. The main crops grown are maize, groundnuts and sweet potatoes. The livestock kept includes goats, chickens and cattle (Chilembo, 2004). ‘Women’s Clubs’ are prevalent in the region. They are involved in various activities such as the growing and selling of produce, as well as providing a vegetable nursery for members (Chilembo, 2004). Seventy-five percent of the small and medium scale farmers in the area are women (Ndulu & Bakker, 2001). Out-grower farming on a contractual basis for surrounding industries in the region is also practiced (Simbaya, Mukeya, & Moonga, 2009).

Management practices such as disease prevention and investment in machinery are undervalued by the majority of small and medium scale farmers in the area (Simbaya, et al., 2009). These farmers find chemical based disease prevention such as pesticides and fungicides as well as animal vaccinations rather suspicious and untrustworthy. Many of the small and medium scale farmers in the Lusaka West area favour traditional farming practices that involve little if any mechanisation. This is mainly because of the high cost of machinery and inaccessibility to demonstrations on modes of mechanisation available.

2.4 Agricultural Process Improvement in Zambia

The Zambian agricultural sector is characterised by weak formalised contract enforcement institutions and complex networks of informal trade (Sitko & Jayne, 2012). Consequently,

social structures of interpersonal relations are at the heart of agricultural activity (Sitko & Jayne, 2012), including process improvement.

Private technology dominates agricultural process improvement in the small and medium scale farming subsector in Zambia (Parker, Cross, & Walsh, 2001). Private technology is that which has been developed among private sector actors. It includes technologies addressing irrigation and harvesting challenges. Public technology, on the other hand, is a product of state research institutions and dominates the large scale commercial farming subsector. The production of process improvement technology that targets small and medium scale farmers has been taken up by the private sector. This is in response to failures of public research institutions to meet the process improvement needs of farmers on a smaller scale. The private sector has contributed the following process improvements over the years:

Table 2- 2: Private Sector Contributions to Process Improvement in Zambian Small and Medium Scale Agriculture (Author's Own)

Product Type	Examples of Process Improvement
Machinery	Irrigation equipment
Agronomic advice	Cell phone based market information
Livestock processors	Poultry freezing, smoking
Crop processors	Vitamin fortification

From the 1990s, agricultural research in Zambia has focussed on methods for increasing agricultural productivity (Kabwe, 2010). The means of productivity increment have focussed on agricultural technologies for process improvement. This study, however, takes a different perspective by looking at the knowledge transfer aspect in the networks that these technologies are disseminated through.

Factors affecting knowledge transfer in Zambia have been identified by Kabwe (2010) as including:

- Extension work;
- Knowledge and skills of the extension worker;
- Farmer interest;
- Club membership;
- Farming organisations;
- Information sources;
- Farming experience;
- Household and non-farm income;
- Farm size.

Extension work is the transfer of knowledge from experts to the farmers. Extension officers vary in the extent of their knowledge and approach to farmers. This variation impacts on the rate of knowledge transfer. For effective transfer, farmers must have interest in the knowledge offered and be able to see its benefits. Belonging to farmer groups enables a more centralised channel for knowledge dissemination and additionally peer support in adopting new technologies. The welfare of farmers has a big influence on technology adoption because uptake of new technology often requires some investment. Consequently, farmers with less disposable income are unlikely to take up new technology.

Whilst these factors have been identified, how each of them operates in affecting knowledge transfer in Zambia is not well understood. So this study seeks to understand how at least one of these factors, farmer networks, operates. Studies have suggested that for small and medium scale farmers in Zambia, club membership and farming organisations are central to facilitating knowledge transfer (Jiggins, Maimbo, & Masona, 1992; Kabwe, 2010). Yet, the interactions

of the different actors in the environment that make club membership and farming organisations pivotal have neither been explained nor explored. Madzudzo (2011) argues that the problem in African agriculture is not a lack of process improvement. Rather, inefficient networking and below optimal interaction among actors in process improvement systems is the problem (Madzudzo, 2011). The reasons for ineffective networking and actor interaction are investigated in this study.

2.5 Irrigation

Irrigation is important because it supports agriculture during the dry seasons and ensures that fresh fruit and vegetables can be grown all year round. This can ensure steady cash flow for farmers and contribute to national food security by enabling a switch from subsistence farming to market oriented production (Hiller, 2007). Irrigation can increase crop yield by as much as 400 percent (Hiller, 2007). Given that Zambia hosts about 40 percent of the water resources in Southern Africa (Food and Agriculture Organisation, 2005), there is great potential for process improvement in this area.

According to the Ministry of Agriculture and Livestock (Kroma, 2006), there are an estimated 100,000 hectares under irrigation yet the irrigation potential is estimated at 423,000 hectares. Of the irrigated land, 52,000 hectares are under medium to large scale farming and 48,000 hectares are under small scale farming. Far less than 10 percent of small and medium scale farmer land is irrigated and most small and medium scale farmers own more land than they can cultivate (Food and Agriculture Organisation, 2005). Irrigated lands are mainly found in parts of the country underlain by dolomitic limestone. This is where groundwater is abundant and can easily be pumped from reasonably shallow boreholes. Forms of irrigation include gravity fed surface water systems, hand carried buckets, drip systems, sprinklers, rain guns

and centre pivots. Crops irrigated include wheat, rice, green maize, soya beans, paprika, sugar, tea, coffee, cabbage, tomatoes, onions, field beans, citrus and cut flowers.

Many irrigation technologies are unaffordable by average small and medium scale farmers. Belonging to organised farmer groups like cooperatives may make new technologies accessible and more affordable. The relevance of farmer networks can be seen as vital for knowledge transfer in this area.

2.6 Transportation

Farming plots tend to be located a distance away from the main urban commercial centre and from each other. This has created serious obstacles and costs for farmers in accessing extension officers, accessing farm inputs and transporting produce to the desired market. Farmers lack suitable vehicles and the condition of feeder roads warrants ongoing attention.

Process improvement in this area includes initiatives such as the ‘Transzam’ of the Zambia National Farmers Union (ZNFU). Transzam is a transport solution that works by farmers taking advantage of empty backloads of transporters that log their journey onto an online system. Farmers can then contact the transporter and negotiate a transportation price. Currently, the platform for the system’s use is the internet. Farmers in outlying areas who do not have personal internet access rely on the use of the Zambia National Farmers Union offices closest to them. This can be challenging where the office is a distance away from farms and for farmers with limited knowledge of how to navigate the internet. The Zambia National Farmers Union is currently trying to renovate the Transzam system for mobile phone use.

The biggest challenge in improving transport for farmers lies in farmers being unaware of services like Transzam. This is indicative of problems in knowledge transfer on this sector improvement.

2.7 Marketing

Presenting produce to the market in a form that enhances the product's value is a function of marketing. The activities that may go hand in hand with this include produce preparation, processing, preservation as well as advertising and promotion.

The government's objective toward marketing is to promote competition, efficiency and transparency (The Republic of Zambia, 2004). It intends to achieve this by developing a public and private sector driven marketing system for agricultural commodities and inputs (The Republic of Zambia, 2004). The principal strategy in achieving this objective has been stated as, 'Facilitating market information flow among stakeholders in various regions'. The value of near perfect information is evident in this statement and this can emerge where there is effective knowledge transfer.

2.8 Knowledge Needs

The areas for process improvement rely on small and medium scale farmers acquiring knowledge through education and training. The knowledge necessary is that on agriculture, the environment and social groups (Mulauzi, 2007). Knowledge is a basic prerequisite to the initiation of process improvement. It enables small and medium scale farmers make better choices regarding the type of training they need to undertake to fully implement a process

improvement. It also heightens awareness of advances in the sector with regard to various technologies and techniques. Knowledge increases preparedness when factors such as weather patterns change and affect farming. Most of this knowledge is acquired through information communicated through their social groupings, be they associations, clubs, professional organisations or unions.

2.9 Summary

This chapter has shown how geographical, political, economic and social forces interact to affect the agricultural activities of small and medium scale farmers. The rural-urban fringes of Lusaka have been introduced as sites for the study. The chapter has illuminated areas of small and medium scale agricultural activity in Zambia. It has also highlighted the knowledge that needs to be transferred with process improvements in the sector. The chapter provides the perspective from which the research questions will be answered. It sets the contextual boundaries within which the theoretical and practical contributions of this research are set. Studies of process improvement in Zambian agriculture have endeavoured to elucidate the rates of adoption of various technologies. This thesis builds on those works by investigating how social networks that farmers belong to contribute to knowledge transfer on these process improvements in Zambia.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

The introductory chapter presented the research problem as a sought understanding of how Zambian small and medium scale farmer networks function in knowledge transfer. The key literature that informs the resolution of this problem is primarily in the area of social networks. Literatures on knowledge transfer and social identity are briefly drawn on to enhance our understanding of the research problem.

The various streams of literature are considered in an attempt to better analyse and potentially explain the phenomena of this study. Multidisciplinary approaches address the challenge of complexity (Szostak, 2012) that comes with under-researched study contexts such as Zambia. In under-researched study contexts, the applications of theory in any one discipline may be limiting. Furthermore, research in the African context requires approaches that are multidisciplinary in order to understand the unique contrasts, contradictions and conflicts across the continent (Kiggundu, 1988). Kiggundu (2013) in his reflections on management studies of Africa questions the extent to which Western and Eastern models and theories apply. He (Kiggundu, 2013) argues that there may be a need to reconsider, adjust, relax and in a few extreme cases, discard what is inapplicable. This is best achieved through the multidisciplinary approach advocated.

The context of the networks of small and medium scale farmers in Zambia is characterised by a dearth of social networks research. Additionally, the context is characterised by informality which creates a distance between this context and the contexts in which social network knowledge has been created. Complementing the knowledge from the social networks

discipline with knowledge from other disciplines may help overcome these contextual complexities.

The purpose of this chapter is to review the key literature on the research problem. In doing so, where the resolution to this problem would fit into the current body of work is identified. Research gaps are identified through a critical reflection on the literature. The literature reviewed has been taken from academic books, journals and reports. Journals and reports have been sourced from publisher databases and websites accessed through the internet.

The chapter is divided into three sections based on the key literature areas identified earlier. Section A reviews social networks, Section B reviews knowledge transfer and Section C reviews social identity. The chapter structure is shown in Figure 3-1.

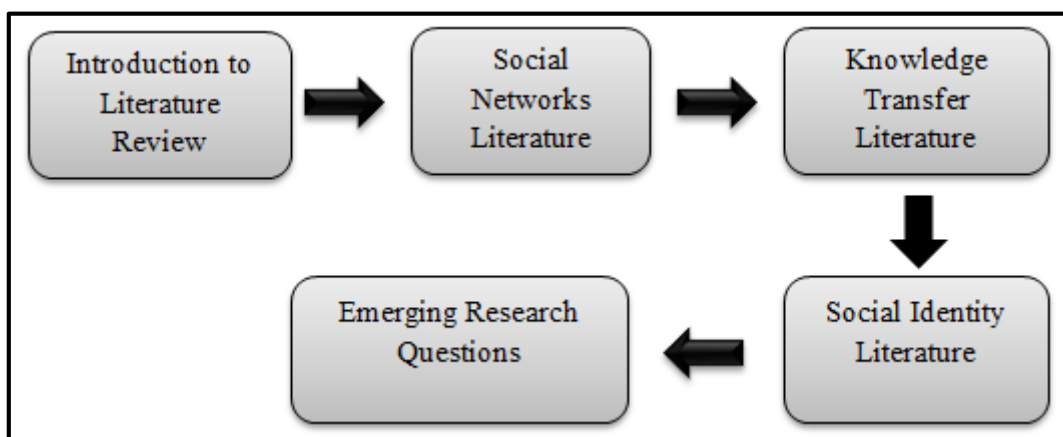


Figure 3- 1: Structure of Chapter 3

3A: SOCIAL NETWORKS LITERATURE REVIEW

Social networks have gained popularity in business studies because they have been found to confer benefits in resource sharing and access to knowledge, among others (G. Ahuja, 2000). Social networks consist of structured relations between or among people (Aldrich, 2006). Social networks are formed when individuals or organisations are linked into a system. The formed system is used as a vehicle for facilitating information communication and content exchange. Content exchanged includes knowledge goods.

Social network theory is among the major research traditions in studying knowledge creation, diffusion and utilisation (Dunn, 1983). The social network perspective is that individuals, groups and units are not isolates but rather are embedded in systems of social relationships (Granovetter, 1985). Social network theory is primarily concerned with the structures of these systems of social relationships (Dunn, 1983). Social network research is a wide-ranging field with very field specific terminology. This terminology is provided in Table 3-1 to facilitate proceeding discussions in this thesis.

Table 3- 1: Terminology of Social Network Research

Concept	Description
Social network	An interconnected system
Node/ Actor/ Social entity	The discrete units in the network; individual or social group
Network approach	Level of analysis/ discussion of network relationships
Whole	Consideration of all nodes in the environment
Egocentric	Single node as the focus of attention
Ties	The relationship connection between pairs of nodes
Directed/	Contents flow in one direction
Asymmetrical	Contents flow in both directions
Reciprocal/	Physically proximate but absent or irrelevant
Symmetrical	exchange
Undirected	Close association, based on the research context
Strong	Distant association, based on the research context
Weak	
Content	The resource shared, delivered or exchanged
Structural properties	Pattern of ties within a network
Size	The number of logically possible relations, reach of
Density	access
Degree	Extent to which members are connected to all others
Centralization	Number of connections to other actors
Distance	Extent to which actors organise around a central point
Clusters	Number of connections between actors enabling
Cliques	reach
Network position	Subgroups of highly interconnected actors
	Fully interconnected clusters
	Location of actor in relation to others

Source: (Schultz-Jones, 2009) p.594

3A.1. Streams of Social Network Research

The literature on social networks can generally be classified as either social capital research or as network development research. Social capital research views social networks as *contexts* for action as can be seen in the works of Granovetter (1985) and Portes (1998). This stream of research is characterised by Borgatti and Halgin (2011) as being *Network Theory Proper*. Research that views social networks as contexts concludes with propositions on how

interactions with social network structures yield certain outcomes for individuals and groups. When the social network is viewed as a context, the focus is on ties and central positions. Simply put, research on social networks as contexts seeks to understand how the social network behaves and the expected impact of this behaviour on actors. Network Theory Proper exposes social network consequences (Brass, 2002).

Social network development research looks at the patterns and determinants of social network formation and change. The view of social network development research is that social networks are a *phenomenon* and a predicted effect of action (Provan, Fish, & Sydow, 2007). Under Borgatti and Halgin's (2011) characterisation, research that considers social networks as a phenomenon provides answers to questions on *Theory of Networks*. *Theory of Networks* research answers questions about why social networks have the structures they do. The focus in this stream of research is not on the ties and central positions but on how and for whom they come about. Simply put, research on the social network as a phenomenon seeks to describe the social network and its properties. Theory of Networks exposes network antecedents (Brass, 2002).

The position of this thesis is that the identifiable streams of social network research ought to be unified. This is in order to enhance the explanations that research in this domain can provide. This unification broadens the agenda of social network studies to not look at network structure and network behaviour independently but rather jointly. In so doing, our understanding of social networks will be enhanced by unravelling out not just their consequences but antecedents as well.

This study captures the essence of both streams of social network research. Investigating knowledge transfer outcomes as a consequence of social networks lies in the Network Theory Proper stream of research. Examining further what gives the social network the characteristics

we observe is a feature of Theory of Networks research. It is possible to situate the study within both research streams because social network theories have common underlying assumptions as stated by Borgatti and Halgin (2011):

1. Structure and position play fundamental roles: Interactions with social network structures yield certain outcomes for individuals. Position becomes especially fundamental when there are several actors in the network. This is because position influences interactions with social network structures (Kadushin, 2011). Explicating the connections between structure, position and outcome has been the principal agenda for social network studies. The literature therefore has benefitted from more work in Network Theory Proper and this has increased our knowledge of the consequences of social networks. However, our knowledge of what causes the structural and positional characteristics of social networks is limited. This suggests that a gap exists in Theory of Networks Research. A literature review by Brass (2002) exposes the gap in our knowledge of social network antecedents. According to Brass's (2002) list, the literature is able to show that some of the antecedents and consequences of social networks are as follows:

Table 3- 2: Antecedents and Consequences of Social Networks

ANTECEDENTS	CONSEQUENCES
Physical and temporal proximity	Attitude similarity
Workflow and hierarchy	Job satisfaction and commitment
Homophily	Power
Personality	Conflict
	Leadership
	Getting a job
	Getting ahead
	Individual and group performance
	Turnover
	Citizenship behaviour
	Creativity and innovation
	Unethical behaviour

Source: Author's summary of work by Brass (2002)

2. Individual attributes are ignored: An individual attribute is a characteristic belonging to an actor by which the actor can be distinguished (Knoke & Kuklinski, 1982). These characteristics can be derived genetically (e.g. gender and age) or socially (e.g. socio-economic status). Social network theory tends to examine individuals at the relational level. This tends to be only at the level of the number of other actors in the network and the extent of their connections. The relationship becomes the subject of interest and the individual ‘disappears’. In this assumption, the individual does not influence their success or failure but the social network structure and their social network position (assumption 1) do. Organisation attributes have been given some consideration in the literature (Brass, Butterfield, & Skaggs, 1998; Breiger & Melamed, 2014; G. Walker, Kogut, & Weijian, 1997) but individual attributes have largely gone underappreciated. A few notable exceptions have been in the studies of homophily in networks (Brass, 1985; Ibarra, 1992; McPherson, Smith-Lovin, & Cook, 2001; Mehra, Kilduff, & Brass, 1998) and in studies of personality in networks (Klein, Lim, Saltz, & Mayer, 2004; Mehra, Kilduff, & Brass, 2001). The argument against studying attributes is that the connection between attributes and social structure changes across populations over time (Burt, 1992). Burt (1992) argues that although attributes are a useful guide for discovering structural processes they cannot provide explanations. The tradition of ignoring individual attributes dates as far back as Barton’s 1968 statement, cited by Freeman (2004). Barton argued that removing social actors from social contexts, and assuming that actors do not interact with anyone else, is a shortfall in sociological studies. Barton further argued that this is a shortfall that social network theory addresses. However, social network theorists seem to have fallen into a similar trap by separating attributes from actors and assuming that attributes have no impact.

3. The function of the social network is the flow of content: The flow mechanism suggests that actors far from others receive content later than those centrally positioned (Borgatti & Halgin, 2011). This assumption reiterates the overriding importance of structure and position (assumption 1). It further reiterates the minimal influence of individual attributes (assumption 2). This assumption however implies that flows can neither be directed nor managed in a network. It also implies that actors cannot seek the content they desire unless it flows through the social network's structures towards them.
4. In management science, actors are strategic players who maximise their self-interest: Subjectivity is neglected and intent is viewed as being consistent among all actors. Neglecting subjectivity and assuming no variation in intent flows on from ignoring actor attributes (assumption 2). This assumption is largely drawn on the 'rational man' of classical economics. The rational man will always behave in ways to maximise his own well-being and expect others to do the same (Anderson, 2000). However, in the economics discipline from which this assumption is drawn, the perspective of what rational behaviour is has greatly evolved from fixation with self-interest (Ariely, 2010). The assumption of self-interest has limited application in collectivist societies where the actions of the individual are motivated by the greater interest of others. The cross-cultural limitation of this assumption has been demonstrated in small scale collectivist societies in previous studies (Henrich et al., 2005; Murove, 2005).
5. Social networks are conceptualised as lasting patterns of relations among actors: The assumption held is that social, economic and political structures are stable for relatively long periods of time. However, the stability of structures varies from one place to another. If the assumption that relations among actors emerge from these structures is held (assumption 1) then these patterns too will change as structure changes.

6. Actors and their actions are interdependent rather than independent: The social network is viewed as a set of relations. Interdependence arises where relations exist. However, the question of the extent of interdependence arises because actor relationships can be directional or non-directional, reciprocal or non-reciprocal (Wellman, Carrington, & Hall, 1988).

3A.2. Social Network Ties

Attention is now drawn to the object of investigation in social network studies which is the connection that exists between actors- the social network tie. By definition, social networks exist because of relationships between actors in a given system and these relationships are called ties (Schultz-Jones, 2009). The strength of a tie is generally determined by the amount of time spent, emotional intensity, mutual confiding and reciprocity between actors (Granovetter, 1973). When these determinants are high the tie is strong, whereas, when the determinants are low the tie is weak. Where the determinants cannot be established, there is a lack of relationship between actors or the relationship that does exist is not substantially significant. Weak ties exist between asymmetrical actors whereas strong ties emerge where a reciprocal relationship exists between actors (Friedkin, 1982).

Håkansson and Snehota (1995) described ties as existing in three forms; resource ties, activity links and actor bonds. Resource ties connect various tangible elements, such as technologies between companies. Activity links involve coordination of specific activities, such as joint research, where interdependencies exist (Håkansson & Snehota, 1995). Actor bonds, which are the ties of interest for this study, connect actors and influence how they perceive each other. Actor bonds also form the identities of actors in relation to each other. They determine

trust levels, interactions and how situations are interpreted in relationships (Håkansson & Snehota, 1995).

As mentioned earlier, social network studies are concerned with relationships, hence ties, between actors. Notable studies have identified the benefits and shortcomings of both strong and weak tie networks as discussed further:

3A.2.1 Strong Ties versus Weak Ties

Strong tie networks are highly clustered, forming cliquish sub-networks in which actors interact exclusively with one another (Granovetter, 1973). Strong ties are useful for exploitation of resources (including knowledge) because it is through these channels that high quality information and tacit knowledge are transferred (Nooteboom, 2000). Support for strong tie networks can be found in the arguments of Powell (1990) and Coleman (2000) on how social capital emerges. Social capital is based on the idea of close and powerful social ties that can ease relations between parties (Gargiulo & Benassi, 2000). However, the sub-networks that exist in strong tie networks restrict information flows (Burt, 2004).

Weak tie networks are more random, consisting of bridges that connect diverse members from different or socially distant sub-networks (Granovetter, 1973). Weak ties are useful for exploration because they enable access to novel information (Nooteboom, 2000; Uzzi, 1999). Granovetter's (1973) *Strength of Weak Ties Theory* is an influential argument in the literature for the utility of weak ties.

3A.2.2 Strength of Weak Ties Theory

Granovetter's (1973) theory states that actors that have strong ties are most likely to be characterised by homophily and therefore have access to similar resources. Strong ties are

therefore unlikely to provide a local bridge to new resources in unconnected segments of a network.

Homophily is the principle that contact between similar people occurs at higher rates than among dissimilar people such that information flows tend to be localised (McPherson, et al., 2001). Homophily can be based on either status or based on value. Status homophily is based on informal, formal or ascribed status (sex, age, religion, education, occupation) while value homophily is based on internal states (Lazarsfeld & Merton, 1954). The causes of homophily have been found to be geographical proximity, family ties, focussed activity and cognitive processes such as knowledge sharing (Lazarsfeld & Merton, 1954).

The key benefits of homophily are that tacit knowledge can be transferred and coordination can be simplified (Cross & Parker, 2003). Homophily in a social network however can be a barrier to knowledge transfer (Rogers, 1962). Homophily is a drawback when it leads to ‘us versus them’ thinking (Krackhardt & Stern, 1988), which in turn results in a lack of diverse ideas.

Weak ties on the other hand are likely to be characterised by heterophily and therefore have access to different resources. Weak ties therefore have the strength of providing local bridges to new resources. Heterophily refers to preference for degrees of difference among actors in a social network (Rogers, 1962). Heterophily in a social network can however be a barrier to communication because heterophilous actors do not speak the same subcultural language. The subcultural language is framed by knowledge levels, experience, social status, education and the like (Rogers, 1962).

Importantly, Granovetter’s theory states that all social network bridges are weak ties but not all weak ties are bridges (Granovetter, 1973). According to the theory, weak tie local bridges create more and shorter resource diffusion paths. They are therefore indispensable to an

actor's opportunities while strong ties breed local cohesion. Local cohesion results in the formation of sub groups which in turn results in network fragmentation (Granovetter, 1973). Fragmentation occurs where there is local cohesion because cohesion leads to the creation of several intimate clusters that form around common activities or knowledge.

Although much of the literature supports Strength of Weak Ties Theory, a few notable exceptions exist. Krackhardt (1992), for instance, argues about the absence of trust in weak ties. He argues that without trust, although new knowledge is received, change will not occur. Krackhardt surmises his proposition as being that there is strength in strong ties. This is because they are a basis for trust and useful where severe change is required and uncertainty looms.

However, in favour of Granovetter's (1973) Strength of Weak Ties Theory, this thesis argues that trust may not only reside in strong ties. Trust may emerge in weak tie networks as well. The trust that can be developed is based on the reliability of the knowledge transferred rather than reliability of actor intentions. The quality of knowledge can ramp up trust regardless of the perceived trustworthiness of the actor. As the quality of knowledge is demonstrated in its applications, trust in the knowledge develops.

Two caveats exist in determining what is more desirable in as far as the strength of ties is concerned. Firstly, if weak ties were strengthened to benefit from the trust that exists in stronger ties, this would lead to increased redundancy (Maurer & Ebers, 2006). Secondly, if strong tie networks were continuously extended to benefit from the novelty of resources in weaker tie networks, it could lead to network overload (Elfring & Hulsink, 2007). There is, therefore, a need to determine what characteristics cultivate trust in weak ties. Additionally there is a need to be definitive on what forms of trust drive change in social networks. In this way, social network coordination can be enhanced to increase access to resources. The

position assumed in this study is that the optimal social network structure will consist of a mix of both strong and weak ties for knowledge flows, a state referred to as network complementarity (Uzzi, 1997, 1999).

3A.2.3 Structural Hole Theory: The argument for not focussing on ties

Another influential theory in the literature of social networks is one that shifts the focus of investigation from ties to ‘holes’ in social network structure. A structural hole is a lack of connection between two groups in a social network (Burt, 1992). These groups are non-redundant. Non-redundant groups are disconnected either because of not having direct contact with one another or because of one group having contacts that exclude the others. Burt’s (1992) argument is that people in a group are more focussed on their own activities and do not participate in the activities of another group. However, the structural holes that exist between groups can be brokered by boundary spanners who will allow resources to flow from one group to another (Burt, 1992).

Although similar to Granovetter’s (1973) Strength of Weak Ties Theory, Structural Hole Theory is about the chasm created by weak ties rather than the ties themselves. The focus of Structural Hole Theory is on actor position rather than tie formation. Obstfeld (2005) identifies an action problem associated with structural holes. He (Obstfeld, 2005) finds that although a focus on the chasm between weak ties generates many ideas, there is ineffective action taken regarding these novel ideas. Ties are needed for action on ideas and are therefore relevant in increasing the applicability of Structural Hole Theory.

Structural Hole Theory depends on network size and therefore structure (Burt, 1992). It therefore tends to be more suited to group studies in large firms than study of relationships in ego-focussed networks (networks that are focussed on the individual). Additionally, Structural Hole Theory emphasises on boundary spanner brokering between groups. This makes the

theory useful for studying control and power benefits of the individual's network position. It has limited application, however, in studying resource flows to individuals unless the boundary spanning role is better specified. Because of the limitations in applying Structural Hole Theory to this study, greater attention will be given to Strength of Weak Ties Theory in analysing and discussing the findings.

3A.3. Network Embeddedness

The notion of interdependencies in social network studies brings us to the notion of embeddedness. Embeddedness refers to how social structures affect economic life (Uzzi, 1997). Embedded relationships exist where strong ties form close and dense networks (Uzzi, 1997). Strong ties, because of embeddedness, facilitate the sharing of highly contextual and complex knowledge by developing trust and creating common values and norms (Uzzi, 1997). Embeddedness can be viewed as relational as a result of network closure due to strong ties (Burt, 2004). It can alternatively be viewed as structural as a result of network architecture influencing economic activity (Uzzi, 1997). Structural embeddedness is concerned with the impersonal configuration of linkages. Which actors are reached and how they are reached as well as the presence or absence of network ties are all impersonal configurations (Granovetter, 1985). Relational embeddedness on the other hand is about the kind of personal relationships (respect, friendship) actors develop through a history of interactions (Granovetter, 1985).

The components of embedded relationships according to Uzzi (1997) are trust, fine-grained information transfer and joint-problem solving arrangements. The key facets of these components lie in norms and sanctions (Coleman, 2000), obligations and expectations (Burt, 1992) as well as identity and identification (Håkansson & Snehota, 1995). Uzzi's (1997,

1999) arguments in support of studying embedded relationships are around the notion that embeddedness creates economic opportunities difficult to replicate via markets and contracts. The trust and personal ties associated with embedded relationships determine interactions more so than explicit contracts and allow for the exchange of tacit content (Uzzi, 1999). This unique advantage of embedded relationships over market based relationships is because of the long term cooperative ties that are nurtured over the self-interest of market ties.

At this juncture, it is important to briefly describe market ties which are being contrasted to embedded relationships. In market ties, transactions take place through loosely connected individuals who maintain impersonal and constantly shifting exchange ties (Powell, 1990). Self-interest dominates actor motivations and as such dependence on single actors is avoided. Market ties reflect calculated risk (Powell, 1990).

According to Uzzi (1997), a paradox however does exist with regard to embeddedness in that it inhibits an actor's ability to adapt. Embeddedness becomes a liability in the following instances:

Embedded relationships tend to have core network players. This increases resource dependency and hence vulnerability, especially because embedded relationships tend to have very restricted actions outside the network. An unforeseeable exit of a core network player can therefore be problematic;

Embedded relationships can be replaced by market ties. This is likely where trust fails and institutional forces are necessary to facilitate exchange;

Overembeddedness, a situation where a network is exclusively characterised by strong ties, can characterise a network and when this happens ties become redundant. This reduces the flow of novel information.

It is assumed therefore that the optimal network structure will be an integrated structure consisting of a mix of market and embedded ties because each tie offers different benefits. Extremes of either ties are undesirable with market only ties creating underembeddedness whilst having embedded only ties creates overembeddedness (Uzzi, 1997).

3A.4. Summary Reflections on Social Networks

The identifiable streams of social network research, Theory of Networks and Network Theory Proper, ought to be unified. In unifying the streams of research, the assumptions of social network theory may need to be revisited. This is in order to broaden the applicability of the theory across a range of contexts.

Strong ties and weak ties lead to variations in social network outcomes. These variations need to be explored further so that social network outcomes can be better predicted. In our examination of social network ties, we must keep afore the extent to which embeddedness greatly influences the outcomes of otherwise predictable phenomena. This means, the social, political, cultural and economic accounts of the individual must be recognised and incorporated in our explanations of social networks.

3B: KNOWLEDGE TRANSFER LITERATURE REVIEW

‘Knowledge Transfer’ essentially involves knowledge movement and knowledge application. It can therefore be defined as the communication of knowledge from a source so that it is learned and applied by a recipient (Ko, Kirsch, & King, 2005). In the literature, knowledge transfer is also sometimes referred to as ‘knowledge utilisation’, ‘knowledge dissemination’, ‘knowledge diffusion’ or ‘knowledge implementation’. And so for the purposes of this study, literatures bearing these terminologies are also drawn on.

Knowledge transfer has been studied extensively in the health, business and government sectors. The literature on knowledge transfer in the agricultural sector in Africa largely focuses on agricultural extension and technology transfer (Sulaiman & Hall, 2002). In this conversation, there are two focal points of discussion. One discussion is on how the farmer receives knowledge from the extension officers in the public, private and non-governmental sectors (Feder, Birner, & Anderson, 2011; Subair, 2002). The other discussion is on how farmers adopt farming technology and how technology can be used for extension work (Lawal-Adebowale & Omotayo, 2012). The state of research and literature on knowledge transfer in agriculture has resulted in the concept of knowledge being reduced to an inanimate object. Knowledge is treated as an abstract commodity and the actor disappears. This has detracted away from the importance of the farmer, the very actor for whom such knowledge is intended. Too little attention is paid to farmer-to-farmer knowledge transfer (Ssemakula & Mutimba, 2011). In reflecting on the social network literature and the premise of embeddedness, this thesis regards this as an important oversight. This thesis argues that knowledge cannot be disembedded from wider social relations. This oversight has created a gap in the literature. This thesis contributes to addressing the gap on understanding the basis of farmer-to-farmer knowledge transfers.

A distinction is made here between farmer-led knowledge transfer and farmer-to-farmer knowledge transfer. The key difference between the two lies in the consideration of social processes (Kiptot, Franzel, Hebinck, & Richards, 2006). In farmer-led knowledge transfer, the lead farmer takes on the role of the extension officer having the knowledge to be disseminated to others. Farmer-to-farmer knowledge transfer, on the other hand, is based on a peer relationship and knowledge exchanges rather than one way transfer.

The social networks research terminology used in part 3A of this literature review is used to explain some phenomena regarding knowledge transfer through social networks. In addition to this, basic terminology in knowledge transfer research used in this thesis is introduced in Table 3-3.

Table 3- 3: Terminology of Knowledge Transfer Research

Concept	Description
Information	Data processed to answer questions asking ‘who’, ‘what’, ‘where’ and ‘when. It is data that is given more meaning by means of a relational connection (Ackoff, 1989).
Knowledge	The application of information that answers questions asking ‘how’. It is the appropriate collection of information intended to be useful (Ackoff, 1989).
Knowledge Transfer	Communication of knowledge from a source so that it is learned and applied by a recipient (Ko, et al., 2005).
Knowledge Types Explicit Tacit	Knowledge of ‘what to do’ that can be explained What is known ‘how to do’ by an actor but is nonetheless difficult to describe except by the actor’s performance (Polanyi, 1958).

3B.1. Knowledge Types

According to Polanyi’s knowledge dichotomy of the 1950s, knowledge can either be tacit or explicit (Li & Gao, 2003). This classification is adopted in this research as it allows us cover other classifications found in the literature namely formal versus informal; codified versus

unwritten. The application of the formal, informal, codified and unwritten classifications to Polanyi's knowledge dichotomy is discussed further in this section.

3B.1.1 Tacit Knowledge

Tacit knowledge is what is known 'how to do' by an actor but is nonetheless difficult to describe except by the actor's performance (Polanyi, 1958). Tacit knowledge is anchored in action, commitment, and involvement in a specific context (Nonaka, 1994). Tacit knowledge can be embrained, embodied, embedded or encultured (Johannessen, Olaisen, & Olsen, 2001). Embrained tacit knowledge is 'know-that' consisting of conceptual skills and cognitive abilities. Embodied tacit knowledge is 'know-how' acquired by doing work rooted in a specific context. Embedded tacit knowledge resides in relationships between organisational constituents. Encultured tacit knowledge is a shared understanding that is socially constructed and reconstructed. It is likely that tacit knowledge can simultaneously embody all these forms and so in order to identify it, these features must be considered.

In the context of this study, tacit knowledge would include knowledge of farming techniques passed on within families. Such knowledge is more popularly known as indigenous knowledge. Indigenous knowledge is the systematic body of knowledge acquired by local people in a given culture (Rajasekaran, Martin, & Warren, 1993). The consideration of indigenous knowledge is important particularly in the Zambian context. This is because most of the knowledge transferred is foreign and competition appears to exist between the foreign and indigenous knowledge bodies. This is discussed in the context of this study's findings in Chapters 5 and 6.

3B.1.2 Explicit Knowledge

Explicit knowledge is formal, systematic and transparent and is embedded in standardised procedures (Martin & Salomon, 2003). It can take the form of manuals, instructions and textbooks. Key features of explicit knowledge are that it can be recorded easily and documented.

Explicit knowledge can be informal when what happens in everyday practice (the tricks of the trade) is told to another person in a formal setting. It is not tacit knowledge because the knowledge source is aware of it. That explicit knowledge is available does not necessarily mean that it gets transferred.

3B.2 The SECI Model

Studies of knowledge creation by Nonaka (1991, 1994; Nonaka & Takeuchi, 1995; Nonaka & Toyama, 2003) have been the most influential on our understanding of knowledge transfer. Notably, the knowledge creation studies provide a framework through which knowledge is converted and through this conversion new knowledge may be created. The framework is the SECI model which studies how knowledge can be converted from one form to another through socialisation, externalisation, combination and internalisation (SECI). This framework highlights the dynamic nature of knowledge and considerations that need to be taken into account to make knowledge usable because of this dynamism. The conversion of knowledge, as per the SECI model, inevitably involves the transfer of knowledge. The social network implications of knowledge transfer within the SECI framework are considered.

3B.2.1 Socialisation

By socialisation, knowledge is transferred through practice and observation. Knowledge transferred by socialisation is tacit in nature and retains its tacit form. The essence of socialisation lies in connections existing between individuals. These connections exist through social relationships and this highlights the role of social networks in the knowledge transfer process. For socialisation to be effective it is necessary for actors to be *willing* to share knowledge (Andreeva & Ikhilchik, 2011). This willingness may be affected by trust.

3B.2.2 Externalisation

Externalisation attempts to transfer tacit knowledge by explicating it through codification into documents. Open dialogue is necessary for externalisation to be successful (Andreeva & Ikhilchik, 2011). From a social network perspective, the open dialogue that facilitates externalisation must occur across various levels of the network. Identification of actors at the different levels is crucial and again, trust among actors across the levels may be an important consideration.

3B.2.3 Combination

Combination integrates codified knowledge sources and in so doing new knowledge is created. Communication is required between the holders of the different knowledge in order for combination to occur. Systemisation makes the combined knowledge usable but this requires a level of formalisation in the social network arrangements.

3B.2.4 Internalisation

Internalisation occurs when explicit knowledge is learned and used to the extent that the knowledge recipient's tacit knowledge is modified. In a social network context, internalisation

requires the individual to identify the knowledge relevant for them within the social network's available knowledge. The individual needs to find themselves and their place in the social network in order to be able to internalise what is explicitly available.

3B.3. Forms of Knowledge Transfer

Hansen (1999) concludes that neither weak nor strong ties lead to efficient knowledge transfer. Each is useful depending on the complexity (with tacit being more complex than explicit) of the knowledge to be transferred.

3B.3.1 Tacit Knowledge Transfer

Tacit knowledge, by its nature of residing in an individual's intuition (Polanyi, 1958) is challenging to transfer. Tacit knowledge comes about because actors tend to combine different types of information to form new and unique knowledge. The new unique knowledge is refined for specific use or generalised for broader application (Horvath, 1999). This new unique knowledge becomes embodied in the practices of the actor. How tacit knowledge can be acquired through personal relationships, apprenticeships and socialisation overtime has been investigated (Krackhardt & Hanson, 1993; Nonaka & Takeuchi, 1995). What previous studies have found is that tacit knowledge transfer occurs where there is trust and where a long term relationship is developed between parties (Krackhardt & Stern, 1988; Sun & Scott, 2005). Tacit knowledge transfer is based on the depth of social relationships and trust between partners (Chen, Sun, & McQueen, 2010). Tacit knowledge can sometimes be elucidated through prolonged observation of actions and frequent probing.

Barriers for tacit knowledge transfer have been found to include lack of experience and capacity to assess knowledge evidence, mistrust and negative attitudes towards change (Mitton, Adair, Mckenzie, Patten, & Perry, 2007). Too many knowledge transfer interventions rely on the use of information and communication technologies (ICTs). Although information flows can be enhanced by ICTs, tacit knowledge tends to be de-emphasised (M. K. Ahuja, Galletta, & Carley, 2003; Johannessen, et al., 2001). With increased ICT use in knowledge transfer, tacit knowledge can be overlooked, toned down or even completely removed (Johannessen, et al., 2001). This is because although communication technology connects people across space and time the individual ties are likely to become weak (Gargiulo & Benassi, 2000).

Formal structures and systems may hinder tacit knowledge transfer because they frame how actors interact and are coordinated (Szulanski, 1996). Inability to freely socialise means that actors that may need the knowledge do not have access to it because of barriers presented by formal structures.

3B.3.2 Explicit Knowledge Transfer

Explicit knowledge is less ambiguous and more specific to the extent that it can be coded, articulated and transferred (Inkpen & Tsang, 2005). Explicit knowledge is embedded in standardised procedures so it can be effectively transferred through written documents without need for direct contact and attachment between parties. Using documentation for the transfer of knowledge is convenient in that recipients can refer to the knowledge at their own convenience several times. However, this is not without its challenges. Particularly, documentation does not provide opportunities for timely and direct inquiry or feedback. Technology driven structured processes enable explicit knowledge transfer (Hansen, Nohria,

& Tierney, 1999) and as such the use of ICTs in explicit knowledge transfer has gained much popularity.

The challenge for explicit knowledge transfer, however, is actor implementation. Actor implementation requires a conversion of explicit knowledge to tacit knowledge through internalisation (Nonaka & Takeuchi, 1995). This is where the effectiveness of technology in explicit knowledge transfer has a limitation. Interpersonal relationships become essential in the implementation process because they facilitate trust. Others have noted, however, that explicit knowledge transfer does not require a high trust relationship to be effectively transferred (Powell, 1990). It may however be enhanced by the presence of trust in the interpersonal relationship.

An important consideration is the proposition that tacit knowledge may assist in the acquisition of explicit knowledge (Dhanaraj, Lyles, Steensma, & Tihanyi, 2004) and so the failure to transfer tacit knowledge may be a barrier to knowledge transfer in its fullness. It is only when tacit knowledge is linked to explicit knowledge in a system that improvements emerge (Johannessen, et al., 2001).

3B.4. Summary Reflections on Knowledge Transfer

Knowledge should not be regarded as a static object that is simply passed on from one actor to another. Knowledge is embedded in the actors that possess it as well as in their actions and non-actions. Knowledge is activated and lives through actors that create it, use it and transfer it to others. Interpersonal relationships are necessary for knowledge transfer regardless of the knowledge form. The nature of these relationships, the ties between actors, need to be understood for the successful transfer of knowledge.

3C: SOCIAL IDENTITY LITERATURE REVIEW

Social identity has been largely used as a lens through which to study social power, collective action and political influence. Social identity as a concept was first introduced by Tajfel (1972) and is an individual attribute which this thesis seeks to examine. This is in order to enhance network theory explanations of how knowledge is transferred in small and medium scale farmer networks in Zambia.

Actor attributes have an impact on social structure (Edelenbos & Klijn, 2007). However, much of the social network research literature ignores attributes of actors because actor outcomes are assumed to derive from embeddedness in systems of relations (Edelenbos & Klijn, 2007). The view that attributes are an unnecessary consideration in social network studies can be seen in the works of Mayhew (2002), Wellman (2003), White (1986) and others. In contrast to this view, Uzzi (1999) asserts that actor attributes are as important in network research as the quality of ties and resources transferred. This thesis takes a lead from Uzzi's assertion. This thesis argues that the assumption that actor attributes ought to be ignored in social network research needs to be relaxed. This argument is made specifically in the context of Zambian small and medium scale farmer networks. The attributes of individuals in these networks influence their behaviour and in turn the transfer of knowledge in the network.

Identity processes are relevant to organisational problems because they constitute an important motivating factor in people's behaviour in groups (Haslam, 2004). The transfer of knowledge is a type of behaviour and is therefore motivated or demotivated by how actors identify themselves.

Although the influence of actor identity has been observed in other network studies, to present knowledge the manner of impact has not been explicated. This is a theoretical gap this thesis addresses. The terminology used to explore identity in this thesis is presented in Table 3-4.

Table 3- 4: Terminology of Identity Research

Concept	Description
Self-categorisation	The perceived inclusion of the self in the group (Tajfel, 1978)
Group commitment	The extent to which an individual feels emotionally involved with the group (Tajfel, 1978)
Social identity	Individual's knowledge that they belong to a social category or group (Hogg & Abrams, 1988)
Social category or group	Set of individuals who hold a common social identification (Hogg & Abrams 1988)
In-group	Persons deemed similar to the individual by social comparison who are then categorised with the individual in the same social category or group (Hogg & Abrams, 1988)
Out-group	Persons deemed dissimilar to the individual by social comparison who are then categorised with the individual in a different social category or group (Hogg & Abrams, 1988)
Salience	Probability that a given social identity will be invoked (Ashforth & Johnson, 2001)
Social identity complexity	The way in which individuals subjectively represent the relationships among their multiple in-group memberships (Dejenne & Forsé, 1999)

3C.1. Identity Theories

The most influential theories in the study of identity have been *social identity theory* and *self-categorisation theory*. Social identity theory purports that a person's need for positive self-identity can be satisfied by membership in prestigious social groups (Tajfel & Turner, 1979). This need motivates social comparisons that favourably differentiate in-group from out-group members. Self-categorisation theory makes a fundamental distinction between personal and collective identities. It argues that whichever identity is more salient, critically shapes the

individual's perceptions and responses to situations and to others (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).

From both theories, forming an identity is an inevitable process for actors and this process has a consequential outcome for the formation of groups. The groups formed may be deliberately included or excluded in knowledge transfer activities, depending on whether they are perceived as in-groups or out-groups. This may result in either an enhanced or hindered knowledge transfer process.

This thesis does not engage in the debate on which identity theory to consider. The thesis is not concerned with the origins and development of individual identity. Identity as a holistic concept will be used as a lens to analyse existing explanations and predictions of network theories. This is deemed suitable because of the evidence of its impact on social structures and relations.

3C.2. 'In-groups', 'Out-groups' and Identity Complexity

Social identity provides a basis for in-group and out-group status (Rivera, Soderstrom, & Uzzi, 2010). Individuals that strongly identify with a group use strict criteria to determine who is a legitimate member of the group. Those who do not meet the criteria are excluded (Ellemers & Rink, 2005).

Most individuals simultaneously belong to multiple social groups because multiple potential identities exist (Degenne & Forsé, 1999). The way in which individuals subjectively represent the relationships among their multiple in-group memberships is referred to as social identity complexity (Degenne & Forsé, 1999). The concept of social identity complexity was

introduced by Roccas and Brewer (2001). This was done to capture the importance of how different identities are subjectively combined to determine the overall inclusiveness of the individual's in-group memberships.

Where individuals have a low social identity complexity, they see their in-groups as the intersection of all their group memberships. This results in a single highly exclusive identity category that excludes others who do not belong to *all* groups that intersect to create that identity (Degenne & Forsé, 1999). Low social identity complexity means that multiple identities are subjectively embedded in a single in-group representation.

In contrast, individuals with a high social identity complexity recognise their distinct membership of different groups. They thereby form more inclusive identity categories by summing up their identities (Degenne & Forsé, 1999). High social identity complexity acknowledges differentiation and difference between in-group categories (Degenne & Forsé, 1999).

Salience varies across one's multiple identities. Higher order identities, those at the organisational level of the network, are more inclusive and abstract such that their impact is indirect and delayed (Ashforth & Johnson, 2001). Lower level identities, those at the ego level of the network, tend to be more subjectively important and situationally relevant (Ashforth & Johnson, 2001). What Ashforth and Johnson (2001) argue is that although higher order identities tend to be less salient, they are important. This is because if the salience of higher order identities is enhanced, individuals will think, feel and act in ways more consistent with those identities.

When higher order identification occurs, actors adopt the central and distinctive characteristics of the higher order organisation as defining characteristics of themselves (Haslam, 2004). Such characteristics may include goals, values and beliefs. When higher

order identification is strong, other identities recede (Johnson & Ashforth, 2008). Such identification aligns an actor's interests with those of the overall network, thereby facilitating motivation and task performance (Haslam, 2004). Even with this said, identities are not always neatly stacked up as high and low order because they may be in conflict with one another.

3C.3. Individual Orientation and Identity

By taking an ego level unit of analysis for this study, the identity of actors emerges as important. This is because identity creates variation in how open actors are and whether they display allocentric or idiocentric properties.

Allocentrism is the individual level orientation reflecting a collectivist culture whereas idiocentrism is the individual level orientation reflecting an individualistic culture (Triandis, Bontempo, & Villareal, 1988). Allocentric preferences and values include looking to the in-group as an extension of self and source of identity. Idiocentric preferences include detachment from the in-group, self-reliance and a competitive nature (Triandis, et al., 1988). It is anticipated that allocentric individuals will rely on the group to access new knowledge. Idiocentric individuals on the other hand will be self-propelled in seeking out and accessing new knowledge.

3C.4. Identity and Network Roles

Individuals have multiple identities that are attached to multiple roles which are embedded in social networks. According to Walker and Lynn (2013), individuals have self-held identities

formulated by themselves and identities that are attached to them by their social contacts. When there is congruence between self-held and attached identities, identity confirmation (Milton & Westphal, 2005) is achieved and individuals are expected to adequately fulfil the roles they are expected to perform. However if there is a mismatch in the identities, identity imbalance exists (M. H. Walker & Lynn, 2013). This can be detrimental to social network performance because actors perform roles not expected of them by others in the social network. It is important to consider this for knowledge transfer in social networks. This is because knowledge transfer requires actors to perform certain roles in acquiring knowledge and disseminating it to others. If it is unknown or disagreed on who should perform what function, knowledge transfer may be hindered. Identity influences the behaviour of an actor in the social network as identity leads to the assumption of roles (Cross & Parker, 2003). These different roles assumed by actors impact on the efficacy with which knowledge can be transferred in social networks.

Whilst an argument exists that an individual's identity arises from belonging to a social network (Coleman, 2000), others suggest that an individual's personal social network arises from an identity based social network (Hite, 2005). The evidence arising from this thesis tends to support the latter view in that actors take on a number of identities with which they use to form social networks around them. Consequently, accurately identifying a social network's actors requires us to first establish how actors identify themselves.

3C.5. Identity and Trust

Scholars have found that a link exists between identification of in-groups and trust (Brewer, 1979; Ellemers & Rink, 2005). This link exists because identification of similar others as

members of in-groups legitimises them (Hogg & Terry, 2001). It is this legitimacy as a member of a group that grants one trust from other actors and reduces hurdles in knowledge transfer that exist due to mistrust in the social network. Although many social network studies discuss the role of trust, they fall short in linking trust back to identity.

3.2 Emerging Research Questions

In drawing on the key points considered in the literature, the review identified the following research gaps:

- A gap in Theory of Networks Research evident by our limited knowledge of what causes the structural and positional characteristics of social networks;
- An insufficient understanding of the impact that social networks have on the transfer of knowledge as a resource in some industries like agriculture;
- Insufficient attention is paid to farmer-to-farmer knowledge transfer;
- Knowledge is treated as an abstract entity and the actor disappears;
- Although the influence of actor identity has been observed in other network studies, to present knowledge the manner of impact has not been explicated.

This thesis situates the study in the literature and attempts to address the identified research gaps by asking the following questions:

- What factors have led to the observed structures and positions in social networks in Zambian small and medium scale agriculture?
- How suitable and effective are the social networks that Zambian small and medium scale farmers belong to in transferring knowledge? Does membership of a social network open-up or restrict knowledge opportunities?
- What governs displayed behaviours in farmer-to-farmer knowledge transfer?
- What explanations can be provided for the influence actor identity has on social network outcomes?

The numerous questions posed can be concisely summarised in two broad research questions to guide this study as follows:

1. *What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*
2. *What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?*

CHAPTER FOUR: METHOD AND METHODOLOGY

4.1 Introduction

This chapter discusses the methods used in this research and the underlying epistemology informing these decisions. Chapter 1 presented the focus of this research as being to understand how *Zambian* small and medium scale farmer networks function in transferring knowledge.

Chapter 2 introduced the *Zambian* context. It highlighted the relevance of this research for the *Zambian* and similar contexts. The chapter highlighted that there is insufficient preceding research in the study area and this influences the research method undertaken in this study.

In order to understand the phenomena of social networks, knowledge transfer and social identity, a critical literature review was conducted in Chapter 3. This revealed an important gap in the literature on social networks and knowledge transfer that this study may begin to fill. This gap is the insufficient research in the area of Theory of Networks which has resulted in poor understanding of social network antecedents. The incorporation of actor attributes such as social identity in social network research was presented as an opportunity to fuse this gap.

Drawing on the research focus, theoretical gap and the insufficient literature on the gap identified provided the rationale for pursuing this research agenda. Further considerations informing the method and methodological choices of this project are based on previous studies in similar areas as shown in Table 4-1.

Table 4- 1: Method Review of Similar Studies

AUTHOR	STUDY	CONTEXT	METHOD
Sabine Hiller (2007)	The treadle pump in Zambia: Stepping out of subsistence farming	Zambia	Feedback Methodology
Jody D. Sturdy (2008)	Understanding agricultural innovation adoption processes and garden scale water use through farmer-driven experimentation	South Africa	Participatory Learning; Action Matrices
Berhane Hailu (2009)	The impact of agricultural studies on smallholder innovation capacities	Ethiopia	Social Network Analysis
Joshua E. Cinner, Örjan Bodin & James H. Jones (2010)	Livelihood diversification in tropical coastal communities: a network based approach to analysing 'livelihood landscapes'	Kenya, Tanzania, Madagascar, Seychelles, Mauritius	Network Analysis

The studies in Table 4-1 were all conducted in the context of agrarian economies and focussed on smaller scale farmers. The methods highlighted in the table enabled the researchers answer questions pertaining to the under-researched groups of interest. Some of their techniques were incorporated in the method design of this study as is discussed further in this chapter.

This study requires an approach that will provide the most practical means of understanding the study phenomena. Understanding in order to explain phenomena is best achieved when a qualitative approach that embraces multiple paradigms is employed (Gioia & Pitre, 1990). A multi-paradigm qualitative approach enables fresh insights and comprehensive understanding of the multifaceted nature of reality.

Furthermore, the social networks discipline under study is relatively young, the discipline having only gained attention in research from as recently as the mid-1980s (J. Hill, McGowan, & Drummond, 1999). This supports the need to employ methods that allow more exploration rather than empirical testing. The methods also need to capture the complexity of

the context- Zambia. This will enable further development of existing explanations- all consistent with the promises of qualitative research (Creswell, 2007). According to Creswell (2007), the qualitative research approach is useful when:

- Research is conducted in the natural setting in which the phenomenon investigated occurs;
- The researcher is the key instrument;
- Multiple sources of data are to be employed;
- Inductive data analysis is necessary to arrive at participant meanings.

This study adopts a qualitative research design by using an inductive approach for which this chapter provides a comprehensive account. Section 4.2 outlines the choice of method. Section 4.3 discusses the methodology of inductive research and its accompanying methods as relevant to this study. Section 4.4 provides details of social network analysis as a method for data analysis in conducting social network research. Considerations for trustworthiness are discussed in section 4.5. Section 4.6 presents the ethical considerations for this project. Section 4.7 outlines some of the identified limitations of the research design. Figure 4-1 outlines the structure of this chapter.

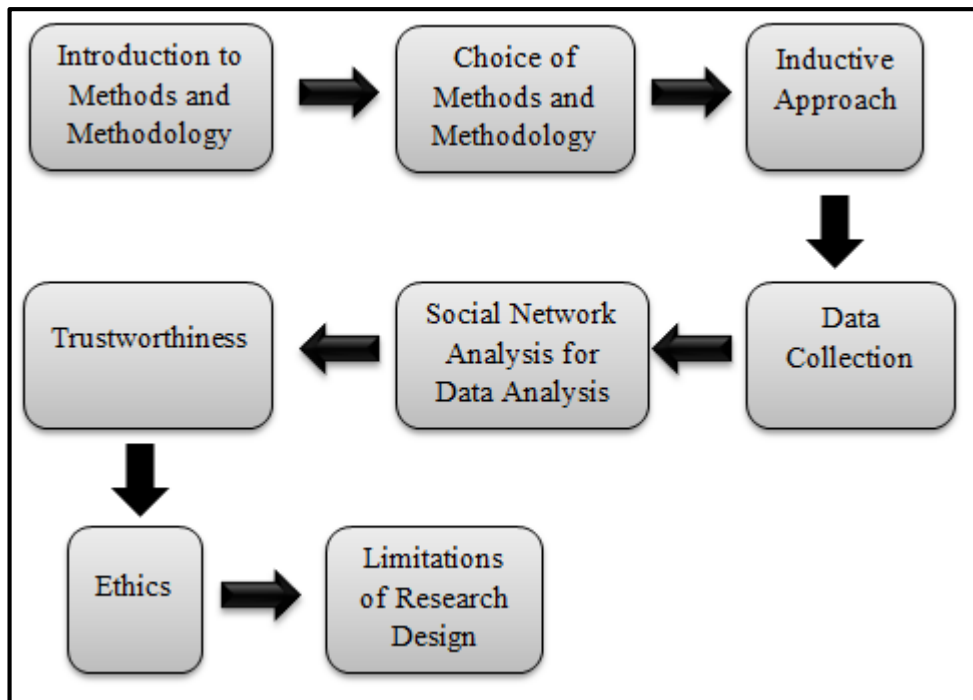


Figure 4- 1: Structure of Chapter 4

4.2 Choice of Method and Methodology

The questions this research asks to address the research problem of how networks of small and medium scale farmers in Zambia transfer knowledge are:

1. *What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*
2. *What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?*

4.2.1 Qualitative Research

The research problem and questions are exploratory in nature in order to address the limitations of existing explanations. This gives support for the adoption of a qualitative research design because qualitative research offers an opportunity to transcend the

shortcomings of existing explanations (Weick, 2007; Yin, 1994). The benefits of qualitative research design are that qualitative approaches enable depth and breadth of focus (Dumka, Gonzales, Wood, & Formoso, 1998). For an under-researched study context such as Zambia, achieving depth and breadth will lay the foundation for future studies. This will transcend the dearth of research that has been highlighted as being a hindrance in several sections of this thesis.

Qualitative and less structured approaches to data collection have been a recognisable feature of social network studies from social network theory inception (Hollstein, 2011). Hollstein (2011) surmises that the utility of qualitative approaches in social network studies are as follows:

- Exploration and development of new concepts;
- Validation of social network data;
- Description of social network practices;
- Assessing the performance of social network orientations;
- Providing insight on social network impacts and dynamics.

The problem and questions are context bound suggesting the need for an approach that will provide answers based on the context. Social network studies have largely been conducted in developed market economy contexts. This has given rise to the prominence of theories that do not adequately explain social network phenomena in agrarian economy contexts.

Cernea & Kassam (2006) discourage the use of quantitative research in agrarian economy contexts prior to qualitative research. This is because most quantitative approaches are modelled on research in the context of a developed market economy and agrarian economies cannot simply adopt research designs.

Furthermore, data relating to an individual's attitude, preferences and judgements are more accurately collected by using qualitative research (Tekola, Griffin, & Camfield, 2009). It is agreed that qualitative and quantitative research can be used in a complementary fashion (Dunning, Williams, Abonyi, & Crooks, 2008). However, in this project only a qualitative design is considered because, to present knowledge, no similar study has set precedence in the Zambian context. Therefore, the subsequent findings of this study may be useful in setting a basis for a future quantitative study.

4.2.2 Ontological and Epistemological Stances

The choice of methodology is governed by the study's objectives. The theoretical frameworks informing it are structured around the researcher's core beliefs about knowledge as follows:

- People participate in the construction of knowledge;
- The perspective of people and their insight into the workings of society varies systematically with their position within that society. This means that small and large scale farmers have a different perspective of society stemming from their different positions.

The understanding of the underlying ontological and epistemological stances of these beliefs is explained as follows:

4.2.2.1 Social Construction of Knowledge

The question of what can be known, how it can be known and how we can know that we know is an age old philosophical question (Gold, 2012). The view that knowledge is socially constructed emphasises that different social groups develop ways of thinking and types of knowledge to solve their own problems (Gold, 2012). Knowledge can be constructed by an individual as in constructivism or by a social group as in constructionism (Young & Collin,

2004). Consequently, what constitutes knowledge will vary for different social groups and phenomena take on different forms, values and meanings (Gold, 2012). Knowledge and the belief of what reality is becomes embedded in the institutional fabric of society (Berger & Luckmann, 1991). Social construction helps us take account of diversity in the ethnic, cultural, and religious backgrounds of individuals.

4.2.2.2 Subtle Realism

Subtle realism lies at the cusp of realist and relativist ontologies. The subtle realist stance acknowledges that human practice shapes world realities and the world in turn has its own realities that impact on human practice (Seale, 1999). Society is therefore both subjective and objective (Andrews, 2012; Berger & Luckmann, 1991). Hammersley (1992) emphasises that in research, what occurs are representations and not reproductions of phenomena. This means that researchers influence the research process (Andrews, 2012). Subtle realism is compatible with inductive research strategies (Blaikie, 2007).

4.3 Inductive Approach

4.3.1 Purpose of the Inductive Approach

An inductive research approach aims to establish descriptions of characteristics and patterns (Blaikie, 2007). The purpose of the inductive approach is to allow research findings to emerge from themes inherent in raw data recognised as frequent, dominant, or significant (Thomas, 2006). It starts with a collection of data on characteristics or patterns in order to produce descriptions and ends with relating descriptions back to research questions (Blaikie, 2007).

Social network studies that have successfully employed the inductive approach include those of Gluckman (1940, 1962), Fischer (1982), Rea-Holloway (2008) and Spillius (2014).

4.3.2 Data Collection in the Inductive Approach

Multiple data sources are drawn on but the principle means of data collection is the interview (Gioia, Corley, & Hamilton, 2012). Understanding is arrived at by seeking a complexity of views rather than narrow meanings (Creswell, 2007). Broad and general questions are asked so that participants can construct the meaning of the phenomenon of interest (Creswell, 2007). The focus is on the specific context in order to understand the historical and cultural settings of the participants that give new dimensions to knowledge.

4.3.2.1 Sampling

The sampling techniques employed are purposive sampling and snowballing. A purposive sample is selected based on the knowledge of a population and the purpose of the study (Babbie, 2001). Purposive sampling serves to focus on particular characteristics of a population that are of interest, which will best lead to answering the research questions (Trochim, 2006). The purposive sampling technique used is homogeneous sampling so that research participants share important characteristics (Patton, 1990). The sample size can be very small, as small as less than 10 participants (Addis, Urga, & Dikassol, 2005; L. M. Lyon & Hardesty, 2005; Prance, 2004; M. Walker, Nunez, Walkingstick, & Banack, 2004).

The goal of purposive sampling in this research is to have a group of participants meeting the following observable criteria:

- Female farmer participant in the small and medium scale farming sector in Zambia;
- Operating in the rural-urban fringes of Lusaka Province of Zambia;

- Self-identification of agricultural activity as making an important contribution to the participant's income.

The specifications on gender and location of operation are made in order to increase the comparability of research findings. They also reflect the important features of the context as was discussed in Chapter 2. The contribution of agricultural activity to income is specified to increase the probability of sampling farmers that farm for a livelihood rather than for recreation.

The purposively sampled institutional participant is the Zambia National Farmers Union (ZNFU). This participant is sampled because they are the umbrella body of all farmers in Zambia.

Snowballing is useful in determining the actors in the social networks as participants provide the leads on who they are connected to and how they are connected. It is a network based technique with widespread use and growing popularity (Goel & Salganik, 2010).

The sample that was snowballed was reached through recommendations of the Zambia National Farmers Union and initial contact farmers. The sample for this study was made up of the following participants:

Table 4- 2: Study Participants

Primary Participants	#	Farmer-based Organisations	#	Sector Service Providers	#	Total
Small to medium scale farmers	9	Women's associations	2	Mobile technology solution providers	2	
Market traders	4	Farmer cooperatives	2	Farmer magazine	1	
		Farmer's union	1	Farmer's market	1	
				Agricultural knowledge transfer expert	1	
				Micro-lending institution	1	
				Government ministry	1	
				Agribusiness institution	1	
TOTAL	13		5		8	
						26

Having a sample consisting of less than 10 farmers in qualitative theses on the agricultural sector is not unusual and is in fact desirable as indicated in the works of writers in the field (Dooley, 2007; Strong, Harder, & Carter, 2010).

4.3.2.2 Trust Building

Access from the major informant to the study, the Zambia National Farmers Union, is granted prior to data collection. However, it is necessary to build trust with individual farmers before data collection commences. Even after data collection commences, consent is ongoing and renegotiated to maintain and build further the developed trust. The trust issues arising are a result of the following:

- The farmers have never interacted with academic researchers before and question the motives of the researcher;
- The farmers need confidence in the ability of the researcher to adequately represent their experiences;

- The election of a new government in Zambia makes farmers reluctant to talk to any ‘outsiders’ (read non-farmers). They fear that their access to government farming subsidies and inputs may be compromised if their political allegiance becomes known;
- The political climate has also affected feedback from organisation participants such as the Ministry of Agriculture and Livestock as well as the Food Reserve Agency. Appointments and reshuffles in these organisations are ongoing. This has resulted in a frequent change of authorised informants with whom relationships need to be forged.

Trust building activities with the farmers involve the researcher assisting farmers with their daily work and living in their communities. This is done to get a sense of what their experiences really are. It is during this work that the researcher’s questions are asked and farmers open up to answer them. This work took place over 2 weeks with each farmer alongside the iterative process of interviews, reflections, probing and confirmation.

To build trust with organisations and farmer associations, the researcher engaged in the following:

- Attended and contributed to their meetings;
- Participated in their field work;
- Performed some administrative.

This took place over a month and data was gathered through the iterative process of interviews, reflections, probing and confirmation as was with farmers.

4.3.2.3 Interviews

There is no prescriptive number of interviews in this research design. Rather, interviews conclude when analytical saturation emerges within the constraints of time, resources and availability of participants (Mason, 2010). The number of interviews is not as important as the

thickness of descriptions that can be obtained. Thick interpretation is supported based on Geertz's (1973) case that thickness is the characteristic of research output that has explanatory power. It enables a researcher reach deeper levels of meaning. Repeat interviews were conducted as deemed necessary; either face-to-face or through telephone calls.

Richness is obtained by lessening the distance between the researcher and participants through collaboration and spending time in the field. Data collection in the field occurred over 6 months, whilst confirmation or, otherwise and, disconfirmation of data continuously occurred over 12 months. The process of developing richness is not linear but an iterative inquiry. It constantly moves the research between concepts and data, society and concrete phenomena, past and present issues, appearance and essence (Harvey, 1990). This method allows richness to develop by:

- Seeking connections and reflections;
- Forming opinions and new concepts;
- Correcting elements;
- Getting deeper below the surface;
- Refocusing until a coherent model is produced through ongoing construction and deconstruction.

Interviews with farmers were conducted face-to-face in the field. Interviews consisted of questions associated with the research problem and any emerging questions from the participants. Twenty-six participants were interviewed over a series of interactions with the participants rather than single instances. Interviews occurred during farm stays with farmers and through meetings arranged with institutional participants. Farm stays lasted between 1 and 2 weeks whereas meetings with institutional participants lasted between 30 and 45 minutes. Most interviews with farmers were conducted informally in the course of the

performance of farm tasks which the researcher participated in. The diversity of views is presented in the findings through quotations from the participants.

Questions asked were open ended in nature and probing was used to achieve richness. The majority of interviews were conducted in English while a few others were conducted in Zambian local languages, Bemba and Nyanja. It was observed that participants tended to use English in the first contact interview but preferred the use of either (and in some cases both) Bemba or Nyanja in subsequent interviews. This has been interpreted as a demonstration of increased familiarity and comfort with the researcher. This is because English language use in Zambian society is considered very official and appropriate for use with strangers but not so among friends.

In an effort to maintain the meaning of questions asked across the languages used, simplicity was strived for. However, in some instances it was helpful to use culturally relevant metaphors to aid in description or elicit emphasis on some points of interest. For example, in a few cases, farmers were not aware of how much land they possessed in terms of acres or hectares. It is culturally known however, what the minimum amount of land required to farm is. This minimum is called a 'lima garden' in many parts of Zambia, approximately 2 hectares. This cultural knowledge was used as a reference point in asking a question regarding farm size i.e. rather than asking, "*What size is your farm?*" the question asked was, "*If you had to divide your farm land into lima gardens how many lima gardens would you have?*"

Because participants were interviewed on more than one occasion, there were several opportunities to probe the responses given to questions in order to be as close to the intended meanings as possible. All participants spoke at least more than one language and so in some instances a single interview may have been conducted in up to 2 languages. Decentering

(Brislin, 1970) was used in these cases to ensure that the language used did not contain content requiring further modification.

The interviews were recorded and transcribed. Local language interviews were translated to English. English translations were approved by a certified linguist, translator and interpreter with the Institute of Economic and Social Research at the University of Zambia. Follow-up face-to-face and telephone interviews and were used to verify the correctness of transcribed data. The language use by participant is shown in Table 4-3:

Table 4- 3: Interview Language Use by Participant

Participant	English	Bemba	Nyanja
Farmer JC	x	x	
Farmer MN	x		x
Farmer AN	x		x
Farmer FP	x		x
Farmer IA	x		
Farmer GK	x		
Farmer FS	x		
Farmer ES	x	x	
Farmer CZ	x		x
Market Trader VK		x	
Market Trader VZ		x	x
Market Trader TP	x		x
Market Trader MM		x	

Like Gioia, Corley and Hamilton (2012), the researcher made efforts to give the participants voice rather than imposing concepts and theories on their experiences. Specific efforts made were inviting research participants to narrate their stories of farming experiences uninterrupted and in their own words. The interview guides and feedback reports used in this research are attached as Appendix A.

4.3.2.4 Other Data Collection Techniques

Data was also collected through feedback reports on the researcher's interpretations. Memos of observations were created and documents obtained from identified actors were drawn on. Field observations captured the essence of what was left unsaid. Documents were used as a means of contrasting what was believed to be happening by the actors to what was observed happening by the researcher. The researcher also kept a reflective diary of the research experience attached as Appendix B. The diary was used to document decisions on which actors to access, how to access them and reasons for doing so. This was to ensure continuous reflection on ethical and methodological considerations.

4.3.3 Data Coding in the Inductive Approach

Categories are developed from the raw data. Key themes are constructed by the researcher. The coding strategy employed is based on the coding methods of Strauss and Corbin (1998). Coding is conducted in three stages of open, axial and selective coding (Strauss & Corbin, 1998). The coding method of the data produced 6 themes, 30 categories and 114 codes within them, presented in Appendix C. Coding is done by manually working through interview transcripts several times until no new codes emerge.

Open coding occurs by segmentation of data through identified properties that give data dimensions. The data is segmented into 4 levels by network level as follows:

- The ego-level of the network i.e. the farmer;
- The meso level 1 of the network i.e. farmer groups;
- The meso level 2 of the network i.e. farmer service providers;
- The macro level i.e. agricultural system coordinators and regulators.

These levels are observed from the data. Appendix C demonstrates the open coding process of this study.

Axial coding presents the central phenomenon as it emerges from the data. It also presents the causal conditions influencing the phenomenon and the resulting actions and interactions. Axial coding brings to the fore the centrality of the context as an intervening condition of delineated outcomes (Strauss & Corbin, 1998). The initial central phenomenon that emerged from the open codes through this method was that of embeddedness. However, on further examination of the codes it emerged that the notion of embeddedness was rooted in questions of identity. This has resulted in identity being placed as the central phenomenon in this study. The causal conditions appear to be occupation, time commitments, up-bringing and the extent of formalisation of the farmer's activities. Resulting strategies involve deciding whether to join a farmer based organisation, whether to seek codified or tacit knowledge and strategies for utilising knowledge opportunities. The contextual markers appear to be the location of actors in relation to the core and periphery of the network. Intervening conditions include levels of education, extent of needs for finance and gender issues. Appendix D demonstrates the axial coding process of this study.

Selective coding is the development of a storyline to connect the categories in order to specify propositions that state the predicted relationships. The storyline developed uses codes associated with relational perspectives of social identity, embeddedness and knowledge transfer. These are used to specify propositions on how the network enables and disables interactions between parties. Appendix E demonstrates the selective coding process of this study.

4.3.4 Data Analysis in the Inductive Approach

Data analysis involves establishing clear links between the research objectives and the findings derived from the raw data (Thomas, 2006). Analysis is carried out by reading and interpreting the raw data multiple times. The findings arise directly from the analysis of the raw data. Part of the analysis occurs during coding. An example is provided here of how the data is analysed from raw text, to thematic code, to category:

Table 4- 4: Example of Data Analysis Procedure Conducted (Author’s Own)

Raw Text	Thematic Code	Category	Data Level
I am a real farmer- a full time farmer; I don't do anything else to make a living besides farming- <i>Farmer AN</i>	Self-identity	Individual attributes influencing the network	1- Farmers
For certain areas, it is important to have a female only cooperative especially because of cultural sensitivities- <i>Farmer MN</i>	Gender issues	Social influences on network composition	2- Farmer groups
In instances where we found a viable group, we would ask them to register to become formalised because it is better to deal with a group in addressing transaction costs administratively- <i>Agri-Business Forum</i>	Network coordination	Strategies for knowledge transfer	3- Sector service providers
We look at farmer organisations, databases of national registration of persons, the electoral commission- these are the state guidelines on farmer identification- <i>Cellulant</i>	Attached identity	Influences of the state on network composition	4- Sector regulators

4.3.5 Research Contributions in the Inductive Approach

Inductive research concludes with a developed model or theory about the underlying structure of experiences or processes that are evident in the data analysis (Thomas, 2006). In this thesis, the inductive approach leads to contributions of social identity to social network theory development. This is based on evidence of the importance of identity in the data. This is discussed in Chapters 5 and 6.

4.4 Social Network Analysis for Data Analysis

Social network analysis is applicable across disciplines and across a broad spectrum of opportunities (Borgatti & Foster, 2003). Prominent areas have been crime, education, online communities, private and public organisations with a small but growing body on social network analyses in agriculture (Cinner, Bodin, & Jones, 2010; Sachs, 2010). Social network analysis allows for research of attributes and patterns of behaviour, a characteristic of studies of social networks in social science and business management (Schultz-Jones, 2009). In this study, social network analysis is the investigation of the link between social networks and knowledge transfer in small and medium scale farmer networks.

4.4.1 Techniques in Qualitative Social Network Analysis of Data

In addition to the analysis by coding techniques, this study incorporates 2 fundamental techniques specific to qualitative social network analysis. These are the name generator and walking interview which are used in the interview phase of data collection.

4.4.1.1 Name Generator

The name generator technique is concerned with eliciting responses from individual participants about whom they are connected to. It has become the standard in research concerned with the individual rather than the whole network (Marin & Hampton, 2007). Questions asked can be extended to get responses on why and how they are connected. In this way the individual's connections can be mapped. By analysing these responses in concert, a researcher can identify the channels through which content flows from one node to another and the potential for a corresponding influence of one over the other (Schultz-Jones, 2009). The results of this technique application are presented in Chapter 5.

4.4.1.2 Walking Interviews

Walking interviews are interviews conducted on the move (Emmel & Clark, 2009). By being mobile in the farming environments where farmers experienced network activity and knowledge transfer, farmer recollection on specific events may be enhanced. Placing events and stories in the actual context is useful in helping participants articulate their thoughts. For the researcher this technique enhances their understanding and insight and provides the additional content necessary for an in-depth analysis of participant responses. This technique also allows for the verification of connections determined from the name generator method.

4.4.2 Level of Analysis

This project takes an egocentric approach to analysis primarily identifying the individual farmers as the unit of analysis. The ego actor's alters (e.g. other farmers, family, friends, institutions) at different levels of the network are included to develop the picture of linkages.

4.5 Trustworthiness

Qualitative research strives for understanding of deep structure. The standard of trustworthiness is in spending extensive time in the field and evidence of probing for detailed meaning (Creswell, 2007). Lincoln and Guba (1985) propose that the general standards for validity in qualitative research are credibility, transferability, dependability and confirmability- standards adopted in this study.

Credibility is about giving readers of the research confidence in the findings. The goal is to demonstrate that a true picture of the phenomenon being investigated is being represented (Shenton, 2004). It has been achieved in this study through prolonged engagement in the field and the triangulation of data sources and methods. This brings about structural corroboration which relates multiple types of data to support or contradict the interpretation (Eisner, 1991; Lincoln & Guba, 1985). Time in the field is spent until data from multiple participants reaches saturation. Saturation is considered achieved when further probing yields no new information. Data collected in interviews is complemented by relevant documentation.

Transferability is achieved by providing sufficient detail of the context of the fieldwork (Shenton, 2004). This is so that readers of the research can easily detect similarities or key differences to other contexts. This presents opportunities to justifiably apply the study to other settings, hence achieving dependability. Transferability has been attempted in this study by providing thick description.

Confirmability is a demonstration that findings emerge from the data rather than the researcher's predispositions (Shenton, 2004). This has been achieved in this study through a demonstration of the analysis of findings from raw data to key themes. Confirmability is further established through an auditing of the research process by research supervisors. The

researcher has strived to ensure that different voices are heard for authenticity and has been self-critical to ensure integrity (Whittemore, Chase, & Mandle, 2001).

4.6 Ethics

There is a need to ensure as high as possible levels of protection and confidentiality in qualitative research (Mauthner, Birch, Jessop, & Miller, 2002). This is to minimise coercion, and manage risk and harm to all parties involved in or affected by the research. These interests are covered by:

- Requesting access and obtaining informed consent;
- Constant negotiation of participation in the research relationship;
- Developing rapport;
- Explicating the details of this research for the approval of the ethics committee of the sponsoring academic institution;
- Communicating to the participants the intentions of this research, analysis of this data, the responsibility and accountability of the researcher.

Edwards and Mauthner (2002) state that research must focus on care and responsibility over outcomes and in so doing, the researcher put the following afore:

- Prior to data collection, the researcher identified as many actors as possible that may be affected by ethical dilemmas raised in the research;
- The researcher identified what needed to be done to mitigate the dilemmas;
- The researcher considered how best to communicate the ethical dilemmas to those involved, obtained their views and negotiated how to carry the research forward;

- The researcher acknowledged that ethical responsibilities were not only to participants but to readers and users of this research. Ethical care is taken for the benefit of those who may build on the knowledge, on interpretive, epistemological and academic levels.

This research has been approved by the Monash University Human Research Ethics Committee (MUHREC). The approval of the committee (MUHREC) verifies that the objectives of the research and its intended contributions have been adequately communicated to those involved. The nature of the data required and how it would be collected are acceptable. When data collection will conclude, what information will be accessible by the participants and measures employed for confidentiality are satisfactory.

All forms regarding consent and participation were drawn based on the guidelines of MUHREC. Data collection only commenced when consent (verbal or in print) was received. Data collected will be stored for a period of five years in locked filing cabinets in the office of the chief research supervisor. The data is only accessible by the researcher and research supervisors. The lapse of the five year period will see the disposal and destruction of transcripts and recordings.

4.7 Limitations of Research Design

All methods are constrained by time limits imposed on research activity, finances, the social skills of both the researcher and participants as well as linguistic resources (Collins, 1984). However, the chosen methods impose additional limitations. Social network analysis only takes a 'snapshot' of what is going on. This means the study is static and not longitudinal thus unable to move the data beyond a substantive level theory (Schultz-Jones, 2009). The study of a static picture is not by any means prescriptive of problems that may exist in the lives of the

participants. In addition, social networks are only one piece of a big puzzle and so this research cannot make general claims about the transfer of knowledge in agricultural networks but can only represent the claims of individuals participating in this study. Generalisations are difficult to propose using the chosen methods.

Research in agrarian economies like Zambia presents additional challenges. Among these are the unfamiliarity of research participants to highly technical and experimental research activities and insufficient reliable secondary data. The limitations of this social network study are mitigated through ensured research rigor to yield useful research outcomes.

4.8 Chapter Summary

Presented in this chapter was a detailed description of the methodology and methods associated with inductive research and social network analysis applied to this research. Incorporated in this discussion were issues on trustworthiness, ethics and limitations of this research project associated with the research design. The proceeding chapter, Chapter 5 presents the findings of the research and the analysis thereof.

CHAPTER FIVE: FINDINGS AND DATA ANALYSIS

5.1 Introduction

This chapter presents and analyses the findings of the data collection activities of this research. Data collection activities included face-to-face interviews with various participants, field observations, document analysis and attendance at agricultural forums in Zambia.

The presentation of findings includes participant quotations to retain the richness of the data. Quotations have been minimally edited for language correctness and to allow an easy flow for the reader. Local language interviews have been translated. The analysis has been conducted in light of the literature reviewed.

This chapter is presented in a manner that answers the research questions posed for this study:

- 1. What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*
- 2. What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?*

5.1.1 Personal Reflections

There are many voices on the topics of agriculture, social networks and knowledge transfer. What this study intends to achieve is a minimisation of the researcher's voice and amplification of the voice of the participants in this research. The researcher's processes of reflection served the purpose of making the researcher more aware of their own opinions in contrast to what was being heard, experienced and observed. This simple reflective process is akin to the benign introspection stage of reflexivity on Woolgar's (1988) continuum.

The researcher employed the voice centred relational method of data analysis, as described by Brown and Gilligan (1992) to enable reflection on the data collected and the entire research experience. The voice centred relational method involved several readings of the interview transcripts for their general meaning, for their meaning in the context of the participants' experience and lastly for their meaning to the researcher. The personal reactions and opinions of the researcher are captured in the attached research diary, Appendix B, and have intentionally separated from the presentation of findings in this chapter.

Underlying the decision to separate personal reactions and opinion from participant data is the researcher's self-awareness as a non-farmer. This is coupled with a regard for the participants as experts whose accounts must be privileged. The findings in this study imply a capturing of participant experiences and an aim to achieve accuracy in representations of participant reality.

5.2 Name Generator Findings

Farmers were asked questions about who they were directly connected to that was a source of knowledge in the areas of irrigation, transport and marketing. This culminated in a name generation exercise which has been compiled in the following name generator table:

Table 5- 1: Direct Knowledge Connection Name Generator (Author's Own)

Actor	Farmers	Family	Friends	Informal Groups	Cooperatives	Unions	Associations	Private Sector Actors	Government Actors	Donor Actors
Farmer JC	0	Husband; Son; Cousin	Neighbours (1); Church members (8)	0	0	0	0	Market traders	0	Kasisi Agricultural Training College
Farmer MN	12	Daughter	0	0	Kumboshi	Zambia National Farmers Union	0	Market traders; Agri-Business Forum; Amiran	Food Reserve Agency; Extension	0
Farmer AN	15	Grandfather	0	Tilimbikile	0	0	Katuba Women	Market traders	0	0
Farmer FP	9	0	0	0	0	Zambia National Farmers Union	0	Market traders	Food Reserve Agency	0
Farmer IA	7	0	Colleagues (3)	0	Vorna Valley	Zambia National Farmers Union	Poultry Association of Zambia	Market traders; Amiran	Food Reserve Agency; Extension	0
Farmer GK	0	Daughter	0	0	0	0	0	Market traders	Food Reserve Agency	0
Farmer FS	0	0	0	0	0	0	0	Market traders	Food Reserve Agency	Common Market for Eastern and Southern Africa
Farmer ES	10	Husband; Son; Aunt; Niece	0	0	0	0	Poultry Association of Zambia	Market traders; Amiran; Hybrid Poultry	Food Reserve Agency	0
Farmer CZ	22	Son; Grandson	0	0	0	0	Cetvon Women	Market traders; Masterpork	0	0

5.2.1 Farmer-to-Farmer Knowledge Connection

It is observed that not all farmers have direct farmer-to-farmer connections for knowledge purposes. This is an unexpected finding in a society where collectivism characterises the general community culture. It is further unexpected because it was anticipated that farmers have close relationships to other farmers on the basis of occupational similarity.

Farmers that have direct farmer-to-farmer connections are compared to those that do not. It is observed that the difference lies in whether or not farmers have membership of any groups (informal groups, cooperatives, unions or associations). Farmers that have direct farmer-to-farmer connections are members of such groups whereas farmers lacking these connections are not members of these kinds of groups. The initial assumption drawn from this observation is that farmers rely on membership of groups to have direct farmer-to-farmer connections with others.

In order to verify this assumption, farmers with direct farmer-to-farmer connections were asked whether:

- a) They became connected to other farmers after joining the groups or;
- b) They became connected to other farmers and then joined the groups.

The responses to these questions were as follows:

When I purchased my farm and started farming in Kanakantapa, other farmers already in the area saw that I was now one of them and invited me to start joining their meetings. It was after several of these meetings that we decided to form the [Kumboshi] cooperative.

Farmer MN

In our area you cannot be part of any group unless the group leader approves of you. It is not like some of the clubs in the city where you can apply because you think you fit the group. Around here, you have to know other farmers in the [Tilimbikile] group who can present you to the leader and support your inclusion.

Farmer AN

I was able to become part of the Zambia National Farmers Union and became directly connected to farmers through the union. As long as you have registered with the government district registrar as a farmer, Zambia National Farmers Union can grant you membership, after you pay of course.

Farmer FP

The Vorna Valley residents have organised themselves as farmers, fishermen, teachers and so on. When I moved to the area, my neighbours who had already established a cooperative asked me to join them when they realised I was involved in serious farming.

Farmer IA

It is very difficult to be connected to others although there are several farmers here. The few farmers I have managed to get connected to and exchange knowledge with I met through meetings at the Poultry Association of Zambia. One automatically becomes a member of the association once they purchase chicks for farming.

Farmer ES

I was connected to other farmers who introduced me to the association [Cetvon].

Farmer CZ

From these responses it is determined that farmers first have to be connected to other farmers in order to become group members. There is an exception to membership of Zambia National Farmers Union and Poultry Association of Zambia. The Zambia National Farmers Union has its own criteria for membership based on formal farmer registration with the government. The Poultry Association of Zambia's criteria are commodity specific. The importance of farmer-to-farmer connections is demonstrated here:

...information they [members of Katuba Women's Association] gather on exchange visits [visits to other women's associations in Chongwe district] has improved their way of doing things.

Katuba Women's Association

Farmers were further asked if they thought they could join the groups directly without first being connected to farmers who were already members. This was asked in order to present a conclusive analysis of the relationship between farmer-to-farmer connections and group membership. The farmers asked this question excluded Farmer FP and Farmer ES. This is

because they are connected to other farmers through the Zambia National Farmers Union and Poultry Association of Zambia respectively. This question elicited the following responses:

I was one of the founders of the group. Those who have joined after have been brought in by others.

Farmer MN

Farmers know other farmers. You cannot just join the group out of the blue when no known farmer knows you.

Farmer AN

Simply put, not at all.

Farmer IA

If not for my friendship with some women in the group they would not have even considered me.

Farmer CZ

The concluding analysis on the relationship between the farmer-to-farmer connection and group membership is therefore that farmers cannot become members of groups without an established connection to other known farmers. Three issues will be addressed later in this chapter on the basis of this analysis:

1. What is the basis of farmer-to-farmer connections?
2. What are the social network implications for farmers of not being a group member as a result of lacking farmer-to-farmer connections?
3. What are the knowledge transfer implications for farmers of not being a group member as a result of lacking farmer-to-farmer connections?

5.2.2 Farmer-to-Cooperative-to-Government Extension Knowledge Connection

Although farmers can be connected to other groups, the connection to cooperatives is given particular attention. This is because it is only in connections to farmer cooperatives that connections to government extension officers can be seen. This is important because the

government extension services are the most relied upon channels for knowledge transfer in the Zambian agricultural sector. It seems, from the name generator, that an additional actor in the knowledge transfer channel of government extension officers is the farmer cooperative. This is examined further by analysing the typology of groups in Table 5-2.

Table 5- 2: Typology of Groups (Author's Own)

Group Type	Membership and Criteria	Example
Informal group	Local community members having similar attributes; geographical location of members is an important criterion	Tilimbikile Women's Group- Members of this group are married women residing in Ward 6 of the Katuba Constituency
Farmer association	Members meeting a single criterion determined to be the purpose of the association; geographical location of members may be important in some associations but not all	Poultry Association of Zambia- Members of this association are poultry farmers located anywhere in the country; Katuba Women's Association- Members of this association are women residing in Katuba Constituency and needing advocacy on gender issues affecting farming
Farmer union	Members meeting the definition of a farmer according to the union; geographical location of members is not an important criterion	Zambia National Farmers Union- Members of this union are farmers that register themselves with the union after meeting the union's criteria; the union's role is primarily that of farmer advocacy on a range of issues
Farmer cooperative	Members meeting the definition of a farmer according to the cooperative; geographical location of members is an important criterion	Kumboshi Farmer Cooperative- Members of this cooperative are farmers residing in Chongwe District who register their membership after meeting the cooperative's criteria; the cooperative serves the function of coordinating and administering over the various activities of farmers

Farmer cooperatives in the Zambian small and medium scale farmer sector differ from informal groups, unions and associations. Unlike informal groups, farmer cooperatives are formal groupings that are registered as groups representing collective farmer interests. They differ from unions because their representation is not for the purpose of advocacy but for the coordination and administration of activities targeted at farmers. Such activities include knowledge transfer processes. They differ from associations in that associations tend to have a narrow focus in their representation such as gender or commodity. The analysis of the role of cooperatives here therefore presents them as the most effective means of reaching a greater number of farmers. It is understandable then that the government relies on the cooperative system to reach farmers.

However, the membership of cooperatives depends on farmer-to-farmer connections as discussed in section 5.2.1. The issues to be examined further in this chapter concerning this analysis are as follows:

1. What are the knowledge transfer implications for farmers belonging to cooperatives of the farmer-to-cooperative-to-government extension connection?
2. What are the knowledge transfer implications for farmers not belonging to cooperatives of the farmer-to-cooperative-to-government extension connection?

5.2.3 Farmer-to-Market Trader Knowledge Connection

The name generator shows that all farmers have connections to market traders. Market traders include individuals selling produce at open market places and retail supermarkets. These connections represent the majority of connections in the Zambian small and medium scale farmer networks. This is consistent with the findings of Sitko and Jayne (2014a) in their study of small and medium scale farmers in Zambia. However, the nature of knowledge transferred in this connection is more focussed on the financial transactions of farmer produce. They offer

less on the issues that lead to process improvement such as knowledge transfer. The question to be answered here is:

1. What are the implications of the dominance of farmer-to-market trader connections for knowledge transfer?

5.2.4 Farmer-to-Private Sector Knowledge Connection

Private sector businesses like Amiran, Hybrid Poultry and Masterpork are important actors in the sector. This is because agriculture based businesses in the private sector are the generators of most modes of process improvement. These businesses have their own private extension system through which they transfer knowledge to farmers. The knowledge value of this network connection is demonstrated here:

When you can learn to manage a crop and grow it during its off-season, you can make an enormous profit. For example, the best prices for tomatoes are during the rainy season because many farmers lose them during this time to fungal diseases. Most farmers simply lack knowledge on how to manage fungi. A box of tomatoes grown during the rainy season could fetch ZMW120 (AU\$24) compared to the ZMW5 (AU\$1) per box you fight to earn during the dry season. The government does not provide knowledge on things like this, I learned this from Amiran.

Farmer MN

Although they have a profit motive, they [private sector service providers] do support us a lot and are genuinely interested in our performance because at the end of the day, we are the ones that do their marketing for them. If we do well, they do well also.

Farmer IA

However, not all farmers have this connection. This presents the following questions for further analysis:

1. What are the common characteristics of farmers that have a farmer-to-private sector knowledge connection?

2. What are the social network implications of existing farmer-to-private sector knowledge connections?
3. What are the social network implications of the existence of separate government and private sector extension systems?

5.3 Network Characterisation

The Zambian small and medium scale farmer network can be characterised in terms of:

- The actors that participate in the sector;
- The levels at which actors participate in the sector;
- The roles performed by actors participating in the sector.

This characterisation is explained further.

5.3.1 Network Actors

The parameters of where a social network starts and ends are difficult to draw. In this study, the parameters were traced from the Zambia National Farmers Union, which is the umbrella body for all farmers in the country. The assumption was that because of its role in farmer representation, the Zambia National Farmers Union would be at the centre of knowledge transfer activities. A snowballing technique was then employed to identify actors pertaining to the study interest. There are several identifiable actors in the spectrum of knowledge transfer in the small and medium scale farmer sector. Generally, these actors include the following:

Small and medium scale farmers; Farmer-based organisations (including unions, cooperatives, associations and community groups); Retailers of farmer produce; Governmental organisations (including government ministries and government agencies); Non-governmental

organisations (including international donor agencies and local not-for-profit organisations) and Private sector for-profit organisations.

5.3.2 Network Levels

The findings were that the identified actors can be located in four levels of the Zambian small and medium scale farmer network. These levels vary by composition and the extent of formalisation in knowledge transfer processes. These are illustrated in Figure 5-1:

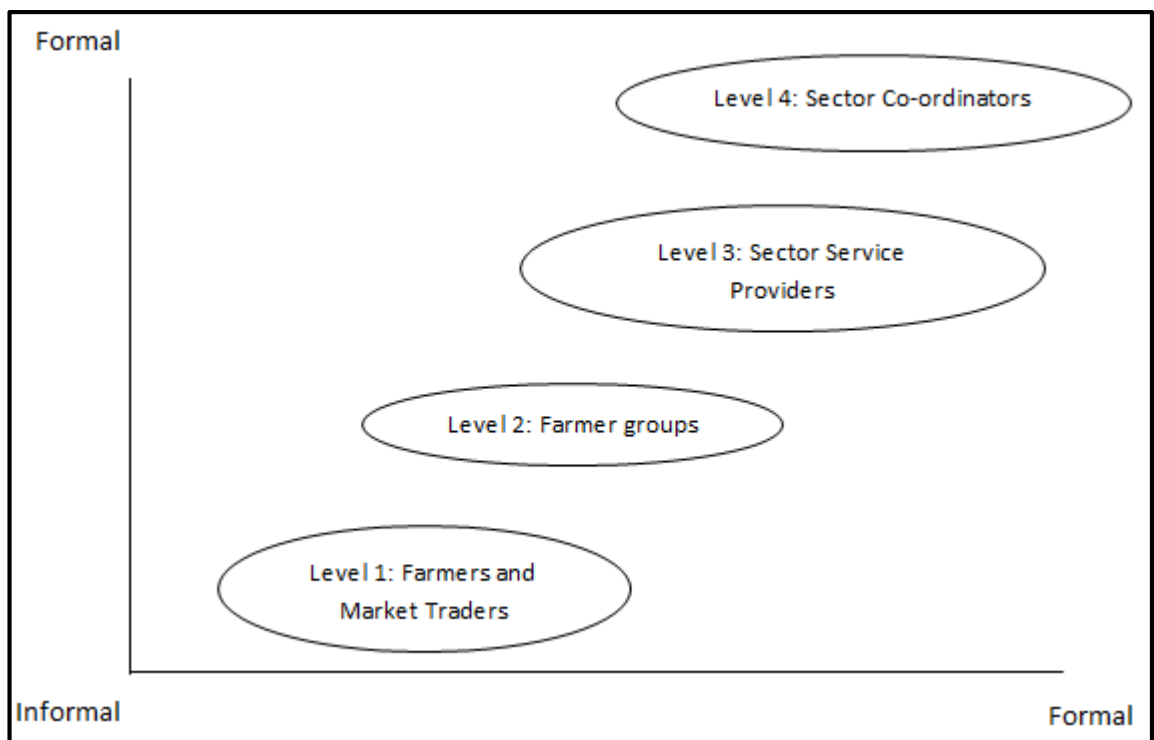


Figure 5- 1: Network Levels in Zambian Small and Medium Scale Agriculture (Author's Own)

Level 1: This is the primary level of the network where small and medium scale farmers operate as well as market traders of small and medium scale produce. This level is represented by Farmer FP, Farmer CZ, Farmer FS, Farmer AN, Farmer ES, Farmer GK, Farmer IA, Farmer MN, Farmer JC, Market Trader VZ, Market Trader VK, Market Trader TP and Market Trader MM.

Level 2: This consists of farmer associations, cooperatives, women's groups and unions. This level was represented by the Zambia National Farmers Union, the Poultry Association of Zambia, Katuba Women's Association, Cetvon Women Farmers Association, Vorna Valley Cooperative and Kumboshi Cooperative.

Level 3: This consists of organisations that provide services to levels 1 and 2. This level is represented by Agri-Business Forum, Ministry of Agriculture and Livestock- in particular the Extension Services Department, Food Reserve Agency, Zambian Farmer Magazine, Cellulant, SMSize Solutions, Giraffe Finance, private sector processors (private buyers, cross-border traders, green vegetable shops, major retail outlets, Soweto Market, Foxdale Court Farmers Market, SOS Children's Village Market, Mutendere Market, Masterpork, Hybrid Poultry, Amiran and transporters. It also includes Kasisi Agricultural Training Centre.

Level 4: This level is primarily concerned with sector coordination. The key actors here are the Ministry of Agriculture and Livestock and the Food Reserve Agency.

5.3.3 Actor Roles in Knowledge Transfer

The levels of operation of the identified actors influence the role of the actor in the knowledge transfer process. At level 1 of the network, farmers are the main recipients of knowledge transferred in the network. Farmers also play a role in providing feedback to knowledge sources on knowledge transferred. Some farmers play a role as knowledge agents by being the point of contact between knowledge sources and farmer groups. Market traders are also at level 1 and play an important role by providing feedback to farmers on consumer demands.

Actors at level 2, the formal farmer groups, serve the role of facilitating knowledge transfer between knowledge sources and farmer recipients. This function is achieved by first and foremost identifying farmers to be reached. They further organise farmers in such a way that

the administration of knowledge is made easier. This is by grouping farmers according to geographic location, produce farmed or some other measure of categorisation. Additionally, they play a critical role in identifying farmers that can play the role of being a contact farmer in the agency of the knowledge transfer process.

At level 3, sector service providers are the main sources and drivers of knowledge. They additionally are the sources of process improvement products arising from knowledge.

Sector coordinators at level 4 are responsible for management of the network. This role is primarily served by identifying the knowledge needs of the small and medium scale farmer network and matching these needs to appropriate knowledge sources. The balancing of power and intentions so that actors are treated fairly also occurs at this level. However, how this role is enacted by actors at level 4 could not be traced in this study.

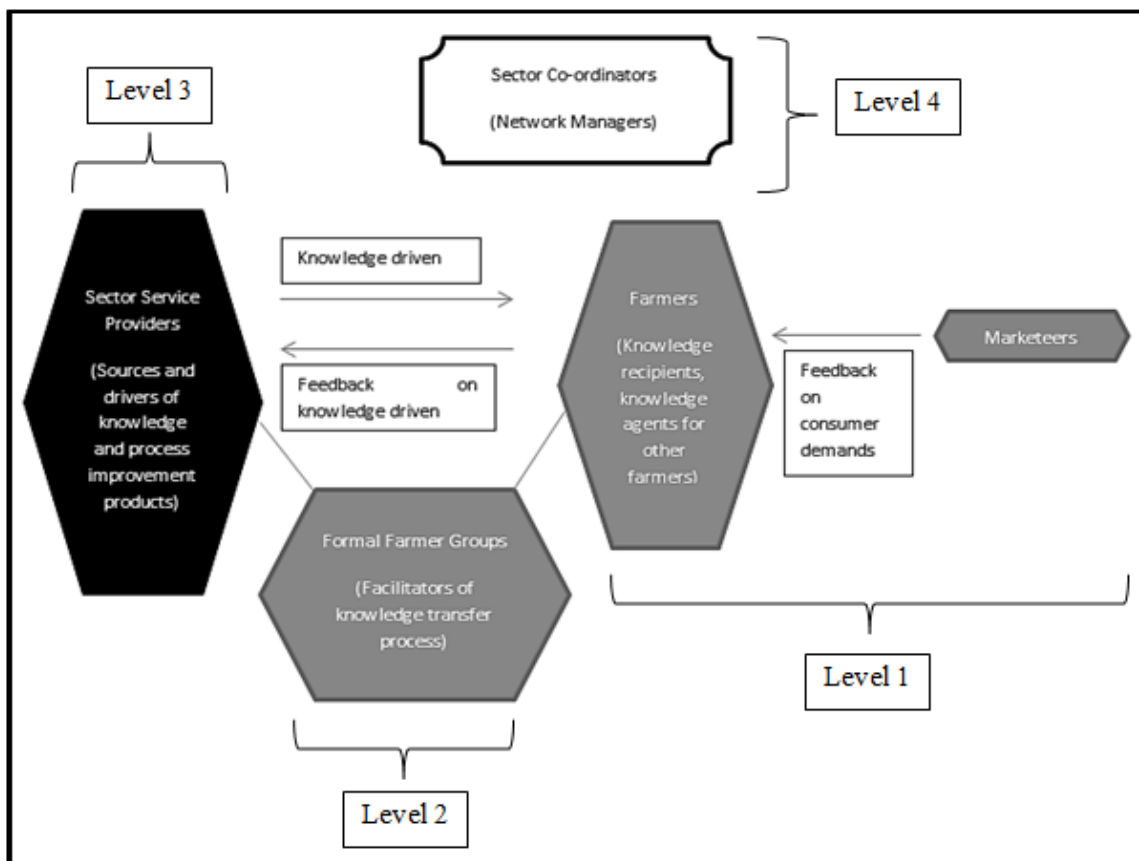


Figure 5- 2: Actor Roles in Knowledge Transfer in the Zambian Small and Medium Scale Agricultural Network (Author's Own)

5.4 Questions of Identity

From the responses of farmers during the name generation process, undertones of issues regarding farmer legitimacy were detected. This is highlighted as follows:

*When I purchased my farm and started farming in Kanakantapa, **other farmers already in the area saw that I was now one of them** and invited me to start joining their meetings. It was after several of these meetings that we decided to form the [Kumboshi] cooperative.*

Farmer MN

The Vorna Valley residents have organised themselves as farmers, fishermen, teachers and so on. When I moved to the area, my neighbours who had already established a cooperative asked me to join them when they realised I was involved in serious farming.

Farmer IA

*In our area you cannot be part of any group **unless the group leader approves of you**. It is not like some of the clubs in the city where you can apply because you think you fit the group. Around here, you have to know other farmers in the [Tilimbikile] group who can present you to the leader and support your inclusion...**Farmers know other farmers**. You cannot just join the group out of the blue when no known farmer knows you.*

Farmer AN

These highlighted portions of the text resulted in asking a question about who was regarded as a legitimate farmer and who was not. Those who regarded themselves as legitimate called themselves 'real' farmers.

5.4.1 Who is a 'real' farmer according to the farmer?

Up-bringing plays an important role in determining whether or not individuals self-categorise themselves in a group of farmers. It was found that 4 of 5 farmers that did not grow up on farms did not identify themselves as farmers. There seems to be a perception that one must be involved in farming activities from their childhood. This allows one to be regarded as a legitimate part of the group of 'real' farmers.

Furthermore, the time allocated to farming activities also has an impact on how individuals identify themselves as farmers. The identification of individuals as part-time farmers seems to lead to a self-categorisation that excludes one from the group of 'real' farmers.

*I come from Southern Province so it's inborn; **people from Southern Province are basically farmers**. Even when I lived in town, I always wished to be in a place where I could have my own garden.*

Farmer CZ

*I am a full time farmer; **I don't do anything else to make a living besides farming**. I was taught how to farm by my grandfather in Kabwe, where I come from. He taught me that farming is a good way to occupy time if you have nothing to do [as a hobby], or are unemployed.*

Farmer AN

I am a farmer at heart. I grew up with my aunt who grew 100 chickens on a small scale. She would send me to run errands in the chicken run, I would handle the chicks and see how they grew to 6 weeks and from that I got interested.

Farmer ES

Farming is in my blood. I grew up on a farm in Zimbabwe and have always been a farmer even while being engaged in other employment.

Farmer IA

I am the farmer. My husband is the farmer's husband. I am part of a fast-growing category of farmers called weekend farmers. Weekend farmers do not live on the farm they have but are involved in regular supervision- weekly I go to the farm and spend the weekend there and I keep an eye on what is going on.

Farmer MN

Five of the nine farmers interviewed categorised themselves as farmers. One of the participants attributed her being a farmer to the fact that she comes from a particular tribal group. This tribe is the Tonga people of the Southern Province of Zambia whose traditional mainstay and present day reputation is in farming. This is not unusual, as many tribes in Zambia seem to have a 'claim to fame' of some sort. For example, the Namwanga and Mambwe peoples have a reputation as savvy traders; the Lunda people as excellent fishermen and the Chewa people as mystics and healers. This attribution of the farmer's identity to her tribal reputation was made by the participant in spite of her involvement in formal employment outside farming. Two of the other five participants categorising themselves as farmers also self-categorised in this group, although they participated in other formal employment. For another participant, the fact that she invested all her time and resources in farming legitimised her identity as a farmer.

Four of the five participants that categorised themselves in the group of farmers further based their claim on the fact that they grew up on farms and have from their childhood been involved in some aspect of farming. One of the five participants that self-categorised as a farmer made specific mention of the nature and extent of her farming. Her view of part-time

farming was that that any level of farm participation was adequate in legitimising one as a farmer. This was irrespective of whether she only farmed during the weekend and supervised workers on her farm in contrast to farming every day and performing physical work.

Four of the farmers spoken to would not recognise themselves as legitimate farmers. Their basis of self-categorisation reinforced the perspectives held by the group of self-categorising farmers as follows:

Well, I would say that Farmer FS is and is not a farmer. I have never lived on a farm before now.

Farmer FS

I am not a real farmer because I have not been in farming full-time. Even from my childhood, we never had a backyard garden at my mother's place.

Farmer JC

I am not a 'real' farmer. I only farm part-time, over the weekend. I only do supervision.

Farmer FP

I am not sure you can call me a farmer. I haven't been involved in farming for such a long time.

Farmer GK

The questions to be answered in light of the existence of at least two farmer identities in the Zambian small and medium scale farmer networks are as follows:

1. What are the social network implications of the existence of two separate farmer identities?
2. What are the knowledge transfer implications of the existence of two separate farmer identities?

5.4.2 Who is a 'real' farmer according to institutional actors?

Because social identity consists of both self-identity and attached identity, it is necessary to establish the criteria for farmer identification from the perspective of institutional actors. This is because on the basis of the identity institutions attach to individuals as farmers or not, they play an important role in farmer access to other farmers and to knowledge resources:

*I was able to become part of the Zambia National Farmers Union and became directly connected to farmers through the union. **As long as you have registered with the government district registrar as a farmer**, Zambia National Farmers Union can grant you membership, after you pay of course.*

Farmer FP

*There are various loopholes in validating the real farmer. **We look at farmer organisations, databases of national registration of persons and records of the electoral commission to countercheck and verify whether we are dealing with a 'real' farmer or not.***

Cellulant

Farmer registers exist with the Ministry of Agriculture and Livestock at district level. We identify farmers through these records.

Ministry of Agriculture and Livestock

*Administratively, **it is impossible for us to identify individual small and medium scale farmers. We have found it easier to locate small and medium scale farmer associations and cooperatives or even informal farmer groups. The individuals involved are identified by these means.***

Agri-Business Forum

From the responses of the institutional actors that participated in the study, it is evident that criteria exist for farmer registration. These criteria are formalised and consistent across the different institutional actors. The questions that arise on this issue are as follows:

1. What are the criteria for attached identity as a farmer from the perspective of institutions?
2. What are the implications of attached identity as a farmer from the perspective of institutions?

5.4.3 Farmer Identity Profiles

The composition of farmer identity needs to be understood in order for us to be able to determine what the basis of legitimacy is from the perspective of farmers themselves. The farmers that identified themselves as ‘real’ or legitimate were asked what made them identify themselves as farmers. Their responses were as follows:

I come from a long tradition of farmers. My parents and grandparents all farmed. If you ask the village chief today about my family name, the first thing he will tell you is, ‘those are farmers’. In addition to this, I don’t just keep a backyard garden. I have 22 hectares which I have been farming for 25 years. Farming for this long is no joke. My farm is in a farming bloc and I belong to a farmer association.

Farmer CZ

All I do is farming. My grandfather passed on his knowledge and skills to me so that I could become a farmer as it is common in my tradition. Many people here grow vegetables or keep a few animals but they cannot really be considered farmers. My plot of land is 16 hectares and just from that you can tell that the farm is not a hobby for me, it is my life. I have been farming for 30 years and now I am 42 so that should tell you something. I also belong to a women’s group of farmers.

Farmer AN

For the last 10 years all I have done is farming. I utilise all of my 12 hectares in my farming activities. I was raised by my aunt who taught me about poultry farming and so that is where I started from. Anyone in this area can tell you that I am a serious poultry farmer. I even have awards from Hybrid Poultry which recognise my performance in this area. If Hybrid Poultry sees me as a farmer, surely everyone else does.

Farmer ES

I grew up on a farm in Zimbabwe. When I came to Zambia and wanted to start farming I went to Zambia National Farmers Union. They gave me advice on where to get farm land and how to register as a farmer. My farmer registration and active status in growing crops and keeping livestock makes me a farmer.

Farmer IA

I have been farming for 14 years on a weekend basis. If you compare my output from my 16 hectares to others who are in it full-time you would definitely regard me as a farmer. In every database of farmers from Kanakantapa, you will find my name there- whether it’s the Food Reserve Agency, Agri-Business Forum, Zambia National Farmers Union or Chongwe District Cooperative.

Farmer MN

Analysis of these responses results in the following identity profiles of self-categorising legitimate farmers. This is the group that this thesis refers to as the traditional farmer:

Table 5- 3: Traditional Farmer Identity Composition (Author's Own)

Farmer	Upbringing	Registration	Farm size	Years in farming	Farm location
Farmer CZ	Farming tradition	Farmer association	22 hectares	25	Farm bloc
Farmer AN	Farming tradition	Women's group	16 hectares	30	Customary farm land
Farmer ES	Family farm	Hybrid Poultry	12 hectares	10	Farm bloc
Farmer IA	Family farm	Farmer cooperative; Zambia National Farmers Union	5 hectares	5	Farm bloc
Farmer MN	-	Farmer cooperative; Food Reserve Agency; Agri-Business Forum; Zambia National Farmers Union	16 hectares	14	Customary farm land

The composition of the traditional farmer's identity is a farming related upbringing, farmer registration, having hectares of farm land in state designated or customary areas as well as having spent time in farming. Ultimately, this means that new farmers with minimal land resources are not considered as farmers.

The farmers that did not identify themselves as legitimate farmers where asked why they did not identify themselves in this way. This resulted in the following responses:

I am quite a newcomer on the farming scene. I have only been farming for 5 years. My main motivation for farming is first and foremost as an income generator and secondly as an occupation to transition to once I retire. I farm land of about 50 hectares and I have employed 2 young men to do the farm work. I don't really call myself a farmer because others are doing the farm work for me. I am not idle in farming though- I read a lot about farming, I go out there looking for the best inputs and also negotiating better prices for my commodities. My farm is a business which I own and manage. When I can afford to, I want to employ a

farm supervisor. Maybe then I will become more hands-on and you can call me a legitimate farmer.

Farmer FP

I have employed 10 farm workers and a farm manager because I am not really a farmer. I have got a few ideas from here and there about farming and I decided it would be a good investment. I have 613 hectares but because the land is not in a state designated farming bloc, they [government extension officers] won't even call it a farm, they call it a plot. The other issue seems to be that because I have ventured into growing quails and foreign mushrooms for the urban markets, the maize growers do not see me as a farmer. If you are not growing the staple food crop or a large scale commercial cash crop they think you are just playing around. I know that quails and mushrooms are good business though so I don't care if they don't consider that farming. The demand for these products is high and the suppliers are few so the profits are huge. I have been doing this for 5 years and will continue to build my farming business.

Farmer FS

I have only been farming for 6 years whilst others have been doing it since forever. In that way I am not yet there in terms of being called a farmer. I have 4 hectares I farm on. I think that because I am also involved in another business as a trader of imported general goods, those who are full-time farmers do not regard me as a farmer. I have employed 2 farm workers but I am also learning to be hands-on.

Farmer JC

I have been farming for 10 years on 6 hectares of land. I have 2 farm workers who I supervise. I am involved in other employment as a primary school teacher so I am not sure if you can call me a real farmer since I do other work.

Farmer GK

The responses from the farmers that do not self-categorise as being legitimate (referred to in this thesis as entrepreneurial farmers), partly reinforce the view that time spent in the farming sector is a factor that determines the establishment of one's identity as a farmer. Additionally, the attachment of an identity from others as a farmer also emerged from the responses of entrepreneurial farmers. The other two identity factors that surfaced among entrepreneurial farmers are the employment of others to perform farm work and the view of the farm as a business. The composition of the identity of entrepreneurial farmers is summarised in Table 5-4.

Table 5- 4: Entrepreneurial Farmer Identity Composition (Author's Own)

Farmer	Lack of attached identity from others	Farm size	Years in farming	Employment of others	Farming as an enterprise
Farmer FP	-	50 hectares	5	2	Farm business
Farmer FS	Extension officers; Maize farmers	613 hectares	5	11	Investment; Farm business
Farmer JC	Full-time farmers	4 hectares	6	2	-
Farmer GK	-	6 hectares	10	2	-

To draw out the differences in the identities that exist in the Zambian small and medium scale farmer network, a comparison is made in the table below:

Table 5- 5: Comparison of Identities and their Composition (Author's Own)

Identity Type	Identity Composition
Traditional Farmer	Upbringing; Farmer registration; Farm size; Years in farming; Farming as a lifestyle; Farm location
Entrepreneurial Farmer	Late entry in the sector; Perception of others; Employment of others; Farming as an enterprise
Attached Institutional Identity	Location in state defined agricultural zones; Formal farmer registration

5.4.4 Other Identities Elicited by Entrepreneurial Farmers

Although entrepreneurial farmers do not categorise themselves as farmers, they do draw on a number of other identities. These other identities prove useful for the knowledge transfer and process improvement processes.

Farmer FS, for instance, takes pride in her job as the chairperson of the Katuba Women's Association. Here she talks about what it takes for her to succeed in that role:

Running a women's organisation is not easy. You have to get the women to trust you and to get along with each other regardless of their tribal differences. I have to be very confident in what I am doing so that the women can be encouraged and respect my leadership...In order to build this confidence, I need to stay current with what is happening in the legal, political, economic and social space regarding women...That is why you will always hear of me attending workshops here and there or locking myself in my office to read something.

Farmer FS

Farmer FS has been able to employ on her farm the skills she uses in her job, perhaps unknowingly. Despite the lack of a farming background, Farmer FS has been able to successfully run a farm by employing individuals with farming knowledge. The confidence she exudes in giving her farm workers and farm supervisor instructions comes from her constant search for knowledge on agriculture; just as she searches for knowledge on other areas to build her self-confidence in them. This confidence has been essential in undertaking what are considered niche areas of production in Zambian agriculture like growing foreign mushrooms and quail rearing. These areas of production are often undertaken by only those with a formal agricultural education and farming on a commercial scale because these products, although very profitable, appeal to a very small part of the urban population. Farmer FS defies the statistics and has broken through this market- all in spite of not being considered a legitimate farmer.

The other skills brought to the farm table from other employment that entrepreneurial farmers engage in include record keeping, project planning and financial management. How entrepreneurial farmers apply these to farming is illustrated here:

Running an import-trade business like I do is not easy. I have to plan my travel, orders and sales in such a way that I have a good cash flow, can pay my employees and attend to my other responsibilities. The farm is no different. I have to plan for the growth season, find buyers and work out how to be profitable so that I can afford to make a living and also pay my workers. My business experience has been useful although I never studied agriculture.

Farmer JC

You know I am a teacher by profession...When dealing with my farmworkers, I guess I treat them a bit like my pupils. If a crop is not performing well, it is their 'homework' to figure out

why and get back to me so that together we can make corrections. Nobody taught me how to run a farm so I am doing the best I can with what I know.

Farmer GK

5.4.5 Farmer Identity Complexity

After the importance of the identity as a farmer emerged, it became necessary to establish whether participants held other important identities. This has to be factored in, bearing in mind that the literature on identity complexity suggests that holding multiple identities has consequences for action (Roccas & Brewer, 2002). Participants were asked a general question about how they would describe themselves to others. It was anticipated that the answers to this question would be relegated to only the perceptions of themselves that participants felt were important (Roccas & Brewer, 2002). Farmers responded to this question as follows:

I am a typical Tonga woman. This is important to me in describing myself to others because everybody knows that Tonga women are humble, hardworking and trustworthy. I am not a tribalist but I prefer to associate with other Tonga women because it is easier for us to communicate in our native tongue. When I associate with other Tonga women, we have fewer disputes because of shared understanding of customs, norms and taboos. We also share similar farming traditions so this helps us in the knowledge sharing activities we spoke about.

Farmer CZ

I am a married woman and a mother. For me this is just as important as being seen to be a farmer. Our women's group here only welcomes married women and mothers because we have things in common. Our husbands respect us when they know that we interact with like-minded peers.

Farmer AN

I am an educated woman. Being educated makes a huge difference in the way one sees things. I may not have been trained as a farmer but so much of what I learned is transferrable to the field. In our cooperative every member has at least a basic level of education. I don't think we would be as successful as I think we are if we were not all formally educated. Gender and tribal division aside, being educated means we are all on the same page and 'speak the same language' you know.

Farmer IA

The 'basket' of identities consists of tribal groupings, marital and family status as well as level of education. These identities can be seen from the responses to influence who farmers choose to associate with and therefore has implications to be considered as follows:

1. To what extent does complexity in farmer identity impact on the social network?
2. What impact does identity complexity have on knowledge transfer?

5.4.6 Gender based experiences of farming

The findings regarding gender based experiences of farming are similar to the findings of previous studies. Participants in this study felt that one of the reasons they lacked legitimacy as farmers in the eyes of other stakeholders was because of the simple fact that they were women. The perception of farming families as consisting 'the farmer and the farmer's wife' continues to perpetuate. This is one of the reasons why gender exclusive groups and associations remain necessary to give a voice to female farmers who may otherwise be dismissed by their male farmer counterparts. As women, the farmers felt that they continue to be marginalised by the financial sector. Some participants cited instances where bank managers asked them why they were the ones making loan applications rather than their husbands. Other gender related challenges lie in the gendering of agricultural activities, to the extent that there is produce that has been branded as either male (e.g. maize, cotton, tobacco, cattle, goats) or female (e.g. groundnuts, garden vegetables, fruit, poultry, pigs). There appears to be no problem in men participating in 'female' produce but the same cannot be said for women that want to participate in 'male' produce.

In reflection on these 'gender problems', the two women's groups that participated in this study both made mention of the tendency of unmarried women to excel better as farmers because of the following:

- they did not have to face the societal pressure of maintaining their home to the sometimes impossible standards set by their husbands;
- they had the freedom to interact with those who were best placed to assist them in their farming regardless of their gender;
- they were considered equal to male farmers and had the respect and trust of the community.

5.5 Observations on the Knowledge Transfer Process in the Zambian Small and Medium Scale Farmer Sector

In order to better understand what implications the nature of the social network has on knowledge transfer, observations on how knowledge is presently transferred are made here.

5.5.1 Extension Services

The majority of knowledge that is transferred is formal in nature and transferred through both public and private extension systems. The Zambian agricultural public extension system comprised a total of 742 extension staff members as at 2011 (Global Forum for Rural Advisory Services, 2011). Of these, 64 were subject matter specialists whilst 323 were field-level extension staff. The sum of those engaged directly in the knowledge transfer process was 387 and these were meant to cater to an estimated 1,100,000 farmers.

We have an agricultural camp officer in the area but I feel that his constituency is too big such that the service delivery is poor.

Farmer MN

Nobody passes through here. I have been here over 20 years and not once been visited by a government employee to see how I am doing...all I know is their absence here.

Farmer CZ

A single extension officer may cover up to 4000 people so that is a big challenge.

Agroforestry Knowledge Transfer Expert JB

The ratio of extension workers to farmers was a paltry 1: 2842, hindering the effective and timely transfer of knowledge to farmers. The understaffing of this department has contributed to transfer failures. In addition to the poor numbers of extension officers servicing the sector, a gap is found between agricultural research and agricultural extension (Swanson, 1997). New knowledge emerging from research institutions does not seem to make its way down to the farmer. This is because it relies on transmission through extension officers. However, research and extension have been historically poorly coordinated (Swanson, 1997). This study confirms these historical findings.

5.5.2 Knowledge Sources

The originators of most formal knowledge in the small and medium scale farmer network in Zambia are institutional actors and this knowledge tends to be explicit in nature. The main sources of formal knowledge for farmer actors are face-to-face interactions with the government extension service and also with non-governmental researchers. The extension officers and non-governmental researchers have expertise on specific aspects of knowledge desired. Agricultural training institutes and processors are also critical knowledge sources for farmers. Farmers can also source general knowledge through their own efforts from the internet, public libraries and specialist books from book shops like Bookworld and Planet Books. The public libraries are however shunned by many farmers because there are not many of them and the few that are there tend to stock outdated material. Book shops are unpopular because farmers complain about the prices of materials from these sources.

Most informal knowledge emerges from interactions of both farmer and institutional actors. Informal sources of knowledge for the farmers are contact farmers, family, social groups,

other farmers, village heads, friends, on-farm experience, experiments and exchange visits. Organisation actors need knowledge of on-the-ground farmer needs as well as feedback on interventions implemented. For these they turn to farmer kept diaries, community feedback, contact farmers and focal point persons.

5.5.3 Knowledge Content

The transfer process mainly carries knowledge on agronomy, mechanisation and market information. Market information dominates the transfer content from government sources and this only has a minimal impact in bringing about process improvement. Market information consists of consumer preferences for commodities and commodity prices. Content on agronomy from government sources is skewed in favour of fertilizer supported maize production. Government sources do not provide much knowledge on mechanisation. The knowledge sought by farmers includes knowledge on mechanised processing such as the use of feathering and boning equipment in poultry farming.

The knowledge content of private sector and donor transfers is largely on mechanisation and agronomy. Private sector and donor actors focus on alternatives for agriculture in their transfer content. These alternatives include knowledge on agro-forestry and farm produce preservation techniques that reduce the reliance on electricity and expensive equipment.

5.5.4 Knowledge Recipients

The main recipients of knowledge transferred in the social network are farmers. Unfortunately, the nature of the present knowledge transfer process means that only traditional farmers are targeted in transfer interventions, although it seems that traditional farmers are less likely to utilise new knowledge.

Other recipients of knowledge are intermediary actors that transfer knowledge from research institutions to farmers. These intermediaries are also recipients of farmer knowledge in the feedback loop. The intermediaries include farmer-based organisations and private sector extension officers.

5.5.5 Knowledge Flows

Knowledge flows enable the transfer of knowledge from one actor to another in the social network. The study found that knowledge can be disseminated formally or informally.

The flows of formal knowledge appear to be one way, from the knowledge source to the knowledge recipient. The only feedback loop that could be determined with formal knowledge was in annual general meetings that include knowledge recipients.

Knowledge is mainly formally disseminated to farmers through contract farming. This is the channel that organisations like Agri-Business Forum work through because of the opportunities that exist in offering knowledge on agronomy, processing and marketing of agricultural produce. Knowledge transfer by contract farming is illustrated here:

The processor [wholesale or retail buyer and re-seller] tells the extension officer what the desired market specifications are for a given crop. They might say that the standard for sugar cane is stalks that are 1.5 metres in height and 4 centimetres in cross sectional diameter with given density and mineral measurements. These specifications are explicit and would be used by the extension officer in determining the appropriate agronomy to achieve the specifications in the produce. During on-site training of the contract farmer, the farmer will be given the agronomy but also practical know-how like how to space his stalks without using measuring instruments, getting a 'feel' for the density of the cane and so-on. Contract farmers then teach other farmers along the way, adding their own tit-bits as they garner experience. Regular checks on knowledge development would ensure that revised versions of training manuals would include the articulation of some of the tacit knowledge acquired. However, these proposed regular checks do not presently occur.

Agri-Business Forum

Best practice observed in contract farming and other ventures is documented by Agri-Business Forum with the view to develop training manuals which are then disseminated

through various forms of print media. Training is also a means of formal dissemination and this occurs in areas like basic record keeping and financial management. A number of actors like Giraffe Finance have taken on the responsibility of offering free lectures and classes in this respect. Other actors, like Cellulant, prefer above-the-line strategies using radio and television programs but not having deliberate interpersonal strategies to transfer knowledge to intended users.

The print media is the most used outlet for formal knowledge transfer from institutional actors to farmers and institutional actors alike. However, the preferred medium of choice for farmers in dissemination of knowledge to farmers is face-to-face meetings. Farmer actors tend to receive knowledge through this means especially from other farmers and prefer this means over others.

Information about these [process improvement in small and medium scale farms] things is not accessible in the absence of talking to people. You need that personal touch- reading pamphlets is only useful to a limited degree because the pamphlets do not talk back to tell you when you have misunderstood. Pamphlets have limited space and do not provide extra tips- you know- the kind of tips only another farmer can give you.

Farmer IA

They [extension officers] need to come around to see us so that they can explain well. We understand better if someone is here telling us face-to face what it is that we can do. Yes I can read pamphlets and listen to the radio but it's not the same thing.

Farmer AN

We do exchange visits. The last 2 years we have had 30 members from Katuba visit various farms in Chongwe and learn how they rear pigs, set up fish ponds and chicken runs. The information they gathered on the exchange visits has improved their way of doing things. For instance, one of our members said she did not know how to cope with the maggots that developed in the sawdust used on the floors of her chicken runs. She has now learned from a farmer met on one of the exchange visits that she just has to change the sawdust. The manuals on bird rearing do not tell you anything about sawdust; it is something that bird keepers have thought of themselves so you can only learn about it from them not a book.

Katuba Women's Association

Institutional actors depend on letters, electronic mail and mobile phone text messages as a formal means of receiving knowledge from farmer actors. They receive knowledge from other institutional actors through conferences, position papers and annual general meetings. Agricultural shows bridge knowledge transfer across the diversity of actors.

It is often through informal sources that knowledge is acquired in farmer networks because of high levels of illiteracy among farmers in small and medium scale farmer networks. Informal sources of knowledge are the most important sources of knowledge in the Zambian small and medium scale farmer network. The flows of informal knowledge appear to be from the knowledge source to the knowledge recipient and additionally from the knowledge recipient to other non-recipients of this knowledge.

A lot of the interpersonal farmer interaction is the basis for first farmer knowledge even before individuals enter the profession. It is transferred in practice on the job and happens informally.

Institutional actors also identify the power of knowledge transfer directly to farmers, face-to-face. On-going active demonstration creates the environment necessary to learn through practice. The Ministry of Agriculture and Livestock encourages Participatory Extension Approaches (PEA) which rely on informal means of knowledge transfer. PEA involves all major social interest groups (men, women and youth) in identifying their problems and developing broad based action plans aimed at achieving sustainable rural development. Once farm families are organised they become the key field personnel of extension.

They [extension officers] encourage them [farmers] by showing them how to go about the new technologies in their neighbourhoods so that they can always have something to refer to through demonstration plots or trials conducted in the community.

Agroforestry Knowledge Transfer Expert JB

In receiving information, institutional actors also depend on informal means through on-site-visits. This is partly because of literacy challenges and also partly because of the inconvenience of more formal feedback loops which are often time consuming.

The focal point person gives us feedback in terms of reports on what they are doing. The purpose of the focal person is to liaise with the local organisations or women's clubs and find out what they are doing and be up-to-date with whatever issue they have and forward them to the organisation. Focal point persons tell everyone else what is going on in their different wards.

Katuba Women's Association

We know that through a committee representing farmers we can spread our word to the farmers...Most farmers that have joined met us through our active community engagement in visiting the farmers and talking to them about the market.

Foxdale Court Farmers Market

What Amiran does therefore is to identify which farmer is doing well with their product and set them up as a model farmer that others can visit and learn from.

Farmer IA

We have contact farmers who are trying to encourage the other farmers to take process improvements up. The idea of having contact farmers is that the transfer would be easier through a network of people. They [contact farmers] are opinion leaders and drive the acceptance of the innovation process.

Agroforestry Knowledge Transfer Expert JB

Informal channels have been very helpful and have taken the shape of the study circle method of learning where farmers identify a topic of interest, literature on the topic is sourced by the contact farmer or facilitator and a time is chosen at which the topic can be addressed through demonstration plots and field days.

Zambia National Farmers Union

A recurring theme in both the formal and informal approaches taken by some of the institutional actors is the power of word of mouth dissemination of knowledge and the need to establish leaders to champion the knowledge transfer process. The efficacy of the word of mouth channel of knowledge transfer ties in well with the Zambian oral cultures. Word of mouth face-to-face interactions appear to break down the barriers associated with farmers

feeling incapable to utilise new knowledge, barriers which have been associated with more formal means of knowledge transfer.

The challenge that exists with focal point/contact person identification is that there is often little consideration for the capabilities of the individual to perform required tasks. The social status of individuals is often used as a proxy for their ability to adequately perform in a knowledge transfer role. Consequently, traditional leaders, those with political or/and financial influence as well as those with a formal education tend to be appointed to this role whilst others that lack prestigious social standing are sidelined. Examples are provided here:

I think the cooperative chose me to be their chairperson because I am related to the former presidential family. They think I have powerful connections and money so they want me to lead them. I am not doing very well in this role because I am busy with so many other projects. I can't turn it [the role] down though, you know our culture- if you are chosen, you are chosen, no questions, end of story!

Farmer MN

I have an MBA and worked with many NGOs so the farmers in the cooperative respect the fact that I am educated. This is why they selected me as a contact farmer. They ask me questions about everything! They think that my MBA provides answers to everything. This is a challenge for us because I can see that some of the other farmers who have not gone very far in education can do a better job than I do as a contact farmer. But no one will give them a chance.

Farmer IA

Your observations in how easy it is for me to show others what to do are correct. My neighbours and the few farm hands that come around often ask why I am not a contact farmer. The reason is obvious. Who am I? I only went up to grade 9 in school, I am not related to the chief, I don't know anyone in politics and I don't have a lot of money. I am nobody. A nobody cannot become a contact farmer.

Farmer AN

5.5.6 Knowledge Storage

In this study, knowledge storage refers to mechanisms for how knowledge can be deposited and retrieved. Only two storage houses were identified; the Zambia National Farmers Union

Library and the Agri-Business Forum Documentation Centre. Both of these largely cater to only formal sources of knowledge. The current mechanism put in place by the Zambia National Farmers Union for knowledge exchange is a study circle of farmer members lead by a contact farmer. The contact farmer investigates the knowledge needs of the farmers in their group and seeks this information from the library. They are in charge of discussing the knowledge they find with the rest of the group. The Agri-Business Forum uses written cases to facilitate knowledge exchange. These are published on the organisation's website and occasionally printed in booklets which are stored in the documentation centre and can be accessed by members. For both organisations, knowledge flows to the farmer but there are minimal opportunities for a knowledge feedback loop. Additionally, the knowledge exchange heavily relies on the farmer actively seeking this knowledge rather than initiatives from the institutions to take this knowledge to the farmer. Herein lies a key difference between the knowledge held by government institutions which is taken into the farming communities and the knowledge held by private institutions which needs to be accessed by the farmer. The present state of knowledge transfer in the Zambian small and medium scale farmer sector can be summarised in Table 5-6.

Table 5- 6: Model of the Current Knowledge Transfer Process in Zambian Small and Medium Scale Farmer Networks (Author's Own)

KNOWLEDGE SOURCE	KNOWLEDGE CONTENT	KNOWLEDGE FLOWS	KNOWLEDGE RECIPIENT
Private for profit sector	Mechanisation; Market knowledge	Private extension officers	Farmers that approach sector actors; often entrepreneurial farmers
Non-governmental not-for-profit	Food security areas aside from the staple food; Alternative farming	Government extension officers; Farmer-based organisations	Farmers belonging to farmer-based organisations; often traditional farmers
Government research institutions	Improvement of the staple crop; Improvement of cash crops	Government extension officers	Registered farmers or farmers residing in state designated farming blocs; often traditional farmers

5.6 Implications of Study Findings and Analyses

This section attempts to draw out the implications of the study findings. It does so by analysing the questions posed throughout this chapter and presenting responses that may address the overall research problem.

5.6.1 Knowledge transfer implications of being on the fringe

As earlier described in Chapter 2, the rural-urban fringe is the area that lies between areas classified as rural and those classified as urban. The rural-urban fringe is nearly the same distance from the knowledge centres in the urban space and from the knowledge centres in the rural space. The urban space is largely dominated by the private for-profit sector and the head offices of the public and donor sectors. The rural space is largely dominated by the stations of the public and donor sectors as well as most traditional farming communities. Ironically,

farmers inhabiting this rural-urban space in between the rural and urban communities are overlooked in both directions.

It is unclear what constitutes a rural area in Zambia although distance from business districts and the presence of traditional leaders in the area are a frequent measure. Most areas classified as urban in Zambia are those that historically sprung up around the mines and related industries and have at least 5000 inhabitants who largely depend on non-agricultural activity (United Nations, 2005).

The public and donor sector tend to specifically target the areas classified as rural or/and remote. The difficulty here is that areas may be classified as rural by some and not others, relative to what is being discussed. Identifying urban areas seems to be more clear-cut. There is therefore a tendency to bypass the rural-urban farmer in knowledge transfer interventions as they are generally not considered 'rural enough'.

Knowledge penetration from the private sector depends on the rural-urban farmer taking up their own initiative to seek knowledge from this sector. Because the rural-urban farmer tends to lack the collective community base that rural farmers would have, seeking knowledge from the private sector as an individual can be an expensive exercise.

Farmer AN's experience demonstrates the difficulty of receiving knowledge in the rural-urban fringe:

I feel stuck in the middle. Our friends at 10 miles [a traditional ward in Chief Mungule's area] have an extension officer who gives them all the information they need. I live in ward 6 and from my house which is on the hills I can see 10 miles. It's very close to me but their extension officer won't help me because he says "ndimwe ba ku Lusaka" [you are from the city of Lusaka]. What annoys me is that that is not true. Lusaka is more than 30 kilometres from me but they think I am not rural enough to need assistance. Do you know that when they are coming from their headquarters in the city they have to pass through my area to reach those at 10 miles? Is it so hard for them to just stop by and talk to me as well?

Farmer AN

5.6.2 The basis of farmer-to-farmer connections and the network implications for farmers lacking farmer-to-farmer connections

Being identified as a traditional farmer is a basis of farmer-to-farmer connections. This traditional identity is composed of tribal or family connections to farming as a lifestyle. It also consists of the location of a farmer's activity in either customary farm land or state designated farming blocs and farmer registration. Linked to the traditional farmer identity is the cultivation of maize, the country's staple food crop. The traditional farmer is largely perceived as a full-time farmer, often not being engaged in other forms of economic activity.

Farmers that are new to the sector and do not have a traditional farming background lack farmer-to-farmer connections. One of the reasons for this is that they are not perceived as equal peers by traditional farmers. The lack of equality is perceived on the basis of lack of historical connections to farming and economic inequality (often because entrepreneurial farmers become better off due to multiple income streams and greater market engagement in their farming practice). Another reason for the lack of farmer-to-farmer connections among entrepreneurial farmers is the location of their farm areas. Most of their farms are located in the rural-urban fringes where there are great distances between dwellings. Geographical sparseness largely contributes to the lack of farmer-to-farmer connections.

These entrepreneurial farmers tend to be excluded from network activities. Without further probing and investigation, the visible network does not fully represent all the relevant actors because it does not represent all farmers by excluding entrepreneurial farmers.

5.6.3 Knowledge transfer implications for farmers lacking farmer-to-farmer connections

As a consequence, of social network exclusion, entrepreneurial farmers miss out on a number of knowledge transfer activities. Some traditional farmers play a role in transferring

knowledge to other farmers in the network by being the point of contact between knowledge sources and farmer groups in the community. In this way, entrepreneurial farmers missing out on this farmer-to-farmer connection therefore are excluded from knowledge transfer opportunities. Due to the lack of knowledge opportunities, some farmers resort to trial and error.

Farming by trial and error emerged as a common theme in the farming practices of the entrepreneurial farmers that lack farmer-to-farmer connections. Much time is wasted in trials and when they fail farmers are discouraged from pursuing farming as a viable business. The reason for Farmer JC resorting to trial and error methods is described here:

The first crop we grew was tomato, it didn't do well; we again grew cabbages on the same portion, they also proved to not be doing well...We keep on trying this and that by ourselves because we have no one to ask. Sometimes I just feel like giving up because it feels like we are on our own.

Farmer JC

On experiencing exclusion from groupings of traditional farmers, entrepreneurial farmers are attempting to form farmer-to-farmer connections with each other. One such attempt has been through a social media network (Facebook). A few entrepreneurial farmers got together and decided to form a social media based group called 'Small Scale Farmers (Farming As Business)'(2014). Members use the group page to ask any agriculture related question or advertise their produce. They share photos to encourage one another's efforts. It is worthwhile noting however that the group relies exclusively on the farming experiences of its members. These members are all relatively new entrants to the sector and quite often are still in the trial phases of their agricultural activities. This is unlike the groups that traditional farmers belong to where knowledge expertise can be found among trained extension personnel and farmers with extensive field experience. Screen shots of the group's activities are sampled here with the permission of the group administrators:

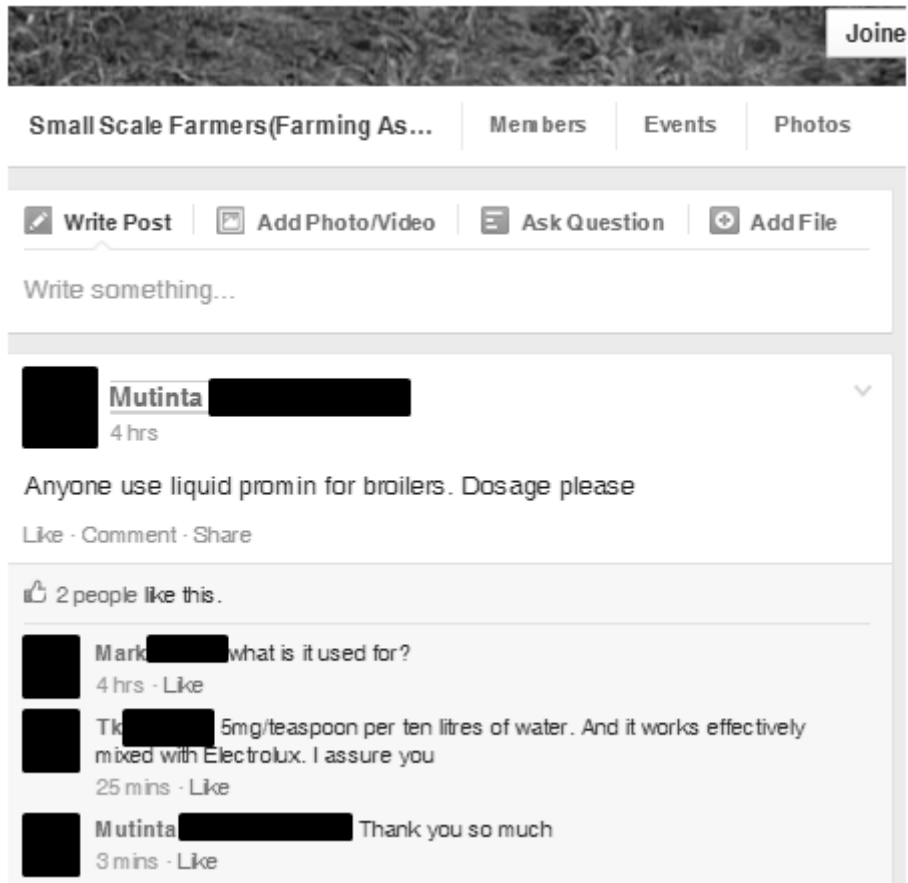


Figure 5- 3: Screenshot 1



Figure 5- 4: Screenshot 2

Kaunda [redacted]
31 August at 16:21

Farmers please help me how to go about treating the disease that has attacked my tomatoes in the back yard garden.



Like - Comment - Share

4 people like this.

Sebastian [redacted] Blossom end rot - caused by a calcium deficiency. You could try applying liquid lime or calomobon as a foliar spray if you have a long season hybrid tomato, but if it's a short lived type, you're probably too late to do anything for this crop. Also try applying more compost to your next crop.
31 August at 17:25 · Like · 3

Andrew [redacted] What are the examples of long season hybrid tomatoes
31 August at 19:54 · Like

Kaunda [redacted] Thanks Sebastian, i will try that.
31 August at 21:46 · Like

Rodney [redacted] In addition to Mr. Scott, physiological disorder can also cause blossom end rot. Drought stress or moisture fluctuation can reduce its uptake into the plant.
Again too much fertilizer can cause the plant to grow so fast that the calcium can't move into the plant quickly enough. So do not over fertilize b'coz too much nitrogen during the early fruiting stage, especially nitrogen made from ammonia, ties up calcium in the soil chemistry.
Also avoid moisture stress. Use mulch to keep the soil moist. Vegetables need about 1 to 1 1/2(1.5) inches of water a week while fruiting. Gud luck and hope this info will help.

Figure 5- 5: Screenshot 3

Most traditional farmers with farmer-to-farmer connections become exclusively reliant on these connections for all their knowledge needs. This results in knowledge redundancy and stagnation as follows:

These farmers do not seem to understand that farming is a business. Too many of them have a 'me too' strategy of going about their activities instead of proactively doing things.

Giraffe Finance

We started with maize because that is what every Zambian farmer does...I have seen that my neighbours are doing well with poultry, particularly layers, so I am going to get into that as well. They [my neighbours] are succeeding in tomato growing and I am trying to do that as well but my tomato crop is not performing as well.

Farmer CZ

5.6.4 Knowledge transfer implications for farmers belonging to cooperatives of the farmer-to-cooperative-to-government extension connection

Maize is Zambia's staple food crop. As a result, for as long as formal farmer organisations have existed, the focus of many government extension agricultural interventions has been around maize production, harvesting, processing and marketing. This has limited the nature of knowledge that farmers in cooperatives access and consequently severely crippled advancement in the development of agriculture in other food crops.

The current cooperatives in Zambia are unfortunately based only on maize production. Cooperatives are usually formed around the accessing of inputs and the marketing of one crop only which is maize. Maize is not the only food we eat! If you as a farmer do not take up the initiative to source knowledge on what else you can do, you resign yourself to the maize trap, which for us small scale farmers is a poverty trap.

Farmer MN

I would have thought the extension officers should have literature on how to grow a variety of crops, where and how you can sell them but they just concentrate on maize- they give you fertiliser and tell you what the floor price for maize is.

Farmer IA

5.6.5 Knowledge transfer implications for farmers not belonging to cooperatives of the farmer-to-cooperative-to-government extension connection

Farmers that are excluded from cooperatives and government extension services create their own knowledge paths. This is achieved through individual learning and research as well as through making connections with private sector service providers. The knowledge among

such farmers consequently varies greatly and differs from the knowledge held by farmers connected to cooperatives and government extension services.

5.6.6 Implications of the dominance of farmer-to-market trader connections for knowledge transfer

Many of the direct bonds that farmers make are with kinsmen, market traders, and the Food Reserve Agency. This observation is important because the research indicates that although kinsmen, market traders and the Food Reserve Agency enjoy the greatest number of farmer bonds, they are not the richest sources of knowledge for process improvement. Whilst kinship ties offer a wealth of social benefits, they have a limited impact on transferring new knowledge. Links to the Food Reserve Agency and market traders, on the other hand, are only transactional and lack the socio-normative dimensions of embeddedness. Food Reserve Agency and market trader linkages also fail to deliver on knowledge for process improvement purposes.

5.6.7 Common characteristics of farmers that have a farmer-to-private sector knowledge connection

The farmers that have farmer-to-private sector knowledge connections are found to have interests in growing crops other than maize. They see the greatest opportunities to source inputs and knowledge on other crops from the private sector as follows:

I get sunflower and cotton seed from the private sector because the government only gives maize and fertiliser. The private sector companies will not just give you the seed. They teach you a lot about the crops you are going to grow from the seed. They are also consistent in their visitations over the growth period of the crop right up to harvest to ensure that you are on track...If I encounter any difficulties before a scheduled visit I am free to call them.

Farmer FS

Aside from crop farming, farmers with farmer-to-private sector connections are engaged in diverse farming activities which they often integrate. This ability to expand the farmer's activity portfolio is credited to the private sector:

When I wanted to start growing tomatoes, I went to Amiran to get advice on the variety that would be suitable for my area and things like that. One of their agro-advisers accompanied me back to the farm to have a soil inspection. I pleasantly got more than I bargained for because when we got to the farm he did not just advise me on tomatoes. He told me I had good water levels and that I could put up a fish pond if I was interested. I was already keeping poultry and he told me that the poultry are a good source of manure for both the tomatoes I want to grow and feed for the bream fish he suggested I could get into. Fish farming had not crossed my mind before then but thanks to Amiran I am now a successful fish farmer in addition to my success in poultry and tomato farming. Mind you, this is all happening on only 5 hectares of land.

Farmer IA

Farmers that have connections to the private sector seem to have different perspectives on knowledge seeking and the value of formal education in comparison to farmers that do not have this connection. This is important because knowledge seeking and education increase the farmer's awareness of what more can be done in their farming. This is a prerequisite to actually improving processes. There are a variety of possible formal and informal knowledge and education sources as noted:

I watch a lot of programs that feature both agriculture and industry on TV like Lima Time and Business in Africa. It helps me stay abreast with what is happening. I also get information from the farmers union of which I am a member. They have classes about once a month on Saturdays on things like how to rear broilers, layers and pigs. We get pamphlets and booklets. We can also take our produce to the offices for them to examine if we are not doing very well and they provide advice. I have an MBA which has opened my mind to be constantly thinking of what next...As a farmer it is better for you to get knowledge, get educated in the field.

Farmer IA

For those of us who are genuine farmers, I don't think that going to school or college changes anything. I learned how to read and write and that is all I need from the education system. My farming knowledge was handed down to me from my family. You can't find what I know in any book or pamphlet...As for other knowledge sources apart from schools, I really don't have the time to sit and listen to the radio or watch television. After all you can't learn anything about farming that way, you can only learn by being in the field with other farmers.

Farmer AN

Traditional farmers were asked why they did not engage with the private sector and their general sentiment was expressed in the response of Farmer AN as follows:

You can't trust them! They just want to make a profit...even the extension officers tell us to beware of them.

Farmer AN

This finding of distrust of the private sector has been found in other studies of the sector (Sitko & Jayne, 2014a). The impact of an absence of trust among actors in the sector is discussed later in this chapter.

5.6.8 Network implications of existing farmer-to-private sector knowledge connections

The private sector has been identified as being the source of most new knowledge in the sector. Additionally, the private extension system appears to be more efficient and better coordinated than the government extension system. This has resulted in farmers that have these connections being at higher rates of development than those that do not. This further fragments the social network as the farmer priorities change with their increased development. For example, Farmer IA who enjoys several private sector connections has developed to the extent that she has moved from basic vegetable farming to a fully mechanised irrigation operation for her vegetables. Early knowledge from the private sector on agronomy has enabled her to grow crops all year round. Her knowledge needs from the network are therefore concerned with minimisation of post-harvest losses and transporting the produce to market. Farmer AN, on the other hand, who does not have private sector connections has not had as many knowledge opportunities in agronomy, let alone on mechanisation. Her knowledge needs from the network are therefore still concerned with agronomy for crop production.

5.6.9 Network implications of the existence of separate government and private sector extension systems

The existence of two separate extension systems has resulted in a lack of sector coordination.

This has resulted in not only repetitive interventions but in farmer confusion as well:

I am confused about which is better between organic farming and using fertiliser because the government gives us seed and fertiliser to use hand in hand. They tell us that if we want to produce more we must use the fertiliser. The private companies and non-governmental organisations come here and tell us something else- that if we continue with fertiliser we will destroy the land and not be able to grow anything at all very soon- that we must be organic. They need to tell us more about this organic business, I don't understand! Isn't organic farming the same as our traditional ways? How come our traditional ways don't produce much if organic farming works? Who should I listen to? They all say they have 'done research' and that their methods work. This is why I told you that you can only learn about farming from farmers. These extension officers just confuse us.

Farmer AN

5.6.10 Network implications of the existence of two farmer identities

The findings show that there at least two distinct farmer identities within the Zambian small and medium scale farmer network rather than one homogenous group as initially assumed.

Previous sections of this chapter have demonstrated how the social network participation of the two groups of farmers differs. These differences lead to social network fragmentation.

From the name generator in Table 5.1 it is seen that the farmers who do not self-identify as legitimate farmers are also the farmers that are neither part of any farmer groups nor have farmer-to-farmer connections. The conclusion drawn here is that identity differences exert a strong influence on the observed differences in the network.

5.6.11 Knowledge transfer implications of the existence of two farmer identities

The behaviours of farmers towards knowledge vary partly because of the different identities they hold. Knowledge transfer interventions that view the farmers as a single group and that do not account for the differences that exist in identity therefore tend to be ineffective.

Multiple sources of identity create complex identities that limit opportunities for trust building. Trust is necessary for knowledge sharing to occur so low levels of trust are detrimental to the knowledge transfer process. Traditional farmers rely on the identity of the knowledge source as a basis for trust and knowledge sharing. The content is not as important as who is transferring it for the traditional farmer. Entrepreneurial farmers that have to create their own knowledge paths rely on the reliability of knowledge transferred and not on the identity of the knowledge source as a basis for trust. Being able to demonstrate the reliability of knowledge transferred is most important to entrepreneurial farmers.

Fragmentation of the social network comes about because the existence of two social network identities distorts trust and mechanisms of trust. The traditional farmer's network has a criterion of social recognition as a farmer for actor inclusion. By sharing this identity with others trust is built on expectations of benevolence. This is illustrated here in a traditional farmer's response to a question on whom they trusted for knowledge:

Farming is my life so I am not willing to just trust anyone. If I am looking for knowledge from other farmers, I seek out those as similar to me as possible...By this, I mean I reach out to other women in farming, who are married and have children, and also who are not engaged in other professions. I believe that someone who is 'in the same boat I am in' will have no intentions of misleading me. I would trust their information...I tend not to trust some of these people that come from the NGOs [non-governmental organisations] because they don't live among us. What are the real motives of a researcher coming from overseas to give knowledge to Zambian farmers? Some of them have probably never heard of Zambia before. I don't want to offend anyone but these types of people in my opinion are just here on paid holidays. They don't really care, how can they care? This is not their home...I will give you an example. When we had a drought in 2002, there was a delegation sent here by one of the NGOs to encourage farmers to appeal to the government for GM [genetically modified] maize cultivars. We came to learn that the government had rejected GM food relief because it may

not be good for one's health. If the GM food is not good why were these foreigners pushing us to grow it? When you think about it, the GM cultivars are produced in the same countries that these NGOs come from so it's more like they are just doing some marketing for their own governments. Poor hungry Zambia will in no time be poorer sick Zambia if we give in to such pressures. Would you trust such people? I certainly don't...With the government, they also have their own issues. They manipulate farming for their own political agendas so I don't think they give any 'good' knowledge anymore- they do whatever it takes to keep votes. So for me and farmers like me, there is no one else to trust but the farmers among us...If a farmer I trust recommends knowledge from a source I personally distrust, I can go against my own convictions because I trust my farmer friend.

Farmer AN

The entrepreneurial farmer identity, on the other hand, is associated with trust built on credibility. This credibility is extended from knowledge sources to the content. This is illustrated here:

I believe that knowledge is everywhere. One just has to verify the source of the knowledge. Personally, I don't care whether or not we come from the same village; whether you are a woman or a man. If you have something [knowledge] useful for me, I will take time to consider it...Many farmers go wrong because they are very mistrusting of those they do not perceive as being like themselves. They place too much trust in their peers and have misplaced trust in some of the individuals in the community...If I were to go round the homesteads giving out free chitenge [Zambian traditional clothing] to the women, my reputation as a 'good woman' would spread like wild fire. They would hang on to every word I say whether it is right or wrong. They would make no attempt to check whether I really know what I am talking about. This is what I mean when I say they have misplaced trust and can easily be taken advantage of.

Farmer FP

Oftentimes, benevolent sources of knowledge may not be credible and the inverse is true. Because the different types of farmers apply different criteria for trustworthiness of knowledge being transferred, the knowledge held by benevolent sources (other similar farmers or those that earn a reputation for benevolence) and credible sources (those with proven knowledge- especially institutions, sometimes other farmers) tends to be disparate.

5.6.12 Implications of attached identity as a farmer from the perspective of institutions

The means of farmer identification by institutional actors like sector coordinators and sector service providers tend to exclude farmers that are not formally registered. This is problematic because, as has been explained before, some farmers are excluded from formal groupings. This in turn excludes them from formal farmer registration.

Another problem is farmers that do not identify themselves as being legitimate would not formally register themselves as farmers. In so doing, they cut themselves off from identification by institutional actors. On the other hand, the very strict criteria that exist on farmer identification tend to reinforce the identity of some farmers as not being legitimate. Again, this is a hindrance to formally registering as a farmer. This has resulted in many small and medium scale farmers, particularly those that are entrepreneurial, being invisible in the eyes of the sector.

5.6.13 Impact of complexity in farmer identity on the network

Complexity in farmer identity further influences the behaviour of farmers in the social network. Traditional farmers have been found to blend together their multiple identities resulting in one highly exclusive identity that results in strict criteria for in-group status. This results in the exclusion of other farmers that are unable to claim *all* the identities of the in-group. An already fragmented network becomes further fragmented along the dimensions of other identities that farmers claim, such as tribe and levels of education.

Identity complexity also affects network participation. The multiple roles that farmers take on when they form a blended single identity cause problems as illustrated here:

Women only groups tend to not work because they don't operate like businesses. A business has a focussed agenda but the groups around here are not just focussed on farming, they want

to attend to all issues that they feel they are responsible for as women of our society. They might meet weekly but end up discussing funerals, weddings and other things.

Agroforestry Knowledge Transfer Expert JB

Without trying to insult any of the sexes, I observed that male members of a group tend to be more serious about treating their enterprise as a business. This is because the women are not really farmers... first they are wives, then mothers, then daughters, then sisters, then friends, then neighbours...all this before they are farmers! For some reason they find a contradiction in pursuing farming as an enterprise while meeting their family and societal obligations.

Giraffe Finance

5.6.14 Impact of complexity in farmer identity on knowledge transfer

Network exclusion on the basis of education is problematic for new entrants to the sector who in spite of not having a rich agricultural training background may still have something important to offer in knowledge exchanges. Consequently, foreign and indigenous knowledge systems remain separated rather than united.

Those farmers that were married identified themselves as having additional occupations outside farming and employment in managing their households. The importance of keeping their family units together meant that any efforts to access knowledge that may compromise duties to be performed in the house would be forgone. Consequently, those that were widowed or had never married appeared to have greater flexibility in how they managed their time and consequently greater freedom to access new knowledge. Because of the differences in time availability and flexibility, farmers do not benefit equally from knowledge transfer efforts.

5.6.15 Imbalanced Identities

It was determined that what contributes to the complexity of the Zambian small and medium scale farmer network is the plurality of farmer identities that exist. The farmers that describe themselves as entrepreneurial farmers can be described as having high social identity

complexity. This means that entrepreneurial farmers recognise their distinct membership of different groups and thereby form more inclusive identity categories by summing up their identities. By so doing, the definition of who a farmer is, from the perspective of entrepreneurial farmers is not a single highly exclusive identity category. These farmers do not see a contradiction in self-identifying as a farmer and simultaneously claiming other occupational identities. They separate their entrepreneurship in farming from their occupations.

Farmers describing themselves as traditional farmers tend to exhibit low social identity complexity by subjectively embedding multiple identities in a single in-group representation. They do not acknowledge differentiation and difference between in-group categories. For these farmers, farming is not occupational but is a state of being. Those engaging with other occupational identities are not viewed as belonging to the group.

What comes to the fore here is that for actors to engage with the social network, congruence needs to exist between the self-identity of actors and the identity attached to them by others. Those who perceive themselves as farmers must enjoy that perception from others as well before they can be recognised as being legitimate players in the social network. The same goes for the identification of other key actors such as community leaders and knowledge drivers. However, it was found that identity imbalance exists because the self-identity of farmers is not congruent with identities attached to the farmer by others. The attached identities that are relevant to the desired congruence are those from knowledge sources (government and non-government), community leaders and other farmers. A failure to achieve congruence results in exclusion from association memberships and role performance in the social network. Sometimes this exclusion is self-imposed but often times, it comes about as a result of exclusion by others who do not attach the desired identity to an individual.

5.7 Summarising the Study Findings to Answer the Research Questions

The study findings are summarised in this section to provide specific answers to the research questions posed at the onset of this thesis:

1. *What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*

Networks in the Zambian small and medium scale farmer sector have several actors operating at four levels. Level 1 of the network consists of farmers and market traders. Level 2 of the network consists of farmer groups. Level 3 of the network consists of sector service providers. Level 4 of the network consists of sector coordinators.

The farmer actors in the network do not experience the same patterns of ties to others. The differences in tie patterns emerge from the two different social identities held by farmer actors. The two different social identities are the identity as a traditional farmer and the identity as an entrepreneurial farmer.

The traditional farmer identity is based on upbringing related to farming, the number of years spent in farming and the attached identity as a farmer from others. Farming is viewed as a lifestyle in the traditional farmer identity. The entrepreneurial farmer identity is largely determined by late entry into the sector, farming in areas not formally recognised by the state as farming blocs and employment of others to perform farm work. Farming is viewed as a business in the entrepreneurial farmer identity.

Traditional farmers have more network ties than entrepreneurial farmers. The majority of ties held by traditional farmers are to other traditional farmers. Entrepreneurial farmers have fewer

but more diverse ties. Ties held by entrepreneurial farmers are to a few other entrepreneurial farmers and various institutional actors.

The social network is fragmented as a consequence of the two different social identities of farmers. The prevalence of farmer-to-farmer ties among traditional farmers result in the emergence of cliques within the network that reinforce the shared identity of traditional farmers as the yardstick of legitimacy as a farmer. These cliques take the form of both formal and informal farmer groups.

2. What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?

The distinct levels of actor operation facilitate a hierarchical transfer of knowledge. In the hierarchical arrangement, transfer is often unidirectional from the higher levels of sector coordinators and sector service providers to farmer groups and farmers.

Two knowledge transfer streams are identifiable from institutional actors; public extension systems and private extension systems. The public extension systems tend to work through outreach to identified farmers (often identified through national farmer registers or membership of farmer groups). Both these mechanisms reach more traditional farmers than they do entrepreneurial farmers. The private extension system works through farmers that approach the institutions. By and large, the farmers that approach the private sector for knowledge are entrepreneurial farmers.

The transfer of knowledge from one farmer to another occurs on the basis of shared identity. This is because shared identities encourage trust. As a consequence of differences in identity,

the two types of farmers rarely have knowledge exchanges between themselves and tend to hold different types of knowledge.

The invisibility of entrepreneurial farmers in the sectors has contributed to inefficiencies in sector coordination. This has had the impact of hindering knowledge transfer on process improvement. The majority of knowledge recipients are traditional farmers but they are less likely to participate in applying the knowledge for process improvement than their entrepreneurial farmer counterparts. The poor utilisation of knowledge on process improvement, particularly by traditional farmers, has seen the sector become dominated by knowledge transfer on market information which both traditional and entrepreneurial farmers tap into.

CHAPTER SIX: DISCUSSION

This chapter further discusses implications of the key findings of this study as they affect knowledge transfer in Zambian small and medium scale farmer networks. The small and medium scale farmer sector has been viewed in much of the national policy and interventions for agriculture as being relatively homogenous. Perceptions of homogeneity are extended to the characteristics of farmers, their fields of activity and manner of production. This study however identifies the diversity of the small and medium scale farmer sector: diversity structured around farmer identity. This has implications for the manner in which networks emerge and the nature they assume. It also has implications for the effectiveness of policy and interventions aimed at improving the sector. This diversity of the sector is based on the social identity of farmers and the implications of this are explained further.

Many studies interested in understanding social networks have focussed on the more structural explanations that considerations of tie strength and tie weakness have to offer. This study offers another possibility for consideration in understanding social networks. The strength of ties in this study could not be easily measured. Direct and indirect ties have however been used as a proxy for the effects of tie strength and weakness respectively. The findings on indirect ties supported Strength of Weak Ties Theory to the extent that indirect ties resulted in a greater diversity of information. The findings on direct ties also supported Strength of Weak Ties Theory to the extent that direct ties resulted in clique formation and network fragmentation. However, the findings on ties gave little insight on network structure and position, in contrast to network study expectations in more developed market economies. What the findings unexpectedly provided though was the importance of social identity in determining tie formation and influencing structure and position. It would appear then that the directness or lack thereof, of ties may not be as important a factor as initially expected. The

question of identity appears to supersede the question of tie directness in the Zambian context. This is the key finding of the research -that identity has an overarching impact on the nature of networks and on knowledge transfer outcomes.

It was found that Zambian small and medium scale farmers claim several identities which eventually culminate in a farmer's identity as either traditional or entrepreneurial. This identity is carried through in decisions as to whom to associate with and whether or not to access new knowledge. This chapter discusses the theoretical implications of this finding. It achieves this by reflecting on the social network literature that was reviewed in Chapter 3 and provides arguments rooted in the study findings for theoretical consideration.

6.1 Revisiting the Assumptions of Social Network Theory

In order to appreciate the assumptions of Social Network Theory, the next few paragraphs briefly discuss how the study of social networks has developed over time in the various sciences. This brief discussion is based on the extensive historical analysis of social network theory development by Freeman (2004).

What is surmised from Freeman's (2004) analysis is that there are at least two distinct contexts in which social networks operate. This is relevant to the discussion argued by this thesis for contextualising social network theory depending on the level of country context development. This is presented in Table 6-1.

Table 6- 1: Contexts for Social Network Theory (Author’s Summary of Freeman (2004))

Author	Developed/Market Context Social Network Distinction	Developing/Agrarian Context Social Network Distinction
Sir Henry Maine (1861/1931)	Contract- Negotiated agreement in large modern society	Status- Small, traditional, family-oriented societies
Ferdinand Tönnies (1855/1936)	Gesellschaft- Formal, impersonal and instrumental links	Gemeinschaft- Personal and direct social ties of individuals that share beliefs and values
Emile Durkheim (1893/1964)	Solidarité Organique- Modern society in which division of labour leads individuals to form cooperative links	Solidarité Mécanique- Traditional society with similar individuals under repressive regulation
Sir Herbert Spencer (1897) and Charles Horton Cooley (1909/1962)	Secondary relations- Modern large scale societies in which individuals are linked impersonally	Primary relations- Traditional small scale societies in which individuals are linked intimately

There are at least two distinct contexts for social networks and this thesis argues that Social Network Theory accounts for the features of only one of these contexts- the developed/market economy context. Freeman’s (2004) analysis demonstrates that social network theory as understood today has largely developed on the basis of studies in the developed/market economy context. This is despite the fact that principle insights on social networks emerged from the ethnographic studies by Warner (1937) of kinship patterns and rules of descent among the Murngin of Australia- a developing context. Warner’s (1937) findings were used to explore market communities in studies concerning:

- Industrial productivity among engineers and personnel managers (Warner & Lunt, 1941)
- Consumer behaviour, unemployment and communication (Lazarsfeld, Berelson, & Gaudet, 1944)

- Friendship among physicians and the dissemination of drug information (Lazarsfeld & Merton, 1954)

These studies were influential but had a large bias to the structural features of networks whilst the relational aspects were taken as a given entity. The emphasis on structure was particularly upheld in economics, network science and organization science whilst the emphasis on relations was captured in psychology, sociology and geography. The mathematical turn in social network studies of the 1950s (Freeman, 2004) laid the foundation for theoretical framing of Social Network Theory which focussed on structure, particularly that linked to the market/developed economy.

The literature review discusses the common underlying assumptions of social network theories (Borgatti & Halgin, 2011) as follows:

6.1.1 The fundamental roles of structure and position

The influential theories in social network studies such as Granovetter's Strength of Weak Ties Theory and Burt's Structural Hole Theory were all developed on the basis of the assumption that structure and position provide explanations for network outcomes. In order to predict network outcomes on the basis of structure and position, networks have for a long time been assumed to be static structures. There has been recent support however to change this perspective and view networks as being the products of dynamic processes and consequently as dynamic structures (Newman, Barabási, & Watts, 2006). In concurring with the view that networks are dynamic, it is important to understand what factors give networks the properties they assume. This is a gap that exists in the literature and development of theory in this area and as a result, there is limited knowledge on the antecedents of networks.

6.1.2 Ignoring individual attributes

The literature reviewed suggests that social network theories hold the assumption that individual actors do not determine network outcomes. Network outcomes for individuals are assumed to emerge from their structural and positional orientations in the network. In this way, the importance of individual attributes is at best minimised and often ignored. Burt (1992) summarises the position of social network theorists regarding individual attributes in his argument that attributes are incapable of providing explanations for networks. The limitation of this assumption lies in the fact that by assuming that attributes have no impact, we must also assume that actors are at the mercy of the network. We must further assume that we cannot influence network outcomes and that therefore a network cannot be managed.

6.1.3 The network function of content flow

Social network theories assume that the channelling of content to network actors is underlain by a flow model. The flow model emphasises the advantages of the central position in the network. The flow mechanism suggests that actors far from others receive content later than those centrally positioned (Borgatti & Halgin, 2011). Studies have however shown that not all desired network outcomes rely on flow and as such the central position does not always matter. The studies that have indicated these results are primarily concerned with network power (Cook & Emerson, 1978; Marsden, 1983).

6.1.4 Strategic and self-interest maximising actors

An assumption is held in management science that actors have strategic intentions and act in order to maximise their benefits. Underlying this assumption is another assumption that individuals are homogenous in their intent. This is an objective view of individuals which

results in a further minimisation of individual attributes and views intent as consistent among all actors. The meaning and nature of intent are however context dependent.

6.1.5 Lasting patterns of relations

Relations are assumed to emerge from network structures. These structures may be social, economic or political. The assumption held is that these structures are stable for relatively long periods of time resulting in lasting patterns of relations. However, stability of structures is also context dependent.

6.1.6 Actor interdependence

The network is viewed as a set of relations among actors. Interdependence arises where relations exist. The extent of interdependence is however unaccounted for. Determining the extent of interdependence may provide us more information about the ‘rules of association’ in the network and lead to suggestions on what form network interventions should take in order to create the desired impact.

6.2 Questioning the Assumptions of Social Network Theory on the Basis of Evidence from the Findings

In order to adequately contextualise the findings that lead to a questioning of the assumptions of Social Network Theory a brief discussion on the differences between the market economy contexts in which Social Network Theory was developed and the agrarian economy context of this study is presented here. The market economy is characterised by highly formalised network arrangements. Structure and position are easily determined because all actor decisions are based on basic supply and demand (Gregory & Stuart, 2003). There is minimal, if any, state intervention. The agrarian economy, on the other hand, is characterised by

informal and personal network arrangements where social identity matters. Structure and position are difficult to determine because the actions of agrarian actors are embedded in a planned economy which may feature state interventions such as subsidies and price fixing (Shah, 2013).

This said, it may be assumed that the social network findings of the rural-urban context of this study may not be representative of social networks in other more industrial parts of the Zambian economy where the features of a market economy are observed.

6.2.1 Other fundamental roles in addition to structure and position

This thesis does not dispute the importance of structure and position in networks. However, what it challenges is the assumption that structure and positions are the only fundamental considerations in explaining network outcomes. The role of network structure in knowledge transfer has been examined in the work of Reagans and McEvily (2003). Their (Reagans & McEvily, 2003) study found that the network structure features of dyadic tie strength, cohesion and range affect knowledge transfer. Tsai (2001) studied how network position influences knowledge transfer. He (Tsai, 2001) found that being centrally located in a network provides knowledge transfer advantages. The questions on what leads to tie strength, cohesion, range and centrally positioned actors in the network were not examined in these studies.

Tsai (2001), Reagans and McEvily (2003) all found in their studies that individuals made choices in transferring knowledge in some cases but not in others. Understanding why this choice to transfer knowledge is made in some cases but not in others is an important precursor to explaining what enables transfer (Reagans & McEvily, 2003). The present study makes a contribution to this theoretic tradition. The findings here suggest that perhaps actor attributes provide some answers to these questions. For as long as the reasonable conclusion is drawn

that individual actors make a choice i.e. network actors have agency, it is unreasonable to assume then that only network structure and position, and not individual attributes, influence choice. Specifically, the social identity of individual actors may be a possible explanation of variations of tie strength, cohesion, range and central network position.

In this study, tie strength was not measured. Tie directness is however used as a proxy for the strength of the relationship between two actors. Directness is a measure of closeness and is a popular technique for estimating tie strength; direct ties represent strength in the relationship and indirect ties represent weakness (Marsden & Campbell, 1984). What this study shows is that farmers that had direct ties with other farmers (the traditional farmers) were able to establish such relationships because of a perceived shared social identity. It further showed that this perception of a shared social identity resulted in the formation of in-groups by traditional farmers which took the form of informal groups or associations. These in-groups provide cohesion. The importance of social identity amongst traditional farmers leads to some farmers gaining prominence in the group on the basis of their reputation and influence. Farmers that attain such prominence are expected to assume central positions. Entrepreneurial farmers, as a consequence of their out-group status, have to make as many connections as they can for themselves across the network. In this way entrepreneurial farmers have a wider range of connections.

Apart from ties with other farmers, direct ties associated with social bonds (e.g. familial and tribal) have implications for trust relationships and in turn for in-group status. This study views trust as a construct shaped by relational norms (Wicks, Berman, & Jones, 1999), an embedded property of relationships among actors (Granovetter, 1985) and a moderator of interactions (Zucker, 1986). Trust is promoted by community rules, personal bonds, informal mechanisms or recurrent transactions (Geertz, 1973; Granovetter, 1985), particularly where actors have homophily (Ashforth & Johnson, 2001; Obstfeld, 2005; Rousseau, Sitkin, Burt, &

Camerer, 1998; Zucker, 1986). Social bonds encourage trust and lead to the prominence of a given social identity. This sets the basis for network interactions.

These study findings suggest that social identity may indeed influence observed structure and position. This understanding gives us an opportunity to anticipate where desired structural features of networks may be developed. It further enhances our ability to manage observed networks rather than simply take networks as a given entity.

6.2.2 Considering individual attributes

Ignoring actor attributes has been convenient in using social network theory to explicate how structure leads to outcomes. However, ignoring individual attributes has the consequence of hindering our ability to predict where and how networks may emerge. This additionally limits the utility of social network studies in providing relevant information on how to channel resources to groups of individuals.

The number of attributes individuals can possess is vast. Establishing which attributes are relevant for any given outcome is a daunting and complex task which heavily depends on the context. However, it is the position of this thesis that the challenges presented by taking individual attributes into account are not sufficient reasons for dismissing them altogether. Our explanations of social networks are only as relevant as the contexts in which the networks are situated. It is therefore a worthwhile consideration that individual attributes may be contextually relevant in some instances.

The next step in developing this argument is to propose in what instances individual attributes are important in providing network explanations. This is achieved by discussing the reasons why the individual attribute of social identity is important in the Zambian small and medium scale farmer networks.

*6.2.2.1 How the rural-urban fringe contributes to the importance of identity in the
Zambian small and medium scale farmer network*

Zambia has a rapidly growing urban population. The urban areas of the capital city of Lusaka are projected to accommodate 25 percent of the national population by the year 2030, compared to the present 17 percent (Cheelo, 2011). Urban farming is popular particularly on a commercial scale. Rural farming is more wide spread but occurs commonly on a small to medium scale. As individuals migrate from the rural to urban areas, they carry with them their agricultural activities and practice farming in the urban space. As land for farming rapidly becomes unavailable in the urban areas, farmers inhabit areas that lie in between the rural and urban spaces. Additionally, urban dwellers seeking investment opportunities in farming are moving away from the urban centres towards the fringe areas for the opportunities to purchase land and establish a farming business. The rural-urban fringe which is the study site for this thesis is shown in Figure 6-1.

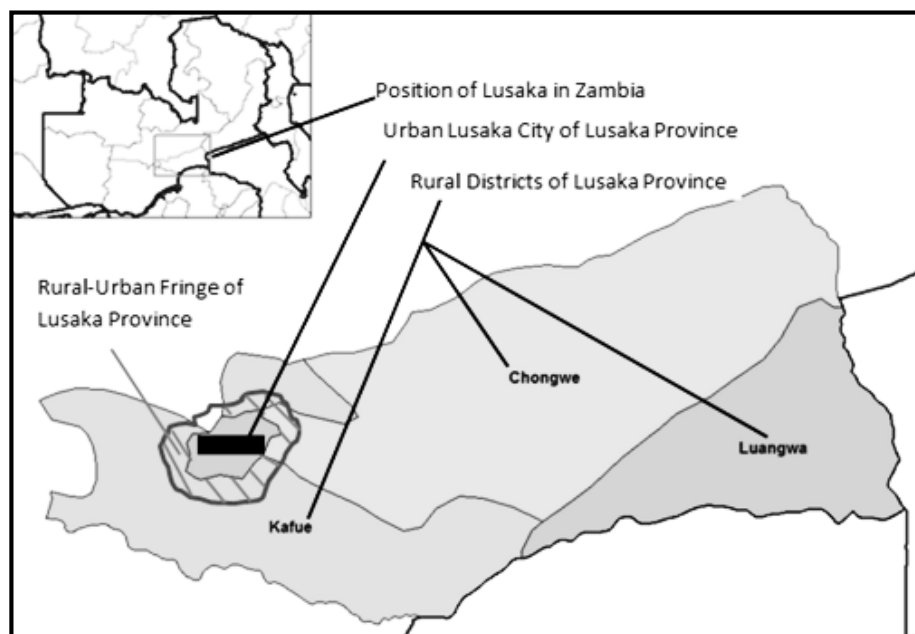


Figure 6- 1: Rural, Urban and Rural-Urban Lusaka (2012)

The fringe areas, on the rural-urban boundary of Lusaka, are increasingly becoming an important zone for consideration as they receive both migrating rural dwellers and migrating urban dwellers. These fringe areas are generally unplanned living spaces. The lack of planning in these spaces has resulted in a lagged development of institutions in the zones.

In Chapter 2, issues of land tenure were investigated with a complex system of dual tenure systems being uncovered. The forms of land tenure in Lusaka are state-owned land acquired by lease-hold purchase and tribal-owned land acquired by customary traditions of inheritance (Chileshe, 2005). In general it was found that the urban city of Lusaka falls under the jurisdiction of state-ownership whereas the rural districts fall under customary law. A complex land ownership system recognising both state-ownership and customary law is found in the rural-urban fringe which is located in between the rural and urban zones of Lusaka. The challenge of the dual land tenure system in Lusaka's rural-urban fringe is that neither the state, nor traditional leaders have 'ownership' of agricultural concerns. This means that neither the state nor chiefs and elders are seen to be in charge of the zones. This means that no one is responsible for spearheading any efforts towards agricultural improvement. This makes the rural-urban fringe of Lusaka in many ways 'no man's land'. The 'no man's land' effect has resulted in most knowledge transfer interventions by-passing the rural-urban fringe. This is because, from the government point of view, there are no recognisable farmers in the fringe. Rural-urban fringe farmers are invisible to the government. Farmers in this zone therefore have to make very deliberate efforts to attain the identity that makes them recognisable. This is achieved by membership of farmer based organisations as was discussed in Chapter 5.

The conclusion that can be drawn on this point is that in contexts characterised by the absence of adequate institutions, networks emerge in a fragmented fashion. Networks are self-creating and self-sustaining but this occurs within a structuring institutional context. Where

fragmented networks occur, the social identity of individual actors may be an indicator of the possible network outcomes.

6.2.2.2 How the agricultural sector differs from other industries and contributes to the importance of identity in the Zambian small and medium scale farmer network

The agricultural sector differs from other industries on many dimensions. These include the large contribution the sector makes to national income, the large number of participants the sector has and the impact of natural phenomena. It differs in an additional important way that affects network development and emphasises the importance of the social identity of farmers. This difference is in the relationship that exists between production and consumption. The key actors in the sector, the farmers, make joint production and consumption decisions. This is especially the case for farmers that are of the small and medium scale category. The variation in the way these joint decisions are made has implications for the extent to which farmers engage with the networks. This variation stems from the social identity of a farmer as either a traditional farmer or entrepreneurial farmer.

Traditional farmers tend to limit their cycle of production to their consumption needs. Their reasons for tapping into the agricultural networks therefore have very little to do with knowledge for process improvement purposes. Rather the network exists to meet other social needs of the farmer. Traditional farmers seek out and become embedded in social ties that reinforce their perspectives of farming- that it is a way of life they have inherited from ancestral owners of the land and a duty to be performed by women in their role as wives and mothers. They engage with the market to a very minimal extent for the purposes of selling a small portion of their produce in order to pay for their needs not met by their produce. Market engagement is limited to low value monetary transactions. The engagement of traditional

farmers with others in the social space tends to be with intent to fulfil the aforementioned perspectives by maintaining the ties of social relations they are embedded in.

Entrepreneurial farmers, on the other hand, because of their interest in producing beyond their consumption needs, engage with the network for market purposes. Seeking out knowledge is a priority for these farmers. This influences the range of network connections they make.

What both traditional and entrepreneurial farmers have in common is that they primarily identify themselves as women. This gendered identification has implications for with whom farmers interact and the nature of content carried in knowledge transfer activities. The complexity of gender role performance in conjunction with farm work impacts on farmer performance and farmer identity outcomes. Specifically, the identity as a woman attracts negative perceptions about their capabilities as farmers because of their performance of several other roles (as mother, wife etc.). Gender matters for women farmers, whether they are traditional or entrepreneurial.

The conclusion that can be drawn from this discussion is that because the agricultural sector differs remarkably from other industries, its actors are unique. The actors are both producers and consumers of their output and this places importance on decisions that actors make towards networks either in favour of greater production or greater consumption. These decisions emerge from the social identity of the individuals as either traditional or entrepreneurial farmers and additionally, their identity as women.

6.2.3 Additional network functions

Networks still exist where flow of content is not the concern of actors that participate in the network. When flow is not a concern, network position does not matter. The other things that

matter depend on whether the actor forms ties for the purposes of exchange or for the purposes of solidarity (Borgatti & Halgin, 2011).

These differences in tie formation were observed in this study. Entrepreneurial farmers that demonstrated a higher interest in knowledge transfer form ties for the purposes of exchange. What matters in these ties is the reliability of the knowledge being transferred. Entrepreneurial farmers purposely seek out this knowledge and this means that they would benefit from these knowledge flows regardless of where they are located in the network.

Traditional farmers form ties for the purposes of solidarity. What matters in these ties is the reliability of actor intentions. This reliability is estimated on the basis of a shared social identity. Part of a shared social identity has to do with spatial proximity with others and so for these ties position may matter.

The conclusion that can be drawn from this discussion is that networks serve functions beyond the flow of content. The importance of network structure and position therefore depend on the function served by the network from the perspective of the actors involved. This actor perspective may be informed by the social identity claimed by these individuals.

6.2.4 Actor orientation towards strategy and intent

Previous studies have shown that how actors view strategy and intent varies with the context. Part of this difference stems from the societal culture that actors are embedded in. Part of the difference can also be linked to the social identity of the individual actors.

In previous sections, the differences in intention between traditional farmers and entrepreneurial farmers have been drawn out. Because of the differences in intention, the perception of what strategy is depends on the actor. The intention for traditional farmers in participating in the network is to nurture social relationships. This is linked to their identity as

allocentric individuals with collective rather than individualistic concerns. The strategy employed to nurture social relationships is the enhancement of their social identity in order to increase perceptions of similarity and gain in-group status. Entrepreneurial farmers intend to improve their agricultural performance. The strategy employed to achieve this is the forging of relationships with multiple stakeholders. This is a reflection on their identity as idiocentric individuals with individualistic rather than collective concerns.

The conclusion that can be drawn from this point is that when network actors are not homogenous, their strategy and intent vary. Social identity becomes an important factor for determining what intentions actors have and the strategies used to achieve them. This in turn affects how the network develops.

6.2.5 Changing patterns of relations

Changes in structure are frequently observed in the Zambian small and medium scale farmer sector. Radical economic and political changes have greatly influenced the social structure and resulted in changes in the patterns of relations. The networks in the sector are therefore not static and consequently network outcomes cannot be easily determined.

Social identities, which are also assumed to remain stable over extended time periods, tend to outlive the structures in the Zambian small and medium scale farmer sector. This may be a reason for the prominence of social identity in this context. To illustrate this point, a farmer's responses on her interactions over the course of changes in the political and economic structures are quoted here:

In the Kaunda era [the period over which Zambia was a one party state under first president Kenneth David Kaunda from 1972-1991] farming was well organised. We had produce boards like the Dairy Produce Board, Tobacco Produce Board and so on which catered to farmers that were involved in those commodities. It did not matter if you only had 10 milkers whilst another farmer had 100 because these boards were the market place for all farmers. There were no stringent registration requirements. If you had cattle and they produced milk

that was all the board was interested in knowing. They made sure that you had access to all the knowledge you needed on veterinary care for the cattle and they also organised the milk collection. We were not looked at as large or small scale, rural or urban. None of that stuff mattered. We were all farmers and only had to worry about producing good milk. We as farmers helped one another. We were not in any sort of competition. These were the good old days you hear us farmers talk about.

Not long after the 'manna period' under Kaunda, the Chiluba era came upon us [the period of multi-partisan democracy under second president Frederick Titus Jacob Chiluba 1991-2001] and everything changed! Everything became privatised and the boards disappeared. Some farmers that had the initiative organised themselves into groups so as to minimise the impact of the absence of the boards. These groups that emerged were very strict about who could become a member...I don't really know the reason why. I guess when your livelihood is affected; your response is to be more protective and controlling over your resources. When this happened, it was each farmer for themselves. No one was coming to you to give you advice on anything because the extension department was streamlined. Unfortunately, too many of us were used to the services provided by the government and once these services vanished we were stuck. We went back to farming just enough for ourselves because there suddenly was no market for our produce. I personally did not know how to make that connection from collecting milk from my cows and having it bought by customers. When an outbreak of disease hit us, all my cows died. I strongly feel that this would not have been the case if the outbreak had occurred in the Kaunda era. Back then we would be warned about impending disasters and be advised on how to minimise our losses.

The Mwanawasa era [the third government under Levy Patrick Mwanawasa 2002-2008] gave us some hope because they encouraged more private sector actors and donors to assume some of the duties that the boards used to perform. This really revived the sector by making it a little more organised. The Land Act was revised and so you could see many new people joining farming because now they were able to purchase land. Farmers became important again.

But you know the story in Zambia, nothing good lasts forever. When Mwanawasa died and Banda took over [the fourth government under Rupiah Bwezani Banda 2008-2011] all the programs in small scale agriculture seemed to stop. All efforts went to the commercial farmers, especially those that have moved here from Zimbabwe. They were given all the support to put up farms as big as the ones they left behind so that they could grow commercial cash crops. Yet again, we small scale people were left out in the cold.

With this new government [the fifth government under Michael Chilufya Sata 2011-to date] it may still be too early to say how they will affect us. But they have already made massive changes like removing farmer subsidies, anti-dollarization of the economy and cutting off farmer support programs. These changes impact us directly so we need to regroup and think of how best to weather this period until we have an opportunity to vote for a government with interests of the farmer at heart.

The governments come and go. The farmers however still remain. We have to learn to adapt to the 'million plus one' changes they make and I have learned this the hard way...Some of the circles I was in over the Kaunda era are not relevant to me anymore in this Sata era. Government changes create changes in the farmer problems we need to solve so if you are smart you will reorganise yourself every time change happens.

Farmer CZ

Networks are not independent of institutions; they are rather dependent upon them. Networks must be understood in the context of institutional arrangements (Owen-Smith & Powell, 2008). Institutional changes such as privatisation and marketization have led to the observed fragmentation. The point to be made here is that by examining only the structure of networks, as has been the tradition in social network studies, our predictions of network outcomes are only as reliable as the structures we determine them from. Where structures are dynamic over relatively short time periods, a more stable measure may need to be considered. This thesis suggests that social identity may be one such measure.

6.2.6 The extent of actor interdependence

In as much as actors in networks are interdependent, the extent of this interdependence varies from one actor to another. Actor interdependence also shifts to reflect the dynamism of the network because interdependence exists between the characteristics of the network and the actors (Burk, Steglich, & Snijders, 2007).

What has been established and discussed in previous sections is that when actors do not have a homogenous social identity, their intentions and strategies differ. These differences impact on whether actors are interdependent or not.

Traditional farmers are interested in the achievement of collective social goals. Interdependencies are therefore expected to be higher among their connections with other farmers. Entrepreneurial farmers, largely because of their exclusion from the in-groups of traditional farmers, tend to be more independent and less interdependent with other farmers. Both farmer groups however seem to have a similar interdependence with the changes in the network.

The point to be taken on this discussion is that actor identity has an impact on interdependencies. This has implications for how the network develops and how knowledge flows through the network.

6.3 Summarising the theoretical contribution of this study

It has been demonstrated that there are empirical grounds for questioning the assumptions of social network theory. This has been achieved by revisiting the assumptions of social network theory and analysing how these assumptions provide explanations for the findings of this study. The key assumption regarding individual attributes has been shown to influence the general direction in which social network theories have developed over time. Finding that an individual attribute like social identity has an important bearing in the social networks of small and medium scale farmers in Zambia has presented the possibility that in some contexts and instances individual attributes matter. This thesis, by considering social identity, has found that the predictions of network behaviour are better enhanced because the behaviour of individuals in the network can be determined. To qualify the position of this thesis that attributes are necessary inclusions in network theory, the differences offered by the Zambian context in contrast to the contexts of earlier network theory development in the western world are brought to the fore.

This thesis contributes grounds for considering social identity attributes in applications of social network theory. The thesis has demonstrated how social identity, an individual attribute, has implications for both individual actors and the networks at large that they belong to.

CHAPTER SEVEN: CONCLUSION

This chapter concludes the thesis by providing a recapitulation of this work. How the study has achieved the set objectives and answered the research questions is explained. It also presents the practical implications that arise out of the study findings and how they may be taken into consideration for policy development.

7.1 Chapter Review

7.1.1 Chapter 1 Review

Chapter 1 of this thesis introduced the research problem. The problem is that the success rate of knowledge transfer interventions aimed at improving processes among small and medium scale farmers in Zambia has been extremely poor (Chomba, 2004). It was established that the failure of knowledge transfer interventions may be linked to how farmers are organised within the social structure and as a consequence how they access knowledge.

The research problem was considered in terms of two dimensions; a network question and a knowledge question. The research questions formulated along these dimensions were as follows:

- 1. What is the nature of the social networks among Zambian small and medium scale farmers located in rural-urban fringe areas?*
- 2. What are the knowledge transfer outcomes flowing from the nature of social networks in the rural urban fringe of the Zambian small and medium scale farmer sector?*

The objectives of these research questions and how they have been achieved are explained later in this chapter.

7.1.2 Chapter 2 Review

Chapter 2 considered the state of agriculture in Zambia. It looked at the geographical, socio-economic and political issues that characterise the study context. It was shown in Chapter 2 that Zambia has the geographical resources and potential to develop a thriving agricultural economy. However, the geography of the country also presents challenges which have been discussed. The discussion of the socio-economic state of the country revealed and explained the dominance of women in the sector. On the political front, it was shown that the active participation of the state in the agricultural sector has been diminishing overtime. The effects of policy transitions were traced from the first government, when the state was the chief actor in agriculture (Wood & Shula, 1987); to the second government where liberalisation and decentralisation meant that it became a farmer prerogative rather than state prerogative to coordinate the sector (Kajoba, 2007); and to the third government where the sector was largely developed by the blueprint for action laid out by the Agricultural Sector Investment Programme (ASIP). The ASIP blueprint for action was designed and supported by the Swedish International Development Agency (SIDA) and the World Bank (Beintema, et al., 2004). The ASIP blueprint for action placed the fate of the agricultural sector largely in donor hands.

The argument of this thesis is that the diminishing participation of the government in the sector has hindered the capabilities of the network in facilitating knowledge transfer. This is because the network is suffering from a lack of efficient coordination- a role that the state is well placed to fulfil. The state is better placed to act in this role because of its extensive skilled staff resources, its ability to collate and centralise data and statistics and its greater

reach in dissemination of information. Additionally, the state is recognised by both farmer and institutional actors alike as having legitimacy in being involved in the concerns of the agricultural sector. This legitimacy is linked to the public interest that motivates the state rather than interest in selling products. This is unlike the rejection and hostility that non-governmental actors often face. However, the legitimacy of the state is insufficient for it to perform its role as a network coordinator effectively. What is necessary in building the confidence that accompanies legitimacy is a stable political environment, resulting in stable policies and a departure away from the overly frequent changes in key office holders.

7.1.3 Chapter 3 Review

Chapter 3 explored the literature that would be used to enhance understanding of the study findings and through which opportunities for knowledge extension would arise from this study. The chapter explored discussions in the studies of networks, knowledge transfer and social identity.

The position taken in consideration of the literature reviewed was that the identifiable streams of social network research, *Theory of Networks* and *Network Theory Proper* (Borgatti & Halgin, 2011), ought to be unified in order to enhance the explanations that research in this domain can provide. The purpose of the study was determined to not just look at network structure and network behaviour independently but rather jointly. This is so that network outcomes could be determined by gaining an understanding of how network structure impacts on network behaviour, how network behaviour impacts on network structure and what knowledge transfer network outcomes emerge. The key assumptions underlying influential theories in social network studies such as Granovetter's (1973) *Strength of Weak Ties Theory* and Burt's (1992) *Structural Hole Theory* were highlighted as follows:

1. Structure and position play fundamental roles;

2. Individual attributes are ignored;
3. The function of the network is the flow of content;
4. In management science, actors are strategic players maximising self-interest;
5. Networks are conceptualised as lasting patterns of relations among actors;
6. Actors and their actions are interdependent rather than independent.

The literature on network ties, particularly how ties have been understood in theory development was presented in overviews of Strength of Weak Ties Theory, Structural Holes Theory and the literature on embeddedness.

In the review of the knowledge transfer literature, the forms of knowledge, explicit and tacit knowledge, were discussed. Additionally the forms of knowledge transfer were discussed from the perspective of the key insights provided by the SECI model (Nonaka & Takeuchi, 1995).

In reviewing the identity literature in the context of network studies, it was established that because identity is an actor attribute it is often ignored. This is based on the view that actor attributes are derived from embeddedness in systems of relations (Edelenbos & Klijn, 2007). However, debate about this view has been stimulated by empirical evidence (Håkansson & Snehota, 1995; Uzzi, 1999). This thesis engages with the debate by supporting the need to consider individual actor attributes in network studies.

The concept of identity salience from *Self-Categorisation Theory* (Ashforth & Johnson, 2001; Turner, et al., 1987) was engaged with. This was considered within the framework of social identity complexity (Roccas & Brewer, 2002). Issues around legitimacy, identity confirmation

and imbalance (M. H. Walker & Lynn, 2013) came to the fore as having implications for the desired network outcome of knowledge transfer.

The review found that there are research gaps as far as:

- Understanding the impact that networks have on the transfer of knowledge as a resource in some industries, specifically for this research, in agriculture;
- Using social network theories to explain phenomena in agrarian economy contexts when these theories have been developed around highly formalised network arrangements in developed market economy contexts;
- Insufficient Theory of Networks Research resulting in our limited knowledge of social network antecedents;
- Although the influence of actor identity has been observed in other network studies, to present knowledge the manner of impact has not been explicated;
- Incorporating actor attributes such as social identity in network research.

7.1.4 Chapter 4 Review

Chapter 4 described the methods employed to undertake this study. The rationales for a qualitative study and inductive approaches were described. The study sample was introduced as consisting of 26 participants, particularly:

9 small-medium scale farmers; 4 market traders; 2 mobile technology solution providers; 2 women's associations; 2 farmer cooperatives; 1 farmers' union; 1 agribusiness institution; 1 farmers' magazine; 1 farmers' market; 1 agricultural knowledge transfer expert; 1 micro-lending institution and 1 government ministry.

Farmer participants were interviewed during farm stays with farmers whilst institutional participants were interviewed during scheduled meetings. Farm stays lasted between 1 and 2

weeks whereas meetings with institutional participants lasted between 30 and 45 minutes. Most interviews with farmers were conducted informally in the course of the performance of farm tasks which the researcher participated in. Interviews consisted of questions associated with the research problem and relevant emerging questions from the participants. Data was also collected through feedback reports on the researcher's interpretations. Six months were dedicated to data collection in the field, whilst confirmation or/and, disconfirmation of data continuously occurred over 12 months. The diversity of participant views was presented in the findings through direct quotations from the participants.

The coding method employed for the analysis of the data consisted of open, axial, and selective coding processes. Coding was done by manually working through interview transcripts and developing themes. Open coding occurred by segmentation of the data through identified properties that gave the data dimensions. The data was segmented into 4 levels by network level, ascending from the ego-level of the network (the farmer), to the meso levels of the network i.e. meso 1 (farmer groups) and meso 2 (farmer service providers), to the macro level (agricultural system coordinators and regulators). These levels were observed from the data.

The coding method of the data produced 6 themes, 30 categories and 114 codes within them. This study took an egocentric approach to analysis, primarily identifying the individual actors as the unit of analysis. The walking interview and name generator techniques were employed in this study

Identity emerged as the central phenomenon in this study of how social networks impact on knowledge transfer in the context of small and medium scale farmer networks in Zambia. The causal conditions influencing the nature of identity that emerges appear to be occupation, time commitments, up-bringing and the extent of formalisation of the farmer's activities. Resulting

strategies emerge as involving decisions whether or not to join a farmer based organisation, whether to seek out codified or tacit knowledge as well as strategies for utilising knowledge opportunities. The contextual markers appear to be the geographical location of actors whereas intervening conditions include levels of education, extent of needs for finance and gender issues. The storyline developed uses codes associated with relational perspectives of social identity and knowledge transfer to specify propositions on how the network enables and disables interactions between parties.

7.1.5 Chapter 5 Review

In Chapter 5, the findings of the data collection process were presented and analysed. The composition of the *Zambian small and medium scale farmer network* was found to be firstly farmer actors and agricultural institutions. Among farmer actors two sub-groups were identified. These were self-identifying traditional farmers and self-identifying entrepreneurial farmers. The scales of participation i.e. small, medium or large scale were spread out between these two groups. The agricultural institutions were identified as having four sub-groups, namely governmental, non-governmental international donor, non-governmental local not-for-profit and private for-profit.

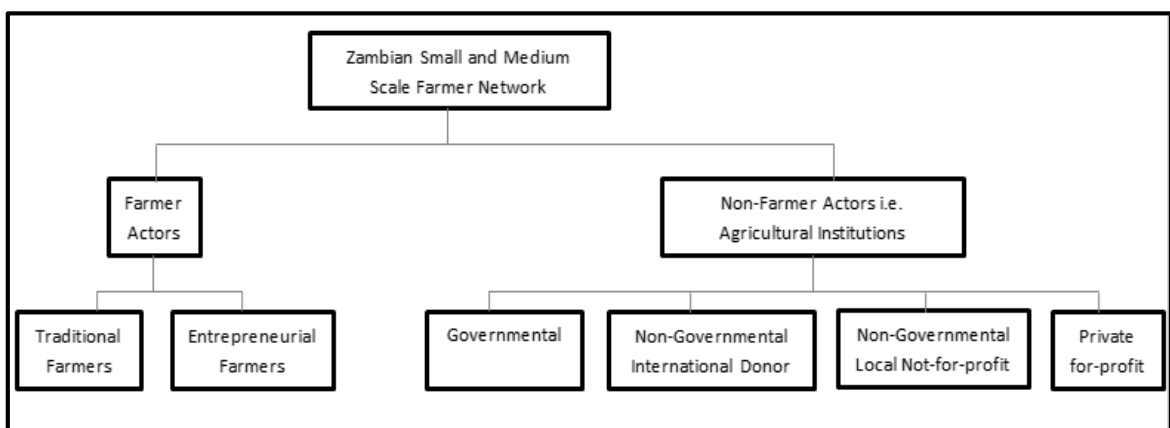


Figure 7- 1: *Zambian Small and Medium Scale Farmer Network Composition (Author's Own)*

The key finding was the existence of two identities within the small and medium scale farmer sector. Identity as a traditional farmer largely appears to be composed of identities associated with upbringing, time allocated to farming and tribal background. Rooted in this is the belief that the practice of farming cannot be taught; only experienced. The identity as an entrepreneurial farmer largely emerges alongside other identities. Entrepreneurial farmers often have no farmer-linked upbringing or/and are engaged in other employment. These identities were found to have implications for the nature of connections and network characteristics.

The forms of current connections were drawn from the name generator. Most dominant network connections in the network are farmer-to-sector-service-providers. The most connected sector service providers are buyers of agricultural produce. This has also been discussed.

The network characteristics were discussed by analysing the network actors, levels and the roles they play in knowledge transfer. Observations on the knowledge transfer process were made to capture the state of extension services in the sector, the sources of knowledge, knowledge content, knowledge recipients, knowledge flows and knowledge storage.

The study additionally found that there are three main sources of knowledge in the Zambian small and medium scale farmer network. These are namely the private-for-profit sector, the non-governmental not-for-profit sector and government research institutions. It was further found that the knowledge content transferred and transmission means differ depending on the knowledge source.

7.1.6 Chapter 6 Review

In Chapter 6, the chapter discussed the theoretical contributions of the key findings of this study. This was achieved by situating the findings in the assumptions of social network theory. What the chapter highlighted was that the contextual nature of social networks requires an approach that relaxes the theoretical assumptions to reflect contextual reality. The chapter demonstrated how individual attributes such as social identity may have a greater impact on social networks than previously assumed.

7.2 Achievement of Research Objectives

The overall objective of this research was to find out what is going on in the networks of small and medium scale of farmers that is causing problems for knowledge transfer in the sector. The view of achieving this objective was to explore what social network theory applications have been unable to explain in the sector. In so doing the aim was to present arguments for theoretical consideration and recommendations for practice. The objectives to be achieved have been articulated as follows:

- Understand the experiences of Zambian small and medium scale farmers in accessing knowledge;
- Explain the nature of Zambian small and medium scale farmer networks and their impacts on knowledge transfer;
- Propose directions in which theories on networks should be developed to increase their predictive powers in contexts similar to the Zambian one.

7.2.1 Understanding the experiences of Zambian small and medium scale farmers in accessing knowledge

The experiences of Zambian small and medium scale farmers in accessing knowledge have been understood more satisfactorily through the course of this research. This objective has been achieved by seeking the Zambian small and medium scale farmer's perspective as the key source of information over the study. The farmer's perspective has been captured in interviews conducted with farmers in the course of their work and from observations of farmer interactions with others for knowledge purposes.

7.2.2 Explaining the nature of Zambian small and medium scale farmer networks and their impacts on knowledge transfer

The nature of Zambian small and medium scale farmer networks was explained by identifying the key actors and the connections among them as well as the connections that are missing. By mapping these actor connections to knowledge on process improvements in irrigation, transportation and marketing, it was established that the network had capabilities for both facilitating and hindering knowledge transfer. The impact on knowledge transfer was found to be determined by the social identity of the actors.

7.2.3 Proposing directions in which theories on networks should be developed to increase their predictive powers in contexts similar to the Zambian one

This study proposes steering network thought towards the consideration of identity attributes. This appears to be necessary given that the more common network considerations like tie directness are not good predictors of network behaviour in the Zambian context of small and medium scale farmers. These theoretical directions have been proposed as follows:

- The importance of structure and position in networks is not disputed. However, what is challenged is the assumption that structure and positions are the only fundamental

considerations in explaining network outcomes. The study findings suggest that social identity may indeed influence observed structure and position. This understanding gives us an opportunity to anticipate where desired structural features of networks may be developed. It further enhances our ability to manage observed networks rather than simply take networks as a given entity.

- Although ignoring actor attributes is convenient in using social network theory to explicate how structure leads to outcomes, ignoring individual attributes has the consequence of hindering our ability to predict where and how networks may emerge. This additionally limits the utility of social network studies in providing relevant information on how to channel resources to groups of individuals. The thesis finds that in contexts characterised by the absence of adequate institutions, networks emerge in a fragmented fashion. Where fragmented networks occur, the social identity of individual actors may be an indicator of the possible network outcomes.
- Networks serve functions beyond the flow of content. The importance of network structure and position therefore depend on the function served by the network from the perspective of the actors involved. This actor perspective may be informed by the social identity claimed by these individuals.
- When network actors are not homogenous, their strategy and intent vary. Social identity becomes an important factor for determining what intentions actors have and the strategies used to achieve them. This in turn affects how the network develops.
- By examining only the structure of networks, as has been the tradition in social network studies, our predictions of network outcomes are only as reliable as the structures we determine them from. Where structures are dynamic over relatively short time periods, a more stable measure may need to be considered. This thesis suggests that social identity may be one such measure.

- Actor identity has an impact on interdependencies. This has implications for how the network develops and how knowledge flows through the network.

7.3 Practical Implications of Study Findings

7.3.1 Achieving the goals for process improvement

The Zambian government has identified three broad areas for improvement in the Zambian small and medium scale farmer sector. These areas are the scale of production, market access and development of a knowledge base (The Republic of Zambia, 2011). The network study found that actors either faced or presented challenges to the improvement areas identified by the government. Some of these challenges were found to be linked to farmer actors whilst others were linked to agricultural institutions.

In achieving scale of production, farmer actors are impacted through resource deficits such as poor financial access, lack of mechanisation and poor farm supervision. Farmer actors also present challenges through knowledge deficits in alternative farming methods, agronomy and alternative irrigation. Poor planning in land utilisation, specialisation and year-round farming also have an impact on the scale of production of farmer actors. For agricultural institution actors, their contribution to the problem of the scale of production was found in their lack of diversification from maize farming.

In achieving market access, farmer actors are impacted through insufficient further processing, unawareness of developments in the sector designed to enhance the access of farmer actors to the market and lack of transportation. For agricultural institution actors, their contribution to the problem of market access was found in their failure to provide enough facilities for further processing, warehousing and trading places. It was also found that

agricultural institutions insufficiently transfer knowledge to farmers on developments in the sector designed to enhance the access of farmer actors to the market. Agricultural institution actors also have a lot of work to do in improving transportation through provision of suitable vehicles and maintenance of the road network.

The area of developing a knowledge base depends on the level of formal education of the farmer. Particularly, education in agriculture and in business is necessary. Access to information was also found to affect the development of a knowledge base. The information referred to here can be primary in nature when it is from kith, kin and extension officers. It can also be secondary in nature when it is from multi-media sources. Although primary information from extension officers are the most relied on, the extension services function in Zambia does not operate optimally. Too few extension officers are available to cater to a large number of farmers. This is exacerbated by the sparseness of farmers in the country and gender issues that limit the access of female farmers to extension officers. The development of a knowledge base is also constrained by agricultural institutions that inhibit sector coordination by not sharing information. These factors affecting the achievement of government goals are summarised in Table 7-1.

Table 7- 1: Summary of Actor Influences on Achievement of Government Goals for Process Improvement (Author’s Own)

Areas Targeted by Zambian Government for Process Improvement			
	Scale of Production	Market Access	Knowledge Base
Required Knowledge			
Agronomy	x		x
Further processing		x	
Year round farming	x		
Alternatives (Farming, Irrigation and Energy)	x		x
Institutional Actor Influences			
Excessive maize focus	x		x
Poor sector coordination		x	x
Poor information sharing		x	x
Overreliance on ICTs		x	x
Inadequate warehousing facilities		x	
Inadequate transportation facilities		x	
Insufficient market access facilitation		x	
Private sector profit motives	x	x	x
Farmer Actor Influences			
Low educational levels	x	x	x
Poor financial access	x	x	
Low mechanisation	x		
Inadequate farm supervision	x		x
Poor land utilisation	x		
Lack of specialisation	x		x

The duality of farmer identities has further implications for the achievement of goals towards process improvement. Traditional farmers are generally challenged in all three areas for

reasons elaborated hereafter. Opportunities seem to exist for achievement of these goals among entrepreneurial farmers. This is also elaborated hereafter.

Identity as a traditional farmer has implications for:

1. **Scale of production:** Traditional farmers express no interest in increasing their scale. For as long as these farmers are able to produce what they need they have little concern about producing more. One of the identified obstacles to scale of production was a knowledge deficit in areas of alternative farming and irrigation. This is especially linked to traditional farmers because they are unwilling to formally seek out knowledge that departs from that they have already acquired informally through traditional farming practices or from their peers. Unless such knowledge is passed on subtly and tacitly, and from individuals of some social standing, such farmers continue to abide by earlier acquired knowledge with few prospects of scaling up. Social standing impacts on how much trust and confidence are placed by farmers in the knowledge source. The preference for traditional farming knowledge to modern techniques keeps traditional small and medium scale farmers from new techniques in agronomy and from mechanising. Using existing social structures for knowledge transfer is therefore necessary in reaching traditional farmers.
2. **Market access:** Traditional farmers participate in market exchanges, but only to a limited extent. The challenges associated with insufficient further processing and unawareness of market developments in the sector are again strongly linked to traditional small and medium scale farmers. Again it is the lock-in with traditional farming practices that is a hindrance here. The market exchanges are on a monetary level where little knowledge is transferred. The concerns of traditional farmers lie in sustaining social relationships that extend beyond farming practice. It is therefore necessary to consider providing further incentives for market participation to draw in the traditional farmer and maximise their efforts.

3. Knowledge base: The level of formal education among traditional small and medium scale farmers is generally low. Arguably, farmers have enjoyed success in farming with only indigenous farm knowledge. However, what the sector demands is business savvy as well.

Identity as an entrepreneurial farmer has implications for:

1. Scale of production: Entrepreneurial farmers appear to easily emerge from small scale to medium scale. In some cases, they go on to be large scale farmers. Often, due to the lack of any agricultural background of any form and at any level, entrepreneurial farmers are more likely to seek out as much knowledge as they can. For their perceived illegitimacy, entrepreneurial farmers have limited access to informally transferred knowledge among peer groups, unless those peers are like themselves perceived as entrepreneurial farmers. This results in a heavy reliance on more formal knowledge sources which consequently lead to larger scales of production. There is an opportunity here for institutions to effectively transfer knowledge to willing recipients.
2. Market access: Entrepreneurial farmers participate actively in market exchanges. The exchanges that entrepreneurial farmers engage in are associated with further processing and utilisation of market developments. Although the linkages enjoyed by entrepreneurial farmers are fewer than those of traditional farmers, they tend to be more relevant for knowledge transfer processes that lead to process improvements.
3. Knowledge base: The level of formal education among entrepreneurial small and medium scale farmers is generally higher than that of traditional farmers. As mentioned earlier, entrepreneurial farmers are often engaged in other employment for which they are formally trained. Their knowledge base is therefore extensively enriched by utilisation of knowledge gained in their other roles. This knowledge ranges from record keeping and budgeting to business management.

7.3.2 State participation in the network

The Sixth National Development Plan (The Republic of Zambia, 2011) and a number of other policy documents proclaim the commitment of the state to the small and medium scale agricultural sector. However, what this study finds is that this commitment is limited to trade based activity around pricing, and interest in mainly one commodity, maize. State participation in knowledge transfer is severely lacking, apart from knowledge transfer on maize, despite the existence of state owned research institutions and public extension systems (although these are inadequately staffed and funded).

The Ministry of Agriculture and Livestock has limited interactions with other institutional actors. It also has an excessive focus on commercial farming. The state as a sector coordinator is not sufficiently proactive in the network for effective transfer of knowledge to occur. The unfulfilled role of the state has resulted in missed opportunities, for instance in relation to indigenous knowledge systems. It has also led to inefficiencies in meeting farmer demand for knowledge and a lack of farmer engagement. It is believed that by decreasing the presence of the state in marketing activities and increasing its presence in process improvement activities, sector coordination would be improved (Sitko & Jayne, 2014a).

Increased interaction of government institutions with the various actors in the sector is desired. This is so that the government has a more central position in the network favouring its on-going role as a sector coordinator. The network would benefit from the human and financial resources that the government has at its disposal.

The political climate has an important impact on knowledge transfer in process improvement because policy affects interventions. At the heart of government policy is the focus on maize agriculture. Government interventions often occur at the same time as the maize marketing season which occurs only once a year. This impedes network development because core

network clusters tend to focus only on maize whereas other agricultural activities are focussed on in isolated clusters.

The government is an important sector regulator. This is not only in terms of efficiencies, but fairness as well. Where injustice in the network is perceived and the government is non-responsive to it, mistrust arises and individuality in actor practices thrives. This hinders process improvement because social linkages between network actors are broken.

7.3.3 Servicing the rural-urban fringe

As noted in Chapter 5, the public and donor sector tend to specifically target the areas classified as rural or/and remote. The very broad criteria used to determine whether an area is rural or urban often result in rural-urban areas being classified as rural by some and not others, relative to what is being discussed. The rural-urban fringe often suffers from a lack of services consequently.

The government has not formally recognised the rural-urban fringe areas as agricultural zones. As a result, it does not identify residents in these areas as legitimate farmers. Consequently, there are no government plans for development specifically targeted towards the rural-urban fringe. This means that government resources in agriculture such as extension officers who are instrumental in knowledge transfer do not reach residents in these areas. In as much as knowledge does not flow easily from the government to farmers in these zones, knowledge does not flow either in the other direction from farmers in the rural-urban fringe to the government. It is worthwhile remembering that the government is not the only actor that plays a role in knowledge transfer to the farming population. Non-governmental organisations have taken on a range of knowledge transfer schemes. The implementation is often in concert with government recommendations and advice, and as such, decisions on where to implement

projects are often guided by areas of government interest. This further poses a challenge to those in the rural-urban fringe in being included in knowledge transfer programs.

Lack of state planning in the fringe areas has resulted in the development of residential and farming properties in an uncoordinated fashion. These properties spring up in isolation from each other which tends to hinder network formation. Additionally, the spatial challenge has exacerbated the problems of inadequate reach of agricultural extension officers.

7.3.4 Towards a more inclusive definition of the farmer

The most frequently observed and studied mechanisms for knowledge transfer in the Zambian agricultural sector is the government agricultural extension service. The agricultural extension service system in Zambia is modelled on the British system of extension developed during the Great Irish Famine of 1845-1851 (G. E. Jones & Garforth, 1997). This system is bureaucratic with distinct hierarchical structures (G. E. Jones & Garforth, 1997).

Bureaucracy and hierarchy introduce additional measures of identity, particularly from institutional actors. The bureaucracy found in the practices of the Ministry of Agriculture and Livestock has resulted in the very rigid definitions surrounding farmer identity that tend to exclude the small and medium scale farmer with an entrepreneurial identity. The following criteria are used by the state and several other institutions in identifying farmers in the country (Mofya-Mukuka, Kabwe, Kuteya, & Mason, 2013):

-A farmer is a member of a farmer cooperative or other farmer organisation: Farmers that are new to the sector, as in the case of entrepreneurial farmers face challenges in attaining membership of farmer-based organisations. This is partly due to a lack of sufficient awareness of what groupings are accessible. It is also partly due to the reluctance of existing farmer-based organisations to bring on inexperienced members. New and inexperienced farmers

often rely on the recommendations of existing farmer members in the farmer-based organisations. These recommendations are difficult to come by because those farmers identifying themselves as traditional find no basis for bringing on those they do not perceive as similar to themselves. The problem of geography, discussed earlier, is also a factor here because farmer-based organisations do not operate in the new farmer zones, the rural-urban fringes. This further accentuates the problem of membership to farmer-based organisations and in turn results in robbing new actors of legitimacy to the farmer identity. The knowledge transfer that occurs through farmer-based organisations is therefore hindered from reaching entrepreneurial farmers on the grounds of their identity, or lack of meeting the identifying criteria set by government standards.

-A farmer must have at least 1 hectare of land under cultivation: By definition, this farmer specification causes problems for farmers engaged in other areas of farming besides crop cultivation. The majority of traditional farmers are involved in crop cultivation in which they utilise on average 1.21 hectares. Livestock rearing and fish farming, commonly practiced utilising a smaller portion of land, are more popular among entrepreneurial farmers. Entrepreneurial farmers that are engaged in crop farming tend to do so using land management techniques that minimise how much land is cultivated further pushing these farmers away from state definitions of farmer identity.

-A farmer must be registered in the farmer register of their district: The Ministry of Agriculture and Livestock administers over farmers in the country through farmer registration. The levels of registration are camp level (the locale of the agricultural zone in which an extension officer resides is known as an agricultural camp), district level and provincial level. The rural-urban fringe however does not fall neatly into camp or district zones. Registrars often take up membership from farmer cooperatives and farmer associations. As discussed earlier, these memberships exclude entrepreneurial farmers.

Furthermore the farmer registers are not updated frequently to reflect changes in where farmers are located. Additionally they are unavailable at the various levels of administration. The hindered access to registration for entrepreneurial farmers is therefore a challenge to their legitimate identity as farmers. Knowledge transfer interventions that rely on farmer registers therefore omit farmers who could benefit from the interventions but are unable to do so because they do not meet the government regulations for farmer identification.

In summary, effective knowledge transfer to farmers is dependent on legitimate farmer identity. Each of the state criteria of farmers reinforces a farmer identity that excludes entrepreneurial farmers. The state perspective is that farmer identity is composed of the elements in Figure 7-2:

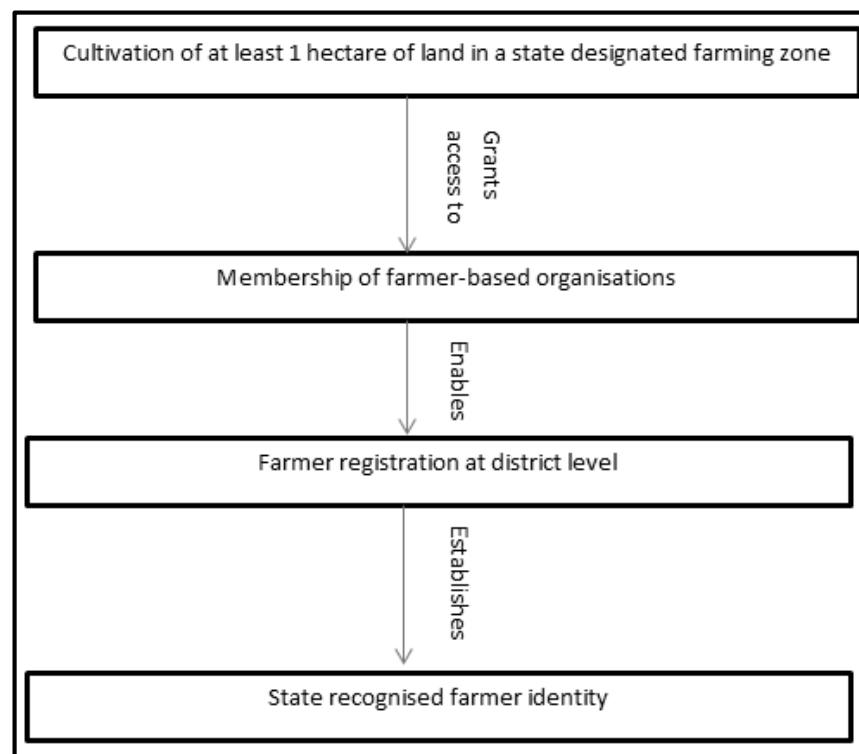


Figure 7- 2: State Perspective of Farmer Identity (Author's Own)

A more inclusive formal definition of a farmer is needed such that entrepreneurial farmers are drawn in from the periphery towards the centre of knowledge transfer activity. With a more

inclusive farmer definition, the distinction between the social identities of entrepreneurial and traditional farmers becomes blurred. The prediction of network behaviour is likely to become more accurate when farmer identity is de-emphasised. When predictions of network behaviour are accurate, better knowledge transfer interventions can be designed and implemented.

7.3.5 Broadening the range of content transferred

It was established that there are three main sources of knowledge in the Zambian small and medium scale farmer network. These are namely the private-for-profit sector, the non-governmental not-for-profit sector and government research institutions. The knowledge content transferred differs depending on the knowledge source. Specifically, the private-for-profit sector transfers knowledge on mechanisation and market related issues. The non-governmental not-for-profit sector transfers knowledge on areas of food security including but not limited to the staple food crop of maize. Additionally, the non-governmental not-for-profit sector transfers knowledge on alternative farming techniques. Government research institutions also participate in knowledge transfer but their content is limited to commercial cash crops and staple food crops.

The various knowledge sources and knowledge content reach different recipients. The private-for-profit sector transfers knowledge to entrepreneurial farmers. Traditional farmers with their membership of farmer-based organisations have access to government extension officers even where they otherwise would not. Extension officers tend to reach out to such organisations and their members much more than to individual farmers. Government research institutions, with their focus on commercial growers and the staple food crop tend to transfer knowledge to only registered farmers and to those residing in areas designated for the farming of maize.

The private-for-profit and non-governmental not-for-profit sectors offer a greater diversity of knowledge than do the government research institutions. Because of the greater access to financial and human resources, government research extension officers are often better trained than those engaged by the private sector. It would seem then that the reach of government extension officers is more limited than that of private extension officers. There is a mismatch in the network with regard to where resources lie and where content ought to be transferred for process improvement to occur. The private for-profit and non-governmental not-for-profit sectors possess the knowledge to and have the interest in the process improvement of the sector as a whole, but have inadequate financial and human resources. Governmental research institutions have a narrow knowledge focus, but have better access to both financial and human resources.

Entrepreneurial farmers have hindered access to knowledge from both governmental and non-governmental not-for-profit actors. They do however gain knowledge from the private sector which has no criteria used to determine who should receive knowledge.

The knowledge transfer environment in the Zambian small and medium scale farmer network is seen as characterised by a focus on knowledge regarding the staple food crop and commercial crops. It also tends to favour knowledge transfer to traditional farmers, but to omit entrepreneurial farmers.

7.3.6 Knowledge documentation

There is a lack of adequate documentation on knowledge transfer interventions. The inconsistent funding of agricultural departments in Zambia has resulted in inconsistent data collection and poor records (Sitko & Jayne, 2014a). Stored knowledge is usually not revised and updated. Even more challenging is that stored knowledge is often more accessible to

institutional actors than to farmers who may be in at least equal need of the knowledge if not greater need.

There are opportunities to develop and promote feedback streams from farmers to institutional actors. However, the problem with obtaining knowledge from farmers is that knowledge on record keeping is still quite low and so there is often very little documented knowledge that can be stored.

The development of a central knowledge repository would help to enhance knowledge sharing. This must be particularly targeted at the donor community and private sector where new knowledge tends to arise. It is essential that the knowledge repository is accessible by all sector actors. This would minimise the challenges faced by farmers in seeking several packets of knowledge from multiple sources. It would also minimise the likelihood of repetitive interventions that are typical in the sector.

7.3.7 Taking language and literacy into account

Traversing the language barrier is still a challenge in knowledge dissemination. Most knowledge sources are available in the official language of the country, English, but many small and medium scale farmers have insufficient fluency to understand English language material.

Even where knowledge material is available in local languages, most farmers of this scale are insufficiently literate to access it when this material is available only through print as is usually the case. Of the literature available, farmers complain of its inability to address diverse areas in agriculture besides maize. This is not helped by the inadequate reach of extension services in knowledge dissemination.

Sector service providers have spoken of efforts to translate material into the various languages but being hindered in doing so due to high costs of translation processes. Adult literacy programs, particularly those for women, are neither well supported nor well attended. This may be because adult education in Zambia is often offered as a 'night school' program and this is incompatible with the gender based expectations of women. Several customs consider it taboo for women to be outside the home after dark or/and when their husbands are at home. The problems of gender mean that attendance of women at adult literacy classes is inconsistent and the supply of adult literacy in turn becomes sporadic. Adult literacy programs offered through gender specific organisations have been fairly more successful but lack sufficient capital to be ongoing rather than one-time efforts.

The biggest opportunities for knowledge dissemination in Zambian small and medium scale farming are in mobile phone technology. It helps circumvent the issues of geographical sparseness and lead time on receiving information.

Like any other technology, mobile phone technology requires supportive infrastructure for it to be an effective channel for knowledge transfer. The challenge of literacy is one that needs attention to make mobile use effective. Furthermore, mobile technology of simpler design than common cellular phones may need to be customised to maximise their use. In addition, there needs to be an increase in the number of cellular phone providers with platforms on which the technology can be supported. The cost of the mobile technology platform also needs to reflect the purchasing capacity of the small and medium scale farmers the technology is intended to serve.

7.3.8 Taking indigenous knowledge into account

The findings have shown that knowledge transfer is particularly effective where indigenous knowledge is incorporated in knowledge-based interventions. Indigenous knowledge is the

type of knowledge found amongst the majority of farmers. However, the exclusion of fringe farmers on the basis of their lack of identity as community leaders has further implications for the utilisation of indigenous knowledge in knowledge transfer programs. This is so because as people have moved away from the rural areas to the urban areas, they have taken some of the indigenous knowledge with them. Consequently the identity of holders of indigenous knowledge has greatly changed over the years. It is no longer only the elders and leaders residing in the rural areas that possess this knowledge. Urban and rural-urban dwellers who are engaged in other professions in addition to farming may also hold this knowledge.

The idea that indigenous knowledge only resides in the rural community continues to persist among not only farmer actors, but also among the institutional actors that design knowledge transfer interventions. As such, there appears to be reluctance to access the knowledge of those on the rural-urban fringe. This is despite evidence that indigenous knowledge is being practised away from the rural community.

The indigenous knowledge practices found among small and medium scale rural-urban fringe farmers consists of, for instance, knowledge of crop varieties, knowledge of suitable growth conditions for various crop varieties, disease recognition and management, making wetlands usable for agriculture and preservation techniques. Hence the knowledge which rural-urban fringe farmers, the self-identifying entrepreneurial farmers, now work with is 'hybrid' knowledge that consists of some elements of local and Western technologies (Moyo, 2010). Seemingly unbeknown to any of the actors in the network, the entrepreneurial farmers are enjoying the best of both knowledge worlds. Even where farmers have acquired 'modern' agricultural training, it was found that an indigenous knowledge base was used as a frame of reference through which one could understand new knowledge.

Knowledge transfer agents should be aware of the indigenous knowledge possessed by farmers and introduce new knowledge to complement rather than compete with the knowledge resources available. Although indigenous knowledge is informally tapped into by farmers it has not been adequately assimilated into new knowledge by knowledge drivers. This is to say that although farmers access indigenous knowledge through their social relationships with one another, knowledge drivers like extension officers have been unable to incorporate such knowledge into the new ideas for improvement that they present to farmers. A gap exists in utilising the farmer's indigenous knowledge base as a platform on which to introduce new knowledge. This gap results in farmers not feeling a part of changes and also feeling that interventions are being imposed on them without the necessary appreciation of the farmer's background and experiences therefore evading social acceptance.

This thesis posits that the inability to leverage on indigenous knowledge reflects that knowledge leaders are often misidentified due to the overwhelming perceived importance of community leaders. It further posits that the inability to leverage on indigenous knowledge partly reflects that most interventions are based on donor driven knowledge rather than based on farmer demand for knowledge.

The Zambian agricultural sector has been dominated by interventions designed and implemented by actors in the donor community. The frameworks for these interventions are often based on the success of similar programs in the donor's home country. In this study for instance, farmers indicated an overwhelming desire to learn more about land use practices and soil management. However, this farmer demand for knowledge is not being sufficiently met. This is unlike current projects being driven like Transzam. Transzam has been implemented under the auspices of the European Union (EU) based on the success of electronic transport management systems in European Union member countries. The EU and its cooperating

partners recognise the value of Transzam to the sector, but it does not interest farmers much, particularly those of a small and medium scale because it does not meet their present needs.

7.3.9 Taking community social structures into account

At the heart of interpersonal relations are the rules governing interactions which are a product of the social systems individuals find themselves in. Each community will have its own rules and traditions. The key people involved in maintaining the social order expect themselves, and are expected to by others, to be leaders in any knowledge transfer interventions introduced by outsiders. Experts or otherwise better placed individuals in facilitating knowledge transfer tend to be placed on the back bench in favour of community leaders who sometimes hinder knowledge transfer processes. This status process is based on customary recognition of community leadership. Knowledge transfer to traditional farmers in particular, needs to be channelled through existing social structures for knowledge to be accepted.

Gender is an important feature of the social aspects for consideration because as discussed in the chapter on the *Zambian context*, women form the majority of small and medium scale farmers. The roles and responsibilities they have as women impact on their participation in the sector and in turn on their participation in knowledge transfer activities that would lead to process improvement.

Gender imbalances that can be found in some of Zambia's communities make it difficult for women to participate in knowledge transfer processes. There is certainly a need to address this problem faced by womenfolk through creating and supporting more women-only platforms where women would have more rights and freedoms to actively participate in agricultural fora where knowledge exchanges occur. Furthermore, gender sensitivity training is necessary across the sexes to improve the knowledge transfer process. Where possible, modifications to technologies must occur to accommodate the cultural systems affecting the genders.

The majority of extension officers are male (Farnworth & Munachonga, 2010). This is a situation that needs to be addressed in order to overcome challenges such as traditional customs that forbid communication and socialisation of married women with men.

Whether we talk about community leaders, gender or ‘outsiders’ that have knowledge to share (e.g. extension officers, farmers not meeting the in-group criteria of the dominant group), the fabric that weaves across all these issues in a community social structure is trust. The identity processes that individuals undergo and the resulting in-groups and out-groups observed in the community are outcomes of trust (Platow, Foddy, Yamagishi, Lim, & Chow, 2012; Tanis & Postmes, 2005). The networks that were investigated here are not mediated by contractual agreements but are heavily embedded in perceptions of trustworthiness among stakeholders.

The networks of small and medium scale farmers in Zambia appear to be crippled by a lack of trust on several levels leading to network fragmentation:

- Lack of trust among different groups of traditional farmers on the grounds that a lack of shared customs and values implies a likelihood that one will take advantage of the other;
- Lack of trust between traditional and entrepreneurial farmers on the grounds that the latter group is not a legitimate participant in the farming sector and therefore may have ulterior motives for participating;
- Lack of trust between farmers and government officials on the grounds that political disagreement may come into play and hinder the efforts of farmers;
- Lack of trust between farmers and non-governmental officials on the grounds that non-governmental officials are outsiders and may have ulterior motives for participating in the sector;

- Lack of trust between farmers and market traders and the private sector on the grounds that the former will be treated unfairly in transactions.

Part of the problem for participants in this study is that trust (defined generally as a measure of belief in the honesty, fairness or benevolence of another party (J. A. Hill, Eckerd, Wilson, & Greer, 2009)) is often equated to credibility (defined generally as a measure of belief in the competence of another party (Nyaga, Whipple, & Lynch, 2010)). As a result, the appointment of leaders in the knowledge transfer process is often conducted on the basis of trust (a question of status) rather than credibility (a question of sound knowledge and ability). Credibility based on knowledge rather than status, however, is what is required and should be demanded by farmers in order to appoint leaders capable of facilitating knowledge and finding reliable knowledge as well. Credibility by itself will not facilitate knowledge transfer but must go hand-in-hand with trust. The study has already shown that high levels of trust lead to belief in credibility. Therefore, belief in credibility may increase levels of trust.

7.3.10 Proposing a model for effective knowledge transfer in Zambian small and medium scale farmer networks

Presented here is the present model for knowledge transfer interactions in the Zambian small and medium scale farmer network. Entrepreneurial and traditional farmers do not interact. The private sector and governmental institutions are at the periphery whilst the donor community takes centre stage.

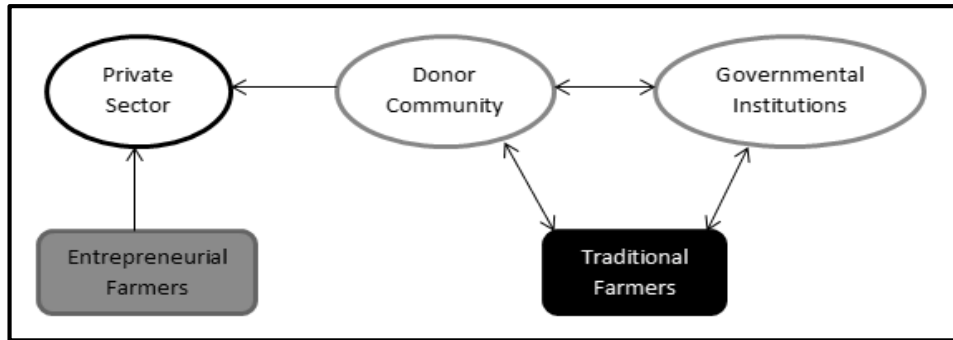


Figure 7- 3: Present Model of Knowledge Transfer Based Interactions in the Zambian Small and Medium Scale Farmer Network (Author’s Own)

Figure 7-3 shows that entrepreneurial farmers only have interactions with the private sector but with neither the donor community, governmental institutions nor with traditional farmers. Traditional farmers have interactions with the donor community and governmental institutions but with neither the private sector nor with entrepreneurial farmers. The figure also shows that the donor community works with both the private sector and governmental institutions. The private sector, however, has no interactions with governmental institutions.

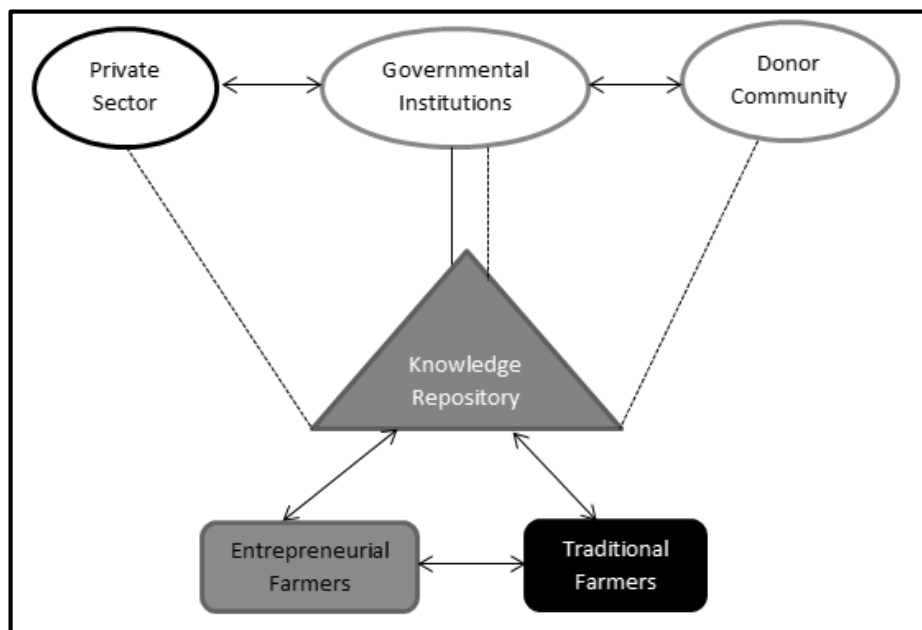


Figure 7- 4: Proposed Model of Knowledge Transfer Based Interactions in the Zambian Small and Medium Scale Farmer Network (Author’s Own)

In Figure 7-4, entrepreneurial farmers interact with traditional farmers. Both farmer groups, rather than engaging with each of the institutional actors individually, interact with a common knowledge repository. The knowledge repository is developed from the knowledge sharing of all institutional actors and farmers. It is managed and coordinated by governmental institutions. Governmental institutions are able to achieve this by working with both the private sector and the donor community.

The rationale of the proposed model in Figure 7-4 is that increased interaction among sector actors, with the government institutions at the centre would result in the development of a knowledge repository. This knowledge repository would be managed by the sector coordinator, the government, yet be accessible also to all other actors. To access new knowledge, farmers would then have to tap into only the knowledge repository rather than make numerous arrangements to interact with various sector actors. As importantly, farmers would have a clear channel through which to deposit the indigenous knowledge they possess.

The proposed model for actor interaction in the Zambian small and medium scale farmer network forms the basis for policy recommendations that inform the practice of scholars, business owners and policy makers. With regard to the necessary structural arrangements for effective coordination in transferring knowledge, Smedlund (2009) posits that centralised structures are useful for explicit knowledge, distributed structures for tacit knowledge and decentralised structures for potential knowledge.

The Zambian small and medium scale farmer network primarily appears to be a distributed structure. Network flows are not managed by any specific actor and tend to occur, not as an outcome of deliberate intervention, but as an unplanned consequence of actor linkages. Actors in such structures are members of different cliques that have varying connections and so some actors become more connected than others. The transfer of tacit knowledge is expected to

thrive in this context. The absence of a clearly identified focal node for knowledge flows hinders the transfer of explicit knowledge and potential knowledge.

A move towards coordinated decentralisation is proposed. This is taking into account the rapid development of agricultural hubs in the rural-urban fringe that are spatially distant from one another. Central coordination is at best difficult, but perhaps coordination at hub level would improve the opportunities for the transfer of explicit and potential knowledge. Hub level coordination would support a mix of both market and embedded ties, resulting in network complementarity which pushes the network towards a state of optimal levels of embeddedness that facilitate knowledge transfer.

With identity being recognised as an essential factor driving network properties and behaviour around knowledge transfer, this thesis supports deliberate efforts to manage the salience of various identities so that the identities most relevant to the effective transfer of knowledge are enhanced. The aim of this thesis in offering these practical contributions is that small and medium scale farmers in Zambia become more active in processes around knowledge transfer and it has been found that for this to happen, the formal identity of farmers needs to become more inclusive to accommodate entrepreneurial farmers.

7.4 Contributions of the Study

This study makes contributions to the development of Social Network Theory in at least three ways. Firstly, it presents a case, through argument and evidence, for questioning the assumptions of Social Network Theory. It proposes directions for the theory's development with regard to consideration of individual attributes. Secondly, it presents relational explanations, embedded in social identity, for social network properties such as tie strength,

cohesion, range and centrality. Thirdly it presents evidence supporting the suggestion that Social Network Theory is context dependent at least to the extent of the identity processes of individuals, geographical factors, the industry and the level of country development.

This study further contributes to the literature on knowledge transfer by demonstrating that choices made in the knowledge transfer process are embedded in social identity. Additionally, the study contributes the basis for a coordinated decentralisation of knowledge model to accommodate the nature of ties relevant to the two farmer identities recognised in the study i.e. embedded ties and trustworthiness for traditional farmers and market ties and reliability of knowledge for entrepreneurial farmers.

The performance of individuals appears from this study to be linked to not only how they identify themselves but how they are identified by others as well. This insight has implications for management practice. For management practice in farmer based organisations what needs to be addressed in the short run is a tailoring of interventions to suit the two tiers of farmers i.e. management practice tailored to suit traditional farmers and management practice tailored to suit entrepreneurial farmers. For management practice in the long run what is necessary is a revision of the definition of a farmer to make it more inclusive and in doing so legitimising the participation of entrepreneurial farmers alongside traditional farmers. Doing so lies in the domain of identity salience management. Identity salience management is a deliberate effort by managers to change the importance placed on certain elements of identity so that the more desired identity becomes more prominent (in this study, the identity of a farmer in general rather than as traditional or entrepreneurial/ male or female/ Tonga or Bemba). Deliberate efforts could be targeted at eliciting the importance of specific unifying cultures and inspiring individuals to attain a unified goal. This is important because as the study has shown, individuals may have a basketful of identities and order them by

importance quite differently. Different orders of salience could be divisive among individuals, lead to fragmentation of the network and be detrimental to collaborative efforts.

For the agricultural sector in Zambia, the study pays attention to a frequently overlooked geographical location i.e. the rural-urban fringe. It further contributes a basis for a model of knowledge transfer interactions. It draws attention to farmer diversity structured around farmer identity and re-examines the role of the state accordingly.

7.5 Limitations of the Study

The study context, Zambia, has not had much research on networks in the agricultural sector conducted. This has meant that the majority of the information in this research had to be generated for the first time during this study. Without a knowledge base in the context to build on, much still remains unknown. Hence, this is an opportunity to break new ground in the context and participate in the development of the much sought after knowledge base.

From a methodological standpoint, it is acknowledged that social network analysis only takes a 'snapshot' of what is going on. This has meant that the study conducted was static rather than longitudinal. In addition, networks are only one piece of a big puzzle and so this research cannot make general claims about the transfer of knowledge in agricultural networks, but can represent only the claims of individuals belonging to an identified network, which may or may not resemble others. Consequently, in an attempt to develop theory in the field, this study can make only a modest contribution by moving the data towards a substantive level theory, rather than a grand macro-level theory of generalisation (Schultz-Jones, 2009). Generalisations are difficult to propose using the chosen methods. However, although generalisations make for useful descriptions, useful analysis needs to be based on context. The

limitations of this network study are mitigated by careful research to yield useful research outcomes.

A larger sample size would have been desirable, but there were constraints of finance and time. A larger sample size would have been desirable, because it would have opened up opportunities for quantitative analysis that would be valuable in adding to understanding of the research phenomenon. However, where this study is limited in quantity, it has a high quality in terms of the rich data collected. The smaller sample size allowed for a thorough qualitative analysis of the data collected.

A further methodological challenge was that the researcher was initially treated as an ‘outsider’ in matters concerning farm business by the majority of participants. Apart from a shared gender and language, the researcher and participants differed on a number of other identification criteria including marital status, level of education and occupation. It became necessary for the researcher to deliberately elicit gender identity and compassion for gender based challenges of farmers as well as appreciation for the various cultural backgrounds of the participants as a basis for similarity to the participants. Over time, this led to inclusion of the researcher in the in-group of those concerned with farm business.

The extent of the applicability of the findings of this study to other industries in Zambia may be more limited than initially thought. This is because the practice of agriculture has for a long time been mainly regarded as a function of the customs and traditions of the land. As a result, the agricultural sector tends to have sub-cultures within it which are different from the sub-cultures of other industries like mining and tourism. The sub-cultures influence network dynamics differently. However, this does not subtract from the importance of undertaking this research because the agricultural sector is an important part of the Zambian economy and its ‘health’ has implications at the most basic level of household food security.

7.6 Future Research

Conducting a similar study with a larger sample size would open up avenues to further understand the phenomenon of interest. By complementing the richness of the current data with measures of quantitative significance, the reliability of this study's findings could be strengthened.

This study has culminated in testable arguments for theoretical consideration. A future research direction would include testing these arguments in other similar contexts. Theoretical development would be enhanced with a greater breadth of applicability of the study's arguments. Extending the research to the urban environment will also enable a better scoping of the findings and analysis made regarding the different applicability of Social Network Theory in market and agrarian economies. A future direction for research may include the consideration of livelihood risk in identity and social networks.

An additional research direction would be to conduct a longitudinal social network study. This would be useful in determining to what extent and at what rate network identities and behaviours develop. An understanding of time effects on networks would be useful in designing more effective interventions.

It would also be worthwhile to explore the inter-sectoral transferability of the study findings in the Zambian economy. This is expected to make contributions not just in social networks but in areas such as identity work as well.

The thesis demonstrates that further cross disciplinary research into networks in management is necessary due to the inadequacy of current theory. There is a breadth of knowledge in social network studies in other disciplines that the management sciences need to take account of.

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APPENDIX A- INTERVIEW GUIDES AND FEEDBACK REPORT

Interview Guide- Small and Medium Scale Farmers

Section A- For association members/ cooperative members

1. How did you hear about the association/cooperative?
2. How did you join the association/cooperative?
3. Why did you join the association/cooperative?
4. How long have you been a member of the association/cooperative?
5. Who are the key members of the association/cooperative and what are their roles?
6. What role do you play in the association/cooperative?
7. To what extent is the association/cooperative formal?
8. To what extent is the association/cooperative informal?
9. What are the advantages of belonging to the association/cooperative?
10. What are challenges of belonging to the association/cooperative?

Section A- For non-association members/ non-cooperative members

1. Why do you not belong to any farmer association/cooperative?
2. What would be the advantages of belonging to an association?
3. What are challenges of belonging to an association?

Section B- For all farmers

1. What is the size of your farm?
2. What proportion of your income is your farming activity responsible for?
3. What are your other sources of income?
4. What does farming mean to you?
5. Why did you become a farmer?
6. How did you become a farmer?
7. How long have you been a farmer?
8. Have you had any agricultural training course? Why or why not? How did you learn to farm?
9. What areas of farming are you involved in?
10. What are your responsibilities in running your farm?
11. Which individuals or institutions are you connected to that have an impact on your farming activities?
12. How do the individuals and institutions you mentioned impact on your farming activities?
13. In which farm activities do you need assistance in? If any, what is the nature of the assistance you need?
14. What are the challenges you experience as a small-to-medium scale farmer in Zambia?
15. From where do you get knowledge about how to improve your farming practices?
16. How do you access knowledge about how to improve your farming practices?

17. What are the challenges you face in accessing knowledge about how to improve your farming practices?
18. Who do you believe has first knowledge about improvement programs or practices?
19. Who do you believe they share first knowledge with?
20. How do you think they share the knowledge?
21. Why do you think they share the knowledge with some people and not others? What sort of people will they not share knowledge with?
22. Why do you think they share knowledge in the chosen means rather than others?

Section C- For all farmers

1. Why are improvements in irrigation, transport and marketing for small and medium scale farmers important?
2. Who are the key stakeholders in designing and implementing programs in irrigation, transport and marketing for small and medium scale farmers?
3. Who are the actors involved in the transfer of knowledge on irrigation, transport and marketing to small and medium scale farmers?
4. What role do the named actors play in the knowledge transfer of the named areas?
5. How is knowledge on irrigation, transport and marketing transferred to small and medium scale farmers?
6. What challenges are farmers facing in accessing or utilising knowledge on improvement programs in irrigation, transport and marketing?
7. What other areas of process improvement would you say may be important to look at for small scale farmers apart from irrigation, transportation and marketing?
8. To what extent is knowledge formalised?
9. To what extent is knowledge informal?

Section C- For association/cooperative members

1. What role does the association/cooperative play in knowledge transfer on irrigation, transport and marketing to small and medium scale farmers?
2. Which additional stakeholders may be necessary to improve knowledge in irrigation, transport and marketing?
3. May you please describe what the role of the association/cooperative has been with reference to Treadle pump irrigation?
4. May you please describe what the role of the association/cooperative has been, with reference to the e-Transport system (Transzam)?
5. May you please describe what the role of the association/cooperative has been, with reference to marketing information such as SMS for commodity prices?
6. Who are the association's/cooperative's partners in knowledge transfer activities with regard to irrigation, transport and marketing issues for small and medium scale farmers?
7. How is the association/cooperative involved in the knowledge management activities of:
 - Creating knowledge repositories from which knowledge can be retrieved easily
 - Improving knowledge access to facilitate transfer
 - Creating an environment that encourages knowledge creation, transfer and use

- Managing knowledge as an asset to increase effectiveness of use

Interview Guide- Zambia National Farmers Union

1. How important are improvements in irrigation, transport and marketing for small and medium scale farmers?
2. Who are the key stakeholders in designing and implementing programs in irrigation, transport and marketing for small and medium scale farmers?
3. Who are the actors involved in knowledge transfer in the areas of irrigation, transport and marketing as relevant to small and medium scale farming?
4. What role do the named actors play in the process of knowledge transfer in the named areas?
5. How is knowledge on irrigation, transport and marketing transferred to small and medium scale farmers?
6. What role does Zambia National Farmers Union play in knowledge transfer on irrigation, transport and marketing issues for small and medium scale farmers?
7. May you please describe what the role of Zambia National Farmers Union has been, with reference to Treadle pump irrigation in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers
8. May you please describe what the role of Zambia National Farmers Union has been, with reference to the e-Transport system (Transzam) in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers
9. May you please describe what the role of Zambia National Farmers Union has been, with reference to marketing information such as SMS for commodity prices in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers
10. Who are Zambia National Farmers Union's partners in knowledge transfer with regard to irrigation, transport and marketing issues for small and medium scale farmers?
11. Which additional stakeholders may be necessary to improve knowledge transfer on irrigation, transport and marketing:
 - knowledge access by farmers?
 - knowledge utilisation/application by farmers?
 - knowledge dissemination/transfer to farmers?
12. What challenges are farmers facing in accessing or utilising knowledge on irrigation, transport and marketing?
13. What other areas of process improvement would you say may be important to look at for small scale farmers apart from irrigation, transportation and marketing?

14. How is Zambia National Farmers Union involved in the knowledge management activities of:
 - Creating knowledge repositories from which knowledge can be retrieved easily
 - Improving knowledge access to facilitate transfer
 - Creating an environment that encourages knowledge creation, transfer and use
 - Managing knowledge as an asset to increase effectiveness of use
15. To what extent is knowledge formalised?
16. To what extent is knowledge informal?

Interview Guide- Associations/Cooperatives

Section A

1. How was the association/cooperative formed?
2. Why was the association/cooperative formed?
3. How can women become members of the association/cooperative?
4. How do most women become members of the association/cooperative?
5. How is the association/cooperative coordinated?
6. Who are the key members of the association and what are their roles?
7. To what extent is the association/cooperative formal?
8. To what extent is the association/cooperative informal?
9. What are the advantages of belonging to the association/cooperative?
10. What are the attitudes of members towards process improvement and what beliefs do they have about their abilities in that respect?

Section B

1. How important are improvements in irrigation, transport and marketing for small and medium scale farmers?
2. Who are the key stakeholders in designing and implementing programs in irrigation, transport and marketing for small and medium scale farmers?
3. Who are the actors involved in knowledge transfer on irrigation, transport and marketing as relevant to small and medium scale farming?
4. What role do the named actors play in the process of knowledge transfer in the named areas?
5. How is knowledge on improvements in irrigation, transport and marketing transferred to small and medium scale farmers?
6. What role does the association/cooperative play in knowledge transfer on irrigation, transport and marketing issues for small and medium scale farmers?
7. May you please describe what the role of the association/cooperative has been, with reference to Treadle pump irrigation in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers

8. May you please describe what the role of the association/cooperative has been, with reference to the e-Transport system (Transzam) in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers
9. May you please describe what the role of the association/cooperative has been, with reference to marketing information such as SMS for commodity prices in
 - knowledge access by farmers
 - knowledge utilisation/application by farmers
 - knowledge dissemination/transfer to farmers
10. Who are the association/cooperative's partners in knowledge management activities with regard to irrigation, transport and marketing issues for small and medium scale farmers?
11. Which additional stakeholders may be necessary to improve, in irrigation, transport and marketing:
 - knowledge access by farmers?
 - knowledge utilisation/application by farmers?
 - knowledge dissemination/transfer to farmers?
12. What challenges are farmers facing in accessing or utilising knowledge on improvement programs in irrigation, transport and marketing?
13. What other areas of process improvement would you say may be important to look at for small scale farmers apart from irrigation, transportation and marketing?
14. How is the association/cooperative involved in the knowledge management activities of:
 - Creating knowledge repositories from which knowledge can be retrieved easily
 - Improving knowledge access to facilitate transfer
 - Creating an environment that encourages knowledge creation, transfer and use
 - Managing knowledge as an asset to increase effectiveness of use
15. To what extent is knowledge formalised?
16. To what extent is knowledge informal?

Data Collection Feedback Report: Summary of Research Findings

Prepared By Natasha Katuta Mwila

The Research: This study was conducted over the period July 2012 to November 2012. The study was designed to investigate the role of networks in knowledge transfer on process improvement among small and medium scale farmers in Lusaka's rural-urban areas. The areas of process improvement under consideration in this study were those related to irrigation, transportation and marketing.

The Participants: In order to conduct the study a number of participants were engaged for the study and the representation was as follows:

- 9 small-medium scale farmers
- 4 market traders
- 2 mobile technology solution providers
- 2 women's associations
- 2 farmer cooperatives
- 1 farmers' union
- 1 agribusiness institution
- 1 farmers' magazine
- 1 farmers' market
- 1 agricultural knowledge transfer expert
- 1 micro-lending institution
- 1 government ministry

The Method: A number of the participants were recruited based on their theoretical fit for the study i.e. their involvement in small and medium scale rural-urban farmer networks was predetermined. Other participants were recruited as a consequence of snowball information from other recruited participants. Data was collected through interviews with participants at their sites of work during farm stays. Interviews were semi-structured as the aim was to collect qualitative rather than quantitative information. The farmer participants recruited were all female in order to represent the majority of small to medium scale farmers in Zambia.

The Data: The data collected sought to answer the following questions:-

The Network Question:

- 1a) Who are the actors in the networks of small and medium scale farmers in Zambia?*
- 1b) What structures and relations link the actors in the networks of small and medium scale farmers in Zambia? i.e. Who is connected to whom? How are they connected? Why are they connected? Who is at the centre of most connections?*

The Knowledge Question:

- 2a) What sources of knowledge are drawn on by various actors in small and medium scale farmer networks in Zambia?*
- 2b) What forms does knowledge take?*
- 2c) How is knowledge transferred among the actors in networks of small and medium scale farmers in Zambia?*

Findings on The Network Question: The data collected shows that the networks of small and medium scale farmers primarily consist of individual farmers, farmer cooperatives/ farmer groups, the Zambia National Farmers Union, the Agri-business Forum, the extension department of the Ministry of Agriculture and Livestock, financial institutions, farmer market places, non-governmental donor funded institutions and private sector enterprises.

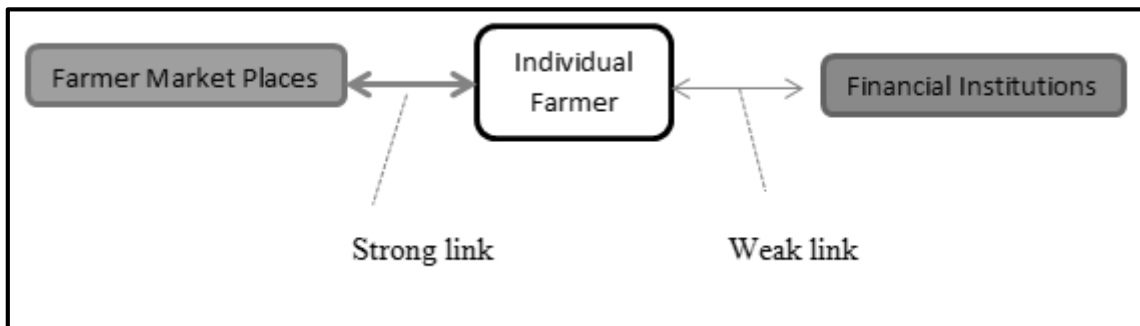
Actors in Small and Medium Scale Farmer Networks in Zambia



The networks of small and medium scale farmers are complex in that the nature of connections among actors depends on which actor is at the centre of an individual farmer’s activities. Specifically, individual farmers will generally operate individually or have membership with an organised group in the form of a cooperative or women’s association.

Network Type A

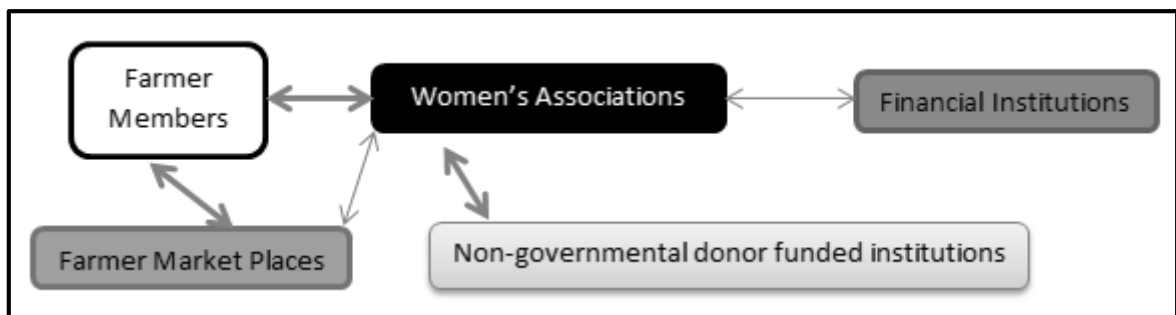
For individual farmers, the connections are generally to farmer market places and to a lesser extent financial institutions. These connections are direct with the individual farmer at the centre. Individual farmers, probably due to an insufficient number of connections, operate on the smallest scales and hardly have any capacity for process improvement, let alone further expansions. The weaker linkages to financial institutions barely support the enterprises because of high interest rates that have to be paid on loans. Individual small and medium scale farmers are dominated over in market places by market traders for a range of reasons all linked to their poor bargaining positions as a result of lack of transportation and inadequate volumes.



Network Type B

For farmers that have memberships with associations, the connections are generally to non-governmental donor funded institutions, financial institutions and farmer market places. The

women's associations are at the centre of these structures. Because of their social impetus, women's associations are strongly linked to non-governmental donor organisations that have gender issues on their agenda. As a consequence, agriculture does not necessarily take a primary focus and this may provide a partial explanation as to why there has not been as much process improvement as would be expected from the number of interventions in this area. Furthermore, the strong link appears to create a somewhat dependant relationship that tends to stifle independent farmer efforts. There appears to be not much difference from individual farmers in the relationship with the market place. Where the associations intervene for price control and to control what produce is offered, they increase the bargaining power of farmer members. Farmer members appear to be unlikely to have direct interactions with financial institutions as their associations often mediate.



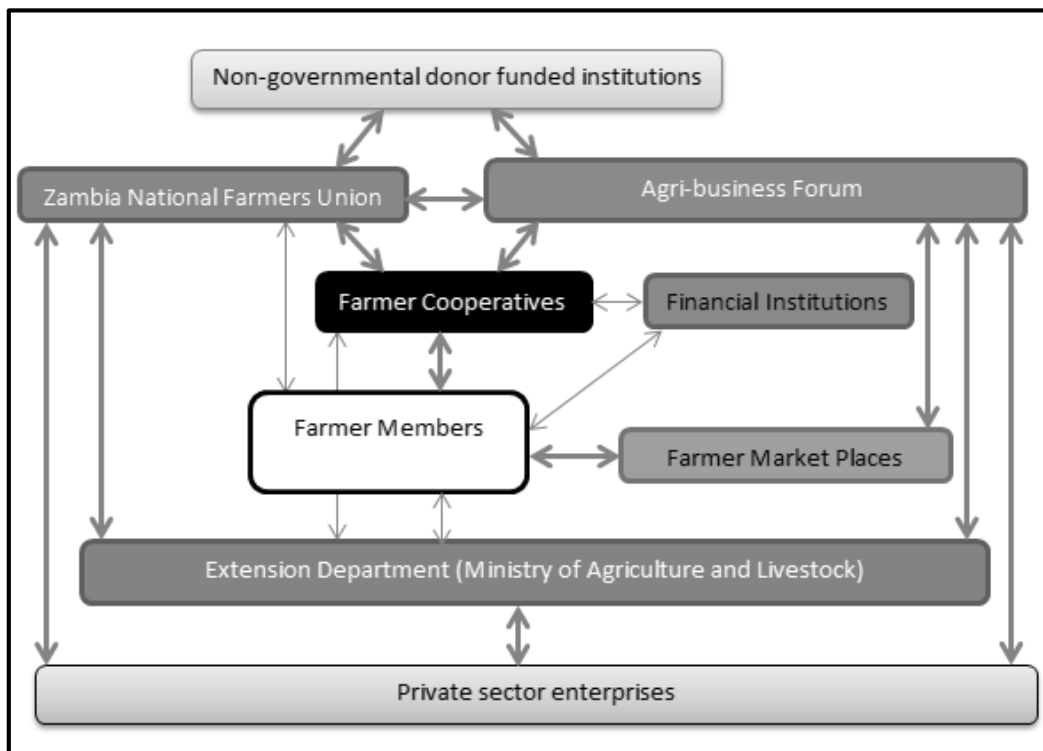
Network Type C

For farmers that have memberships with farmer cooperatives that are not exclusively for women, the connections are the most progressive and are generally to the Zambia National Farmers Union, the Agri-business Forum, the Extension Department of the Ministry of Agriculture and Livestock, financial institutions, non-governmental donor funded institutions and farmer market places. The Zambia National Farmers Union and the Agri-business Forum are both at the centre of these structures. Both centres are strongly linked to each other, the extension services department of the Ministry of Agriculture and Livestock as well as to non-governmental donor funded institutions- making their programs more viable. They also have strong links to farmer cooperatives allowing them have a greater reach to farmers.

Farmer cooperatives also have linkages to extension services and financial institutions that are stronger than those of individual farmers. This is because more centralised groups are more desirable to work with in comparison to individual farmers due to geographic logistical reasons. Cooperatives therefore provide solution to the problem of farmers being wide spread of great areas of land and therefore unreachable by many service providers. Private sector enterprises with process improvement solutions tend to have strong interactions with the Zambia National Farmers Union, Agri-business Forum and the extension department of the Ministry of Agriculture and Livestock for the easy access to farmer cooperatives addressing the challenge stated earlier.

The Agri-business Forum emerges as one of very few formalised institutions interacting directly with the market places. This places them in a good position to facilitate process improvements in marketing among farmers.

The interesting phenomenon here is that the farmers likely to belong to this type of network are those women that are making a transition from being weekend/hobby farmers to full time farming and, those transitioning from full time employment to retirement. These characteristics appear to create conducive traits for effective networking such as a formal education background, interest in knowledge seeking and learning, high ambitions among others. This group deserves specific attention because they are not formally recognised as farmers and yet seemingly have the greatest potential to maximise the utility of their networks in bringing about process improvement.



Findings on The Knowledge Question: The concerns with regard to ‘Knowledge’ reside in the areas of knowledge transfer and knowledge utilisation.

Knowledge in Network Type A

Network Type A has three actors- the individual farmer, market places and financial institutions. The farmer’s knowledge needs are market demands, market prices and how to meet financial requirements. Farmers in this type of network tend to rely on market traders, who are often informal traders for their market knowledge needs. The power imbalance between most farmers and market traders (with market traders often having the upper hand by providing their own transportation to collect produce from the farmer and the farmers having low volumes of their commodities) often means the knowledge creating information that is transferred is often skewed and unreliable at the expense of the farmers’ operations. Transfer of knowledge on financial requirements relies on either farmers deliberately seeking out this information for themselves (which was not a finding in this study) or financial institutions rolling out adult education, as literacy among farmers in this network type tend to have low

literacy, on access to finance (which has been found to not be a priority for private sector financial institutions in this study). The farmer is somewhat completely cut-off from knowledge on irrigation and transportation. Knowledge transfer in this network is at most inadequate and knowledge utilisation as a consequence even more so.

Knowledge in Network Type B

Network Type B has five actors- farmer members, women's associations, non-governmental donor funded institutions, market places and financial institutions. The various farmer knowledge needs are transferred through the women's associations as they are at the centre of connections to knowledge sources on irrigation (the non-governmental donor funded institutions) and they play a role in market knowledge as well. Farmer knowledge on transportation in these networks is relatively poor. The women's associations to some extent see to the utilisation of transferred knowledge through active facilitation. Knowledge transfer in this network is relatively better than that in Network Type A and knowledge utilisation quite widespread.

Knowledge in Network Type C

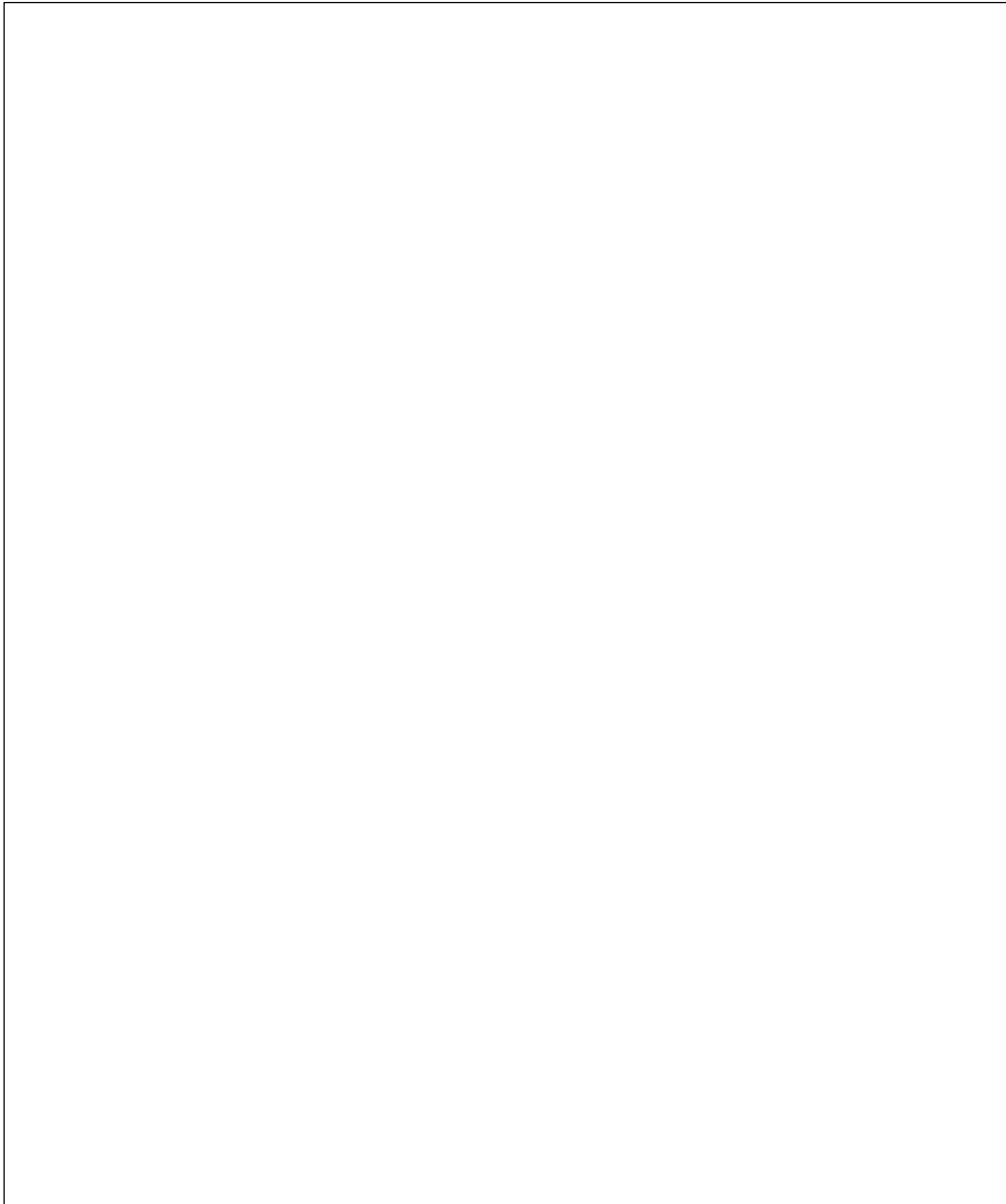
Network Type C has all identified nine actors- individual farmers, farmer cooperatives/ farmer groups, the Zambia National Farmers Union, the Agri-business Forum, the extension department of the Ministry of Agriculture and Livestock, financial institutions, farmer market places, non-governmental donor funded institutions and private sector enterprises. The centres of this network, the Zambia National Farmers Union and the Agri-business Forum are critical in transferring knowledge due to the many connections they have with other knowledge sources in irrigation, transportation and marketing. They however suffer in their knowledge repository systems which hinders effective knowledge transfer. Knowledge utilisation is often facilitated by multiple stakeholders particularly private sector enterprises and the Agri-business Forum. Knowledge transfer and utilisation are therefore more likely to lead to process improvements in this network type.

The edge of Network Type C over the other network types is the crucial linkage to extension services- where extension officers are the greatest agents of process improvement and private sector enterprises which work to design process improvement interventions. Market places have great potential to drive process improvement but this depends on their coordination with the rest of the actors in the network as opposed to interaction with only the farmers.

The Agri-business Forum and Zambia National Farmers Union bridge knowledge gaps on what crops to grow/ animals to rear, how to grow/raise them well, what quantities of produce are needed, minimum scale for desired profitability, market needs, process improvement technology and equipment, transport, marketing and negotiation skills.

Unique challenges in knowledge now are questions of how to facilitate transfer and utilisation for the 'new' farmer (previously weekend/ hobby farmer) earlier identified.

Respondent's Comments on Findings:

A large, empty rectangular box with a thin black border, intended for the respondent to provide comments on the findings. The box is currently blank.

APPENDIX B- RESEARCH DIARY

Jul2-Jul5

I have spent these 3 days, upon arrival in Zambia trying to confirm my earlier made appointments with participants. It has not been easy! Challenges have included everything from poor communicators that take long to respond to emails, to bad phone numbers and simple unavailability. In light of these challenges, I have had to modify my strategies. I may not cover Chongwe as I cannot get hold of the Chongwe District Association. I will have to see what the Zambia National Farmers Union can do for me in getting Chongwe contacts. Katuba seems more promising. Kafue has no good leads. I am now relying on independent farmers scattered across the province. This may pose a problem for me in trying to map a network. I will really have to push for proper leads through Zambia National Farmers Union and Katuba.

July 6 2012

I have my first interview today with Zambia National Farmers Union. I will have to do it in two parts to take advantage of Farmer FP's dual role as a Zambia National Farmers Union representative and as a small to medium scale female farmer. She can only spare one hour but I think I can push it. Maybe she can grant me a farm visit over the weekend.

So much paper work! Explanatory statement, permission letter, consent form- the list goes on- not great for the environment. So far I have 5 out 20 guaranteed appointments for interviews. With some luck I may have my 6th today. I was really fortunate today, all I could have hoped for happened. I ended up having 3 interviews- 2 with Farmer FP in her own capacity and as a representative of Zambia National Farmers Union as well as 1 with Zambia Farmer Magazine- 3 down, 17 to go! Really glad that my major suspicions have been confirmed and that I have found some surprising information as well.

The lack of process improvement in Farmer FP's marketing activities is a little surprising as she has so far built her farming enterprise through knowledge available from Zambia National Farmers Union. She has not taken the additional step to benefit from process improvement knowledge in the area. The low profitability of her farming may be due to the scale of operations and lack of value addition.



Farmer FP's maize crop- Captured by Researcher

According to Zambia National Farmers Union, the Ministry of Transport and Local government need to come on board. For the purposes of coordination, centralisation is desirable. However, knowledge storage a problem. Both formal and informal knowledge means are relied on by Zambia National Farmers Union. The contact farmers and district managers take the role of boundary spanning. Zambia National Farmers Union needs more informal knowledge transfer mechanisms.

With regard to the Zambian Farmer Magazine, small scale farmers do not read the magazine. The magazine only reaches 1percent of all farmers in the country. The magazine however does bring about awareness of farmer issues to the policymakers who can contribute to process improvement. The interview with the magazine brings to my mind questions about the knowledge transfer process with regard to sources, mediums and recipients. It is obvious that the magazine intends to reach farmers but it does not seem to achieve this- the knowledge is received by sector others. Farmer generated knowledge however plays an important role in being a reference source for the magazine. The storage system of the library can be improved. Presently information is kept in hard copy form and accessible from large folders. It is not easy to retrieve information stored in large files. The library is too small and not friendly for non-English reading farmers.



*Zambia National Farmers
Union Head Office-
Captured by Researcher*

Jul7-Jul14

Got a farm stay in Lusaka West at Farmer CZ's Farm. Went so well. Had a positive response. Learned more than I thought I would. I left quite exhausted and emotionally sucked into all the challenges she goes through. Gendered issues really do take centre stage at least as far as Farmer CZ is concerned.

Farming for her is a way of life. She is trying to develop simultaneous multi-stage activity which is a critical process improvement that requires irrigation which Farmer CZ does not employ. She is easily discouraged in challenging times. The women's association exists for relationship building and resource sharing. Issues of association leadership arose. The association realises the need for further linkages. Lack of collaborative work is a drawback in negotiations. Scalability is a prerequisite for many of the benefits that small scale farmers seek. Farmer CZ is aware of her knowledge needs but is still 'waiting for extension officers' rather than being proactive in looking at other sources. She is reactive in her approach rather than proactive.



Farmer CZ's activities on her farm- Captured by Researcher

July 15 2012 Following up with people has been a real mission! I am having challenges from all angles- promises unfulfilled; emails not responded to, phone calls not answered, text messages not replied to.

July 16 2012 Met with Farmer FS. That was awesome! I was able to interview her in 2 capacities; as a small and medium scale farmer as well as a representative of the Katuba Women's Association. She has been helpful in providing farmer leads and her perspective on important network actors to consider that I had not previously thought about. On her advice, I will take a drive down to the Common Market for Eastern and Southern Africa greenhouses to have an appreciation of what non-governmental organisations are doing for the farmers. Farmer FS's agricultural training is largely informal. For the Katuba Women's Association, focal point people appear to be the boundary spanners. The association depends on a system of collegiality and trust. Farmer knowledge is shared among the women. The farmers collaborate for fair price and waste minimisation. The association is self-sufficient because it looks at alternative supportive economic activities which cover the non-farming season. Despite their efforts, the association still suffers from a lack of finance. Additionally the association suffers extension problems and the dilemma of existing in the Rural- Urban fringe where accessing help is difficult.



Katuba Women's Association's communal plot- Captured by Researcher

July 17 2012 This research process feels haphazard. I cannot conduct useful future interviews without first reflecting on the interviews I have already conducted and trying to place that in the framework of the literature I reviewed. Documenting memos of my thoughts is helping me keep track of the various directions my study could take.

July 18 2012 In what is fast becoming an expected pattern, I have been stood up by an organisation representative. This time around it is SARO-AGRO. Have to move on and deal with other participants. Got to organise meetings for this week as early as Monday else I fall behind.

July 19 2012 I managed to secure at least 4 contacts: 2 farm stays over this weekend should see me get more data. I meet with Cellulant on Tuesday and Agri-Business Forum on Thursday. I hope to go to the agricultural show on Friday.

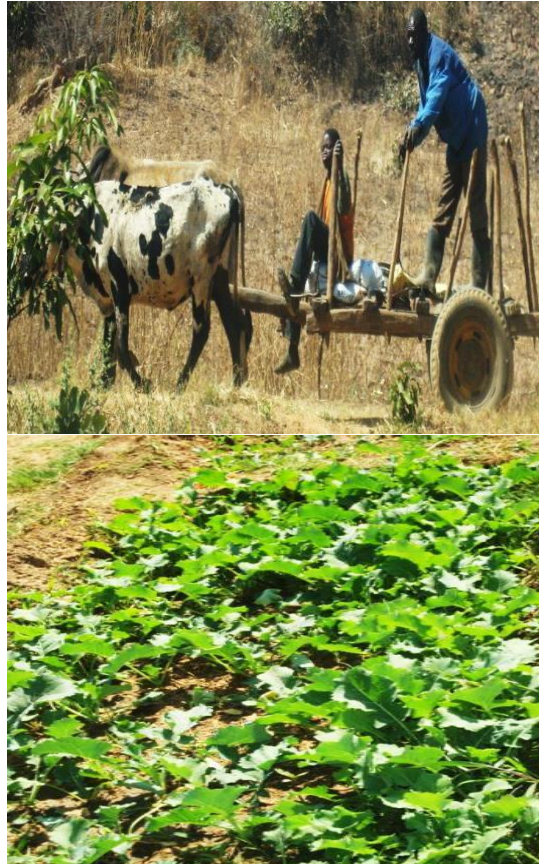
I had a good informal meeting with a small micro lender, Giraffe Finance, who felt the problem with small scale female farmers was scale, business plans, and revenue targets. Their informal approach to business appears to be their handicap. I need to investigate this further. Business skills knowledge is a means of process improvement and itself an avenue of improvement. There is a need to shift perspectives from mere livelihood to profitable business. Scalability, farmer proactivity, the importance of cooperatives and lack of seriousness from women were all strong themes in the meeting.

Jul 20- 28 The farm stay with Farmer AN went really well. It was eye opening to the challenges that exist. I also saw the problems of internal management- Farmer AN does zero planning, has set herself poor targets and makes poor utilisation of her land. Anne appreciates farming as both a pastime and livelihood. Her family has been a substantial source of knowledge. Livestock is a cash driver for her; she does not regard it as a major part of her farming activity and has no real plans to increase its importance for her. Farmer AN uses crude methods to measure her output. She measures everything using boxes and is unable to sell her produce in smaller custom quantities. She needs a more flexible measuring mechanism. Farmer AN

lacks knowledge on basic tomato growing techniques that would improve her crop such as raising them off the ground. Other women in the group know this but do not share. She grows things in small proportions that are not scalable except for the tomatoes. Ox drawn carts are her only means of transportation in the rainy season.

The women's group Farmer AN belongs to has benefitted her by providing family support. They have also assisted her in understanding the value of her membership in creating bargaining strength for prices. The group however suffers from lack of cohesion.

I also saw the demonstration plots that Farmer AN is exposed to which in my opinion is nothing but a bad joke because they have nothing to show!



Ox-drawn work and vegetable crop at Farmer AN's farm- Captured by Researcher

July 29 2012 I have an interview Farmer GK. Looking forward to it. Like Farmer AN, she has planning issues and seems unsettled in her role as a farmer. She relies on the market coming to her. Customers use their own discretion in harvesting the produce they buy. She is too charitable- she really does not see farming as a business. She has selling and transport problems. Her keen interest is in organic farming which she views as process improvement. She identifies farmer groups as valuable knowledge sources but is quick to point out that she is hesitant about the trust and jealousy issues associated with groups.



Farmer GK's farm workers tending to tomato and cabbage crop at her farm- Captured by Researcher

July 30 2012 Had an interview with Cellulant. The importance of the network could not have been emphasised more. Moreover the question of scalability has yet again reared its head. It seems to me technology is the only way to bridge the sparse population. Where is the government? As a coordinator with national interests its role is pivotal and yet they are nowhere to be seen. According to Cellulant, challenges to process improvement include poor rate of internet penetration; poor channels of input distribution; poor logistics in farmer validation and tracking of inputs to their intended and actual use. The latter challenges can be addressed through a seamless knowledge capture, transfer, storage and retrieval system. The address of the challenge depends on formalisation of farmers by them belonging to farmer organisations and being counted in census activities. Farmer validation is a prerequisite to process improvement efforts from government and private sector and a prerequisite to becoming bankable. Subsidies, micro insurance, quality seed and money are viewed by Cellulant as means of process improvement. Poor payment mechanisms hinder process improvement. Agro dealers need to be added as network actors. Technology may be a big variable in my research. There is need for near perfect information and scalability. Low density sparse populations are a challenge. The scalability problem can be addressed through use of cooperatives. There is a need for coordinating actors to act as intermediaries for technology based process improvement.



David Waithaka, Managing Director of Cellulant Zambia- Captured by Researcher

July 31 2012 Things have been going pretty well. I attended the annual agricultural and commercial show- I got a better insight into the Ministry of Agriculture and Livestock- a participant I otherwise cannot get a hold of. I felt that the enormous number of departments- so called decentralisation- is actually a disservice to the farmer- too many channels to go through. The role of the extension farmer as a central contact was emphasised. This has left me seeing the networks as more disparate than ever. Presently extension officers do not have all the knowledge necessary to do the work they do. Another key point was the number of innovations we do have. We are constantly and consistently thinking of new ideas but I think we miss out on commercialisation. Expanding the reach and affordability of innovation is necessary.



Process and storage improvement demonstrations at the Zambian Agricultural and Commercial show- Captured by Researcher

Aug1-Aug8 The week has been relatively awful. IDE failed to come through because of poor information on the address. I'm considering abandoning ship with them. WEDAZ was also quite a disappointment. Firstly, although the coordinator

seemed eager, she gave me quite the run around when it came to organising a meeting. At the end of it all, what I got was a brief discourteous 'sorry I cannot make it'. I am not sure if I just have bad luck or there is something else going on here. I need to investigate further.

Aug 9 2012

I am supposed to be meeting SMSize today; it is 10am on the dot and still no sign. I hope this will not be another wild goose chase. Well the SMSize representative just confirmed that he is leaving another meeting, claims he will be here soon- I wonder if it is real soon or Zambian soon.

Although the interview with SMSize was not as exciting as I would have liked, it provided some partial insight and makes up for lack of access to NAIS. Nonetheless it presented its own issues in KM.

Once again the discussion turned to the role of ICT- mobile solutions in process improvement. There is not enough sensitisation on various ICTs. There are 3 ICTs used in process improvement- NAIS feedback, Transzam, SMS Commodity Prices. There is a need for informal training in ICT roll-out and to scale up trials to full launches.



*Ntilila Chaila, SMSize
Solutions Representative-
Captured by Researcher*

Aug10-17

Farm stay at the Farmer ES's. Farmer ES is the first poultry livestock farmer I have talked to and she has tremendous insight on the business. Farmer ES grows white fresh maize for sale, 20,000 layers, pumpkin leaves, potato leaves, tomatoes, facilitates farrowing but has no broilers.

For Farmer ES, measures of process improvement are scale increase, market value addition, profitability, time to market. I need to include a section on challenges to process improvement in my analysis. Lusaka West appears to have mainly new farmers hence the isolated practice of farming. There is a comfort zone mentality when it comes to where to sell produce. She is interested in mechanisations. There is evidence of social harm that is a process improvement concern- critically especially with the issue of Chinese chickens. There could be real risks to health with bold claims of premature vaccination and no controls on poultry feed. The Poultry Association of Zambia is aware of all this yet to date has done absolutely NOTHING. Government intervention is sought in market mechanisms. Farmer ES views Zambia National Farmers Union as a source of ideas. There is a lack of social collaboration in her community. Farm owner led training and knowledge transfer to farm workers is filling the gap of extension officers who prefer to deal with farm owners rather than workers.

She also brought up 2 potentially important leads in as far Poultry Association of Zambia and Hybrid. I may just contact these two and see what I can come up with.



*Poultry activities at
Farmer ES's - Captured
by Researcher*

Aug18 Time to regroup and identify a new strategy to get informants.

Aug19 I had an insightful interview with Agroforestry Knowledge Transfer Expert JB, the agri-tech transfer expert at the University of Zambia. There was an emphasis on social structural issues which seemed to sit in the background. Social issues seem to only be fully appreciated by Agri-Business Forum and Agroforestry Knowledge Transfer Expert JB thus far. Is gender now overplayed? Have people accepted the status quo so much that it is now silent? What does this even mean for policy makers and those trying to make a difference in the field if it is not even being considered? Was Farmer FP right about the men feeling victimised and is this being played out in a complete dismissal of gender as an issue even by the Ministry? Agroforestry Knowledge Transfer Expert JB is concerned about the transparency of leadership selection in farmer groups. Could leaders be being chosen as a result of a popularity contest?

Aug 20 Met up with Agri-Business Forum and found that contact farmers are generally considered as boundary spanners. Female decision makers are more likely to take up process improvement than females in male headed households as observed by Agri-Business Forum. Social structure appears to not be an important variable in the rural-urban fringe but may be more so in rural areas. Extension workers and cooperatives are the channels for intervention. There are few incentives for improvement and resistance to change. Multiple tiers of engagement are required to motivate improvement. There is a lack of actor coordination. Although resistant to change, the passion to learn exists among rural dwellers. Resource availability has a large influence on propensity to engage in process improvement. Politics and duplication of interventions are a hindrance to process improvement. There is general poor performance among women's groups. There is a need to localise global ideas. There is a need for formalisation of farmer groups as well as a consideration of group dynamics such as trust and leadership. Agri-Business Forum is a coordinator, a formaliser and collator of information for dissemination. Women's groups are needed to address gender challenges. Some of these challenges are that female participation in groups and training is poor. Widows are probably doing better because farmer knowledge is now first-hand knowledge- again the need for women's farmer groups. Females in

charge of their homes tend to perform well on the farm- like Farmer ES. Record keeping and scalability were key issues- like they were for Giraffe Finance and Cellulant. Improvement could be achieved by leveraging of competencies in networks. Poor knowledge capture and storage systems affect Agri-Business Forum. Processors are the main boundary spanners. There is a lack of adequate extension services. There is need for centralised knowledge mechanisms for most training. Cooperatives are important. There are issues of geographical dispersion. Social structural and governance issues abound. There are opportunities for process improvement through IT. Prevention of initiative replication is a means of process improvement. Cross border knowledge sharing occurs. Collective action for price bargaining is essential as well as cross border export facilitation. Business skills knowledge is being imparted to farmers registered with Agri-Business Forum. Agri-Business Forum needs an informal knowledge management strategy.



Brenda Nang'amba, Agri-Business Forum Representative- Captured by Researcher

Aug21

Had an insightful meeting with Foxdale Court. Foxdale has made attempts to standardise stalls- using reed mats rather than chitenge. They attempt to keep the environment clean with dust bins. They brought out the need for traditional vegetables to make a comeback. There is demand but no one investing in the time to grow them. They might be extinct before we know it. Processed produce is the new direction to head in. Market place coordination and improvement of minimum standards for packaging and prices is necessary. Market places may have a role as processors. There are limited market opportunities in the absence of process improvement.



*Angelika Huwiler, Foxdale
Court Farmer's Market
Representative- Captured by
Researcher*

Aug22-29

Farm stay with Farmer JC. Farmer JC has made no personal investment in knowledge. Farmer JC belongs to women's groups at church and in her import business. She is not involved in knowledge sharing with other farmers.

She and her husband know something is wrong but make decisions based on guess work. A lot of knowledge is needed on agronomy and disease. She is greatly affected by poor standard setting in the industry which makes it difficult to set a benchmark for process improvement. There is room for competition and room for low price setting.

Farm supervision is an important factor in process improvement. Lack of standardisation- there are no guidelines on what is acceptable or not in Zambian agriculture. There is therefore no real impetus to desist from bad practices and improve processes. Vague calls exist for process improvement but with no set guidelines in place, who decides what produce is good enough and what needs more work? This will vary from buyer to buyer and invariably affects the price- no wonder prices are so unstable! Farmer JC has made no personal investment in knowledge.

For Farmer JC, land utilisation and time saving are means of process improvement. Is time management a challenge for women only because of the social expectations on their role in the households? More questions are arising regarding the utility of women's groups in light of trust and competition.



*Farmer JC's, struggling cabbage patches and soil improvement trial-
Captured by Researcher*

Aug 30 - Sep 30 Volunteering with the Ministry of Agriculture and Livestock. The representatives of the technical service branch of the Ministry of Agriculture and Livestock disputed the poor uptake of treadle pumps by women. This in itself is evidence of a knowledge disparity which would hinder efforts for both Zambia National Farmers Union and the ministry to improve irrigation by our small farmers. None of the farmers interviewed had heard of Transzam or SMS Commodity Pricing. The need for coordinating nodes in the network is evident. More work is needed by technical services branch of Ministry of Agriculture and Livestock. There is advocacy for mechanisation, irrigation engineering, simple processing of food for value addition and participatory extension. Extension service relies on full participation of farmers for informal knowledge transfer mechanisms to take hold.



*Basic Process Improvement Projects by Ministry of Agriculture and
Livestock- Captured by Researcher*

Sep 5-Sep 6 I attended the Agribusiness Congress. I confirmed some of my initial thoughts but also added additional stakeholder perspective to my work.



Various speakers at the Agri-Business Congress in Zambia led by the Vice President of Zambia, Dr. Guy Scott- Captured by Researcher

Oct 1 2012 Good day today. Doing an initial analysis of my interviews and concepts and feeling good that I am on the right track and may have answered my questions.

Oct 2 2012 I visited the Foxdale Market traders. It pretty much brings the project full circle.
Initial thoughts on interview with Market Trader VZ: Opportunities exist for market managers to intervene in market trader processes on price and packaging. Market traders could be incorporated in women's groups- this may address the market place problems Farmer FS talked about and allow farmers to concentrate on their fields rather than trying to grow and sell things themselves
Initial thoughts on interview with Market Trader VK: Opportunity for high value, up market produce.
Initial thoughts on interview with Market Trader TP: Poor foot flow, pricing problems, need to shorten chain to retail, traditional vegetables and poor transport mechanisms: foot, bicycle, bus, hired van; exclusion of market traders from women's groups.
Initial thoughts on interview with Market Trader MM: mixed means of knowledge transfer-informal and formal, lack of trust.

Oct 3 2012 Interview with Farmer IA. Farmer IA feels cooperative structures are ideal but are locked in fertiliser focus. Sustainability can be achieved through integrated farming. Both formal and informal mechanisms are important. Short-sightedness in financial planning and prioritising hinders process improvement. Both Farmer CZ and Farmer IA have talked about private sector company contributions to knowledge and improvement. Farm owner led knowledge transfer is critical to the process improvement process.

Collegial support helps. There is need for more proactivity from farmers.



Farmer IA's poultry projects- Captured by Researcher

Oct 4 2012 Interview with Farmer MN. Connections can become complex, each farmer has a personal network and then group level networks. There are problems with supervision and agricultural education. Waste and cost minimisation are means of process improvement. Need for specialisation in farmer activities and revamping retail chain. Transzam is more ideal for larger scale export markets; needs scalability; problems of geographical dispersion. Mechanisation enables process improvement. Too many pilot projects are instituted but they are not going full scale- why? Lack of access to machines and equipment for mechanisation perhaps because of geographical issues again. Need for scale to maximise on opportunities for some forms of process improvement. Year round growth is considered a process improvement. There is relevance of women's groups in specific areas like Farmer FP suggested. There is limited relevance of cooperatives like Farmer IA stated. An important category of farmer, the retiring/retired formal worker becoming a weekend farmer, is emerging.

Oct5-Oct 14 Been working on my article and presentation for the Africa Agricongress- been a good opportunity to analyse my interviews further before holding focus groups.

Oct 15 2012 The Agricongress has fallen through so I am now working on my transcribing. Nonetheless, no time has been lost; the article I have drafted is admissible in the Journal of Agribusiness and Sustainability. So perhaps I can target that

Oct16-Nov3 Transcribing is moving along well. I will definitely have edited narratives presented as my findings. It will make thematic work easier. I just need to have uniform categories for data presentation. I still have not identified any need for a focus group. I'll see how I go but so far it is 1) Zambia National Farmers Union and Agri-Business Forum making a case for membership based on their mandate and my findings 2) Presenting a case for greater involvement in the weekend retiring farmer from Zambia National Farmers Union, Ministry of Agriculture and Livestock and the farmers themselves. This could be the theme of the focus discussion group: Raising the New Farmer. We can tackle education, time management, planning. We can involve AGRI-BUSINESS FORUM and GF. 3) Addressing the need for appropriate small scale farmer solutions. Group 3 can be attended by SMSize, Cellulant, Ministry of Agriculture, Zambia National Farmers Union

and Katuba Women's Association 4) Finding solutions to the shortage in extension services involving Agroforestry Knowledge Transfer Expert JB, Agri-Business Forum, farmers, Zambia National Farmers Union and Ministry of Agriculture and Livestock.

Nov4-Nov26 The transcriptions are done. Getting the focus groups organised has been unsuccessful. Consequently I am concluding my research by compiling a summary of my findings and sending them to research participants for their comments. I will then proceed to analyse my other data sources.

Nov27-Nov28 The report has been completed and sent out. I am now waiting on the feedback but so far so good. With all my hand written diary notes completed I will now work on digitising my rough sketches made over the research period.

My initial framework for analysis generally consists of the following: A)Need to identify farmer needs, networks, paths to farming and linkages among these; B)Look at knowledge management means (sources, transfer, implementation) and C)paths to process improvement and linkage between these; Identify linkages and impact between A and B; Identify linkages and impact between A and C. Farmer profiles (size of land, number of workers, crops grown, animals kept, years in farming, percent time dedicated to farming, area/location). Knowledge assessment of participant forms of process improvement. Reasons for belonging to farmer groups and not, benefits and disadvantages of belonging to farmer groups. Gaps between problems and solutions. Presence of extension officers. Identification of processes in need of improvement. Extension officers as agents of improvement. Markets and market traders as drivers of improvement. Part of farmer profile can include what they do well, their failures, their challenges and opportunities- SWOT analysis of sorts related to process improvement and knowledge management.

Nov29-Jan 10 2013 Spent this period going back to participants to get feedback on the report I wrote as well as clarify issues that I have thought about whilst transcribing. I have not had a need to return to sites where I had a farm stay opportunity which I think speaks volumes about how worthwhile the experience of living the participant's daily life is.

APPENDIX C- OPEN CODING

Participant	Raw Text	Thematic Code	Category	Data Level
Agri-Business Forum	...the Agri-Business Forum was set up in 1998 and the main purpose it was set up was to look into contract farming in the contract farming sub-sector. The reason being many-a-time you find small scale farmers have the main challenge of access to markets.	Network linkages	Strategies for knowledge transfer	3
	The idea was that through contract farming we could engage them to processors... You can only help small scale farmers by linking them to processors because processors are already set up, therefore that contract arrangement would be the ideal channel to help small scale farmers.	Network linkages	Strategies for knowledge transfer	3
	...small scale farmers need to be organised and as such our target will be associations and co-operations. Some farmers looked organised because they were in groups but they needed to be formalised by being registered either as an association or co-operative. In instances where we found a viable group, we would ask them to register to become formalised because it is better to deal with a group in addressing transaction costs administratively.	Network coordination; Formalisation; Groups	Strategies for network management	3
	Apart from just having the groups organised, we need to train them in issues of governance because they need to know what leadership structure they have to have in place and who plays what role in transactions with the outside world.	Knowledge areas; Leadership	Strategies for knowledge transfer	3
	When they know who their leader is they can have confidence in that person (leader).	Leadership; Trust	Conditions for knowledge transfer	1

<p>...either the associations come to us and say they want to be members of the forum, this is what we are producing, can you help us find a buyer or, we can engage the processors looking for a particular commodity in given quantities by linking them to known sources of farmer groups producing the commodity or other organisations in the sector that we work with that are supporting small scale farmers in producing particular crops.</p>	Network linkages	Market issues	2; 3
<p>That is how we channel our support to small scale farmers where marketing is related and also where production is related because a market can be found and someone requires huge volumes but a group's production history may indicate that they only produce small volumes; so we identify their potential to produce more for example by having the land, identify their challenges for example access to inputs and also identify the opportunities to help them in this area.</p>	Knowledge areas	Market issues; Strategies for knowledge transfer	3
<p>In the past when we managed a project for which we got a grant, we would help them acquire inputs and in some instances set up a revolving fund channelled through the processor so that the farmers would be able to recover their cost of goods sold.</p>	Financial issues	Farmer challenges	1; 3
<p>In any community, there could already be existing structures so farmer groups may be formed around those structures. For example, if there are political structures, someone will dominate as a leader in that structure and may end up as a leader even in the farmer association. Because most farmers are not empowered to decide what structures the association should have, when and how elections should be held, the duration of office bearing; they will be bogged down in accepting leaders in other areas.</p>	Groups; Social structures; Leader identity	Conditions for group formation; Social influences on network composition	1; 2
<p>In other instances where we have high illiteracy in rural areas, whoever seems a bit exposed tends to dominate.</p>	Illiteracy; Leader identity	Farmer challenges; Social influences on network composition	1
<p>...lack of trust-We are interested in bulk marketing so you should be able to bring your few bags of commodity which will be sold as one as along bags of others, the payment comes</p>	Trust	Farmer challenges	1

as one whole and each contributing farmer is paid according to the proportion they brought. Issues of trust arise in that channel because of worries over payment so some farmers may not want to work together.			
...those who can work together start up groups and later others come on board	Groups	Conditions for group formation	1; 2
The third challenge is on gender lines- Sometimes the women tend to shy away because the men dominate. Females heading households may attend meetings but fail to participate because of some traditions that forbid women to speak when men are there and things like that. Even when it comes to training, it's mainly men that come.	Gender issues	Social influences on network composition; Social influences on knowledge transfer Network engagement limitations	1
We try to be sensitive with the timing of our training because women have other work in getting children ready for school, cooking and things like that.	Gender issues	Social influences on knowledge transfer Network engagement limitations	1
With awareness, we are seeing changes in those trends (gender trends affecting women negatively).	Gender issues	Social influences on knowledge transfer	1
... sometime back when I worked with two co-operatives around Lusaka, what I noticed was that a few single women were doing quite well. In a few instances, the woman was a member of the co-operative but they underperformed yet when they became widows, their performance changed dramatically. I attribute to that their new capacity to make decisions on their own without having to consult their husbands who may have opposed their views.	Gender issues	Social influences on process improvement	1
There are two extremes when it comes to spousal support: some are held back by opposing	Gender issues	Social influences on process	1

husbands whilst others who have the support of their husbands dwindle in performance once he passes on.		improvement	
		Network engagement limitations	
Of most importance is training on agronomy. To achieve volume, you need to get the agronomy right- how to produce the crop.	Knowledge areas	Scalability	1
The other training issues are on governance and group dynamics.	Knowledge areas	Strategies for network management	2
Other issues still are in HIV/AIDS- this is an issue we cannot run away from; a lot of people have gotten the message on the disease through awareness but now the issue is on the nutritional aspect of food which the farmers produce.	Knowledge areas	Meeting social needs beyond farming	1
The other issue is gender mainstreaming, as I have already mentioned- trying to get the best out of the womenfolk.	Knowledge areas	Strategies for knowledge transfer	3
The other issue is negotiation skills- even when the groups are organised and can produce a crop, they do not know how to bargain. Although they could be in remote areas where they are inaccessible and a buyer has to travel to buy from them, they should be able to bargain on the basis of a minimum price. To arrive at a minimum price they need to understand what is involved in producing a crop, the actual costs.	Knowledge areas	Strategies for network management	2
Knowledge on record keeping is still quite low.	Knowledge areas;	Farmer challenges	1
	Record keeping		
We try to simplify it as much as possible as far as the basic information they must keep. When something is complicated, chances are high it will not be used because they may not understand it completely and it may be cumbersome. We try to be flexible in terms of the format as long as they keep the core information.	Knowledge areas;	Strategies for knowledge transfer;	3
	Record keeping	Network engagement	

			limitations	
We take into account those that are illiterate but have school going children that can help. We ask them to keep a small book as a diary where they record what they do in their field, the inputs they acquire and at what price so that they keep track of their expenses.	Knowledge areas; Illiteracy; Record keeping	Farmer challenges; Strategies for knowledge transfer		1; 3
In terms of formalised record keeping and basic financial management, our training is targeted at association level.	Knowledge areas; Record keeping	Strategies for knowledge transfer		2; 3
...the idea is that groups recruit a manager to manage their affairs. Most groups depend on the treasurer for this function so we insist that the treasurer must be one who can read and write. Someone with work experience in financial management is an additional bonus. Associations tend to have many retirees who are usually the right candidates for such positions as treasury.	Leader identity; Illiteracy; Higher education	Social influences on network composition		
Basic record keeping is targeted at individual small farmers while basic financial management is targeted at the associations.	Record keeping; Groups	Strategies for knowledge transfer		1; 2; 3
So again, it is important that they are in groups.	Groups	Strategies for knowledge transfer		3
As an individual it is very difficult to access loans and inputs.	Groups; Financial issues	Farmer challenges; Network engagement		1; 2

			limitations	
Someone may not want to establish an outlet on the basis of one farm but if you are a group they can be assured of volumes and be able to make money	Groups	Scalability;	Strategies for network management	2; 3
The first is our line ministry, The Ministry of Agriculture, The National Farmers Union which is the umbrella organisation of all farmers, individual NGOs that are developmental organisations in agriculture. One of such NGOs that we have partnered with for a long time is SNV, a Dutch development organisation, whose interests are in capacity building. It helped us come up with our strategic plan and implementation. Right now we are structured in such a way that we are their local capacity builder. Interventions needed on the ground are now done through local organisations. Other organisations are the Agricultural Consultative Forum for policy and advocacy- we have reciprocal membership with them. It is a long list. As long as any organisation works with small scale farmers in any particular crop we need to partner with them because we may have different competencies in training, funding and so on.	Network linkages	Network connections;	Strategies for knowledge transfer	3; 4
At the end of the day we draw the whole picture of interventions we are going to have in terms of a value chain. Rather than each actor doing their own thing and risking repetitive interventions whose impacts cannot be easily assessed it is better to work with several partners.	Repetitive interventions	Knowledge transfer	intervention failure	3
The approach we take is commodity specific. We have been active for a long time in honey and rice as well as fresh vegetables around Lusaka. Others we have dealt with in the other past are bananas, cotton and essential oils.	Commodity specifications	Strategies for knowledge transfer;	Network engagement limitations	3
...in honey, we are involved in sector coordination because there is potential for Zambia to	Knowledge	Network coordination;		3; 4

produce much more but we are not so we need to identify the bottle necks; we need to identify what donors are channelling interventions towards the honey sector, what they are doing and what gaps need to be addressed.	need identification; Network connections	Network linkages	
We have regional networks like the East and Southern African Agri-Business Network which ABF belongs to and was secretariat of. It consists of Malawi, Tanzania, Uganda and Zambia. We have partners in each of these countries with the main program being on trade facilitation and information dissemination.	Network linkages	Network connections	3
We exchange information across borders on best practice. We also facilitate exchange visits for information sharing to facilitate trade for the four member countries both within the region and externally.	Practice based knowledge; Exchange visits	Strategies for knowledge transfer	3
Under the sponsorship of the Norwegians, we exchange middle management staff for a period of 10 months.	Network linkages	Network connections	3
Livestock is not our mandate	Commodity specifications	Network engagement limitations	3
We have identified knowledge storage as a challenge. We are very weak on documentation. Besides the reports we prepare for our partners, we do not do much. We need to emphasise on preparation of case studies based on successful stories.	Knowledge storage; Practice based knowledge	Knowledge transfer challenges; Strategies for knowledge transfer	3
Initially the channel of communication we used to relay information we had was the website for the regional network. We are trying to restructure and bring back our own website because that is where we are going to store all that information. Besides that there are two newsletters that we produce one on honey and one for the regional network. We	ICT use; Print matter	Strategies for knowledge transfer	3

produce articles on current events in agri-business.				
We tried to develop a documentation centre which has been idle for some time. We need to revisit what information is outdated and what information gaps exist. We need this so that our members can have access to all the information they need from one centralised source.	Knowledge storage	Knowledge transfer challenges; Strategies for knowledge transfer	3	
From best practice, we are trying to document manuals. We produce pamphlets on various issues like marketing a particular product or post-harvest management of a particular commodity. We produce user-friendly material for community use.	Print matter	Strategies for knowledge transfer	3	
In 2006-2007 we were able to translate a program on information technology use into local languages. It was well received because once we translate programs into local languages we are able to get community feedback on what other aspects we should be providing information on. The translation project was a short term project but it is something we would like to do if we came across the resources for it.	Language	Strategies for knowledge transfer	3	
What challenges us is the remoteness of some farmers. For instance in honey sector, we need to know where particular hives are, some of which are in forests where there are no access roads such that it may take half a day's walk to track them. We are trying to see how technology can help us overcome such issues through GPS devices and so on.	Geographical issues; ICT use	Knowledge transfer challenges; Strategies for knowledge transfer	3	
Processors play a big role because they feed into the market. They provide information on what the farmer's commodity lacks but may not have the extension system or capacity to produce a manual for improvement so that is where we come in.	Knowledge need identification; Network linkages	Network connections	3	
The government extension system is the best in terms of training methodology but they	Extension	Knowledge transfer	3, 4	

	have their own challenges in poor fuel allocations to officers and hence poor access to farmers. So we like to use the officers on secondment for our extension purposes.	services; challenges; Extension challenges	challenges; Strategies for knowledge transfer	
	Some input dealers are our members so we use them to address farmer issues of access to inputs and in some instances can even negotiate discounts.	Network linkages; Farmer resources	Network connections	3
Farmer AN	I am a full time farmer, I don't do anything else to make a living besides farming.	Full-time	Farming involvement	1
	I was taught how to farm by my grandfather in Kabwe, where I come from.	Family	Sources of farming knowledge	1
	He taught me that farming is a good way to occupy time if you have nothing to do, or are unemployed.	Hobby; Occupation	Farming involvement	1
	He also taught me how to manage a business- to run the shop, do stock taking. I keep records.	Stock taking; Record keeping	Other skills acquired used in farming	1
	I belong to Tilimbikile Women's Group.	Group membership	Network connections	1; 2
	We were told that there is Katuba Women's Association ... We found that the programs were good and we joined...I have now been a member for a year.	Association membership	Network connections	1; 2
	I have learned a lot! ...Not just about farming but about other things that affect me as well. For example, before joining the association, I didn't know where to go or complain whenever I had problems with my children or husband.	Association	Sources of farming knowledge; Meeting social needs beyond	1; 2

			farming	
Attendance is very bad. There are several misunderstandings that arise among the group when trying to do collective work- you know how women can be.	Group dynamics	Network engagement limitations;		2
		Group challenges		
I learned to keep records from my grandfather but the association greatly encourages us.	Family; Association	Sources of farming knowledge		1;2
We have our friends in Mchenje Ward who keep goats that they were given by The Ministry of Home Affairs 2 years ago. If I were to get into goat farming I would source information from the officer at '10 miles', Mr Hachilensa. He takes care of the issues of all the women that were issued these goats in Mchenje. My knowledge comes from the association and other women's groups.	Extension services; Association; Groups	Sources of farming knowledge		2;3
It is us the users of the water from the dam who came together to decide what to do. The headman advised us on digging the drainage and fitting machines. No one else is involved in assisting us farmers besides the headman; we just do things for ourselves.	Traditional leader	Sources of farming knowledge		1
We have no interaction with ZNFU and are unaware of their programs.	Absent linkages; Unawareness	vital Network engagement limitations; Knowledge transfer challenges		3
If we know the price is very low we sit down with our friends to discuss a single price that can help us.	Collective efforts	Market issues		1
They (ZNFU) need to come around to see us so that they can explain well.	Face-to-face	Strategies for knowledge transfer		3

	I do not access their farmer magazine nor do I listen to or watch any broadcasting farming programs.	Farmer magazine; Television broadcasts	Rejected knowledge sources	1
	I do not sell anything to them (FRA) because sometimes they buy the produce at low prices.	Absent linkages	vital Network engagement limitations; Knowledge transfer challenges	3
	Now that they require farmers to have accounts in order to transact with them that will further limit my interactions with them as I do not have my own bank account.	Formalisation	Network engagement limitations	1; 3
	We have not had any banks come to advise us on what options are available.	Absent linkages	vital Network engagement limitations	3
Farmer CZ	I come from Southern Province so it's inborn; people from Southern Province are basically farmers. Even when I lived in town, I always wished to be in a place where I could have my own garden.	Farming heritage	Self-identity	1
	I have been farming here from a time before you were born, 1987.	Years in farming	Farming involvement	1
	I have 5 permanent workers, 1 is full time with the pigs, 1 is a supervisor and I have 3 others.	Employment of others	Farming involvement	1
	I may have to reduce the number (of workers) because of the new minimum wage laws.	Financial issues	Farmer challenges	1
	I have no time to participate in the farm work because I work Monday to Friday and attend church on Saturday afternoon and Sunday; I do however oversee the works especially on a Saturday morning.	Part-time	Farming involvement	1
	I am now retiring from work so I want to expand my operation.	Transitioning to	Farming involvement	1

	retirement			
I will become a full time farm manager in October and will be in the field with them, of course not all the time...	Full-time	Farming involvement		1
I used to have 10 milkers but we had a disaster... the cows started dying off one after another. I got discouraged and stopped with the milkers.	Motivation	Individual attributes influencing the network		1
I then bought some egg layers and for about 5 years I sold eggs until we ran into some financial problems and stopped.	Financial issues	Farmer challenges		1
I wanted a market that would not give me issues with money so I started talking to other growers and they told me about Kembe, Zambeef and Masterpork.	Farmer peers; Private processors	Sources of farming knowledge; Network connections		1;3
My passion when I started with the pigs was not just to grow them for others. I am seeing myself growing them and going into the products. That is my focus... My desire is to one day grow the pigs, sell their meat myself, and produce sausages that people can buy from me. My strategy is to take control of the whole process.	Interest in improvement	Individual attributes influencing the network		1
I am saying why not me? Why can't I do the same (pig processing as the private sector processors do)? ...I am already focussed.	Motivation	Individual attributes influencing the network		1
I have not costed it (pig processing), I am told it is very expensive but you can always start somewhere.	Financial issues	Farmer challenges		1
The problem is the rest of the family is not interested in the farm.	Family support	Farmer challenges		1
They (Masterpork) send their truck here to collect your livestock if you have at least 40 porkers to sell...I have a small truck that is broken down at the moment and the delivery centre is far, out of town in Lusaka East... (but) I haven't been under pressure to resuscitate it because they do a pick-up. They have been very efficient with the payments. In less than a week all the admin and transfer is processed. I have never complained, they don't tell you	Produce collection; Efficient transactions	Private sector support		3

stories like other people who will give you the run around for 3 weeks.				
They (Masterpork) are strict about the minimum number (of pigs) because they come from far and don't want to come for nothing, it has to make sense.	Private sector requirements	Network engagement limitations		3
We do have in this community the Cetvon Women's Farmer's Association.	Association	Network connections		2
I think our objective at the beginning was just to know each other so that if we had problems we had somewhere to turn to. Like now that I don't have water, if I didn't know my neighbour I would not be able to go and draw any.	Association	Meeting social needs beyond farming		2
...we demised because of who was running the association at that time.	Association leadership	Group challenges		2
...we want to become affiliated to other organisations	Network linkages	Network connections		2
...as a group we can be linked to sources of finance as well as markets. I think that is of most importance in the farms here...	Access to finance	Group benefits		2
It (Cetvon Women's Farmer's Association) is very formal. When we started, we meant business; we were not just women getting together. We registered our association and have a certificate.	Formalisation	Strategies for network management		2
We have a main committee and sub committees that look into the education situation in the area, health issues, security and others. It goes far beyond the agriculture.	Association	Meeting social needs beyond farming		2
We made losses and I think it is because we didn't put someone who is agriculturally trained to supervise, plan and stuff. It's only now I have someone who has knowledge and knows how to look after the crops, is setting up a continuously growing and sellable tomato crop and making good utilisation of the space.	Lack of training	Farmer challenges		1
Ideas come from around the farms. You speak to colleagues to find out what they are doing and how they are performing. When it comes to managing a crop or livestock, I source information from the internet- I download, read, and see what I can do. Where I don't	Farmer peers; Internet	Sources of farming knowledge		1

understand I ring someone else.				
...we are supposed to have a government extension officer passing through to tell you what to do, how to administer injections and so on but I have seen no one. Nobody passes through here. I have been here over 20 years and not once been visited by a government employee to see how I am doing. And yet I know there are people getting paid by the government to do exactly that job. I am sure there are people assigned to this place, maybe they choose which farms to visit but as for me, I have never seen anyone... They need to be with us because they are trained. Like now, I have this tomato which I would have received advice on with regard to how better to tie the crop, prevent it from drying up and things like that. Even my pig project could have already expanded if someone was there to help me. I really don't have any idea why they don't come because I could technically be a large farmer given the acreage I have if utilised well. I don't know who they target; all I know is their absence here.	Extension challenges;	Knowledge transfer challenges;	3	
I haven't come across that information (ZNFU's recent initiatives in backload transport and use of SMS for communicating commodity price information).	Absent linkages	vital Network engagement limitations		
I however read their magazine (Zambian Farmer) and even took down 3 addresses- for the committee on small scale farmers, for poultry and for pigs. I took details of contact persons because now that I am going into full time farming I need to know what these committees are doing...	Unawareness	Knowledge transfer challenges;	3	Network engagement limitations
I haven't found the information in the magazine useful in the past...	Farmer magazine	Sources of farming knowledge	3	
...I felt they (Zambian Farmer) targeted the larger scale farmers and I couldn't identify myself with them.	Farmer magazine	Rejected knowledge sources	3	
	Identity incongruence	Self-identity	1	

Cellulant	In Africa, there are about 600 million mobile phones. With a mobile phone there is accessibility to many things from payment solutions to basically a means of communication on a continent with 1 billion people. The mobile phone proliferation has increased the rate of knowledge transfer in the market.	ICT use	Strategies for knowledge transfer	3
	...The problems were mainly logistics, we did not know who was a valid farmer, there was no trail so you couldn't tell where the farmers ended up farming after receiving the fertiliser, and there were many challenges. For the last couple of months we have been working with the government in deploying a solution whereby we register farmers, and there are various loopholes in validating the real farmer. We looked at farmer organisations, databases of national registration of persons, and the electoral commission. There are various ways you can countercheck and verify whether you are dealing with a real farmer or not.	Identifying 'real' farmers; Farmer registration	Attached identity; Strategies for network management	1; 3
	We approached the agro dealers directly and registered them as 'agents'... The agro dealer can go to any of our partner banks and receive cash payment as the banks too are on the electronic system.	Network linkages	Network connections	3
	Beyond subsidies, we are looking at micro insurance products for farmers.	Micro insurance	Private sector support	3
	By being able to identify a legitimate farmer we see an opportunity for the government and insurance companies to help guarantee the farmers that whatever they engage in they will get some benefit in spite of pest attacks on crops and the like.	Identifying 'real' farmers	Attached identity	1; 3
	In Zambia you find farmers complaining a lot that their maize is ready for collection but Food Reserve Agency is not ready because they want to only go and collect one batch and they are not sure whether the farmer is ready or not, how many bags they are going to pick, where the farmers are located and so on. The mobile phone technology can come in here to address this knowledge gap.	Logistics; ICT use	Network challenges; Strategies for knowledge transfer	3; 4
	If farmers were able to simultaneously communicate to the FRA their location and the	Logistics	Network coordination	3; 4

number of bags they have available it would be very easy for the FRA to determine how many bags are available in a specific region. As a result suitable transportation can be organised and crop need not go to waste. It is about trying to create near perfect information.				
Zambia is a big country but only has about 220 bank branches covering a significant area so what you find is when farmers are getting paid you find long bank queues whereas this can be dealt with.	Geographical issues	Network challenges		3
We use an above the line strategy, we discuss our solutions on morning radio programs. Kenya's former central bank governor once said that to market mobile money solutions you don't need to go through a lot of stress- just send \$10 to the mobile phone of an 8 year old and tell them they can access the money following a few instructions and they will find a way, you do not need to teach them. You can do radio campaigns for sensitising and public awareness but not for the redemption of money.	Above the line; Radio	Strategies for knowledge transfer		3
When it comes to ZNFU's Transzam, someone without a profitability motive needs to take the lead and this would be ZNFU or FRA themselves.	Network leadership	Network coordination		3; 4
The fact that a rural farmer in Zambia has to go online using a computer to use the service (Transzam) means it cannot work.	ICT use	Knowledge transfer challenges		1; 3
We need a middle-man to link farmers and transporters and not leave the technology to sort itself... It requires investment on the part of the government; someone has to take the lead, the innovator in between.	Network coordination; ICT use	Strategies for knowledge transfer		3; 4
Furthermore, for this (Transzam) to work, you need to be scalable. It is all about scale. Scalability is a problem in Zambia.	Intervention success	Scalability		3
If you leave farmers and truckers to their own devices it (Transzam) will not work. It is the government's job to lay the necessary infrastructure and invest in making this service more accessible and user friendly.	Absent linkages	vital Network challenges		4

	Partnerships are important. We may be great with working out new technology but we partner with experts in logistics to make things work.	Network linkages	Network connections	3
	In Zambia 60-70% of people own a cell phone and that is mainly among the adult population so there is great potential to use this platform for process improvement in a number of areas.	ICT use	Strategies for knowledge transfer	3
	Zambia's sparse population distribution presents ...opportunities...	Geographical issues	Network challenges	1
Farmer ES	One of the sales representatives at Hybrid advised me to grow a minimum of 500 (chickens) so that I could make a decent profit margin.	Private extension	Private sector support	3
	The number (of chickens) increased to 600 and I built another chicken house, increased to 1500 and built another house which housed 3500, bringing the total number of birds to 5000. From that we built a bigger house to cater for 6000 birds in summer and 7000 in winter. The other house I built can cater for 8000 in summer and 10000 in winter.	Farmer growth	Scalability	1
	My interest in growing chickens started when I was 10 years old. I grew up with my aunt who grew 100 chickens on a small scale. She would send me to run errands in the chicken run, I would handle the chicks and see how they grew to 6 weeks and from that I got interested.	Up-bringing; Family	Sources of farming knowledge	1
	Lately I have not spent much time with my farming because my husband is ill, paralysed on half of his body, so it hasn't been easy for me.	Family support	Farmer challenges	1
	When I cannot grow birds, I act as an agent and sell on behalf of others for a commission. I occasionally dress chickens on request.	Market participation	Farming involvement	1
	Hybrid, have given me a lot of information in books which I can read...Sometimes the chickens are infected with a virus and by reading you can see what is wrong and what you can do about it... The books offer information on vaccines, what feed to use for different stages of growth. When I was with my aunt I was not aware of all these things.	Private processors;	Sources of farming knowledge	3

<p>The labourers that help me in keeping the birds are not that experienced. So I have to train them on what they are supposed to do, the protective gear they should wear and all sorts of things.</p>	<p>Lack of training Farmer challenges Knowledge transfer to labourers</p>	<p>1</p>
<p>I have 10 workers. When I include myself, 11 people work the farm.</p>	<p>Employment of others Farming involvement</p>	<p>1</p>
<p>For the vegetable crop I only use female labour. I had 17 ladies and now have 10. I use 2 men occasionally just to spray the crop. Women are the most hardworking people. Farmers prefer female labourers because in spite of the problems they may be going through, when they are given a job, they do their level best. Men on the other hand are full of excuses. I am not the only one with such an experience; a male farmer friend of mine also chooses to only employ women in the garden for the same reasons.</p>	<p>Gender issues Social influences on network composition</p>	<p>1</p>
<p>My son has been helpful in giving ideas on what we can do.</p>	<p>Family Sources of farming knowledge</p>	<p>1</p>
<p>At Soweto Market, without the Chinese presence definitely, I would be able to get about 40-50% in profit margin. But these days, because of the Chinese, you can only get about 25% if you are lucky. There is a lot of competition...During election time and just after the new president won with all the rumours about getting rid of so-called 'foreign investors', you could not find any Chinese at the market and there was all sorts of 'manna from heaven' in each and every corner. Any Zambian selling full grown chickens was able to sell at decent prices of KR26 (AU\$5.20). But this time, with their comeback, they outnumber us at the market 4 to 1...</p>	<p>Foreign competition Market issues</p>	<p>1</p>
<p>The Chinese won't grow a chicken at 6 weeks; theirs are ready for sale at the market in 3 weeks... I have heard their workers say they vaccinate the birds after only 2 weeks! ...I have tried to report to the Poultry Association of Zambia, they don't take any action; the government is worse! They do nothing, there is no help!</p>	<p>Perceived injustice Network engagement limitations</p>	<p>4</p>

We are not saying they (Chinese farmers) should not do business, but that business (farm business) is meant for us as Zambians. It is up to the government to take action, once they do, every Zambian growing chickens will be happy.	National ownership of farming	Self-identity of	1
In Zambia, once you start buying chicks, you automatically become a member of the Poultry Association of Zambia. I do not belong to other associations, just PAZ. I haven't joined the farmer's union. I don't know any farmers in women's associations.	Association	Network connections	2
I will now (join the union) because I want to start growing about 4 acres of spices. You get a lot of ideas from being part of the farmer's union.	Union	Network connections; Sources of farming knowledge	2
The interest to plant more came from the success of... little projects... I am now more interested in farming than before.	Motivation	Individual attributes influencing the network	1
I especially want to do well with the cassava leaves because the Chinese can't plant cassava.	Foreign competition	Market issues	1
In this area there are very few farmers I know, one of my neighbours grows only maize, the other is an Indian and you know they are not interested in sharing any ideas, they are interested in themselves. Farmers in this area are quite isolated in their practice.	Individual farming practices; Lack of farmer peers	Network engagement limitations	1
There are no extension officers that come through here, although they must be here to advise on what I can and cannot do here. With me now wanting to plant much more than I did before I need an agriculturalist to examine the soil, advise me on harvesting and so on.	Extension challenges; Absent vital linkages	Knowledge transfer challenges; Network engagement limitations	3
I transport my own produce to the market. I have a small truck I use for the chickens. I irrigate using overhead sprinklers that are connected to 4 boreholes... We already have a	Improvement processes	Farming involvement	1

	tractor				
	I was advised by my son Matthew to buy a hammermill to mill maize for others and for producing our own feed... I want to be able to get equipment for spraying and planting my vegetable crop...	Interest in improvement;	Individual attributes influencing the network;	1	
		Family	Sources of farming knowledge		
	My biggest challenge is finance... I applied for an agricultural specific loan and am awaiting a response.	Financial issues	Farmer challenges	1	
	I want to become more mechanised because other women are doing it so why can't I? My cousin told me yesterday that she has managed to produce 250 bags of soya beans! That's a lot and she is just a woman! If she can do that, I can, because we learn from each other.	Motivation	Individual attributes influencing the network	1	
	I have a niece in Ndola that told me about it (loans from Stanbic Bank) as she secured one for herself... The family as an information source is useful. I think it is because of how we were brought up, brought up farming.	Family Up-bringing	Sources of farming knowledge	1	
Foxdale Court Farmers Market	We don't have much influence over what they (farmers and market traders) sell, we allow it to be a free market.	Free market	Market issues	3	
	We spoke to some farmers at the Tuesday Market, and we have also seen farmers in the Foxdale farming area. We have also been to Ng'ombe Compound to approach marketeers selling fruit and veg in the market. We have also been to Soweto Market, a lot of the farmers and marketeers there are also interested. We put an advert in the Post Newspaper and we got farmers from that. We approached a lot of farmers at the agricultural show. Sometime last year an association of growers had an exhibition at Arcades and I approached a lot of the farmers... For the public we advertised in the Lowdown Magazine, we also printed 5000 flyers and handed them out	Face-to-face Newspaper Agricultural show Magazine Print matter	Strategies for knowledge transfer	3	
	We decided on a Sunday farmers market... It has caused a problem with some of the	Other farmer	Farming involvement;	1	

farmers because they also want to go to church. We can't win them all.	commitments	Network engagement limitations	
The advantages of this market is that it is a closer alternative for farmers in this area, so near that some walk while others hire a small vehicle over which they only need to drive 1 kilometre. For other farmers it gives them another outlet, most of the small scale farmers can't get into the supermarkets because they don't have the right packaging and barcodes, they are inconsistent in having product available. We have a farmer that comes from Ngwerere and he is a supermarket supplier but he also likes to supply at this market because he can get a retail price whereas with the supermarkets he gets a wholesale price. Whatever he doesn't sell at the market on a Sunday he distributes to the supermarkets on a Monday. It's all gains for him, no losses... We have a good relationship with Spar Supermarket, their CEO likes to visit the farmer's market and it could be a future route for the farmers once they improve their packaging and so on.	Market alternative	Private sector support	3
As we build up we will start formalising the market more. The farmers amongst themselves have expressed interest in creating a small committee because some tomato sellers sold at higher prices than others and it was chasing customers away. That has happened naturally. We are looking at perhaps having 5 farmers to represent everyone else and I think that is really important to discuss price and marketing issues.	Formalisation	Strategies for network management	3
We know that through the committee we can spread our word to the farmers... We would like to get more cooperatives and groups to join.	Farmer committee Cooperatives Groups	Strategies for knowledge transfer	2; 3
...we will become particular on how many can sell what commodity because at the	Commodity	Strategies for network	3

	<p>moment we see a lot of stands selling the same things. We want to be able to afford exclusivity to the best producers of specific commodities but at the moment we are still too small to do that A lot of buyers email us requesting specific vegetables so we would like to become a niche place for our traditional vegetable varieties.</p>	<p>specifications management</p>	
	<p>I think both formal and informal channels of information are important. Most farmers that have joined met us through our active community engagement in visiting the farmers and talking to them about the market.</p>	<p>Formal transfer; Strategies for knowledge transfer</p> <p>Informal transfer;</p> <p>Community engagement</p>	<p>3</p>
Giraffe Finance	<p>We were not specific as to who could qualify...we got post-dated cheques as security, we were not interested in collecting security in the form of assets unless the amount was big. When we started lending beyond ZMW5,000 (AU\$1,000) from amounts of ZMW30,000 (AU\$6,000) we ensured that collateral was available mainly in the form of movable assets like a car. Even then, we would not take possession of the asset used as collateral. The value of collateral had to be way above the value of the loan and its associated interest so that in the event that the lender failed to pay, we had something to fall back on. ...in the absence of collateral, let's say for unsecured loans, we would occasionally take the higher risk of giving out a loan. We secured this with a slightly higher than normal interest rate of 30% per month... What attracts people to micro lending is the time taken to process loans. Under normal circumstances, commercial banks take a minimum time of 2 weeks to process a loan whereas micro money lenders can process in a day.</p>	<p>Microfinance; Private sector support;</p> <p>Inclusiveness Attached identity</p>	<p>3</p>
	<p>The information we collect in order to evaluate one's qualification for a loan is a copy of the national registration card, proof of residence and expected future cash flows which would determine whether one can pay back the loan.</p>	<p>Identity validation</p> <p>Attached identity</p>	<p>3</p>

<p>Three things: Firstly, these farmers do not seem to understand the business they are in. For us lenders, our interest is in having farmers that have a grip on what they are doing, they should understand their business and be able to give information about the business in terms of cash flows, assets and the management system. Even if they are not documented, someone should be able to explain. Secondly, farmers do not have a clear business model. For you to be considered for a loan you must have a business model that can be reduced to numbers that you can explain to the lender. It is easier to appreciate what someone is trying to do when it is in numerical form, wither cash flow, profit and loss, and so on. Thirdly, it is the way farmers present themselves and their case. As a money lender, I am there for business. I am not a charitable organisation. If I have 2 different clients, a small scale farmer and someone else, my main interest is not in just supporting the growth of the farmer but rather supporting my own growth as well. The natural choice is to lend to whom I have assessed has the better capacity to pay. Usually the small farmers have no capacity to pay back. They are not a competitive client to lend money to all in the name of growing the farmer. I have an obligation as a director to achieve maximum return for shareholders so I don't give loans for the sake of empowering people, I am here for profit.</p>	<p>Lack of Attached identity; business acumen Network engagement limitations</p>	<p>3</p>
<p>The inability to pay back is linked to their scale of operation. Someone may be planning to raise 100 chickens and want to borrow ZMW5,000 (AU\$1,000). If we lend at 20% we expect them to pay back ZMW6,000 (AU\$1,200). Let's assume the mortality rate of the chickens is 10% and the farmer remains with 90 that they sell at KR30 (AU\$6) each, they make a gross income of ZMW2,700 (AU\$540). Already the turnover is insufficient to pay back my loan and they still have operating expenses in salaries, feed, electricity and water- this is a classic example of the challenges of small scale.</p>	<p>Access to Scalability; finance; Network engagement Financial issues limitations</p>	<p>1; 3</p>
<p>Too many farmers have a 'me too' strategy of starting a business by picking on activities and commodities that their peers succeed in without fully understanding what is involved. The lack of understanding is in profit margins available, the nature of the market, the skills</p>	<p>Unawareness Farmer challenges</p>	<p>1</p>

required and so on which are all internal issues that the farmer should sort out by themselves.				
Of course the government has a role to play in creating an enabling environment for business through road infrastructure and a sound marketing system for those in maize production. Cooperatives can come in, cooperatives can be formed by the farmers themselves and they may be able to source grants from well-wishers, the government and donor community.	State as an enabler;	Network coordination	4	
	Cooperatives;			
	Donor community			
Cooperatives can source people skilled in the areas they need knowledge on. There are always reference points farmers can go to.	Cooperatives	Sources of farming knowledge	2	
We give small farmers and marketeers free lectures to give them direction on how to record daily sales, determine profit or loss and other basic financial skills.	Free training	Private sector support	3	
We ran a group scheme for marketeers some time back where we grouped them in groups of 10 and lent money to the group. Disbursement was done at an individual level but collection was orchestrated by the group leader. We managed to inspire individuals in the groups who were later able to stand on their own. The lectures were very formal. They came to our premises and were taught in a room in very simple layman language. They had a group leader taking notes so that they could share further when they went home...Mind you; these people were not grouped according to the similarity of their businesses but rather according to who knows whom.	Groups	Strategies for knowledge transfer	3	
	Formal transfer			
	Language			
	Existing identity relationships			
We stopped the schemes because some members of groups were not sincere and as such were denting the image of other group members who were good. It is the prudent members who proposed ending the schemes and acting independently. Some people were 'eating their capital'.	Group dynamics;	Knowledge transfer challenges	3	
	Trust			

	We had 10 groups of 10. Only 2 groups had some male members, a single male in each of the two groups, while the others only had females. So we had 98 women and 2 men. The way the group performs depends on a mixed gender composition. Without trying to insult any of the sexes, I observed that male members of a group tend to be more serious about treating their enterprise as a business. They were more serious than the females. I don't know if it's as a result of the different responsibilities they have in the home where they have challenges they have to meet. All I know is that it was the 2 groups with male members that performed exceptionally well and were the last to disband.	Gender issues	Network engagement limitations	1; 2
Farmer GK	...I have an idea about farming because we lived at NRDC college where I saw a lot of growing of crops and vegetables and became interested. I started by experimenting with green maize for maize meal...	Motivation	Individual attributes influencing the network	1
	I don't belong to any women's groups...I have not approached any organisations, maybe I will later.	Group membership	Network connections	1; 2
	When I moved to this farm 2 years ago, I found a group of farmers that had organised themselves but then I didn't have any cash to become a member but I hope to join them...	Financial issues	Network engagement limitations	1; 2
	...I still cultivate maize. I however do not encourage cultivation involving a lot of fertiliser; I would rather be more organic.	Alternatives in farming	Individual attributes influencing the network	1
	The benefits of belonging to the group are that members can have immediate access to fertiliser and pay back later. They also get advice on different types of crops to grow. They learn from different experiences and share challenges as well. They also organise post-harvest sales and have a chance of being registered for selling to FRA.	Groups; Access inputs; Agronomy advice; Knowledge	Group benefits to Sources of farming knowledge	2

	sharing;			
	Marketing assistance			
I don't want to be dependent on a group. A group is just for sharing information. People can become so jealous of another's success if they are not doing as well and this can lead to disputes.	Group dynamics	Network engagement limitations		2
With the FRA, I am told that this year the government is giving a limit on how many bags farmers can sell to them and the surplus will have to be sold to private buyers. People are not very happy.	State influence	Market issues Network engagement limitations		3
I have 2 workers employed fulltime at the moment. I am sometimes forced to actively participate.	Employment of others	Farming involvement		1
I don't plan on growing so big to the extent that I am selling to FRA. God gives; if He gives I will take it. The surplus I have I want to share with my relatives in need, not just to sell everything.	Interest in improvement	Individual attributes influencing the network		1
All my farm knowledge is from experience. I studied education in college, I am a teacher. While at school we did some basic agriculture in our production unit. I read magazines and I watch TV as well. I manage to get the agricultural magazines from my daughter who studied agriculture. I would like to join the poultry association for advice in that area.	Experience; College training; Magazines; Television broadcasts;	Sources of farming knowledge		1

		Family;		
		Association		
	I haven't heard of any of ZNFU's initiatives in transport and marketing although I think they may be useful. I think they should put the information in brochures because most people can read, also through the television.	Unawareness	Knowledge transfer challenges;	1; 3
		Print matter;	Sources of farming knowledge	
		Television broadcasts		
	They may have something on television but for the last 2 years I have not had electricity so I may have missed it. I applied to be connected to the grid 2 years ago and only had them come through in April! I however had a small radio but never chanced that information.	Electricity	Farmer challenges;	1; 3
			Knowledge transfer challenges	
	We have one extension officer residing in some distant part of this farming bloc who had sent us invitations to attend a meeting which was held on a Saturday. Unfortunately I could not attend as I go to church on a Saturday. That was a year ago and since then I have received no other communication from him.	Extension challenges;	Knowledge transfer challenges;	3
		Other farmer commitments	Network engagement limitations	
	My major challenge is in selling. I require transport and a definite place to sell my produce from. The marketeers that come to order from me walk quite a long distance. The marketeers control the price of my produce because they demand a discount for the long distance they cover to collect the produce from me. If you are new they take full advantage of you and make the most money they can out of you. So I am very watchful of how other farmers price their products so that I can sell at least the average price. Water can also be a problem. I am fortunate to have a borehole because my husband erected it before he died.	Marketing assistance	Farmer challenges	1
		Water		
Farmer IA	I grew up on a farm in Zimbabwe. I have been farming on a serious note since 2007.	Up-bringing;	Farming involvement	1

	Years in farming		
...most of the development was done using my salary. I also have access to salary advances which are interest free so that has helped a lot. We have a scheme here that grants us access to loans from FNB, ZANACO and Ecobank.	Access to finance	Individual attributes influencing the network	1
I decided to install irrigation at the farm. The whole place is under irrigation. I use both the sprinkler and drip irrigation methods, with the drip used especially for tomatoes. The irrigation helps a lot because we have cut down on the time that we spend irrigating using other methods like a hose pipe... I managed to build quite a big chicken run, a 21 by 9. I keep 2000 broilers. Every 6 weeks I manage to sell 2000 broilers. I started the broilers late last year. Luckily, I managed to also get a light truck of about 2.8 tonnes which I use for marketing the produce.	Improvement processes	Farming involvement	1
At the moment I have 2 permanent workers and 5 who regularly come for piece work.	Employment of others	Farming involvement	1
What we used to do initially was contribute KR2,000 (AU\$400) every year to have the road graded and put laterite. Now the government has stepped in to help us so the roads are ok. You can always do something about challenges you face as a community. When I bought that place, I used to get stuck in the mud every morning! We started talking as farmers and decided we had to do something about the road by contributing towards getting the road improved. We now don't have problems even if the rain comes, we can still move our produce with no problems.	Collective efforts	Group benefits	2
...when I am at work, no one is supervising my workers. I don't have a farm manager because I don't think I am big enough to warrant one.	Other farmer commitments	Farming involvement	1
Beginning next year, I want to go into pigs as well, I am building another chicken run to house 3000 layers so I may hire someone with knowledge of farming to coordinate and	Trained labourers	Sources of farming knowledge	1

supervise the other workers.				
Around Lusaka there is a shortage of farm land, one now has to look to far flung places where marketing is a challenge.	Geographical issues	Network engagement limitations		1
Around Lusaka, if you have your own transport, marketing is easy. I know farmers around our place who do not have transport and are finding marketing really difficult because you can have a good crop but if you can't take it to the market you lose out. Most of such farmers are retired from the army and government and really they don't have resources to purchase a truck, it's really difficult, almost impossible.	Transport; Marketing; Financial issues	Farmer challenges		1
We have a cooperative in the area which I am a member of.	Cooperatives	Network connections		2
We are supposed to do more than just get fertiliser from the government. We should assist in marketing. We do some exhibits at the agricultural show but we really haven't exploited the many things we can do like access to financing... We are not very active so to speak because most of the farmers don't have resources and just use the cooperative as a means of getting fertiliser for their seasonal crops. Apart from input access there is not much interaction among farmers for idea exchange.	Narrow focus	Group challenges; Knowledge transfer challenges		2
We also have an extension officer in the area that comes to render advice on what we can do. The extension officer's visits are not very regular. The problem is they visit my house while I am away at work. The problem is there is not much interaction between them and my workers; they prefer to talk to me. They can only talk to me over the weekend when they are off and expect me to pick them up. I am not prepared to start looking for someone over the weekend whether they have information for me or not.	Extension services; Extension challenges Other farmer commitments	Sources of farming knowledge; Knowledge transfer challenges		1; 3
There are a number of small farmers with similar interests; like I have 2 friends also into chickens, both layers and broilers, so we meet and share ideas. When I am importing anything I let them know so that if they are interested as well we can make it one big	Identity congruence;	Individual attributes influencing the network;		1

<p>consignment and such things. If they discover things like if the quality of one feed is better than another, they share just so that we support and help each other. I travel a lot in my job and use them to monitor what is going on at my farm in my absence.</p>	<p>Collective efforts</p>	<p>Sources of farming knowledge</p>	
<p>My interest in fish farming came from reading on the internet- I read a lot from the internet. I read on integrated farming which incorporates a number of areas like chickens and pigs of which you use the droppings to feed the fish. And also from the chickens, I do tomatoes using chicken manure, I use very little fertiliser. Everything feeds itself. I also watch a lot of programs that feature both agriculture and industry on TV like Lima Time and Business in Africa. It helps me stay abreast with what is happening. I also get information from the farmers union of which I am a member. They have classes about once a month on Saturdays on things like how to rear broilers, layers and pigs. We get pamphlets and booklets. We can also take our produce to the offices for them to examine if we are not doing very well and they provide advice.</p>	<p>Motivation; Alternatives in farming; Internet; Television broad casts; Union Print matter</p>	<p>Individual attributes influencing the network Sources of farming knowledge</p>	<p>1</p>
<p>Extension officers with the Ministry of Fisheries are better than those at the Ministry of Agriculture. They check around, inquire on your performance and mortality of the fish. They then write a report and leave you a copy of their findings along with specific advice. They are the ones who told me about the need to line the ponds and fence the area to prevent water monitors from eating the fish. Other extension officers are not as useful.</p>	<p>Extension services</p>	<p>Sources of farming knowledge</p>	<p>3</p>
<p>I would like to expand my village chicken operation, get into guinea fowls in addition to the turkeys, ducks and geese that I keep. I would like to extend all these but I can only do it piece by piece.</p>	<p>Interest in improvement</p>	<p>Individual attributes influencing the network</p>	<p>1</p>
<p>If I meet another farmer when I am buying feed, I start talking to them about what they are doing, how they are doing it and where they sell...Information about these things is not</p>	<p>Face-to-face</p>	<p>Sources of farming knowledge</p>	<p>1</p>

accessible in the absence of talking to people. You have to be proactive if you want to succeed. You cannot go to one place and find all the information you need about farming.				
For people who are just at home and not exposed it is very difficult. A lot of farmers do nothing besides maize; they have no education, no resources for expansion on what they have.	Narrow focus; Education; Financial issues	Network engagement limitations		1
The government talks about farming! farming ! farming! but the support is very minimal. Apart from fertiliser, government support is not much. They don't make information available to farmers. I would have thought the extension officers should have literature in how to grow your crops, where and how you can sell them but they just concentrate on maize, give you fertiliser and tell you what the floor price for maize is.	Narrow focus	Knowledge transfer challenges		3; 4
Amiran sells seedlings and provides a lot of information. You are taught how to grow, fertilise and manage the crop for which you buy seedlings including the chemicals you need to use and where to buy them. If you grow your own seed to transplant you miss out on such information. If you have trouble along the way, they are available for consultation and advice. There is after sales service provided for irrigation equipment purchased from there, not just with the equipment but the effect the equipment has on the crop. Although they have a profit motive, they do support us a lot and are genuinely interested in our performance because at the end of the day, we are the ones that do their marketing for them. When people pass along the road and see my tomatoes they often ask where I got them and what type they are, they then go to Amiran seeking the same.	Private extension	Private sector support; Sources of farming knowledge		3
What Amiran does therefore is to identify which farmer is doing well with their product and set them up as a model farmer that others can visit and learn from.	Model farmer	Strategies for knowledge transfer		3
My retirement plan is to have an abattoir for my chickens and pigs, process sausages and have specialist cuts, as well as open an outlet on the farm. I am exploring how I can have	Transitioning to retirement;	Individual attributes influencing the network		1

	the chickens smoked and sold.	Interest in improvement		
	Availability of capital is what hinders us from taking the next step. You need money to make money. One cannot expand without resources. When you go to the bank you need to have collateral and you would find that the development on most small scale farms is not that much to warrant them getting a big loan in order to make improvements and go an extra mile in sending the end product beyond the live chicken at the market. It would be nice to dress, cut and package the chicken as well. In my opinion, availability of finance is the biggest hindrance, with no capital and no capacity to borrow; there is not much improvement one can make.	Financial issues	Farmer challenges	1
	I also think that the level of education is a factor. I have an MBA which has opened my mind to be businesslike and constantly thinking of what next. Most of the people are just satisfied with having a farm house, sitting and folding their hands. I was telling my neighbour who is at home full time to start ploughing back her capital little by little so that she can grow by the end of 2 to 3 years instead of just complaining about not having enough money. In some cases some people are not interested while others simply do not have the knowledge. As a farmer it is better for you to get knowledge, get educated in that field. That education won't come by just sitting at home and maintaining the status quo without going out of your comfort zone.	Education; Ambition; Unawareness	Individual attributes influencing the network	1
	I feel you cannot get someone from China to come and do chickens here.	National ownership of farming	Self-identity	1
Agroforestry Technology Expert JB	We wanted to see whether this technology (agroforestry) has been taken up by our farmers. The biggest challenge we found was that they needed someone to show them but this someone is not there. Extension officers may cover up to 4000 people so that is the biggest	Absent linkages;	vital Knowledge transfer challenges;	3

challenge. They said they heard that the technology works but they need someone to show them.	Extension challenges; Demos	Sources of farming knowledge	
When looking at technology transfer, you need to consider certain factors like how compatible it is with the way they have been doing things, ease of use-how complex it is, show them in the neighbourhood so that they can always refer to it- through demo plots or trials conducted in the community. These are aspects I found were lacking in the study area. We still have a lot to do.	Compatible knowledge; Demos	Conditions for knowledge transfer; Sources of farming knowledge	3
There is a training institute called Kasisi Agricultural Training Centre which offers a 5 day course weekly to teach farmers on these aspects.	College training	Sources of farming knowledge	3
The farmers are getting the knowledge but some live as far as 20 kilometres from the training institute so to attend the course for 5 days requires them to have passion.	College training; Passion	Sources of farming knowledge; Conditions for knowledge transfer	3
We have contact farmers who are trying to encourage the other farmers to take it up... The idea of having contact farmers is that the transfer would be easier through a network of people. They are opinion leaders and drive the acceptance of the innovation process.	Contact farmers; Acceptance	Strategies for knowledge transfer; Conditions for knowledge transfer	3
The downside is this technology involves a lot of work so the issue is how compatible it is with what they have been doing all along. They are used to cutting and clearing trees, making ridges and then planting; now they are being asked to plant trees in the field, prune the trees and branches and bury them for your source of nitrogen...The seeds for the trees are not easy to access so even when people learn, moving to practice is a bit of a mission...	Compatible knowledge; Access inputs;	Conditions for knowledge transfer; to Knowledge transfer challenges	1 ;3

<p>There is not enough exposure to the technology. Your neighbour might be attending the course at the institute and tell you what they learned yet they do not demonstrate it in their work so that can be a put off... Agroforestry diverts a large proportion of land used to grow crops to tree planting. It is labour intensive and farmers find the cost compared to the benefits too high.</p>	<p>Unawareness; Inspiration; Improvement costs</p>	4
<p>We however have to look at sustainably using our resources, we cannot continue using fertilisers. In Zambia it might not work because of political things...Do you know it is 4 to 6 times more expensive to have fertiliser in Africa than in the Americas?</p>	<p>Alternatives in farming; State influence</p> <p>Improvement areas; Knowledge transfer intervention failure</p>	1; 3
<p>When you go in an area, there will be people that show interest so initially we work with those.</p>	<p>Contact farmers</p>	1
<p>At the same time, you have to be mindful of the social structure. The social structure shows you who is in charge and what they do in the community...you need to equally understand the informal networks- who relates to whom.</p>	<p>Social structures</p> <p>Social influences on knowledge transfer</p>	1
<p>In terms of gender there has been a difference in uptake. More men have tried to adopt it. Initially we thought this had to do with access to information given that women's work was mainly in the home to keep the family together whilst men would be out there in spaces where they get to hear about what is happening in the community. I wouldn't say women don't want to take up these things; it's just that they are sometimes marginalised. Out of a total of 82 respondents I had in my project, 16 were women and most of these women were made to make decisions because they were widows. Widows are given the chance to attend these meetings, they see the need to go and attend these meetings, whereas women with husbands tend to not attend.</p>	<p>Gender issues</p> <p>Social influences on knowledge transfer</p>	1; 3
<p>Issues of resources are another aspect to technology diffusion and acceptance. I found that</p>	<p>Financial</p> <p>Farmer challenges;</p>	1; 3

<p>those that took up the technology were financially better off than those that did not. Even if the technology failed, they had something to fall back on. The other issue is the communication networks- how people get their information. We found that most farmers got most information from their extension workers, contact farmers or their cooperatives in that order. We need to target and utilise these existing channels.</p>	<p>issues; Extension services; Contact farmers; Cooperatives</p>	<p>Sources of farming knowledge</p>	
<p>So much is happening but the social aspects of pushing an idea in the community seem to be hindering progress. Others are used to the status quo because from time immemorial they have been doing the same thing.</p> <p>These people want to listen to an extension worker rather than us new people trying to tell them what to do and how to live their lives. They want someone they are used to, someone they can see. When I asked some ladies how they got information, who they go to, they said they don't listen to the radio, they go to the extension worker- they know him, they know the sound of his motor bike and can stop him to tell him about farming problems they have. They have no time to sit and listen to the radio, they are so busy- if the program starts at 13.00 hours, and they will probably be in the field. They need to strengthen the extension service and employ more as they are currently doing- I am happy with that</p>	<p>Social structures; Extension services; Donor linked extension; Radio; Strengthened public extension</p>	<p>Knowledge transfer challenges; Sources of farming knowledge; Rejected knowledge sources; Conditions for knowledge transfer</p>	<p>1; 3</p>
<p>One cannot access fertiliser unless they belong to a cooperative so that brings with it political issues along party lines... Sometimes you cannot access fertiliser because you do not belong to the political party of choice. Even if this technology is being shunned for</p>	<p>Access inputs;</p>	<p>to Group benefits; Network engagement</p>	<p>2; 4</p>

now, we need to continue encouraging it because you do not need to belong to a political party to benefit from it.	State influence	limitations	
The problem with the technology is it takes at least 2 years for the trees to grow before you can start benefitting. So there is that time lapse as well. In that initial 2 years that we wait for the trees to grow, we need to provide some incentives to fuse in the gap.	Incentives	Conditions for knowledge transfer	1; 3
For now, the main partners in agroforestry are Conservation Farming Unit, Zambia National Farmers Union as well as JTI. We have had donors who have come and gone, it's a whole list!- DAPP, The Catholic... The Land Management and Conservation Farming Project, GART, The Ministry of Agriculture and Dunavant are all working in this area.	Network linkages	Network connections	3
...that's the other problem we have- we have to be co-ordinated but we have donors coming in to do a certain aspect and they go without sharing the information, so the next donor group comes in and starts all over again doing the same thing.	Repetitive interventions	Knowledge transfer intervention failure	3
For an ideal intervention, I would suggest starting with talking to the chief or traditional leader, accessing a piece of land on which to demonstrate the technology, and then campaign to get farmers participation. What people want is to see whether it works. If you start by just talking, it ends with talking. They need to see that what you are talking about works.	Traditional leader; Demo	Strategies for knowledge transfer	1; 3
In the absence of extension workers, we rely on opinion leaders. It is critical to identify them in an innovation process.	Social structures	Strategies for knowledge transfer	1; 3
Women's only groups tend to not work because they don't push hard. They might meet weekly but end up discussing funerals, weddings and other things, they need to be more proactive. If you are just going to be women that meet under the tree while other programs happen in the area and you don't know it means you need to realign yourself. There are a lot of programs the government has put in place so it's up to one to follow them up or else they miss them, that's how our women are missing out on these programs.	Gender issues	Meeting social needs beyond farming; Network engagement limitations	1; 3
The way forward is this: if it's a new idea, create some incentive scheme, let people see the	Incentives;	Conditions for knowledge	1; 3

	benefits but entice them with small loans, subsidies and so on. The problem equally is sustenance, after you have pulled out are they going to continue? Some one really needs to have passion, it should change their lives, they should see a relative advantage in doing what they are doing otherwise motivation will end at the donor funds. I am not of the idea that we should find outside people to have solutions to our problems. We should work hard and come up with our own ideas; our way of doing things that incorporates our traditions otherwise it will not work.	Passion; Compatible Knowledge	transfer;	
	Some of the resistance comes from knowing that the interventions are foreign. When you come in with ideas that are totally foreign, the farmers think you are just promoting them because you are getting paid to not because it really benefits them. We need to invest in research and development to sort out our own problems.	Foreign interventions	Rejected knowledge sources	1; 3
Farmer JC	...I am not a full time farmer...I have never really been interested in farming or thought about being a farmer. It just happened because even from my childhood, we never even had a backyard garden at my mother's place.	Part-time; Up-bringing	Farming involvement; Self-identity	1
	When I started my own home, I started experimenting with tomatoes and a few vegetables, the interest perhaps grew from there.	Experiments	Individual attributes influencing the network	1
	We just came to settle at the farm and have had activities going over the last 3 months; the other 3 months were spent in care nursing my mum. After my mum's demise, the real farming started.	Other farmer commitments	Farming involvement	1
	We are just using our own common sense and haven't had any advice...We still don't know exactly what to do. I haven't sought any expert advice at all on the soil.	Experiments; Absent linkages	Sources of farming knowledge; vital Knowledge transfer challenges	1
	I have never seen an extension officer here; I would be interested in seeing one though.	Extension challenges;	Knowledge transfer challenges	1

	Absent vital linkages		
There once was an advert on TV that there would be a field day at Kasisi Agricultural Training Centre. Out of interest we made an effort to go there for one day only. At Kasisi they showed us a few tips on portions round their farm, it was a good day. We have implemented some of the ideas we got. One of the ideas was to put dry leaves in a sack and the sack in a drum filled with water and let it stay for some time; you then use the same water to water the crop. We have seen improvements in our crop so it has really helped.	Television broadcasts; Donor funded institutions	Sources of farming knowledge	1; 3
So far I have employed only 2 full time workers. One of the workers' wives occasionally comes to help during harvesting. My cousin also helps.	Employment of others	Farming involvement	1
We are still thinking about how we can do our irrigation so that we have help in watering. Watering is another challenge because it can take my workers the whole day to water all the portions because they use buckets. I was thinking of going back to Kasisi to find someone because during the field day I asked if there was anyone who could help us in a number of areas and they referred me to some people there but I had no time to see them. My husband once talked about going to Amiran for irrigation.	Interest in improvement; Irrigation; Advice	Individual attributes influencing the network; Farmer challenges; Donor support; Private sector support	1
There are some people running green vegetable shops whose contacts I have and call when my crops are ready. They place an order and I deliver to different outlets. Some of the green grocers come to collect.	Network linkages	Network connections	3
We...had a very small vehicle, the road was bad, and the distance to the main road was long. We grew maize...and even left some of our crop in the fields there when we abandoned that farm because of transport issues.	Transport	Farmer challenges	1
I don't sell any of my maize, I stock it for my own use. We don't grow more than we need up to the next season because we think it's a waste. It may not be so profitable.	Farmer growth	Scalability	1

	I have never heard of ZNFU's transport system, I may be interested in using it in the future.	Unawareness	Knowledge transfer challenges	1
	If I had to get into any new area of farming, it will have to be something that is not so time consuming and labour demanding. My time is committed to so many different fields including church and my import-trade business.	Other farmer commitments	Network engagement limitations	1
	I don't have a farm supervisor in my absence and depend on the people I leave at home. I have one boy working at my shop who wants to study agriculture and we would like to support his study so that he can come back to be our farm manager.	Trained labourers	Sources of farming knowledge	1
	The challenges in farm work are dealing with people who don't have the idea of agriculture- all our activities seem to be on trial basis all the time. Sometimes I think I would rather stop this and just continue my trading business ...	Lack of training; Experiments; Motivation	Farmer challenges	1
	As at now I don't do much process improvement like packaging my vegetables because I am still fully involved in my trading business...I am failing to divide my time equally into all my commitments of business, church, farming and running of the home.	Other farmer commitments	Network engagement limitations	1
	The rest of the family is not really involved in the farm, especially the boys who are not even interested I should say. They don't mind eating though! They don't help yet they even push me to work harder! The family's lack of input is another challenge.	Family support	Farmer challenges	1
	The farm is still my baby.	Passion	Self-identity	1
Katuba Women's Association	We deal with a lot of issues, women's issues, gender issues but our main mandate is land and access for women. Land is what women survive on be it in agriculture, housing and animal husbandry.	Gender issues; Land	Meeting social needs beyond farming	2
	Women interested in becoming members are welcome to introductory forums where we	Association	Network connections	2

<p>talk about Katuba Women's Association and what it does. They can further their interest by writing to us and we respond to them.</p>	<p>membership; Formalisation</p>		
<p>Katuba as a constituency has 6 wards. In each ward we have a focal point person who looks after the clubs in that ward. The focal point person gives us feedback in terms of reports on what they are doing. The purpose of the focal person is to liaise with the local organisations or women's clubs and find out what they are doing and be up to date with whatever issue they have and forward them to the organisation. These focal point persons are people on our executive. All the various groups meet once a month, the executive meets as and when it is required.</p>	<p>Focal person</p>	<p>point</p>	<p>Strategies for knowledge transfer; Strategies for network coordination</p>
<p>A lot of the way we go about business is informal. It is informal in the sense that the non-educated grass roots women are constantly learning and adult education is different from the classroom scenario. Even when we have monthly meetings, we play netball. Staying in the village, all they know is chores, chores and chores so when they come here they are really interested in knowing they will have fun here.</p>	<p>Informal transfer</p>		<p>Strategies for knowledge transfer</p>
<p>There are so many benefits of belonging to an association, for instance we affiliate to other organisations, international and national. We belong to the Zambian Land Alliance and every Tuesday they come here and provide paralegal officers so the community is well aware that every Tuesday there is someone here attending to cases concerning women. Mostly the issues are land matters but we have contacted paralegals from other organisations who offer marriage counselling and that kind of thing. When crops are not doing well, the women come together and give each other turns on who goes to sell when, especially when the market is flooded so that their minimise wastage. As a group, they can also hire transport. We also belong to the Civic Forum on Housing and Habitat...At international level we have women who have gone to various countries because of land rights conferences. Training therefore also occurs at international level.</p>	<p>Network linkages; Collective efforts; Education; Paralegal</p>		<p>Group benefits; Meeting social needs beyond farming</p>

<p>Rural women will come up with a budget and contribute to making a training session happen...their contribution is often livestock, they camp at the site of learning and organise themselves very well. They really sacrifice.</p>	<p>Collective efforts</p>	<p>Group benefits</p>	<p>2</p>
<p>Location affects the challenges of irrigation, transport and marketing. Those closer to the main road have fewer transport issues. We have women that go very early to Soweto Market. Before they know it, men have got their products to sell for them and are sending them off to have tea. They cash the money at the end of the day but the bulk is retained by the male sellers while the female owners of the commodity do not get as much. Women allow men to do the selling because you really have to have strength to sell at the market- it's a man's world! It's terrible for women because the men scamper everywhere when purchasing produce for resale. For the woman to just get onto the truck it is very difficult because we are slow. You really have to be aggressive. There are some traders from Congo who come here to get products and when they do they sometimes take advantage of the farmers by buying at really low prices.</p>	<p>Geographical issues Irrigation Transport Marketing Gender issues</p>	<p>Farmer challenges</p>	<p>1</p>
<p>Some groups have got fuel pumps for irrigation and take turns to use the pumps. A group as big as 25 members has challenges in the pump reaching the 25th person in a week. It would be better if they were able to buy more pumps but due to resources it is not possible.</p>	<p>Access to inputs; Group size; Financial issues</p>	<p>Group benefits; Group challenges</p>	<p></p>
<p>COMESA has adopted one group at 12 Miles and has started building greenhouses. The women will be taught how to grow vegetables in the green houses.</p>	<p>Alternatives in farming; Donor linked extension</p>	<p>Donor support</p>	<p>3</p>
<p>We get sunflower and cotton seed from the private sector because the government only</p>	<p>Alternatives in</p>	<p>Private sector support</p>	<p>3</p>

gives maize and fertiliser.	farming			
We participate in the local agricultural zone show in Katuba where we got the first prize and also at a show in Chisamba at Fringilla Farm where we got the second prize.	Agricultural shows	Sources of farming knowledge	3	
The government needs to get more involved. They give their support only in the rainy season. We have agricultural extension officers here but I haven't seen them or what they have done much. Their job mainly is to look at what the government provides and that is during the rainy season. We have a few vets. They come if you give them a call and ask them to, I have never heard any of them being proactive and walking around to see how famers are doing. Maybe it's lack of resources to go about, I don't know.	Absent linkages; Extension challenges; Narrow focus	vital Network engagement limitations	3; 4	
We are members of the Civic Forum on Housing and Habitat which organises study circles. We do exchange visits, through the support of the Civic Forum, with groups in Chongwe. The last 2 years we have had 30 members from Katuba visit various farms in Chongwe and learn how they rear pigs, set up fish ponds and chicken runs. We did learn a lot from them. We also learned mushroom growing. We are trying to send out proposals based on the skills we have learned , especially in fish farming and piggeries, to organisations that can assist us... We have individuals raising pigs and chickens who said that the information they gathered on the exchange visits has improved their way of doing things. When you learn from just seeing as a child, then you go into a classroom and are taught, your understanding of why certain things are done the way they are improves. For instance one lady said she never previously understood why they put saw dust on the floors of the chickens and had difficulties coping with maggots. Now she knows that she simply has to change the saw dust.	Study circles; Exchange visits; Network linkages	Strategies for knowledge transfer	2; 3	
ZNFU has not been involved here in Katuba. I believe that a lot of NGOs in Lusaka bypass Katuba. They think we are close enough to the city to access services from there but that is not it. Katuba is quite vast, people don't seem to realise that. There is a lady who went	Absent linkages;	vital Knowledge transfer challenges;	3	

	during the agricultural show to attend a program on conservation farming- that is the only one I have heard of going to Lusaka on invitation from an NGO there.	Geographical issues	Network engagement limitations	
	In each ward we have about 10 groups of women with about 25 to 40 members in each group. We ask them what they need. We try to identify an expert we can engage to address their needs.	Groups	Strategies for knowledge transfer	2; 3
	We have tried to bring someone from Zambia Savings and Credit Bank but their loans proved quite high, the women didn't think they could manage.	Financial issues	Farmer challenges	1
	There is another organisation trying to see if they can give the women loans in terms of what they require and not money. This would include pumps, grinding machines, and ice-cream making machines, pretty much whatever they need. We want to affiliate with that organisation.	Access to inputs	Private sector support	3
	Focal point persons collect records from members...The reports are forwarded to the executive and filed. Focal point persons tell everyone else what is going on in their different wards.	Focal point person	Strategies for knowledge transfer; Network coordination	2
Farmer FS	Farmer FS is and is not a farmer. I have never lived on a farm before now, being on a farm was as a result of us building a house on farm land.	Identity incongruence; Up-bringing	Self-identity	1
	We moved here and waited one whole year to have an electricity connection even after paying. I had to adjust to getting water from wells and things like that.	Electricity; Irrigation	Farmer challenges	1
	We started with just farming during the rainy season and eventually some irrigation.	Improvement processes	Farming involvement	1
	With a bit of training here and there from Katuba Women's Association I have been able to	Association;	Sources of farming knowledge	1

	keep a few pigs at home and learn how to grow mushrooms. I have no other training as a farmer I just learned from others.	Farmer peers		
	As a farmer in Zambia, you have to get involved because if you are not you won't get anything. When I wake up early in the morning, I make sure feed is given to the pigs and a portion removed for the rest of the day, I make sure the pigs are washed and cleaned and then come to the office. On Tuesday I attend to the women's issues. My day starts at 5.00am with me giving the workers responsibilities on what I need them to do.	Part-time	Farming involvement	1
	I have 5 workers on the farm here, we have another farm where we keep cows and goats and go as and when. We have 1 manager there.	Employment of others	Farming involvement	1
	I would like to improve my farming in both areas of knowledge and equipment. I know there are some interesting methods that have come up in conservation farming.	Interest in improvement	Individual attributes influencing the network	
	Transport is my biggest problem as a farmer because I don't have a utility vehicle. The terrain we have to go into makes it more challenging. There are things that we would like to do but because of unavailable resources we are not able to do them.	Transport;	Farmer challenges	1
	To improve knowledge I think it would help to go further into the communities and bring the groups together. People need to see that we are bringing some kind of help to them. We can't just meet here, and then what?	Community engagement	Strategies for knowledge transfer	1
Market Trader MM	I heard about the market from people. They also had an advert in the newspaper. In the newspaper, they said they were looking for marketeers.	Farmer peers;	Sources of farming knowledge	3
	...we registered and were told we could come to sell here every Sunday at no charge for 3 months. That is how I started trading here.	Farmer registration	Strategies for network management	3
	I order my tomato produce from Tata Farm. I get there by walking up a large hill; I load the goods on my head and walk here to sell. The problem I have is when I go to order from the farms, I may be the only one coming from my area so it is difficult to find other marketeers	Transport;	Farmer challenges	1
		Geographical		

	to group with in transporting our goods using hired transport. Some come from as far as John Laing and Missus whereas I come from Ng'ombe. Hiring transport costs between KR100 - KR150 (AU\$20 - AU\$30) and the capital I have is insufficient to meet that cost.	issues; Financial issues		
	We might agree to all sell at the same price but as the day goes by you realise that your friends have secretly been selling their goods at prices lower than you had all agreed. As a result, you remain the only one who isn't able to move your produce. If we all sold at the same price, we would all do well.	Individual farming practices	Network engagement limitations	1
Market Trader TP	I heard about this market from my neighbour. She was coming here and told me to come and register. I looked at what my neighbours were selling and copied from them. People like cassava meal and were buying from my neighbour so I also decided to try.	Farmer peers	Sources of farming knowledge	1
	I have very few commodities because the capital I had to start was borrowed. I borrowed ZMW50 (AU\$10) from a local loan shark and have to pay back ZMW55 (AU\$11) at the month end. For transport I walk here and carry the commodities on my head.	Financial issues; Transport	Farmer challenges	1
Market Trader VK	I have heard about loans but I don't have a house to put as collateral. I rent a house and cannot put that up to back a loan.	Financial issues	Farmer challenges	1
	I don't belong to any women's group and I don't know why.	Groups	Network engagement limitations	1; 2
Market Trader VZ	I don't belong to any women's groups because I don't know any. I hear about them but if women come together to help each other in the high density rural areas there is a lot of gossip and treachery. There is a lot of jealousy when one is doing well so I prefer to be on my own. They want us to all be equally poor and begging from one another!	Groups; Unawareness; Trust	Network engagement limitations	1; 2
Farmer MN	My idea of farming is not to be a farmer of rain-fed crops, I wanted to be able to irrigate... We have been producing fresh vegetables- tomatoes, cabbages, rape, green peppers, okra and even things like pumpkin leaves under irrigation. Before we got	Interest in improvement;	Individual attributes influencing the network	1

irrigation, we did the usual maize and whatever. ..We have 2 hammermills, one for grinding maize to maize meal and one that is a dehuller that removes skin from the shelled maize for making samp. I had started making samp from our maize and selling it- adding value instead of selling it as maize. The difference in price between a bag of maize and a bag of samp is shocking! ...A 50kg bag of maize goes for ZMW55 (AU\$11) but 50kg of samp goes for ZMW250 (AU\$50).	Improvement processes		
Fortunately, we were able to access a loan for irrigation.	Access to finance	Individual attributes influencing the network	1
We were doing reasonably well until I got ill. One of the things I discovered was that even if you have a farm manager, if there is no one to supervise, things just run down...They let the irrigation pipes remain in the field and I am told the rats have been feasting on them in the grass...when a field is not under cultivation, the pipes are supposed to be pulled and put in a store room. Apparently mine have been lying there for the past 2 years.	Labourer supervision	Farmer challenges	1
It wasn't difficult to get the loan because it was part of the project I was doing under Agri-Business Forum. They had funding and managed government funds under the Ministry of Agriculture.	Access to finance	Group benefits	3
They had out grower schemes for coffee and vegetables. We were included to make our farms examples to others.	Model farmers	Strategies for knowledge transfer	1; 3
I am the farmer, my husband is the farmer's husband.	Identity congruence	Self-identity	1
Although he has been helping with supervision, it is not really his interest. He is a lecturer and that takes up most of his time. The farm has suffered because of that.	Family support	Farmer challenges	1
We had a very good manager up to 2010 but he left and joined the government. Towards the end of 2010 we employed another manager who proved to be quite hopeless. He was straight from college just like the one prior to him but he was not a hands on person, which is another challenge we have in that our college graduates are certificate or diploma holders	Trained labourers	Farmer challenges	1

<p>are the supervisors trained to be hands on yet not all of them are. I don't know if the problem is the kind of training they are getting. This manager we got would get up and put on a tie and want to supervise others while dressed in a tie! The farm just went down completely. He went to Chipembi Farm College and our expectations were quite high because he came very highly recommended as one of the graduates who had done well. We part company at the beginning of this year. Even the maize failed because he could not supervise the weeding in spite of having the fertiliser and everything at hand.</p>			
<p>Our workforce has dropped from 10 full-time workers and a number of casuals hired as need would be.</p>	Employment of others	Farming involvement	1
<p>They (the labourers) could pay themselves with what they were producing. From 2010 to date we have had the worst period as far as the farm is concerned. The farm is really down on its knees. The harvest has been very poor; the workers can barely feed themselves. It looks like we have to start all over from scratch... The cost is electricity and labour and of late the cost of electricity has gone up quite a bit.</p>	Financial issues	Farmer challenges	1
<p>I am part of a fast-growing category of farmers called weekend farmers. Weekend farmers do not live on the farm they have but are involved in regular supervision- weekly I would go to the farm and spend the weekend there and kept an eye on what was going on. Quite a few people looking forward to retirement would want to set up and have the farm running and eventually go and settle there.</p>	Part-time; Transitioning to retirement	Farming involvement	1
<p>My daughter Tamara shows some interest. She has been able to supervise and has been into the sales and marketing of the produce...She is getting married and her husband's family is into farming as well.</p>	Family support	Social influences on process improvement	1
<p>When we had produce she had contacts with groceries and supermarkets we could deliver to.</p>	Network linkages	Network connections	1
<p>I took a course in agribusiness and the model markets we were exposed to in American and European markets had a warehouse system.</p>	Higher education	Individual attributes influencing the network	1

<p>...there are times when there is surplus on the market and we don't even have cold-room facilities so there is so much waste... It would have been nice...to have the wholesale place...with electricity and cold-room facilities...It would be very helpful for the people in the area to have a marketing and storage place where if you bring your few bags of cabbages to sell at wholesale price, you also have the few that want to sell at retail. What you haven't sold should be able to store overnight. Instead of trekking back to your farm with the same produce.</p>	Warehouses; Cold-rooms; Electricity; Market place	Improvement areas	3
<p>If you can help it, you don't want to be a producer and retailer, you would want to remain a wholesaler if you could have the delivery and buying organised. Now you are forced to be a producer, wholesaler and retailer and that chain is not developmental, I find it retrogressive.</p>	Production chain	Farmer challenges	1
<p>I was chairperson of one of seven cooperatives in the area.</p>	Leadership; Cooperatives	Farming involvement; Network connections	1
<p>Some smallholder farmers grow so little that it is costly to deliver to the retail market.</p>	Farmer growth	Scalability	1
<p>I would like to expand my maize quantities that I produce so that I can make the samp.</p>	Interest in improvement	Farming involvement	1
<p>When you have the initial quantities of maize and sell it as samp, you can buy maize from others in the locality and create a market for them rather than just for them to wait for FRA. FRA does open and close its season at a particular time but if you have cash you can buy and store the maize.</p>	State influence	Network engagement limitations	1; 4
<p>I would really want to do piggery. If I can find the equipment for smoking some of the meat I would want to invest in that because there is good demand for smoked pigs. I had started a project of village chicken and it had taken off very well. I learned about high productivity of village chickens by feeding them, not free range, and putting them in pens to separate chicks from hens so that the hens could soon lay eggs again. I am planning to</p>	Interest in improvement	Farming involvement	1

	continue with that, they are much easier to manage than broilers.			
Kumboshi Cooperative	The current cooperatives unfortunately in Zambia are based on maize production. The cooperative I joined was already formed around the accessing of inputs long before I joined and the marketing of one crop only which is maize, which is unfortunate. There is the advantage of accessing inputs and being able to offload your maize through the cooperative, which is definitely a plus.	Narrow focus; Access to inputs; Marketing assistance	Group challenges; Network engagement limitations; Group benefits	2
	We have wished to do more- we even acquired a piece of land for the cooperative with the idea of having a place where we could do crop marketing of crops other than maize but we haven't had the resources even as a cooperative so it would be very helpful if funding could be sourced. We need funding in form of a grant because we can't really get it as a loan because we do not have the capacity to pay back as a loan.	Interest in improvement; Financial issues	Social influences on process improvement; Group challenges	2
	A few people in the area own their own transport...There is really no organised transport if you do not own your own transport...We used the backload system of South African transporters delivering equipment or whatever here when we were exporting paprika to South Africa. That worked but I don't know how it can work for an area like ours. What would work would be having some sort of transport attached to the cooperative system where you put your produce together and deliver to one market, of course at a price. But the cooperatives are so weak! Even from the small developmental amounts that we charge it would be difficult to acquire a large truck like a Canter which costs about ZMW100,000 (AU\$20,000) for 3.5 tonnes.	Transport	Farmer challenges; Private sector support	1; 3
	Prior to this research I hadn't heard of ZNFU's Transzam.	Unawareness	Network engagement limitations	1; 3
	For certain areas, it is important to have a female only cooperative especially because of cultural sensitivities. In certain areas depending on the literacy levels women would take a	Gender issues;	Social influences on network composition	1; 2

	back seat and not contribute that much when the husbands are around. For such areas it is important, it has its own value. In the same area, there is a cooperative that produces cassava, it is women only and has worked fairly well but ours is mixed.	Illiteracy		
	Our biggest partner is the FRA. Our cooperative... is linked to the Chongwe District Cooperative. Individual members doing poultry are linked to the poultry association, others producing pigs are associated with the pigs association.	Network linkages	Network connections	2; 3
	There is a very big gap as far as information transfer is concerned. We have an agricultural camp officer in the area and I feel that his constituency is too big such that the service delivery is poor. The ratios are poor and the areas vast so when you really need information which he is supposed to provide on both crops and animal husbandry, they are so stretched that even catching that person is a mission. As a result the agriculture sector is poorly serviced, very poorly serviced.	Extension challenges	Knowledge transfer challenges	2
	I believe agriculture is a business which should be able to bring you income but most farmers in the area farm only for sustenance which is really unfortunate.	Farmer growth	Scalability	1
	One of the problems we have aside from lack of education is lack of mechanisation. That limits your productivity. An area like 20 acres if fully mechanised can be managed by 4 or 5 people, very effective. We have to employ manual labour which we put so much into. It increases the production costs and therefore limits output.	Education; Mechanisation	Farmer challenges	1
	The idea of ZNFU bringing tractors into areas for hire is a good thought but still such a pilot project, it's not widely spread enough. Even if you have the money and want to till your land with a hired tractor, there are no tractors around.	Access to inputs	Group benefits	2
SMSize Solutions	The relationship with the National Agriculture Information Service began from a donor that funds the Ministry of Agriculture. This donor is based in Holland.	Network linkages	Network connections	3
	NAIS runs a radio program for farmers... The radio program is therefore used to advise farmers on their issues and give them tips... Using our mobile value added solutions IICD contacted us on behalf of NAIS to create a customised solution using mobile phones. Our	Radio; ICT use;	Strategies for knowledge transfer	

<p>solution leverages the fact that mobile communication use in Africa is the highest in the world. The way it works is that farmers text in and the messages come through as an email to the head office within seconds and can then be responded back to again within seconds. At the moment we accommodate 8 languages, not that that is a limitation but those are the requests of the client. All text messages are channelled to language specific researchers for response. We registered across all mobile networks.</p>	Language	
<p>Information dissemination for remote farmers is a problem... Farmers would have questions on particular issues discussed and to get those questions to NAIS, they had to write a letter. The letter would be posted to their district NAIS office and then forwarded to the head office in Lusaka. The lead time would be about 4 weeks just for the letter to get to Lusaka and this doesn't even include response time. If someone asked a question 6 weeks ago and still hasn't received their answer, their livelihood is affected because whatever the issue was, whether a disease or tick, would have spread across their produce.</p>	Geographical issues; Lead time	Knowledge transfer challenges 3
<p>...it's the government's baby and responsibility to roll out across all the provinces...it's just a question of the government carrying out a campaign to make more people understand that we can use this technology and keep sensitising them.</p>	State enabler	as an Strategies for knowledge transfer 4
<p>We are not involved in sensitisation because we are just technical consultants. We can however advise NAIS on how to roll out and we can provide support.</p>	Advice	Private sector support 3
<p>One of the challenges is around language. If for example I want to send a text in Bemba, I would have to use a keyword which for Bemba is BE- Lozi would be LO, Luvale would be LU and so on. The problem has been using wrong codes for languages or omitting the code altogether when sending messages. The problem is the system will assume the message is English if there is no code and as such the message may be lost when an English speaking researcher cannot respond to the message. One of the remedies although a little difficult is a verification query that the farmer has to respond to regarding the language the text is being sent in. The real challenge here is people are not being sensitised enough.</p>	Language; Unawareness	Knowledge transfer challenges 3

	For communicating to the rural areas, I definitely think radio and TV are ideal. They listen to a lot of radio in those areas...For the trial, they basically got people on board by going there in person and also using the existing radio program. They also approached farmer work groups which operate like cooperatives and tried to disseminate through those.	Radio; Television broadcast; Face-to-face; Groups	Strategies for knowledge transfer	3; 4
Zambian Farmer Magazine	Through our research and economics department, we have been coming up with position papers highlighting for instance issues on road levy- how other countries like Namibia have been using road levy to improve the transportation system and increasing efficiency. Following our report, government is now looking at how they can get the model that is being used in Namibia to replicate it here.	Research papers	Strategies for knowledge transfer	3
	Irrigation is one area we try to highlight. This is a country that has 40% of the water bodies passing through and yet we have not harnessed the water resource. The majority of our farmers, 60-70% are small scale and not mechanised. If they mechanised, we could improve on productivity, food security and alleviate poverty especially among the rural poor where these small scale farmers are. There was an irrigation fund that should have been set up earlier on but that has not been implemented up to now so we keep on talking about it because all farmers and experts are saying irrigation is the way to go.	Irrigation; Mechanisation	Farmer challenges	1
	At the moment the magazine is only produced in English. It would be nice to have it in 5 other languages but it would be too costly.	Language	Knowledge transfer challenges	3
	The major supermarkets, private supermarkets and other outlets are currently selling our magazine... We need to partner with the farmers themselves to produce relevant content in the magazine. Farmers are on the ground while we are at head office. If farmers started writing articles that would add value.	Network linkages	Network connections	3

	Thematic Code	Frequency
1.	Network linkages	20
2.	Network coordination	2
3.	Formalisation	5
4.	Groups (informal; formal; membership dynamics; size)	21
5.	Knowledge areas	11
6.	Leadership (general; traditional; association; network)	7
7.	Trust	4
8.	Finances (issues; access; micro finance; improvement costs)	27
9.	Social structures	4
10.	Identity (leader identity; congruence; incongruence; 'real' farmers; validation; existing identity relationships)	11
11.	Illiteracy	4
12.	Gender issues	12
13.	Record keeping	6
14.	Repetitive interventions	2
15.	Commodity specifications	3
16.	Knowledge need identification	2
17.	Practice based knowledge	2
18.	Exchange visits	2
19.	Knowledge storage	2
20.	ICT use	8
21.	Print matter	5
22.	Language	5
23.	Geographical issues	8
24.	Extension services (public)	7
25.	Extension challenges	9
26.	Farmer Resources	1
27.	Time (full-time; part-time; retiring; hobby; occupation; years in farming)	13
28.	Family (knowledge source; support)	12
29.	Stock taking	1
30.	Association (type of group; membership)	11
31.	Absent vital linkages	11
32.	Collective efforts	5
33.	Face-to-face	4

34.	Television broadcasts	6
35.	Unawareness	10
36.	Farming heritage	1
37.	Employment of others	7
38.	Farmer peers	5
39.	Private processors	2
40.	Interest in improvement (general interest; motivation; ambition; passion; inspiration)	24
41.	Produce collection	1
42.	Efficient transactions	1
43.	Private sector requirements	1
44.	Lack of training	3
45.	Internet	2
46.	Farmer registration	2
47.	Micro insurance	1
48.	Logistics	2
49.	Above the line	1
50.	Radio	13
51.	Intervention success	1
52.	Private extension	2
53.	Farmer growth	4
54.	Up-bringing	5
55.	Market participation	1
56.	Knowledge transfer to labourers	1
57.	Foreign competition	2
58.	Perceived injustice	1
59.	National ownership of farming	2
60.	Union	2
61.	Individual farming practices	2
62.	Lack of farmer peers	1
63.	Improvement processes	4
64.	Free market	1
65.	Newspaper	2
66.	Agricultural show	2
67.	Magazine (general; farmer)	5
68.	Other farmer commitments	7

69.	Market alternative	1
70.	Farmer committee	1
71.	Cooperatives	6
72.	Formal transfer	2
73.	Informal transfer	2
74.	Community engagement	2
75.	Inclusiveness	1
76.	Lack of business acumen	1
77.	State as an enabler	2
78.	Donor community	1
79.	Alternatives in farming	5
80.	Access to inputs	7
81.	Agronomy advice	1
82.	Knowledge sharing	1
83.	Marketing assistance	3
84.	State influence	4
85.	Experience	1
86.	Electricity	3
87.	Water	1
88.	Trained labourers	3
89.	Transport	7
90.	Marketing	2
91.	Narrow focus	5
92.	Education (basic; higher; college training; free)	10
93.	Linking farmer (model; contact; focal point)	7
94.	Demonstrations	3
95.	Compatible knowledge	3
96.	Acceptance	1
97.	Donor linked extension	2
98.	Incentives	2
99.	Foreign interventions	1
100.	Experiments	3
101.	Donor funded institutions	1
102.	Irrigation	4
103.	Advice	2
104.	Land	1

105.	Paralegal	1
106.	Study circles	1
107.	Labourer supervision	1
108.	Warehouses	1
109.	Cold-rooms	1
110.	Market place	1
111.	Production chain	1
112.	Mechanisation	2
113.	Lead time	1
114.	Research papers	1

APPENDIX D- AXIAL CODING

	Category	Code Composition	Frequency
1.	Strategies for knowledge transfer	Network linkages; Knowledge areas; Leadership; Record keeping; Groups; Commodity specifications; Practice based knowledge; Exchange visits; ICT use; Print matter; Knowledge storage; Language; Extension services; Face-to-face; Above the line; Radio; Network coordination; Newspaper; Agricultural show; Magazine; Farmer committee; Cooperatives; Formal transfer; Informal transfer; Community engagement; Identity; Linking farmers; Leadership; Demonstration; Social structures; Study circles; Exchange visits; State as an enabler; Television broadcast; Research papers	45
2.	Strategies for network management	Network coordination; Formalisation; Groups; Knowledge areas; Identity; Farmer registration; Commodity specifications	9
3.	Conditions for knowledge transfer	Leadership; Trust; Compatible knowledge; Interest in improvement; Acceptance; Extension services; Incentives	9
4.	Market issues	Network linkages; Knowledge areas; Collective efforts; Foreign competition; Free market; State influence	7
5.	Farmer challenges	Finances; Illiteracy; Identity; Trust; Knowledge areas; Record keeping; Groups; Family; Lack of training; Knowledge transfer to labourers; Unawareness; Electricity; Marketing assistance; Water; Transport; Marketing; Irrigation; Experiments; Motivation; Geographical issues; Gender issues; Labourer supervision; Trained labourers; Production chain; Education; Mechanisation	38
6.	Conditions for group formation	Groups; Social structures; Identity	2
7.	Social influences on network composition	Social structures; Identity; Gender issues; Illiteracy; Education	6
8.	Social influences on knowledge transfer	Gender issues; Social structures	5
9.	Network engagement limitations	Gender issues; Record keeping; Groups; Finances; Commodity specifications; Absent vital linkages; Formalisation; Unawareness; Private sector requirements; Extension challenges; Perceived injustice; Individual farming practices; Lack of farmer peers; Other farmer	39

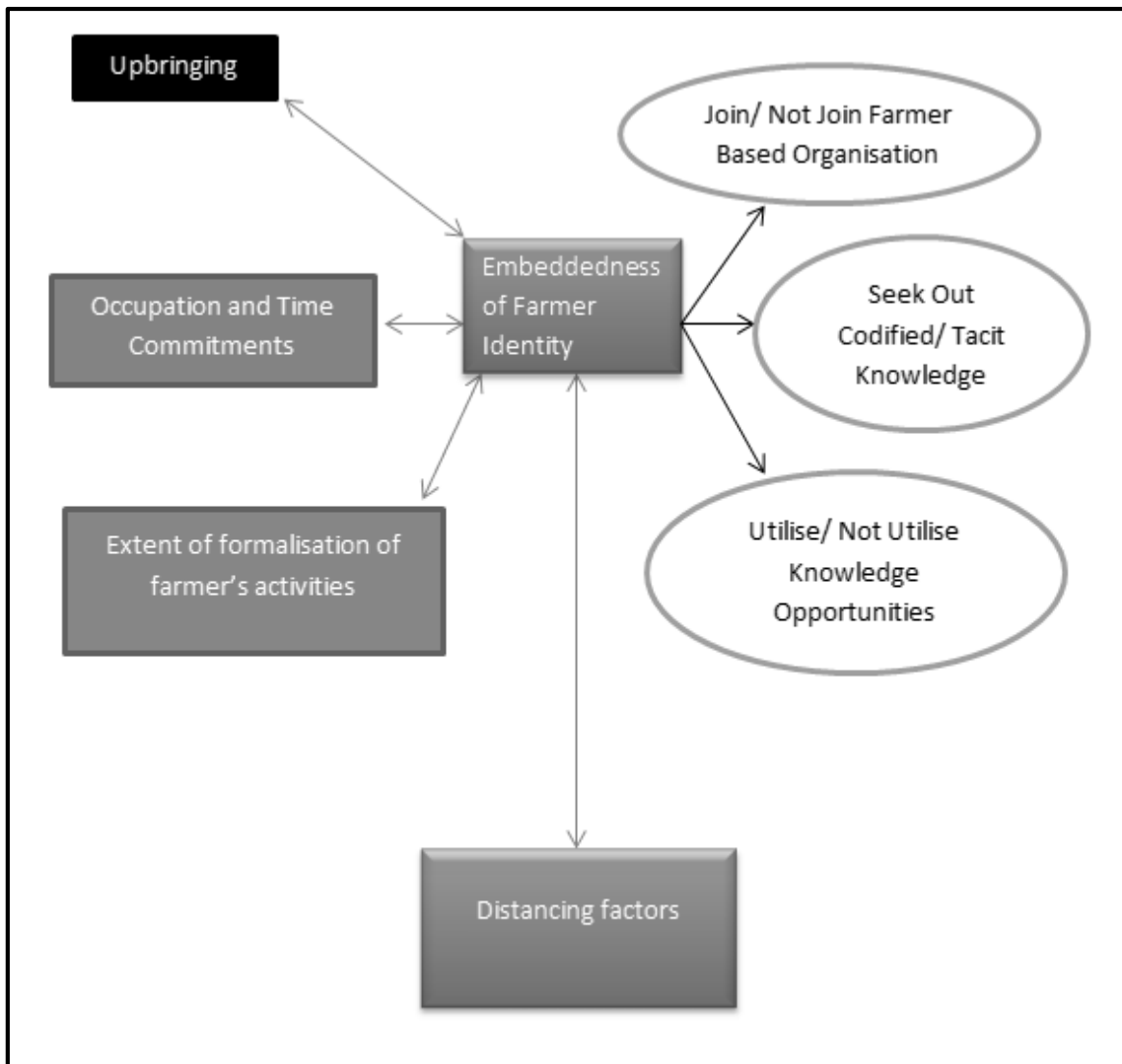
		commitments; Lack of business acumen; State influence; Geographical issues; Narrow focus; Education; Trust	
10.	Social influences on process improvement	Gender issues; Family; Interest in process improvement	4
11.	Scalability	Knowledge areas; Groups; Intervention success; Farmer growth; Finances	8
12.	Meeting social needs beyond farming	Knowledge areas; Association; Gender issues; Land; Paralegal	7
13.	Network connections	Network linkages; Knowledge need identification; Farmer resources; Groups; Association; Farmer peers; Private processors; Union; Cooperatives; Formalisation	26
14.	Knowledge transfer intervention failure	Repetitive interventions; State influence	4
15.	Network coordination	Knowledge need identification; Network linkages; Logistics; Leadership; State as an enabler; Cooperatives; Donor community; Linking farmer	5
16.	Knowledge transfer challenges	Knowledge storage; Geographical issues; Extension challenges; Absent vital linkages; Unawareness; ICT use; Groups; Trust; Other farmer commitments; Narrow focus; Access to inputs; Interest in improvement; Finances; Social structures; Lead time; Language	26
17.	Farming involvement	Time; Market participation; Improvement processes; Other farmer commitments; Up-bringing; Other farmer commitments; Leadership; Interest in improvement	27
18.	Sources of farming knowledge	Family; Association; Extension services; Groups; Leadership; Farmer peers; Private processors; Internet; Up-bringing; Union; Cooperatives; Experience; Education; Magazines; Television broadcasts; Print matter; Trained labourers; Identity; Face-to-face; Private extension; Demonstrations; Linking farmers; Experiments; Donor funded institutions; Agricultural shows	37
19.	Other skills acquired used in farming	Stock taking; Record keeping	1
20.	Rejected knowledge sources	Magazine; Television broadcasts; Donor linked extension; Radio; Foreign interventions	4
21.	Group challenges	Groups; Leadership; Narrow focus; Finances	6
22.	Self-identity	Farming heritage; Identity; National ownership of farming; Up-bringing; Interest in improvement	8
23.	Individual attributes	Interest in improvement; Alternatives in farming; Finances; Identity; Collective efforts; Time; Education; Unawareness; Experiments; Improvement processes	21

	influencing the network		
24.	Private sector support	Produce collection; Efficient transactions; Micro insurance; Private extension; Market alternative; Finances; Inclusiveness; Education; Advice; Alternatives in farming; Access to inputs; Transport	12
25.	Group benefits	Finances; Access to inputs; Agronomy advice; Knowledge sharing; Marketing assistance; Collective efforts; Network linkages; Education	10
26.	Attached identity	Identity; Farmer registration; Inclusiveness; Lack of business acumen	5
27.	Network challenges	Logistics; ICT use; Geographical issues; Absent vital linkages	4
28.	Strategies for network coordination	Logistics; Leadership; Linking farmers	3
29.	Improvement areas	Alternatives in farming; Warehouses; Cold-rooms; Electricity; Market place	2
30.	Donor Support	Advice; Alternatives in farming; Donor linked extension	2

General Themes

1. Identity
2. Strategy
3. Groupings
4. Challenges
5. Benefits
6. Extension

CAUSAL CONDITIONS, CENTRAL PHENOMENON AND RESULTING STRATEGIES



APPENDIX E- SELECTIVE CODING

Proposition 1: Farmer identity is embedded in the upbringing, occupation, time commitments and formalisation of farmer activities of the individual. This results in identification as either traditional or entrepreneurial. This identification is further strengthened or weakened by attached identities from other actors.

Proposition 2: Traditional farmers identify themselves as such based on their involvement in farming from childhood, the full-time nature of their enterprise and formal farmer status through belonging to legitimate formal farmer groups. Entrepreneurial farmers identify themselves as such based on their involvement in farming only later on in adulthood, the part-time nature of their enterprise and lack of formal farmer status due to lack of belonging to legitimate formal farmer groups.

Proposition 3: Traditional farmers tend to join farmer based organisations where they believe they can develop high trust relationships. They seek out tacit knowledge from other traditional farmers and miss out on the utilisation of knowledge opportunities.

Proposition 4: Entrepreneurial farmers tend to work independently and as such are unlikely to join farmer based organisations. They seek out codified knowledge and are more likely to utilise knowledge opportunities.