THE UNTOLD STORY OF THE PIG FARMING SECTOR OF RURAL KWAZULU-NATAL: A CASE STUDY OF UTHUKELA DISTRICT

By

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DECLARATION OF ORIGINALITY

I certify that the work presented in this dissertation is, to the best of my knowledge and belief, original, except as acknowledged in the text and that and the material has not been submitted, either in whole or in part, for a degree at this or other university. I also certify that I have complied with the rules, requirements, procedures and policy of the university.

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" Ngwazi, Jezangeze, Ngangakazane

Manukelana, wena owanukela abakwenu waze wanukela nabezizwe

Nokhonkothwa izinja zakub' oDibini

Kuhhahhame nezasendlunkul' eTsheni, Zayikhex' imilomo

Ngikhuluma nje nanamhlanje zisayikhexile"

Ngiyabonga sihlakaniphi, sesifundiswa esizishaya umfokazane

Ngiyabonga mntanenkosi!

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ABBREVIATIONS

AA	Amino acid
AFRA	Association for Rural Advancement
ANOVA	Analysis of variance
ARC-API	Agricultural Research Council: Animal Production Institute
BC	Before Christ
DAFF	Department of Agriculture, Forestry & Fisheries
DC	Duroc
DSPED	Department of Strategic Planning and Economic Development
EC	Eastern Cape
EO	Extension Officer
FAO	Food and Agriculture Organization
FSA	Farming Systems Approach
FSR	Farming Systems Research
FSRS	Farming Systems Research Section
GDP	Gross domestic product
GPS	Global positioning system
HA	Hectare
IDP	Integrated Development Plan
KB	Koelbroek
KZN	KwaZulu-Natal
KZNDAEA	KwaZulu-Natal Department of Agriculture & Environmental Affairs
KZNDED	KwaZulu-Natal Department of Economic Development
LR	Landrace
LSD	Least significance difference
LW	Large White
NDA	National Department of Agriculture
PG	People's Guide (National Treasury)
PROVIDE	Provincial Decision-Making Enabling Project
RSA	Republic of South Africa
SACNASP	South African Council for Natural Scientific Professions
SADC	Southern African Development Community
Stats SA	Statistics South Africa

UTDM-IDP	uThukela District Municipality Integrated Development Plan
UNISA	University of South Africa
WS	Windsnyer
Vet	Veterinarian
ZCC	Zionist Christian Church

The untold story of the pig farming sector of rural KwaZulu-Natal: A case study of uThukela District

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ABSTRACT

This study was done in the rural areas of uThukela District in KwaZulu-Natal. The objectives were to determine pig production and management practices used by farmers in rearing pigs in rural areas; to establish the role of pigs in social and economic lives of the people; and to characterize and determine constrains and opportunities of pig farming in rural areas. A farming systems approach was used in conjunction with a cross-sectional survey method using a structured questionnaire in face-to-face interviews with farmers for the collection of data. The study involved 4 local rural municipalities with a population of 4205 people who owned 2555 pigs. The sample size was 533 pig farmers/respondents. The data included the demographic characteristics of pig farmers, pig production and management practices, the role of pigs in both the social and economic lives of people and the constraints and opportunities of pig farming. The data were analyzed to determine simple means and frequencies.

The results showed that 20% of pigs were reared in intensive systems and 80% in extensive systems in the district. Each village owned an average of 5 pigs. There were more female respondents (60%) than males, and also female respondents owned more (65%) pigs than males. Most of respondents (99%) were Zulu speaking people and only 1% was from other cultural groups. Majority of the respondents (74%) were unemployed, 16% were pensioners and only 10% were employed. Those who were employed kept more pigs than the other groups. Over one third of the respondents had primary (34.5%) and secondary (35.3%) education; and 2.7% had college education, while 27.5% had no formal education at all.

Sixty-two percent of the older respondents between the age of 46 and 65 years kept more pigs than younger farmers. The collective incomes of the communities from salaries, pensions, and sales of livestock and crops per annum were substantial. The average land size per household ranged from 0.01 ha to 56 ha. Male respondents owned more land (1.68 ha) than female respondents (0.96 ha). Similarly, employed people owned more land (2.49 ha) than pensioners (1.26 ha) and the unemployed people (1.04 ha).

Respondents kept other livestock species such as cattle, sheep, goats and chickens. Ninety percent of households kept chickens in addition to cattle (53%) and goats (49.3%). They also grew crops such as maize, potatoes, vegetables (cabbage, spinach, tomatoes, carrots, beetroots and onions) and fruits (peaches, apples and grapes). They kept pigs for home consumption (63%), source of income (33%), source of manure (3%) and for other reasons (1%). More employed people (68%) sold pigs for extra income, while 91% pensioners and 81% unemployed people used pigs for home consumption.

Marketing channels included pension pay points, abattoirs, butcheries and neighbourhoods. Abattoir sales accounted for 10% and the most common venues were Amblecyte (40%) and Cato Ridge (27%). Selling of pigs occurred throughout the year, with the peak in winter (May/July). Majority of farmers (59%) used their own transport to deliver pigs to the selling points or they used contractors (41%). Pigs were sold at the age of 5 to 18 months old. Farmers sold live pigs and pork to the communities. Some farmers sold live pigs only, while others sold pork only or both pork and live pigs. Religion and culture had little influence on pig farming. Most farmers (88%) had no religious or cultural influences, while 7% were influenced by religion and 1% was influenced by culture. The most preferred meat among the communities was chicken meat, followed by beef, pork, mutton and chevon.

Half of the respondents had >6 years of experience in pig farming, 34.9% had 2 – 5 years of experience and 14.8% were beginners. The breeds of pigs kept in the district included indigenous breeds, Large White, Landrace, Duroc and crosses of indigenous breeds with Large White and Landrace. Farmers bought breeding stock within their communities or they selected breeding stock from their own herds. Very few farmers have ever received any type of training in pig farming. The training was provided by the KZN Provincial Government, Zakhe Agricultural College and private farms. The training took 2-3 days of

workshops, 2-3 weeks of short courses or 3-6 months of hands-on training on private farms. The training improved the performance of sows within the communities.

Only 41% of farmers practised controlled stock breeding, which improved the farrowing rate and litter size. About one third (32%) of farmers bred their gilts at 6 – 8 months, while 21.2% bred them at 8-12 months, and 29% bred them after 12 months. The farrowing rate of indigenous sows was one litter per annum compared with the majority of Landrace and Duroc sows that farrowed twice a year. Some farmers (28%) reported that they routinely observed farrowing, while 72% of them said they never knew when the sows farrowed until they saw sows and new litters coming back to their pens after grazing in the veld. The litter sizes varied from ≤ 7 to ≥ 10. Half of the indigenous sows farrowed ≤ 7 piglets per litter, while 41% had 8-10 piglets; compared with 49% Large White and 44% Duroc that farrowed 8-10 and ≥ 10 per litter, respectively. Majority of farmers (66.1%) did not wean their piglets at all, which was associated with low farrowing rate. However, farmers who sold weaners for income weaned their piglets between 3 weeks and 3 months. This was associated with higher farrowing rate of sows.

Piglet mortality was mainly due to worm infestation (26%), loss of hair (13%), lice and mange infestation (16.4%) and diarrhoea (5.6%). Despite that only 10% of farmers consulted the local Department of Veterinary Services. Some farmers (44.2%) said that they did not know that they could make use of Veterinary services, and 28% of them said it was a waste of time. Majority of farmers (80%) used home kitchen swill and brewer's grains to feed their pigs. Only 16% of farmers bought commercial feeds and 2% fed them on maize grains and vegetables. Commercial feeds were bought from Farm Save (48%), Afgri (19%) and Epol (7%).

Some farmers (65.4%) weighed feed before feeding, while 35% did not weigh feed at all. Water was provided at feeding time, *ad libitum* or several times a day. Farmers disposed of carcasses by eating them, feeding to their dogs, or throwing them away. Over half of the farmers (52%) did not take carcasses for post mortem, while 26% did not know that they could send carcasses for post mortem and 20% said they could not afford the cost. The study concluded that pigs have a vital social and economic role in the lives of the rural people of KZN for income generation and household consumption. The main constraints are wide spread poverty and lack of management skills in pig production, nutrition, health,

housing and management. Government intervention is necessary to help farmers to improve pig production and management as a means of poverty alleviation and household food security.

CHAPTER 1: GENERAL INTRODUCTION

1.1 Background information

The domestication of pigs happened a long time ago during the Neolithic period according to Bushby (1988). References to biblical times have also been mentioned by Esminger (1961), who states that it could have taken place about 1500 BC. Holness (1991) refers to 2000 BC as the time pigs might have been domesticated. It was however not until the 18th century that improvements on the pig breeds were initiated (Bushby, 1988).

The arrival of improved pig breeds in the Republic of South Africa (RSA) is not very clear but, it is believed that the arrival of European settlers in RSA in 1600s was the source of improved pig breeds that are found in Southern Africa today (Krige, 1950; Blench and MacDonald, 2000; Swart *et al.*, 2010). A number of pig breeds are found in RSA but only the Windsnyer and the Kolbroek (Ramsey *et al.*, 2000) are regarded as indigenous to RSA. Other breeds that are found in RSA are the Large White, South African Landrace (ancestral line from Denmark) and the Duroc. These breeds are mostly used in the commercial sector (Kem, 1993; Swart *et al.*, 2010) unlike the indigenous pigs that are reared by smallholders (Blench and McDonald, 2000) in rural areas.

The need for increased animal protein is evident in developing countries and this has led to animal production coming under intense pressure to satisfy the demand from the increasing human population (Bellaver and Bellaver, 1999; van der Zijpp, 1999). The increase in the demand for animal products suggests an increase in incomes and urbanisation (Bradford, 1999), which are linked. Grigg (1995) stated that income has a major role in influencing the level of consumption of animal protein. Therefore, the demand for animal products and the per capita meat consumption can be said to be correlated to economic growth or per capita income in developing countries (Bellaver and Bellaver, 1999; Bradford, 1999; Speedy, 2003). Livestock production growth in general has been very slow in the sub-Saharan Africa (FAO, 2009). Africa as a whole is still underperforming in terms of production, food security and export, which are lower compared to Asia and Latin America (Rukuni, 2002). There is a need to increase production to meet the demand for livestock products and this could be best achieved through improved livestock production and healthcare (Bellaver and Bellaver, 1999).

The South African National Food Survey report (1999) cited in Schönfeldt and Gibson (2009) showed that 25.5% of South African children are stunted and wasted as a result of malnutrition. The children who are stunted are mainly found rural areas (Hendriks, 2003). Stunting in children is a standard term used for children who are considered to be too short and light in weight for their age (Hendriks, 2003). When the RSA government noticed severe malnutrition among the people, a Fortification Programme was implemented in 2003 to curb the problem (Schönfeldt and Gibson, 2009). The programme involved fortification of certain foods like maize meal with minerals and vitamins.

Speedy (2003) mentioned that meat is made up of high quality protein and thus very important in the human diet because it supplies nutrients such as iron, zinc and vitamin B. Pig meat in particular is said to be high in thiamine (Speedy, 2003). Cheeke (1993) cited by Bellaver and Bellaver (1999) reported that protein of animal origin has a higher nutritional value compared to vegetable protein. The differences are in the composition of essential amino acids and minerals.

Pig production has increased dramatically over the years in the developing countries (Steinfeld, 2003; FAO, 2009). Pig production in sub-Saharan Africa increased slightly from 0.5 million tonnes (1987) to 0.8 million tonnes in 2007 (FAO, 2009). FAO (2011) estimated an increase of up to 155% in annual pork consumption from 2000 to 2030 in sub-Saharan Africa. An even higher increase of 167% in annual pork consumption globally in countries deemed to be of low income is also expected (FAO, 2011). Pig production in RSA lags behind countries such as a China and the United States of America who are the leading pig producers in the world (FAO, 2009). However, according to Phiri *et al.* (2003) RSA has the highest pig population in southern Africa, of which 25% are free ranging in the resource-poor areas (Krecek *et al.,* 2004). About 86.5 % of the 2.2 million pigs in RSA are slaughtered through the 46 abattoirs yearly. Most of these come mainly from commercial farms (Pig Breeders Society of SA, 2010). A study conducted in 2010 by the Department of Agriculture, Forestry and Fisheries (DAFF) estimated that there are about 4000 commercial producers in RSA (DAFF, 2010). Although black farming sector in RSA represent a large number of households, Aliber and Hart (2009) argued that this sector contributes minimally to the country's overall output and this might be the case in terms of pig production as well.

Countries like Vietnam (Peters, 1998; Lemke and Valle Zárate, 2008), Nigeria (Ajala *et al*., 2006; Ajala *et al.,* 2007), Mexico (Mota *et al*., 2002), Zimbabwe (Chiduwa *et al.,* 2008), India (Rahman, 2007; Deka *et al*., 2007), Thailand (Nakai, 2012), Colombia (Ocampo *et al.*, 2005), Uganda (Nissen *et al.*, 2011) and Kenya (Carter *et al.*, 2013) have researched the rural pig production sector and smallholder farming with the emphasis on the role of pig production in economic growth and as a development pathway. In RSA, Madzimure *et al.* (2013) has also recently looked at rural pig production in Limpopo and Eastern Cape provinces, respectively.

Apart from pork being an essential source of protein to humans, pigs in rural areas assist with income generation or additional investment and it was also reported that women benefit from the additional income received from pigs, which in turn is used for household goods, school fees and settling other obligations.(Chimonyo *et al.*, 2005; Ocampo *et al.*, 2005; Ajala *et al*., 2007; Phengsavanh *et al.*, 2010; Kamuribo *et al.,* 2011; Nissen *et al.*, 2011; Carter *et al.*, 2013; Madzimure *et al.*, 2013). In Nigeria and India (Ajala *et al.,* 2006; 2007; Deka *et al.,* 2007) In northern Vietnam, Lemke and Valle Zárate (2008) observed similar uses of pigs as was also reported by Deka *et al.* (2007) in India and Ajala *et al.* (2006; 2007) in Nigeria. The consumption of pork in the rural areas however, is influenced by some taboos, which range from human health, religion to cultural beliefs. Religion and cultural beliefs prohibit the consumption of pork. For example, in RSA members of the Zionist Church (ZCC) do not consume pork (Anderson, 1999) and is most prevalent among black communities (Anderson and Otwang, 1993 cited by Anderson, 1999).

Free ranging pigs have the potential to transfer diseases to humans (Lekule and Kyvsgaard, 2003; Fincham, 2005). Pork that is undercooked may harbour worms hence the emphasis on the importance of confining pigs to prevent the transfer of parasites to humans (Lekule and Kyvsgaard, 2003). A parasitic infection known as porcine cysticercosis which is caused by *Taenia solium*, is very common in rural areas (Sciutto *et al.*, 2000; Phiri *et al.*, 2003; Waiswa *et al.,* 2009; Assana *et al.*, 2010a). Pigs are intermediate hosts, while the disease is transferred between humans and pigs (Assana *et al.*, 2010a). The infection can also cause neurocysticercosis in humans. Porcine cysticercosis occurs in many countries including South Africa (Phiri *et al.*, 2003; Krecek *et al.*, 2004; Fincham, 2005; Carabin *et al.*, 2006), Mozambique (Vilhena *et al.,* 1999; Pondja *et al.*, 2010) and Cameroon (Shey-Njila *et al.,* 2003). Areas that are affected by severe poverty are the most prone to *Taenia solium* infection in pigs, resulting in developing

countries being the main reservoirs of the disease (Sciutto *et al.*, 2000; Assana *et al.*, 2010a). In 2010 the Association for Rural Advancement (AFRA) reported that 50% of KZN population live in abject poverty. De Villiers (2005) observed that *"the KZN communal rural areas are characterised by overpopulation, low agricultural productivity, underdevelopment and unemployment which is accompanied by high rate of illiteracy that has resulted in extreme poverty and thus high dependency to remittances"*.

Pigs are more preferred for meat in KZN instead of goats and cattle because it is easier to kill pigs than any other stock, and Zulu people have no attachments to them like goats and cattle. The uses for goats vary among different cultures and traditions in some instances even within families. In KZN goats are used for in rituals for requesting for forgiveness and luck from ancestors, during child birth and for chasing away bad luck (ARC-API, 1999). For this reason goats and cattle are not slaughtered for provision of meat, but for cultural rituals and ceremonies. Rumosa Gwaze *et al.* (2009) found that people in the Eastern Cape Province people viewed goats as animals for ceremonies and were rarely slaughtered for other reasons. Slaughtering of goats in the Eastern Cape Province is done for bestowing good fortunes and to chase away evil spirits (Rumosa Gwaze *et al.*, 2009). Van Averbeke and Khosa (2007) noted that in Limpopo province many households used animals for ceremonies. This shows that traditional ceremonies in rural RSA are still common and hence the importance of livestock. Therefore, the purpose of this study was to determine pig production and management practices; the role of pigs in social and economic lives of people; and constraints and opportunities in pig farming in uThukela District.

1.2 Problem Statement

The study was to answer questions with respect to pig farming in rural areas of uThukela District as there was no primary information available. Pig farming in rural uThukela District is a closed book only known to those within the communities. Furthermore, farmers in uThukela District were constantly raising concerns about issues such as the slow pig growth which was of concern. It was therefore evident that the whole sector needed to be investigated and understood if solutions to the constraints were to be found and to further improve pig production for the rural people of uThukela District.

1.3 Assumptions

Pig farming in rural areas contributes to people's livelihoods and in fighting poverty in uThukela District.

1.4 Purpose statement

The purpose of the study was to obtain information and establish the role of pig farming socially and financially in rural uThukela District.

1.5 Research questions

1. What is the current status of the pig sector in rural uThukela District?
2. What constraints and opportunities related to pig farming exist in rural uThukela District?

1.6 Aims and objectives

1.6.1 The aim

The aim of the study was to gain insight and better understanding of pig production in rural areas of uThukela District by gathering information from farmers through a survey.

1.6.2 The objectives

1. To determine pig production and management practices used by farmers in raising pigs in uThukela District rural areas.
2. To establish the role of pigs in both the social and economic lives of people in rural areas of uThukela District.
3. Characterize and determine constrains and opportunities of pig farming in rural uThukela District.

1.7 Anticipated benefits of the study

The study will provide detailed information on the current status of pig farming in the rural areas of uThukela District. Information obtained from this study will be freely available to farmers, researchers and wider population requiring such information. Farmers and communities involved in this study will benefit as the information gathered will lead to the

development of further research and involvement by the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZNDAEA) in due course with the goal of trying to eradicate poverty in the province. Furthermore, data obtained will assist with addressing areas where there may be shortfalls and facilitate the provision of necessary advice by Extension Officers (EO). It is hoped that pig farming in the area of study will be improved, and as result there will be improved food security and also it could lead to the entrance of new entrant farmers. Other farming areas that may be related to pig farming will also get attention from KZNDAEA.

1.8 Ethical considerations

Farmers' participation in the study was voluntary, and no farmer was coerced to participate in the study. The details of the research were explained to the farmers before the interviews and the consent forms signed by farmers before the survey commenced. Participants were informed of their rights, assurances of confidentiality were given and participants were informed that their identity would be kept anonymous. Animals were not used in this study and therefore the study posed no risks to animals as only human participants provided information used in this study. Entrance into the different areas was pre-arranged in conjunction with EO working in the respective areas and therefore risks towards investigators were also minimal. Ethical approval was acquired from the KZNDAEA research committee (FSR 2.12) and the UNISA Ethics Committee (2011/CAES/047).

1.9 Components of the report

This dissertation consists of 6 chapters:

- Chapter 1: gives the background to the problem, statement, assumptions, purpose of statement, research question, aims and objectives, anticipated benefits of the study, ethics consideration, and the list of abbreviations.
- Chapter 2: presents the literature review with particular reference to the topic.
- Chapter 3: outlines the research methodology applied.
- Chapter 4: provides the results obtained from data after the analysis with respect to the headings derived from the objectives, "pig production and management practices", "role of pigs in both social and economic lives of people" and "constraints and opportunities of pig farming".
- Chapter 5: discusses the results obtained in conjunction with the literature review.

- Chapter 6: draws conclusions and reflects on the objectives and provides recommendations.
- References from the literature read and used in the discussion follow after the conclusions in chapter 6.

CHAPTER 2: LITERATURE REVIEW

This chapter examines the literature on pig farming in rural areas in Africa and beyond. It also looks at the South African pig industry. The social and economic contribution of pigs to the rural households through the use of different production systems and management practices is explored to lay a foundation for the story to be told of the pig farming sector in rural KZN. The chapter focuses on the poverty situation in KZN province and uThukela District in particular to find ways and means of eradicating abject poverty. It further explores how livestock production is involved in the fight against poverty and food insecurity in other countries.

2.1 Poverty in KwaZulu-Natal and uThukela District

KZN province has ten district municipalities with uThukela among them. The national census done in 2011, showed that the number of people in KZN has increased from about 8,572,302 in 1996 to 10,267,300 in 2011 (Stats SA, 2012). There are more people in the province than there were in the past 14 years. The province has the second largest population in South Africa (RSA) after Gauteng province (Stats SA, 2012). In KZN as a whole, about 78% of rural and 28% of urban areas are affected by severe poverty (KZNDED, 2009). De Villiers (2005) reported that rural KZN is overpopulated and most of the people in extreme poverty. Thirty-seven percent of rural areas are involved agricultural activities (PROVIDE, 2005).

RSA is described as a middle income developing country that has contrasting situations of wealth and poverty (Schönfeldt and Gibson, 2009). Most rural households are dependent on crop and livestock farming subsistence (Shackleton *et al.*, 2001). As a result there is high dependency on incomes of relatives (KZNDED, 2006) and therefore there are more people surviving on government grants or social security. Shackleton *et al.* (2001) noted role of government in supporting the rural economy. According to the People's Guide by the National Treasury (2012), *"the social assistance programme is South Africa's direct means of combating poverty"*. The number of grant recipients was estimated at 15.6 million over the period of 2012/2013 (National Treasury, 2012).

The different types for the social grants are State old-age grant or pension (R1200), Disability grant (R1200), Foster grant (R770) and Child support grant (R280) (National Treasury, 2012). The amount budgeted for social security KZN will increase from R1.953

billion in 2011/2012 to R2.401 billion in 2014/2015 (Cronje, 2012). This budget further demonstrates how large the amount is that the government has to provide to alleviate poverty in KZN. Social grants have therefore become an important source of income in KZN and other provinces (Mtileni *et al.,* 2009). With the population increase in the province it can be assumed that poverty has also increased. KZNDED (2009) reported that 58.1% of people in KZN earned <R400 per month per household in 2007 which was higher compared to the 42.5% observed in Gauteng and 37.4% in the Western Cape who earned a similar amount. The 2011 census estimated the unemployment rate in KZN at 33% or 1 006 409 unemployed people (Stats SA, 2012). UThukela District fell under the indicator scale deemed to be in poverty because its income was below R1640 per month per household (DSPED, 2007). The unemployment rate in uThukela District was estimated at 35 – 39 % (Stats SA, 2012).

KZN economy is therefore constantly faced by high level of poverty and unemployment challenges as indicated by the Department of Economic Development and Tourism (KZNDED, 2011a). The globally recession in 2009 also affected KZN economy which has continued to grow below 3% per annum in the past 3 years (KZNDED, 2011a). Growth and development of the economy has been stunted by the high level of illiteracy, poverty and unemployment (KZNDED, 2006). The challenges of poverty, unemployment and underdevelopment are also seen in other provinces in RSA and other developing countries (KZNDED, 2006). It is therefore very important for the provincial government to put measures in place to alleviate poverty and build up household food security. One measure that has the highest potential to overcome poverty in rural areas is agriculture. It is also the starting point for development strategy for economic growth (KZNDED, 2009).

2.2 Fighting poverty through agriculture

Although KZN province has high poverty and dependency level, it has the largest area of good agricultural land than any other province in the country (PGDS, 2011). The provincial agricultural sector has not lived up to expectations because its contribution to the provincial GDP has been ≤ 5.5 % in the past decade, which does not justify the potential of agriculture in the province (KZNDED, 2011a). The KZN Government has since made agricultural development a priority, especially with regard to food security. The importance of this is evident as shown in the provincial goal that says *"To engage, empower and transform communities to participate in sustainable agricultural and environmental*

practices in order to realize economic development and food security in the Province" (KZNDAEA, 2012a). Sustainable economic development and job creation are other areas that have been prioritized by the KZN Government (PGDS, 2011).

The challenges of low food production and sustainable economic growth are not new in RSA. Bembridge (1979) highlighted these challenges and today they are still there in much of the rural areas. Bembridge (1979) identified the shortage of animal and vegetable protein in the former "Black Homeland States" of RSA. A nutritional study conducted by Hendriks (2003) in KZN rural areas showed that cereals are major sources of energy, (if not the only sources) in most households. Hendriks (2003) suggested that an increase in the consumption of animal products could reduce the shortage of protein and fats in diets, thus significantly improving energy intake. Other developing countries as well suffer from shortages of dietary animal protein with per capita consumption being very low (Gill, 1999; Ajala *et al.,* 2007). High per capita income is associated with high per capita meat consumption and vice versa (Grigg, 1995; Bellaver and Bellaver, 1999; Speedy, 2003).

An estimated 675 million rural poor people in the world are supported and sustained by livestock production activities (Livestock in Development, 1999 cited by Steinfeld, 2003). The majority of the rural poor people that are supported by incomes and assets from livestock production activities are women (Steinfeld, 2003). Livestock produce high quality protein from low quality feed resources that might not been used in some instances (Speedy, 2003). One-third of the world protein comes from animal products (Bradford, 1999), but with the constant rise and fluctuations in meat prices (DAFF, 2012) most people cannot access meat due to high unemployment and poverty. In countries such as India (Kumaresan *et al.*, 2007) and Kenya (Carter *et al.*, 2013) it has been established that poverty can be eradicated through pig raising because they have become crucial in supporting the livelihoods of many rural households. In RSA the improvement of agricultural productivity in the rural areas could assist in improving the nutritional status of many households (Hendriks, 2003).

Rural people of KZN keep different types of livestock such as cattle, goats, sheep, pigs and poultry (de Villiers, 2005), where ruminants are more dominant. Cattle form 50% of the population followed by goats (74%) and sheep (19%)(KZNDAEA, 2012b). The livestock industry in the rural areas is still underdeveloped due to low reproduction rate (25 - 35%), shortage of feed in winter, stock theft and limited knowledge and skills in

husbandry (KZNDAEA, 2012b). The disposal of cattle and goats for meat in KZN and EC provinces is culturally forbidden (Rumosa Gwaze *et al.,* 2009), and that leaves sheep, pigs and chickens for regular meat supply. This further decreases the per capita consumption of meat within the communities. Rumosa Gwaze *et al.* (2013) explained that in KZN and EC provinces, goats in particular are slaughtered for cultural ceremonies and for communicating with ancestors among other reasons. Goats are therefore not slaughtered easily for reasons outside these specific rituals.

The status of pig farming in the rural areas of KZN has not been investigated and documented. As such, literature about the subject is very limited and outdated. Pig farming has been sidelined in KZN and is only known to those who have close links to the rural communities. Information available on pigs in rural areas is about indigenous pig breeds, where they are found, their characteristics and their suitability for rural conditions (Ramsay *et al*., 2000), but not on how people farm with these pigs and how they benefit financially from pig farming or the potential of these pigs. There is insufficient information on pig farming in rural areas with respect to social and economic contribution and the production systems.

2.3 Reasons for farming and owning pigs in rural areas

There are many other types of livestock that farmers choose to rear in KZN, but why do some farmers keep pigs in the rural areas? In general pigs are known to be more prolific, early maturing and more likely to give birth twice a year compared with cattle, goats and sheep; and therefore more convenient source of animal protein supplier (Ajala *et al.*, 2007). All these factors are in favour of rearing pigs as the quickest way of increasing animal protein supply (Ajala *et al*., 2007). According to Petrus *et al.* (2011) pigs are genetically superior to ruminants in terms of converting feed to meat. Kumaresan *et al.* (2007) described pigs as biological machines due to their efficiency in converting poor feed resources into pork.

Therefore, taking into account of constrains in rural areas such as feed shortages in winter and poor reproduction performance for ruminants (KZNDAEA, 2012b) this further strengthens the reasons why pig farming may be a possible solution to promote livestock production to meet the rising demand for animal protein and extra income (Chimonyo *et al.*, 2005; Ajala *et al.*, 2007; Kamuribo *et al.*, 2011; Pondja *et al.*, 2010; Hossain *et al.*,

2011; Petrus *et al.*, 2011; Nakai, 2012; Madzimure *et al.*, 2013). Pigs can also be used for household consumption and for sale to generate income which can be used on immediate needs. In addition, pigs are used as a source of fat, dowry and manure in several countries (Ocampo *et al.*, 2005; Petrus *et al.*, 2011; Madzimure *et al.*, 2013; Kamuribo *et al.*, 2011). For example, Madzimure *et al.* (2013) reported that in RSA pig fat is used as cooking oil and for softening leather ropes in Limpopo and EC provinces.

2.4 Pig industry and pork consumption in South Africa

Pork industry contributes about 2.15% of the GDP from the agricultural sector (DAFF, 2010). Limpopo province produces the highest pork (24%), followed by North West (20%), KZN (11%) and the Western Cape (10%). However, the population of pigs reported by DAFF (2010) does not include pigs that are reared in the rural areas and hence the contribution of rural pig production is not reflected in the country's economy, because is regarded as negligible.

It is also known that South Africans consume more pork than they produce in the country, which makes RSA a net importer of pork (DAFF, 2010). The per capita consumption of pork in RSA has not changed drastically from 4.0 kg/yr/capita in 1970s to 4.6 kg/yr/capita in 2010/11 (DAFF, 2012); compared with the consumption of other types of meat such as mutton, lamb and goats (2.9 kg/yr/capita), beef and veal (17.07 kg/yr/capita); and poultry and fish (34.91 kg/yr/capita) (DAFF, 2012a). It shows that the per capita consumption of red meat as a whole was lower (24.47 kg/yr) than the consumption of white meat (DAFF, 2012a). South Africans prefer poultry, beef and pork more than mutton, lamb and goat (DAFF, 2012a). The high consumption of pork is a sign of higher income earnings and urbanisation (Grigg, 1995; Bellaver and Bellaver, 1999; Speedy, 2003).

Despite being a net importer of pork, RSA exports some of its pork to other African countries; mainly the Southern African Development community (SADC) countries (DAFF, 2010).The SADC countries receive 73% of RSA pork, while Nigeria receives 4% and 23% to the rest of African countries (DAFF, 2010). RSA exported 3.02 million tons of pork worth R183.6 million in the period between 2000 and 2009. In 2009 RSA exported 2 022 tons of pork to Zimbabwe (35%), Mauritius (23%) and the rest to Mozambique, Democratic Republic of Congo, Nigeria and Angola (DAFF, 2010). RSA imports pork from Canada,

Germany and France (DAFF, 2010). A total of 27 210 tons of pork were imported in 2009 alone. This was far more imported pork than that produced in RSA within the same period.

2.5 Marketing of rural pigs

According to Shackleton *et al.* (2001) livestock production in rural areas is considered unproductive. This may be due to poor management practices and low or no inputs applied by the rural farmers. As a result marketing of pigs from the rural areas is not easy, because buyers are already biased against rural pigs, which are thought to be of poor quality and hence one would not enough money from them (Chimonyo *et al.,* 2005). For example, in Zimbabwe there is bias against indigenous Mukota pig breed in rural areas. Buyers prefer exotic breeds because more improved and thus more suitable for income generation (Chimonyo *et al.,* 2005). Most of the marketing of rural pigs occurs within the rural communities where pigs are sold either live or as meat (Nsoso *et al.* 2006). For example, 62.5% of pigs were sold within the community in the Ramotswa village in Botswana and 95% in Busia District in Kenya (Kagira *et al.*, 2010).

In Namibia and India 90% of farmers said they sold their pigs to neighbours within their communities (Petrus *et al.,* 2011; Kumaresan *et al.* (2009). In RSA Madzimure *et al.* (2013) also reported that among the different communities in Ntabankulu, Elundini and Ngqushwa, farmers also said they sold (65%), (81%) and (96%), of their pigs respectively, within their communities. Other pig farmers sold their pigs to butcheries, abattoirs and supermarkets (Madzimure *et al.,* 2013). In monetary terms it is not clear how much money is made from pigs in the rural areas, because rural markets are considered inefficient (Petrus *et al.,* 2011). The markets are not well defined because pigs are sold at different ages and sizes (Ajala *et al.*, 2007; Petrus *et al.*, 2011). Indications are that very little effort has been made in trying to improve the marketing of local rural pigs. When looking at the quality of the meat, only commercial pigs have been investigated and that the quality of indigenous pig meat is not well known (Hoffman *et al.*, 2005). The question that arises is whether indigenous pigs will make it in abattoirs. Halimani *et al.* (2012) discussed a number of reasons that have led to the exclusion of indigenous pigs. Among them is the fact that indigenous pig carcasses do not make the grade in the biased grading schemes that focus on lean meat production.

2.6 Production systems and management practices

2.6.1 Pig farmers in rural areas

Results from different studies reviewed suggested that rural pig farming is mainly done by women and girls in RSA, Botswana, Zimbabwe, Namibia and Tanzania (Nsoso *et al.,* 2006; Chiduwa *et al.,* 2008; Kamuribo et al., 2011; Petrus *et al.,* 2011; Halimani *et al.,* 2012). In RSA Madzimure *et al.* (2013) reported that most pigs were also owned by women farmers, and as many as 57% of women and 39% of girls in rural communities were involved with pig husbandry (Petrus *et al.*, 2011). In other studies in Namibia, Zimbabwe and Botswana, Nsoso *et al.* (2006) and Halimani *et al.* (2012) reported that 75% of female and 69.7% of girls were involved with pig husbandry. In Laos, Phengsavanh *et al.* (2010) reported that children assisted women with pig husbandry in contrast with the observation made by Rumosa Gwaze *et al*. (2009), who said that in RSA the youth were not interested in agricultural activities as they saw it as being backward and unpopular.

2.6.2 Breeds of pigs kept in rural areas

There are two indigenous pig breeds RSA: Windsnyer and Koelbroek (Ramsey *et al.,* 2000). The indigenous breeds are classified as *Sus indica,* in common with Chinese pigs (Nicholas, 1999) cited in Hoffman *et al.* (2005a). They are sometimes referred to as unimproved breeds (Robinson and Penrith, 2009; Petrus *et al.,* 2011).

Some of the exotic breeds in RSA (Landrace, Large White and Duroc) are mainly used in the commercial sector (Kem, 1993; Swart *et al.,* 2010). Exotic breeds were crossbred in the rural areas and smallholder farms, which has influenced some farmers to abandon the indigenous breeds, partly because indigenous breeds are not well regarded due to their low productivity and too much fat (Halimani *et al.*, 2012; Lekule and Kyvsagaard, 2003). Hoffman *et al.* (2005a) reported that breed name is crucial in marketing because it is used to distinguish factors that influence consumer's perception of meat products. However, there is very limited information about meat quality of indigenous pigs.

Indigenous breeds are hardy or can tolerate poor conditions or limited resources and inputs (Lekule and Kyvsagaard, 2003; Chiduwa *et al.*, 2008; Mutua *et al.*, 2010). This cannot be said for the exotic breeds because they are bred for intensive production

systems with high inputs in comparatively controlled environments, and thus find it difficult to thrive under extensive production systems (Chimonyo *et al.,* 2005). Chiduwa *et al.* (2008) in a study done in Zimbabwe found that one of the advantages of farming Indigenous pigs is that they more resilient and therefore more suitable for the resource-poor farmers. Adaptability of indigenous pigs to local environment and management conditions was also mentioned by Pengsavanh *et al.* (2010)

Then what could cause rural communities to substitute indigenous breeds with exotic breeds? For more than sixty years developing countries have used exotic breeds for crossbreeding to improve the productivity of indigenous breeds (Mathius and Mandy, 2005; Templeman and Caroellino, 2007 cited by Köhler-Rollefson *et al.* 2009). In a study in Bangladesh, Hossain *et al.* (2011) found that exotic breeds were more preferred than indigenous breeds because of their high growth potential, even though the high growth potential comes at a price of high production inputs (Halimani *et al.*, 2012).The result has been a steady decline in the number of indigenous breeds in the rural areas.

Exotic breeds that are commonly used include the Large White, Landrace, Duroc and Hampshire (Ocampo *et al.*, 2005; Ajala *et al.*, 2007; Kumaresan *et al.*, 2009; Hossain *et al.*, 2011). Reports from India (Kumaresan *et al.,* 2009), Nigeria (Ajala *et al.,* 2007) and Bangladesh (Hossain *et al.*, 2011) showed that there is fast growth in the population of exotic breeds in these countries due to an increase in the demand for pork. In Zimbabwe (Chiduwa *et al.*, 2008) and RSA (Madzimure *et al.*, 2013) found that indigenous pigs were still popular breeds of pigs in resource-poor areas. However, it is uncertain whether indigenous pigs will remain viable rural areas because the balance between indigenous and exotic breeds seems to be shifting towards the exotic breeds. Farmers in Zimbabwe and the RSA are said to be willing to conserve indigenous pig genetics because of their resistance to diseases and good adaptability to low input production systems (Halimani *et al.* 2012).

Lemke and Valle Zárate (2008) separate the small-scale pig production systems into three categories according to production intensity, market access and location. Farmers closer to urban areas are usually driven by the market demand for pork, and those that are far from the markets keep pigs for their own consumption or for informal markets. With the different types of breeds being kept by rural farmers, the production and management practices need to be improved to accommodate the fast growing exotic breeds. That is

why it is important to carry out further investigation of the existing production systems and husbandry practices in KZN. Housing, feeds and feeding and healthcare practices need to be examined. Ajala *et al.* (2007) emphasised the relationship between these factors, making them important determinants of success or failure in pig farms and profit margins.

2.6.3 Breeding

At a glance one would confirm that pig farmers in rural areas do not control the breeding of pigs because majority of farmers use semi-intensive production systems, where pigs of all ages roam freely outside during the day and sleep in shelters during the night. This also the cause of high incidences of porcine cysticercosis in rural areas (Sciutto *et al.*, 2000; Mafojane *et al.,* 2003; Shey-Njila *et al.,* 2003; Lekule and Kyvsagaard, 2003; Krecek *et al.,* 2004; Carabin *et al.,* 2006; Veary and Manoto, 2008).

Nakai (2012) in Thailand reported that both controlled and uncontrolled breeding take place as a result of the types of production systems used. Pigs are semi confined and are sometimes found roaming around especially boars which break out of poorly constructed housing. If pigs are not confined, breeding is difficult to control. In Colombia, Ocampo *et al.* (2005) reported that farmers did not control breeding at all and that led to farmers being unable to know the performance of individual pigs. A high percentage of replacement stock for breeding are purchased within the community in rural areas in Kenya (Kagira *et al.,* 2010) and RSA (Madzimure *et al.*, 2013) because most farmers sold their pigs within their communities.

Uncontrolled breeding leads to uncontrolled weaning of piglets because rural farmers do not know anything better. Piglets are weaned naturally when sows cannot breast feed them any longer (Ocampo *et al.*, 2005). The uncontrolled weaning leads to sows not returning to oestrus sooner. The long lactation period leads to a condition known as the “thin-sow condition” (Kugonza and Mutetikka, 2005). The sows lose body condition and require a longer time to gain weight and show signs of oestrus again. That makes rural pigs very unproductive.

2.6.4 Pig housing

Economic growth in many developing countries has been achieved through the intensification of animal agriculture (Bellaver and Bellaver, 1999). Pigs do not require as

much land like ruminants (Phiri *et al.*, 2003). That is one of the reasons that make pig farming more suitable for the rural and smallholder farmers. Pig rearing can be done intensively or extensively (Nsoso *et al.*, 2006; Kumaresan *et al.*, 2009; Kagira *et al.*, 2010). Pig housing in intensive production systems in developing countries, especially in the tropics have poor waste disposal, wet floors without beddings, no wind protection and worm infested (Lekule and Kyvsagaard, 2003). On the other hand, the poor structures in traditional or extensive systems are seen as better than intensive systems for the local breeds that are said to adapt to local conditions and can survive with limited structures. Despite all this, it does not mean that free ranging pigs they do not require good husbandry practices (Madzimure *et al.*, 2013).

Proper pig housing is very important because pre-weaning mortality is commonly due to piglets being exposed to bad weather conditions such as cold, rain and predators (Chiduwa *et al.*, 2008; Madzimure *et al.*, 2013). The mortality of young pigs can be avoided by providing adequate and secure housing (Madzimure *et al.*, 2013). Semi-intensive systems allow pigs to roam freely by day and at night they are kept in shelters during the dry season; but during the wet season pigs are kept indoors to prevent the destruction of growing crops, and worm infection in muddy pools (Ocampo *et al.*, 2005; Ajala *et al.*, 2007; Chiduwa *et al.*, 2008; Assana *et al.*, 2010b; Nakai, 2012; Krecek *et al.*, 2012). The materials used for building rural pig houses vary according to their affordability and availability locally (Ajala *et al.*, 2007; Kumaresan *et al.*, 2009). Materials such as mud bricks cement bricks, bamboo, concrete, wood and iron sheets (Ajala *et al.*, 2007; Nsoso *et al.*, 2006; Nakai, 2012).

Animal welfare activists believe that outdoor pig farming may be more suitable for pigs because it addresses the welfare of pigs (Bellaver and Bellaver, 1999). Concerns regarding pig housing from the welfare point of view indicate that climate of the buildings, floor types, stocking density, feeding management and restraining devices tend to affect pigs negatively, while other views argue that the confinement of pigs makes production more manageable in terms of feed supplementation, which leads to faster growth and higher performance (Madzimure *et al.*, 2013).

2.6.5 Nutrition

According to Smith (2006) feed costs take 75 – 80% of the total production costs of rearing pigs, this makes feed the most expensive part of pig rearing. Grains make up

between 55 - 70% of pig rations (Smith, 2006), and also used for human and other livestock feeds. Haynes (2001) described a pig's digestive system as very similar to that of humans among all other animals, because they make use of energy and protein from vegetable and animal origins. This therefore makes pig feed expensive because in many developing countries there aren't enough grains to feed humans and livestock (Petrus *et al.,* 2011). Small pig producers in the developing countries face a general problem of high feed costs and shortages as well (Peters, 2004).

Swill or kitchen leftovers make part of diets of most pigs in the rural areas in different countries (Ocampo *et al.*, 2005; Nsoso *et al.*, 2006; Ajala *et al.*, 2007; Kumaresan *et al.*, 2009; Mtileni *et al.*, 2009; Kagira *et al.*, 2010; Phengsavanh *et al.*, 2010; Hossain *et al.*, 2011; Kamuribo *et al.*, 2011; Nissen *et al.*, 2011; Carter *et al.*, 2013). In the Northwest province of RSA, Veary and Manoto (2008) found that farmers fed swill and their findings were of particular interest to this study because it occurs in RSA. Petrus *et al.* (2011) also found 53% of the farmers in Namibia use brewer's grains; while Ajala *et al.* (2007) reported that in Nigeria farmers use brewer's grains mixed with swill.
The problem of feeding swill is the spread of diseases to pigs and from pigs to humans (Haynes, 2001). Kumaresan *et al.* (2007) in India and Phengsavanh *et al.* (2010) in Laos reported that cooking of swill before feeding to pigs is effective in controlling diseases. In addition, feeding of swill poses a challenge because the diets are unbalanced and cannot supply all the necessary nutrients for pigs (Kagira *et al.*, 2010). Lekule and Kyvsagaard (2003) and van An *et al.* (2005) noted that supplying pigs with the required protein under village conditions is very difficulty mainly because of the cost involved. Pigs under intensive systems in particular require a dietary intake of balanced diets because they cannot fend for themselves and get all the required nutrients.

Very few farmers supplement pig diets with concentrates or commercial feeds because most of them are not willing or cannot afford commercial feeds (Kumaresan *et al.*, 2009; Kagira *et al.*, 2010; Hossain *et al.*, 2011). Ocampo *et al.* (2005) reported that less than 2% of farmers in Columbia used commercial feeds, while Kumaresan *et al.* (2007) found that between 8.12% farmers fed commercial concentrates in India; and in Laos 6% (Phengsavanh *et al.,* 2010). The amount of feed and the number of times pigs were fed were very vague in most studies. The amount feed depended mainly on age, physiological state of the pigs (Hossain *et al.*, 2011) and the availability of feed (Kagira *et al.,* 2010). The difficulty in measuring the feed intake in rural areas was a challenge (Ocampo *et al.*,

2005; Phengsavanh *et al.,* 2010). Many farmers could not describe their feeding programmes because in most cases they did not have any. In India, Laos and Thailand farmers reported that they fed their pigs twice a day (Kumaresan *et al.*, 2007; Phengsavanh *et al.,* 2010; Nakai, 2012).

Fewer pigs are normally reared by rural farmers and this is because of feed scarcity at times (Holness *et al.*, 2005 cited by Chiduwa *et al.*, 2008; Kamuribo *et al.*, 2011). Therefore, farmers keep just enough pigs to match the available feed resources, which are most of the time characterised by poor quality and scarcity (Halimani *et al.*, 2012). Mtileni *et al.* (2009) observed that in RSA chickens were fed swill and grains which was similar to what was fed to pigs. The findings suggested that farmers keeping pigs and chickens had to split the already limited feed resources among the animals which further created a problem with regard to feeding animals in rural areas. The feed scarcity in rural areas is therefore one of the most important reasons behind small-scale pig farmers not growing in size (Madzimure *et al.*, 2013). Out of dietary components, water is the most essential although often over looked (Haynes, 2001). Farmers in rural areas often provide water mixed with feed only during feeding (Kumaresan *et al.*, 2007; Phengsavanh *et al.*, 2010). Only a few farmers were found to provide additional water outside the feeding times, while the majority of farmers provided no water. Phengsavanh *et al.* (2010) observed that only 7% of the farmers in his study offered extra water during the day. In Kenya, Carter *et al.* (2013) found that farmers did not provide feed and water *ad libitum.*

2.6.6 Healthcare and mortality

The healthcare of pigs in rural areas has been reported in a number of studies with no particular reference to biosecurity (Lekule and Kyvsagaard, 2003; Ajala *et al.*, 2007; Kamuribo *et al.*, 2011). Worm infestation was reported as one of the health problems frequently mentioned by most farmers (Lekule and Kyvsagaard, 2003; Ajala *et al.*, 2007; Kamuribo *et al.*, 2011). Worms can be controlled but the resistance to a number of drugs used as a result of inappropriate use of antihelmintics has been noted and therefore the worms end up affecting the productivity and profits (Steinfeld, 2003).

In some studies farmers were not able to describe animal diseases and some said they did not experience any disease problems (Mutua *et al.*, 2010). Treatment and vaccination programmes exist in some areas in RSA but farmers were not aware of such services

(Mutua *et al.*, 2010; Petrus *et al.*, 2011). On the contrary, Ajala *et al.* (2007) noted that over 60% of respondents in Kaduna, Nigeria vaccinated their pigs against diseases. Kumaresan *et al.* (2009) also found that 37.8% of farmers in India vaccinated pigs against common diseases.

Most mortality of pigs occurs during the early life of piglets (Ajala *et al.,* 2007; Kamuribo *et al.*, 2011). A number of diseases have been mentioned that affect piglets such as worm infestation, diarrhoea and skin diseases caused by mange, lice and deficiencies. Ocampo *et al.* (2005) reported that at least two piglets die per litter as a result of worm infestation, diarrhoea or being squashed by sows. This suggested that diseases observed by farmers in rural areas are somehow similar worldwide. In terms of healthcare in rural areas, *Taenia solium* infestation is recognised as not only a health problem for pigs but also a public health problem (Vilhena *et al.*, 1999; Sciutto *et al.*, 2000; Veary and Manoto, 2008; Assana *et al.*, 2010a; Assana *et al.*, 2010b).

Lack of pig meat inspectors and poor husbandry practices in rural area makes worm infestation a serious public health problem in many developing countries (Veary and Manoto, 2008). Vilhena *et al.* (1999) in Mozambique noted that poor people who live in poor sanitary conditions were the most affected or showed signs of cystercecosis. Public educating and general awareness of *Taenia solium* infections is vital in eradicating the disease (Krecek *et al.*, 2012). It is important to educate rural people about personal hygiene and environmental control (Vilhena *et al.*, 1999). Assana et al. (2010a) reported that in developed countries neurocysticercosis was eradicated through improvements in public health.

CHAPTER 3: RESEARCH METHODOLOGY

A Farming Systems Research Section (FSRS) was introduced in KZN in mid 1990s to tackle on-farm and client-orientated research in the rural areas (de Villiers, 2005), and to meet the needs of many small-scale farmers. The Farming Systems Research was first introduced in East and southern Africa in the mid 1970s as described by Matata *et al.* (2001). The aim was to improve technology generation and dissemination of technology to smallholder farmers. It was required to conduct the studies on pig production in rural areas through Extension Officers in uThukela District who are the first line of government intervention in the rural areas.

3.1 Materials and methods

3.1.1 The study area

The study was conducted in uThukela District Municipality in KZN province, as shown in **Figure 3.1** below. UThukela District covers an area of approximately 11500 km^2, with a population of about 714 909 people (DSPED, 2012) from a community study done in 2007; while Statistics SA (2012) reported uThukela District to had about 7% of KZN population or 718 711 people in 2011. UThukela District Municipality has five local municipalities: Indaka (991.71 km^2), Emnambithi/Ladysmith (2,965.92 km^2), uMtshezi (2,130.85 km^2), Okhahlamba (3,540.63 km^2) and Imbabazane (827.74 km^2), as shown in **Figure 3.2.**

Seventy five percent of uThukela District is rural comprising of 22 Amakhosi or Traditional Authorities. Indaka and Imbabazane Municipalities do not have any formal towns. Okhahlamba and Indaka municipalities are both dominated by agricultural activities. The district has a good climate and abundance of natural resources such as water which is supplied to the rest of KZN and Gauteng Province. The district receives an annual rainfall of over 1 000 mm per annum with temperatures ranging between a mean maximum of 13.5 ^oC – 25.9 ^oC and a mean minimum of 3.7 ^oC – 12 ^oC (DSPED, 2012).In 2007 DSPED estimated the number of households in uThukela District to be 139 639 (DSPED, 2012). The number of households in the local municipality was distributed as: 50 259 in Emnambithi, 21 081 in Indaka, 15 232 in uMtshezi, 28 508 in Okhahlamba and 24 559 in Imbabazane.

Figure 3.1: The study area in the context of KwaZulu-Natal.
Source: Macro Planning Natural Resources (2013)

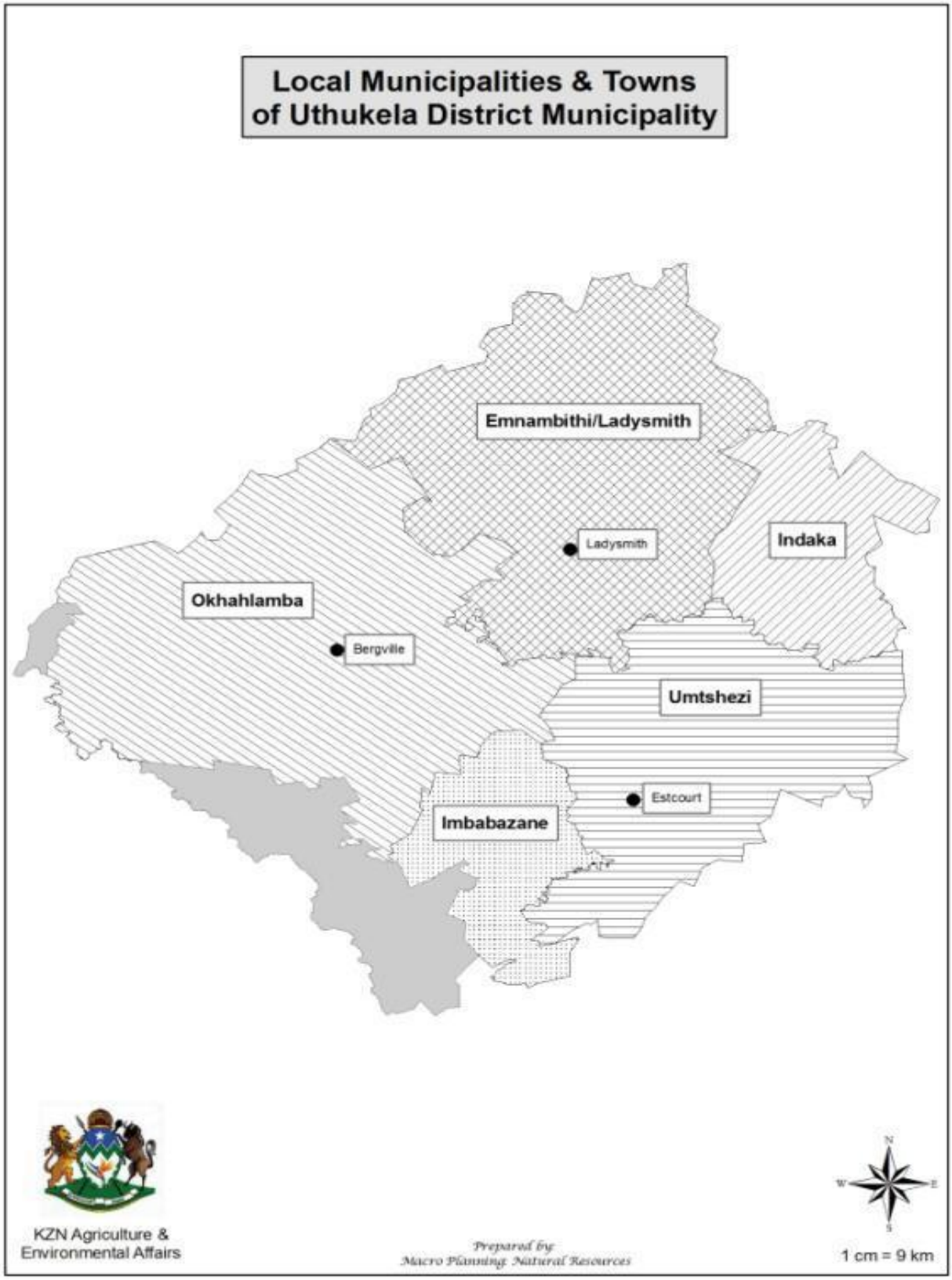

Figure 3.2: Study area showing the local municipalities.
Source: Macro Planning Natural Resources (2013)

3.1.2 Research design and approach

As was recommended by de Villiers (2005) a stronger and much improved bond between the agricultural role players is necessary and must result in demand-driven services which should include research that speaks directly to the farmers. This study therefore followed the Farming Systems Approach (FSA) which sought to understand the whole farm system through studying and understanding the relationships between and among the various components (Matata *et al.*, 2001).

The study methodologies such as the diagnostic study which is a crucial stage in the FSA as it lays foundation for the interventions that follow (Matata *et al.*, 2001). This diagnostic study was the first stage of research which aimed at understanding the current production systems and to identification of the major constraints and possible solutions. The diagnostic stage included identifying the target groups, collection and analysis of data as described by Matata *et al.* (2001).

The target population of pig farmers was identified with the assistance of EOs working in the each municipality through purposive sampling and also through the use of the snowballing technique (Pondja *et al.*, 2010). The EOs were in constant communication with the farmers and livestock associations in their respective areas. This made EOs credible as the source of identifying pig farmers. Purposive sampling was used as only pig farmers were targeted for the study and snowballing technique was later applied to cover pig farmers in the district. By covering all pig farmers we ensured that biasness was minimised in the data collection and all rural villages and communities in the district were surveyed.

3.1.3 Sample size and sample selection

UThukela District was chosen as the study area because there were many pig farmers in its local Municipalities who kept on requesting for advice to improve their pig production practices. A request was made to the FSRS to empower EOs to be able them to assist pig farmers in the district. This resulted in the primary data collection in the area. The target population in the study was all pig farmers living in uThukela District, irrespective of number of pigs they kept. The target group is defined as a group of farmers whose circumstances are similar enough and they can all adopt and use the same advice and

recommendations (Matata *et al.*, 2001) and as such all pig farmers in uThukela were targeted.

As no secondary data existed on pig production in the district, hence accessing respondents was difficult. It was made even more difficult by EOs reporting that some areas of the district did not have pig farmers because of religious beliefs. This was confirmed during the surveys as in some parts of the district there were no pigs. A total of 533 pig farmers were interviewed for the study in the end.

3.1.4 Sampling tools

A cross-sectional survey, using a structured questionnaire (Appendix A) was used to collect data from pig farmers in uThukela District. A cross-sectional survey was used because it provided a snapshot of what was happening at that point in time from a sample selected to represent a larger population (Owens, 2002; Mathers *et al.*, 2009). A structured questionnaire was used because had more closed questions with answers defined in advance and therefore guided the respondents (Mathers *et al.*, 2009).

3.1.5 Sampling procedures

A total of 300 pig farmers were initially identified by EO but the number increased through the snowballing technique whereby farmers who were interviewed referred the team to other farmers in the area. In the end a total of 533 pig farmers were interviewed. The uMtshezi local municipality did not have pig farmers hence no data was collected from there.

The questionnaire was completed during the visits to the farmers homestead and during a face-to-face interview. The interviews were aimed at obtaining information from the farmers themselves to provide a clear picture about the local pig sector. Walonick (2007) described personal interview as one of the best methods of acquiring personal and in depth information. Murphy *et al.* (1998) cited by de Villiers (2005) stated that "*if you want to understand what people do, believe and think, ask them*". The questionnaire dealt with a number of variables which included demographic questions, social and economical contribution of pigs to households and different production systems. The investigation on production systems covered aspects such as farmer's experience in farming and training, pig reproduction management, housing, slaughter, biosecurity and healthcare. The events

that took place during the study are shown in **Table 3.1.** The FSRS staff was already working with the EOs in the study area on other studies, therefore, there was no need for them to be reintroduced to the tribal authorities.

Table 3.1: Main events that occurred during the study

Date of event	Event	Purpose of event
Aug 2011	Meeting between FSR and EOs	Discussed the study and planned the way forward with the survey.
Nov 2011	Meeting between FSR and EOs	Final planning of survey, planned dates and logistics.
Jan 2012	Training of EOs and FSRS staff	Got interviewers to understand the questionnaire and how to conduct the interviews.
	Testing questionnaires (5 farmers interviewed)	Tested questionnaire to check the suitability of questions.
Feb – Jul 2012	Collecting data	Conducted interviews with farmers
Aug 2012	Data captured	Captured collected data
Sept 2012	Data analysis	Analysed data
Oct 2012 to Jun 2013	Writing of report	Wrote report and submitted.

3.1.6 Data collection

The team that conducted the interviews was made up of FSR staff with the assistance of EOs in the different Local municipalities. Each group of interviewers consisted of the professional scientist, technicians and EOs. The EOs guided the groups through the communities and introduced the interviewers to farmers. Data was collected in groups by covering one ward in a municipality at a time. The interviewing of farmers was rotated among the groups with the professional scientists supervising the groups at all times. The survey began at Emnambithi which was the largest, followed by Indaka, Okhahlamba and

iMbabazane. Each community was covered completely before moving on to the next. Data was collected using a structured questionnaire where all identified households formed part of the study. Each pig owner was interviewed in a face-to-face interview at the homestead. The interviews were conducted in isiZulu and answers were translated into English. The study was conducted between February 2012 and July 2012.

3.1.7 Data analysis

Survey data were captured on a Microsoft Excel 2007 spreadsheet and analysed to determine simple means and frequencies. No statistical analysis was done.

3.2 Limitations of the study

Time and resource constraints were the major challenges of this study. Accessibility to some of the rural areas by vehicles was very difficult and therefore interviewers had to walk long distances to reach some homesteads. The snowballing sampling method could have introduced some bias and that some farmers who lived in very isolated parts of the district might have been missed.

CHAPTER 4: RESULTS

4.1 Profile of study area and the participants

A total of 20 Traditional Authorities or Amakhosi where 95% of the respondents lived were surveyed. Municipal ward numbers and GPS co-ordinates for al 533 respondent households where the interviews were done were recorded for future research use and referencing. The number of people in all households interviewed was 4205. The number of females was higher among adults and children younger than 16 years old. Among adults there were 1311 females and 956 of males. Children younger than 16 years were 977 females and 961 boys. The highest number of males in one household was 20 adults, and in another group 13 was the highest number of people in one household among adult females and children. Most of the households had 2 – 3 people. Forty three households have no adult males and fifteen had no adult females. In other homes it was only the youth who were leaving on their own because both parents were deceased.

A total of 2643 pigs were counted in uThukela District, but 5% of that fell outside the Amakhosi areas. Emnambithi local municipality had the highest number of pigs (985) followed by Indaka (885), Okhahlamba (387) and Imbabazane which had the least number of pigs (298). Zondi village in Emnambithi local municipality had the highest number of pigs (369), while Ndaba villages in Okhahlamba and Imbabazane local municipalities had the least number of pigs (37) (**Table 4.1)**

The gender distribution of pig farmers in the local municipalities showed that there were more (60%) female pig farmers than male farmers and also female farmers owned 65% of the pigs. There was an average of 5 pigs per household which were interviewed **(Table 4.2 and Figure 4.1)**.

Table 4.1: The number of pigs in each village in the local municipalities

Emnambithi		Indaka		Okhahlamba		Imbabazane	
Khumalo	124	Kunene	205	Hlongwane	95	Hadebe	107
Majola	205	Mabaso	68	Miya	91	Mazibuko	51
Shabalala	130	Mchunu	41	Mlothswa	164	Mkhize	62
Mthembu[a]	95	Mthembu[a]	95	Ndaba[b]	37	Mlangeni	41
Ngubane	62	Nxumalo	205			Ndaba[b]	37
Zondi	369	Sithole	216				
		Zwane	55				
Total	985		885		387		298
Average	164		126		97		60

[a, b]Land borders a neighbouring municipality, number halved between the two municipalities.

Table 4.2: Comparison between the number of owners and the number of pigs

Gender	Owners	Pigs	Average number of pigs per household
Female owners	346	1660	5
Male owners	187	895	5
Total	**533**	**2555**	**5**

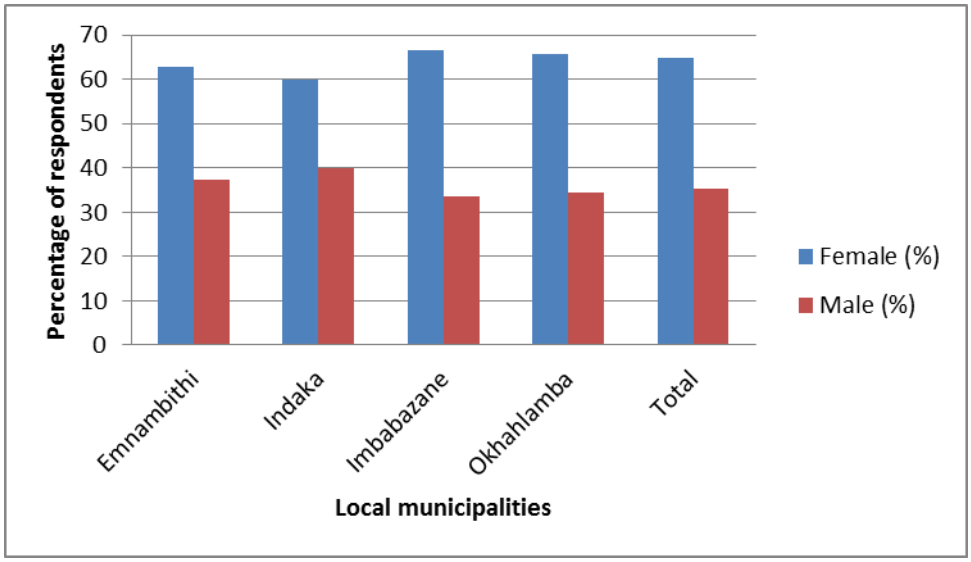

Figure 4.1: Gender distribution of respondents

With respect to home language 99% of respondents stated that isiZulu was their home language. Other RSA official languages such as isiXhosa, Sesotho and siSwati were also mentioned by 1 % of the households in uThukela District. Imbabazane and Indaka both were 100% Zulu home language speakers, with no other RSA official language mentioned in them, leaving Emnambithi and Okhahlamba Municipalities having the other languages as home languages. Overall, there was a 74% unemployment rate in every local municipality, 16% were pensioners, and only 10% of the respondents were employed in different types of employments.

A number of the respondents were self-employed. The most common self-employment area was tuck-shops as owners (4%) or selling in schools during lunch breaks almost similar in all local municipalities, while others were employed as road works labourers (1 %). Other types of occupations observed were taxi drivers, security guards, teachers and domestic workers. People employed had a significantly higher number of pigs than the unemployed and pensioners ($P<0.05$) as shown on **table 4.3.** No significant differences were seen between pensioners and the unemployed.

Table 4.3: Pig numbers in relation to occupation and incomes

Occupation	Average number of pigs per household
Pensioners	4
Unemployed	5
Employed	9
Average	**5**

Education levels of respondents ranged from no education at all to those having tertiary qualifications. About one third of the respondents had no education **(Figure 4.2).** Primary and Secondary school qualifications were evenly matched in the different Local Municipalities with only 2.7% continuing beyond Grade 12. Overall no significant differences were noted between the education levels. **Table 4.4** shows the spread of different levels of education within the different local municipalities of uThukela District.

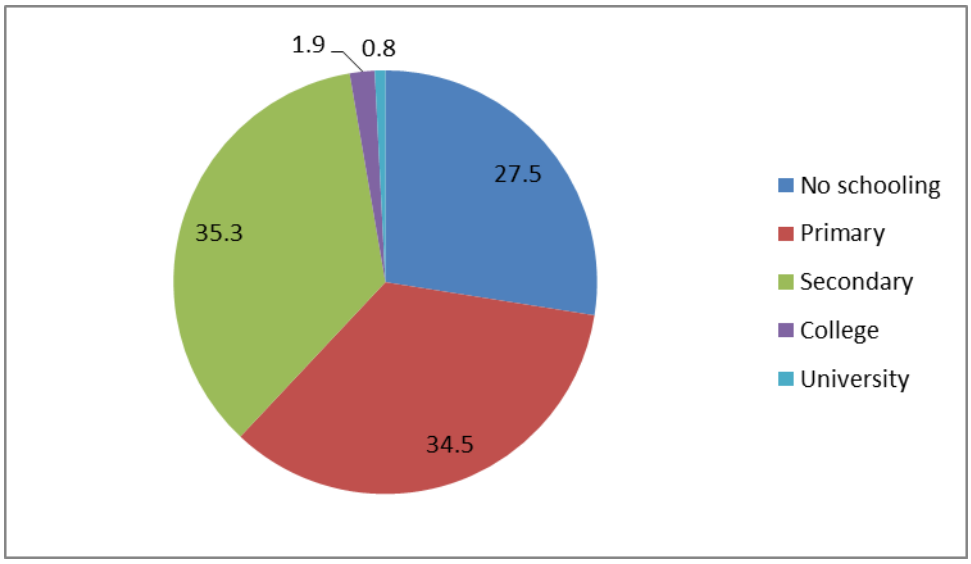

Figure 4.2: Education level of respondents (%)

Table 4.4: Education level of respondents in different local municipalities (%)

	No schooling	Primary	Secondary	College	University
Emnambithi	28.7	31.9	36.2	2.1	1.1
Indaka	22.0	36.0	40.0	2.0	0.0
Imbabazane	30.9	37.7	29.7	1.1	0.6
Okhahlamba	25.6	32.7	38.4	2.4	0.9
Total (n= 533)	**27.5**	**34.5**	**35.3**	**1.9**	**0.8**

Comparison between the level of education and the ownership of pigs showed that people who studied past primary school education kept more pigs then those with lower education level (**Table 4.5).** However, respondents who had primary education had similar number of pigs to those who had no formal education at all.

Table 4.5: Comparison between education level and pig ownership

Education level	Average number of pigs
No schooling	4
Primary education	4
Secondary education	7
College education	5
University education	6
Overall mean	**5**

Figure 4.3 shows that most pig farmers (62%) were older than 45 years, while 38% were young farmers. A high number of respondents were in their fifties or already on pension. That meant age had an influence on the ownership of land and property.

Different sources of income were recorded among different households. Estimates of how much each source contributed to the household are shown in **Table 4.6.** They ranged from government social grants, livestock and crop sales, different home industries, contributions from other family members and salaries for those that were employed. The amount given excluding possibly government grants were all estimates as given by

respondents to the best of their ability as most did not keep records of profits and monies spent.

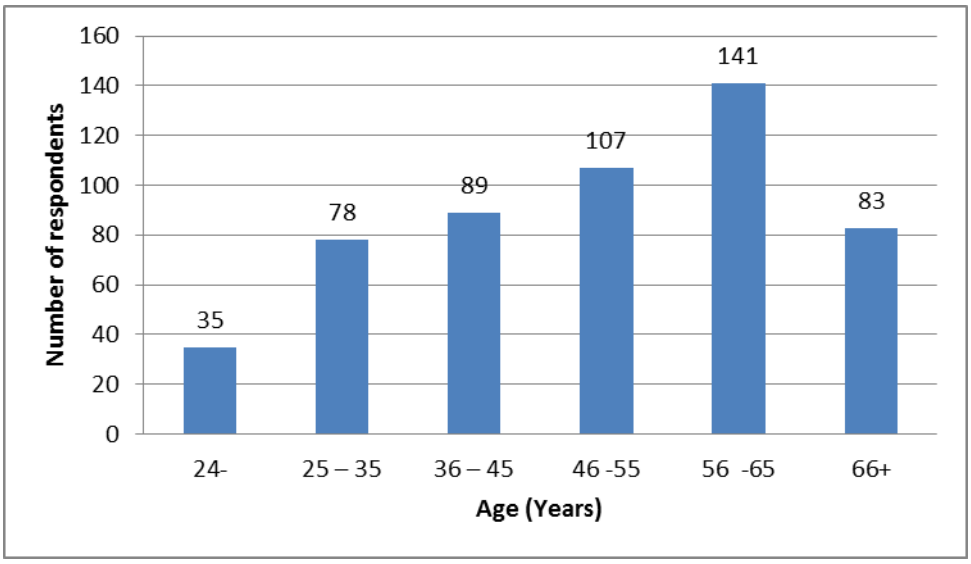

Figure 4.3: Age distribution among pig farmers

Table 4.6: Sources and collective income among households in the study area

Source of income	Collective monthly income (R)	Collective yearly income(R)
Salaries	344 650	4 135 800
Pension	370 800	4 449 600
Child grants	329 080	3 948 960
Disability grants	55 200	662 400
Home industries	21 827	261 924
Crops	36 675	440 100
Livestock	112 675	1 352 100
Family members	39 170	470 040

4.2 Social and economic contribution of pigs to households

The smallest land size in the study area was 0.01ha, and the largest was 56 ha. Emnambithi municipality had the largest land size (1.69 ha); Indaka and uKhahlamba

municipalities an average land size of 1 ha and the smallest land size (0.9 ha) was in iMbabazane municipality. Overall, an average land size of 1 ha per household was observed. Ownership of land was not influenced by age, but it was influenced by gender. Males owned slightly more land (1.68 ha) than females (0.96 ha) as shown in **Table 4.7.** Education level had no influence on land ownership, while employed people had substantially (2.49 ha) more land than pensioners and unemployed people as shown in **Table 4.8.**

Table 4.7: Average land ownership between the genders

Gender	Average land ownership
Female	0.96 ha
Male	1.68 ha

Table 4.8: Average land ownership and employment status of respondents

Employment and income status	Average land ownership
Employed	2.49 ha
Pensioner	1.26 ha
Unemployed	1.04 ha

Different livestock types were kept by different households in the study area. They included cattle, goats, sheep, pigs and chickens. Chickens were kept by 90% of respondents **(Figure 4.4).** Beef cattle were kept by 53% households, while 49.3% of respondents kept goats. Sheep were kept by 19.7 % of the respondents. There was a strong relationship between keeping sheep and goats and between beef cattle and goats. So for farmers who kept goats there was a great likelihood of also keeping sheep or beef cattle.

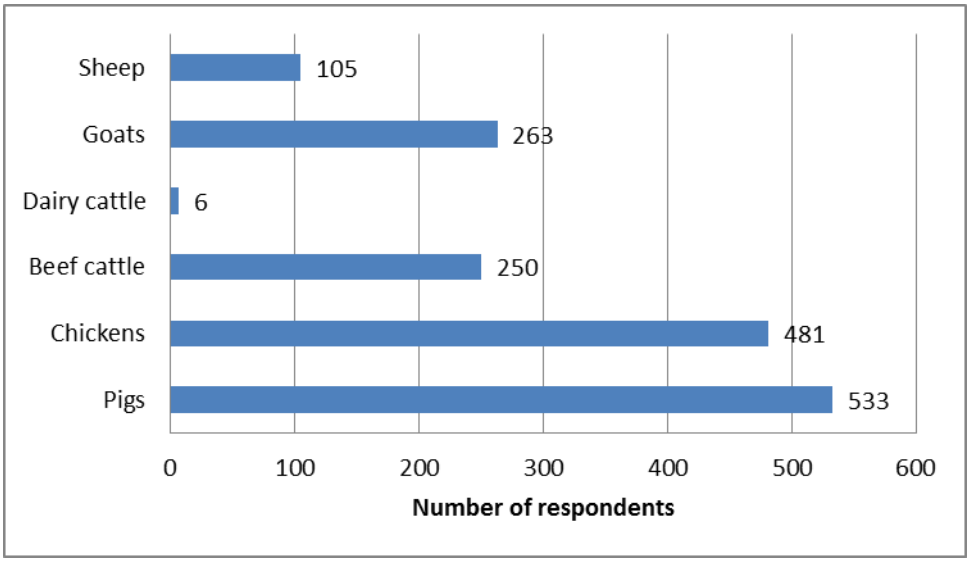

Figure 4.4: The number of respondents keeping pigs and other livestock

Various crops were grown in uThukela District. Maize was planted by 59% of the households. Potatoes were the second most popular crop among 17% of households, together with other crops such as vegetables (cabbages, spinach, tomatoes, carrots, beetroot and onions) and fruits. Peaches were the most grown fruits (71.5%) followed by apples and grapes as shown in **Figure 4.5.**

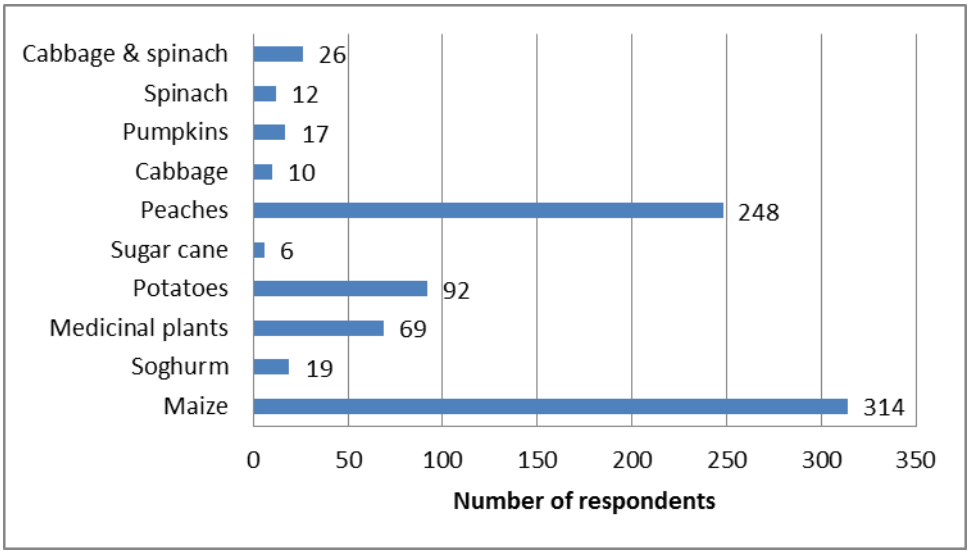

Figure 4.5: The number of respondents growing different crops

Respondents kept pigs for different reasons such as: home consumption (63%), source of income (33%), manure (3%) and other (e.g. fat) (1%) as shown in **Figure 4.6.** The

proportion of respondents that kept pigs for fat and other cultural reasons was very low. Pig fat is used by some households for applying on izidwaba (Zulu traditional attire worn by women and babies to chase away evil spirits). There was a strong relationship between employment and selling pigs as a source of income. More employed people sold pigs for income and more unemployed people used pigs for home consumption as shown in **Table 4.9.**

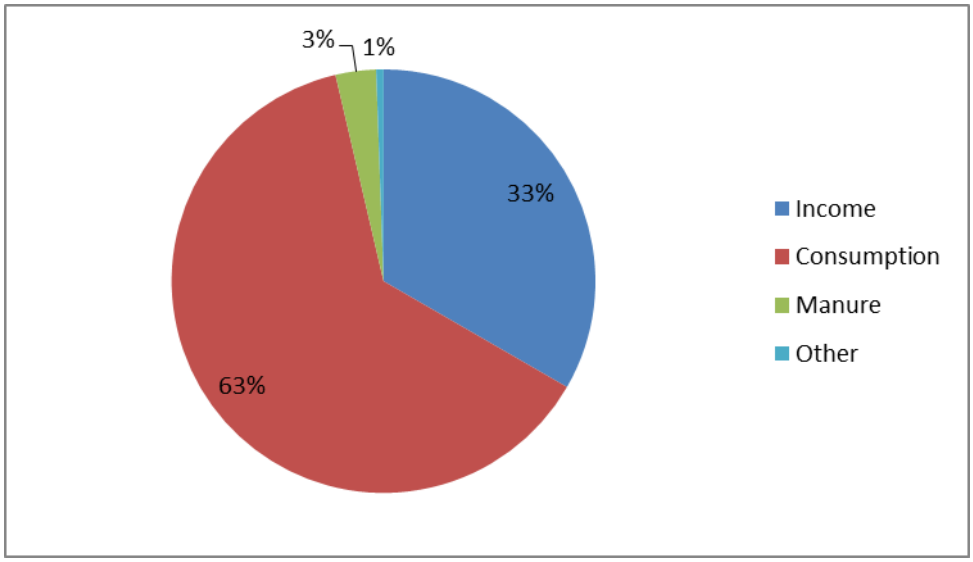

Figure 4.6: Reasons for keeping pigs as mentioned by respondents

Table 4.9: Relationship between income status, pigs sold or pork consumed

Income status	Pigs sold for income		Pork consumed	
Employed	68.0 %	(34 pigs)	74%	(37 pigs)
Pensioner	38.1 %	(32 pigs)	91%	(77 pigs)
Unemployed	43.8 %	(172 pigs)	81%	(334 pigs)

Different marketing channels were utilized by pig farmers in the study area to sell their pigs as shown on **Table 4.10.** Farmers used pension pay points (where old age, disability, foster and child grants are paid), abattoirs, butcheries and neighbours. Initially, pension points were set to coincide with special days when government grants were also

paid, but these days pension points are used for the informal marketing similar to that of selling to neighbours.

Table 4.10: Marketing channels used by pig farmers

Marketing channel	Frequency	(%)
Pension pay points	57	24
Abattoirs	23	10
Butcheries	9	4
Neighbours	183	76

A small number of respondents (10%) sold their pigs at abattoirs. Different abattoirs were used by pig farmers, but Amblecyte was the most popular (40%) followed by Cato Ridge (27%) and least one was Glencoe abattoir. Some farmers used more than one of the three abattoirs. A total of 271 pigs were sold and slaughtered at abattoirs between February 2012 and July 2012. Most farmers used their own transport (59%) and the rest used contractors (41%) to transport pigs to the abattoirs. The age at which pigs were slaughtered varied from 5 to 18 months **(Figure 4.7).**

Figure 4.7: Different ages at which pigs were sold to abattoirs

Farmers sold live pigs or slaughtered them and sold meat within their communities. Majority of farmers sold live pigs of different ages within the communities, while fewer farmers sold pork only and the rest sold both live pigs and pork **(Figure 4.8).**

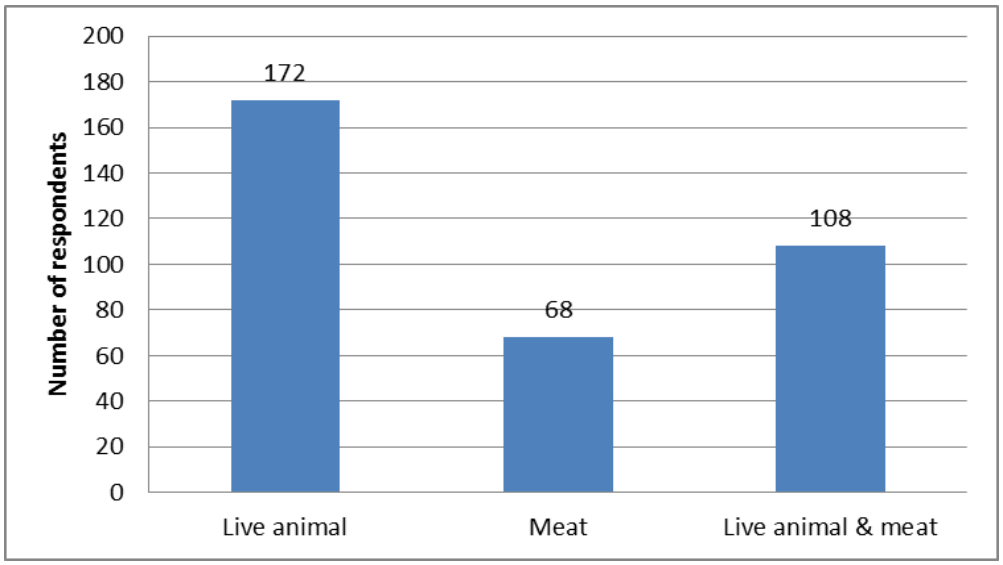

Figure 4.8: The form in which pigs were sold

Different times of the year were utilized by farmers to sell their pigs. Winter season (May/July) was clearly noted as the selling time when a larger number of pigs were sold, although sales also occurred throughout the year.

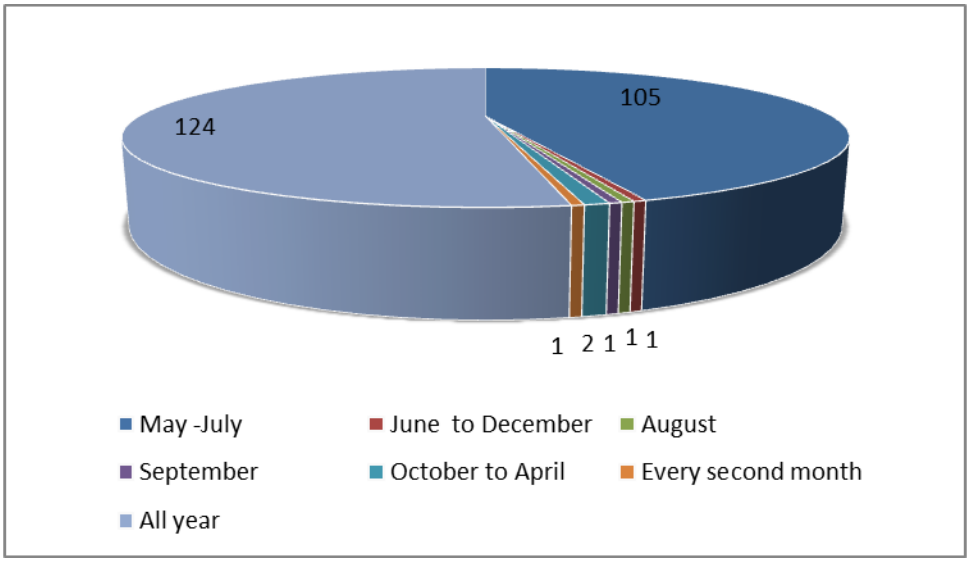

Figure 4.9: Periods when pigs were sold

Religion and culture had little influence on pig keeping in uThukela District. Most of the respondents (88%, n = 465) did not have any challenges with regard to religion or culture. However, 7% were influenced by religion, family members or neighbours who did not want pigs around because they believe that pigs have demons in them. A smaller number (1%) were influenced by cultural beliefs. Some of their neighbours complained that pigs caused thunderstorms and also others complained that pigs destroyed izibethelo (traditional medicine used to strengthen and protect homesteads). Besides the few who had religious or cultural challenges the rest of respondents had no problems with pig farming or the consumption of pork.

Respondents indicated their preferences for meat consumption by ranking chicken meat the highest followed by beef, pork, mutton and chevon in that order as shown in **Figures 4.10 to 4.14.** Other meat types such as fish and turkey were only mentioned by a few respondents.

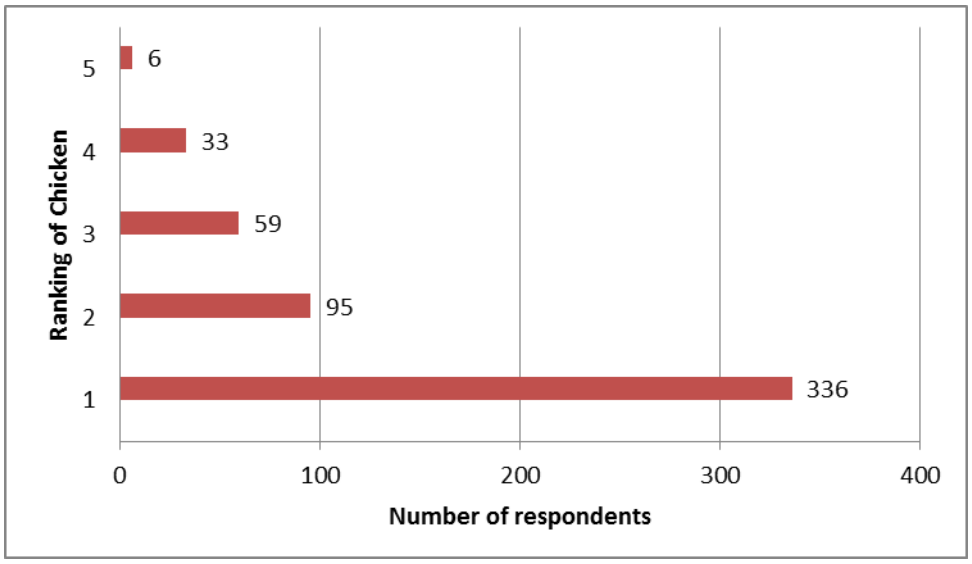

Figure 4.10: Ranking of preference for chicken

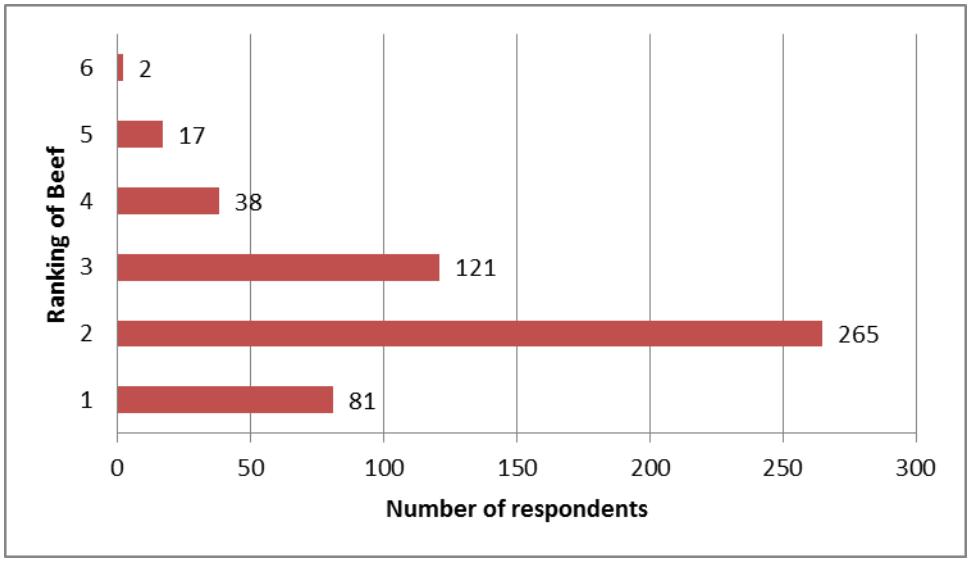

Figure 4.11: Ranking of preference for beef

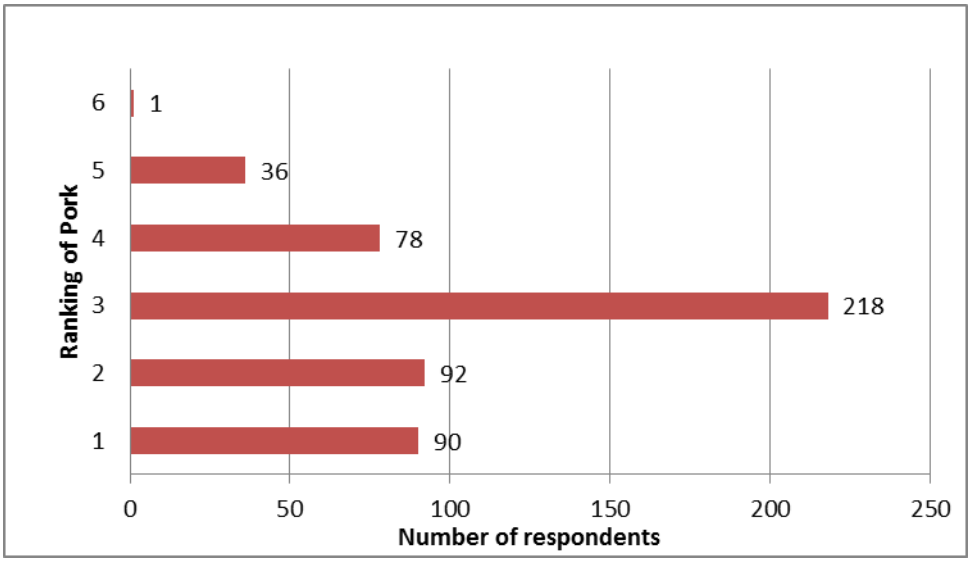

Figure 4.12: Ranking of preference for pork

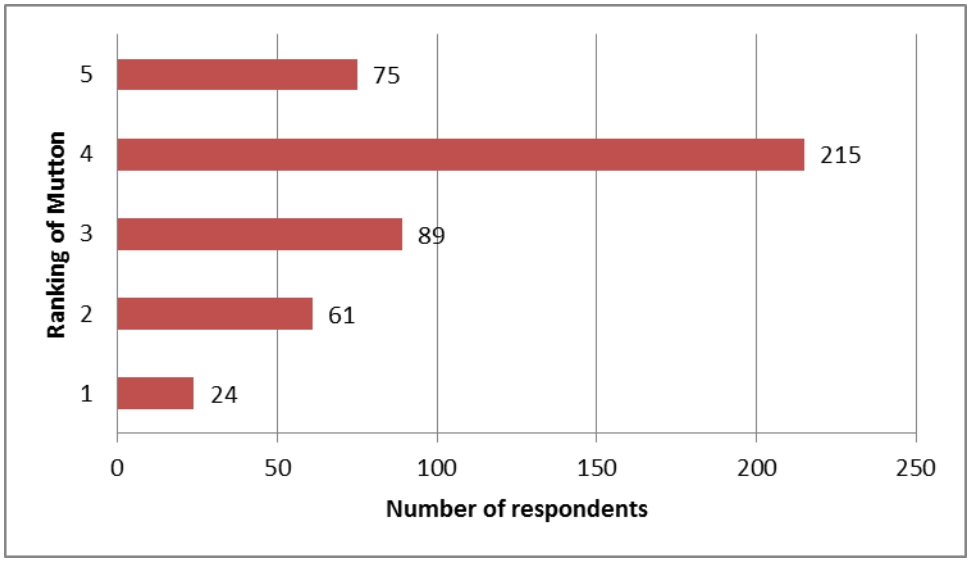

Figure 4.13: Ranking of preference for mutton

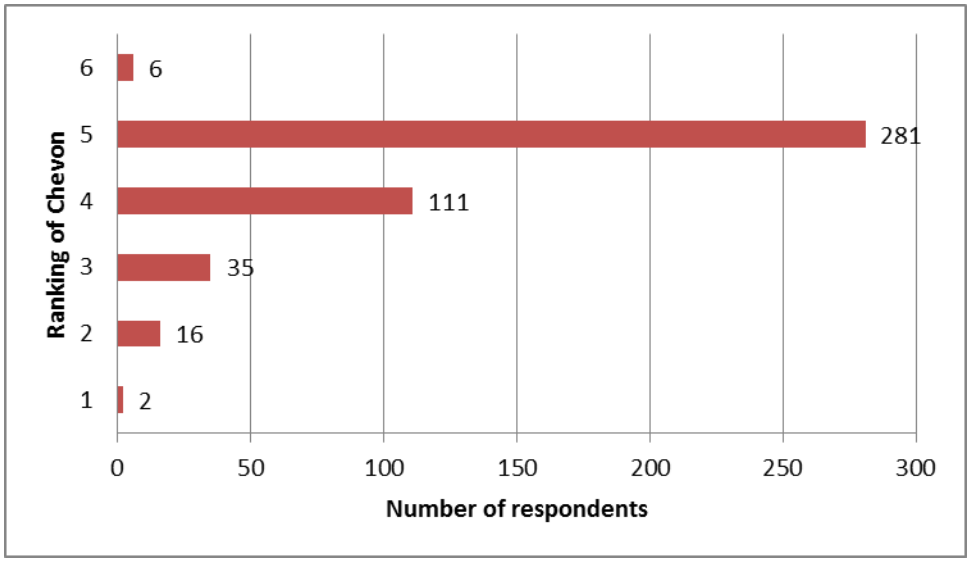

Figure 4.14: Ranking of preference for chevon

4.3 Production systems

Half of the respondents had more than 6 years of experience in farming with pigs, while 34.9% had 2 to 5 years of experience and 14.8% were new entrant farmers with less than one year of farming with pigs **(Figure 4.15).**

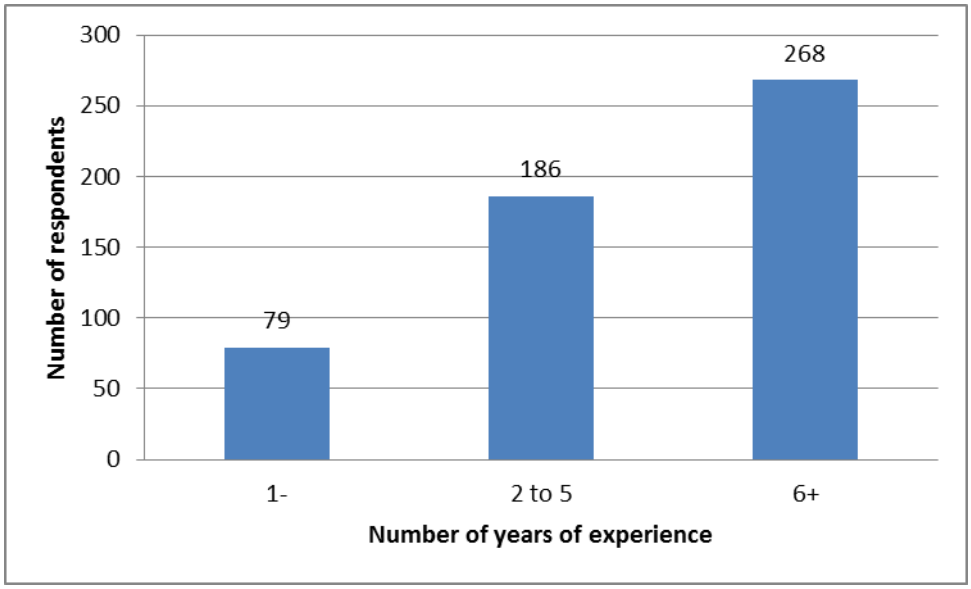

Figure 4.15: Farmers' experience in farming with pigs

Majority of older respondents ((72%; n = 343) who were parents of the young pig farmers, kept indigenous pigs as shown in **Figure 4.16**. They had kept pigs for a long time and that was evident by the number of years of experience. About 12% of farmers kept Large White breed, while 5.2% of farmers kept crosses of Indigenous and Large White breeds and 2% others kept crosses of Indigenous and Landrace breeds.

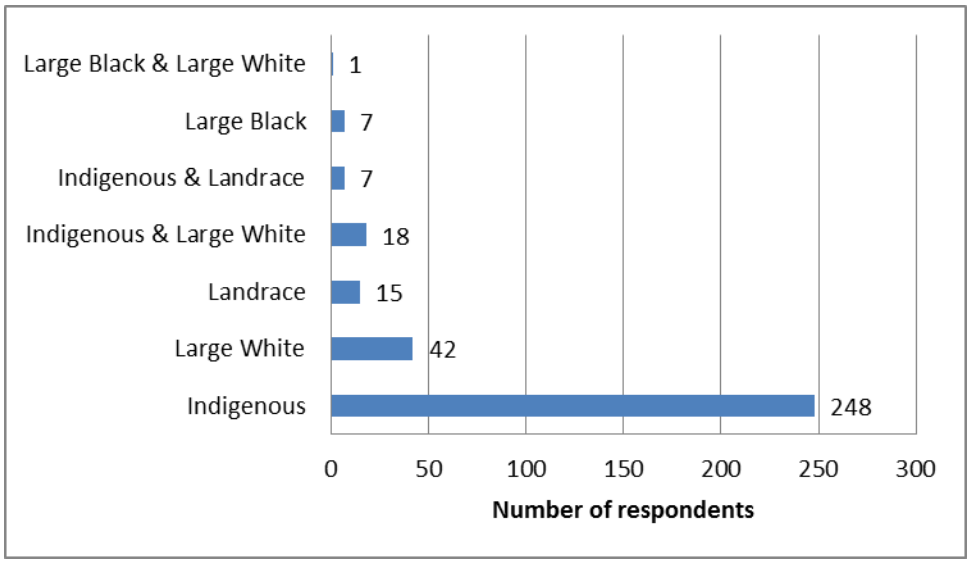

Figure 4.16: Breeds of pigs kept by parents of the current pig owners

Similarly, young farmers kept four breeds of pigs (Indigenous, Large White, Landrace and Duroc) as shown in **Figure 4.17.** Other breeds mentioned by a fewer respondents were noted and discussed in Chapter 5.

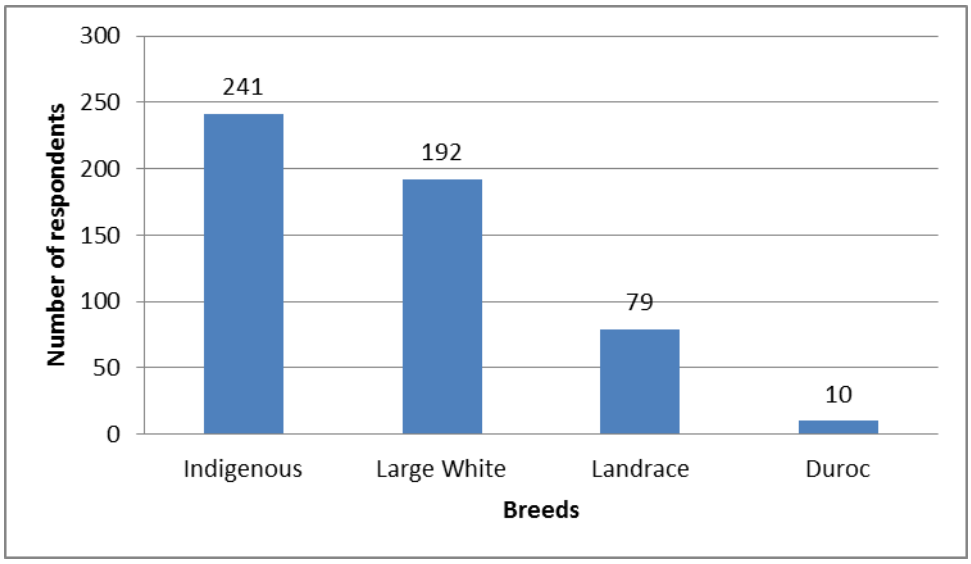

Figure 4.17: Pig breeds commonly kept by young farmers

Despite having kept pigs for many years, very few farmers have been trained on pig husbandry. Only 17 people had attended some sort of training courses in the past. Out of those trained, 59% of the training was conducted by the Department of Agriculture and Environmental Affairs and 11.8% by Zakhe College of Agriculture; others were trained on private farms. Most of the training courses (53%) took between 2 and 3 days, while 11.8 % took between 2 and 3 weeks, and the rest took between 3 and 6 months on private farms. A positive relationship was found between those farmers who were trained and farrowing rate per sow per annum. Training of farmers on pig husbandry improved the performance of sows as shown in **Table 4.11** below.

Table 4.11: Relationship between farmer training and farrowing rate

Training attended or not	Average number of farrowing rate per annum
Yes	1.7
No	1.4

Farmers bought their breeding stock from different areas but most notable were those who bought and sold stock within the neighbourhood; while others selected within their own herds. Very few pigs were bought from outside the study area as shown in **Figure 4.18.**

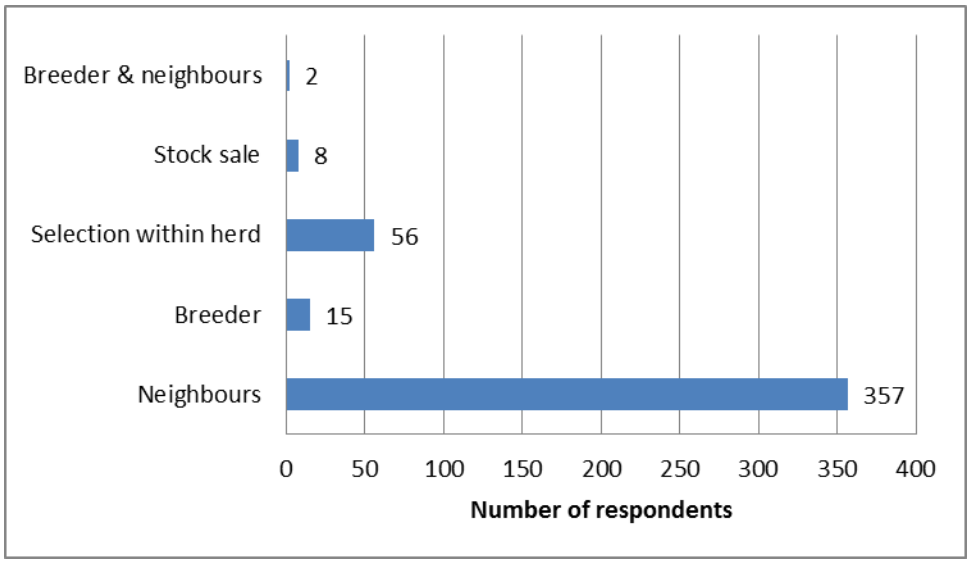

Figure 4.18: Sources of breeding stock

Figure 4.19 shows the different reasons given by farmers for selecting the type of breeds they kept as breeding stock; with majority of farmers having no particular reason for selecting the breeds they kept.

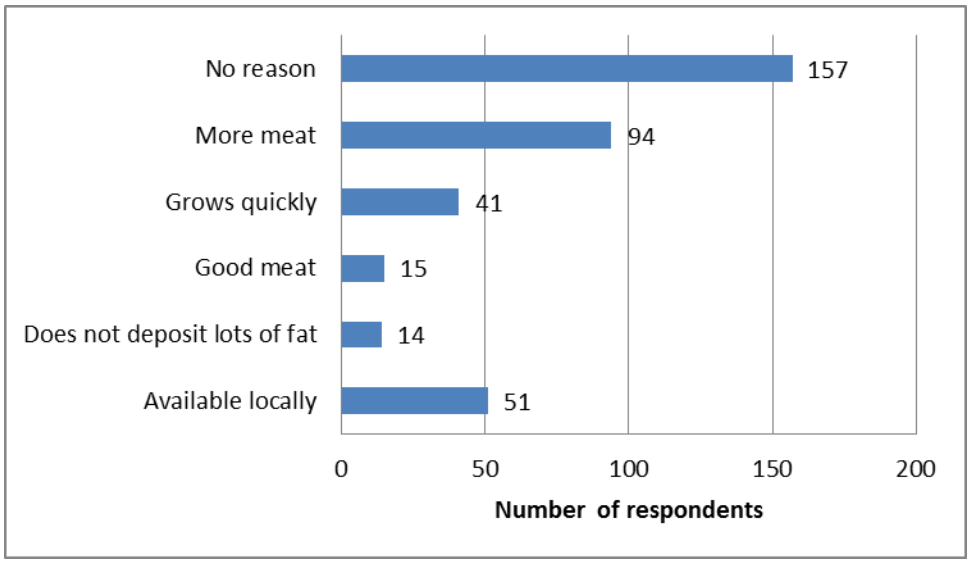

Figure 4.19: Reasons for keeping specific types of breeding stock

Reproduction management practices differed among the farms. Only 41% of the pig farmers controlled the breeding of their stock, while the rest of pigs bred without farmers' involvement. A strong relationship was noted between controlled breeding and births per sow per annum; and between controlled breeding and litter size as shown in **Tables 4.12 and 4.13.** Of the respondents who controlled the breeding of their stock, 32% of them bred gilts at 6-8 months, while 21.2% bred gilts at 8-12 months and 29% bred them once they were over 12 months old.

Table 4.12: Relationship between controlled breeding and farrowing rate

	Farrowing rate/sow/ annum		
Control breeding	**1**	**2**	**Number of respondents**
Yes	49.4%	50.6%	154
No	60.8%	39.2%	209

Table 4.13: Relationship between controlled breeding and litter size

	Litter size (%)			
Control breeding	**≤7**	**8 – 10**	**≥10**	**Number of respondents**
Yes	34.8%	42.6%	22.6%	154
No	44.0%	44.5%	11.5%	209

Figure 4.20 shows that most of sows in the study area farrowed once a year compared to sows in commercial farms that farrowed more than twice a year. **Table 4.11** above showed that farmers who received some form of training improved the farrowing rate from 1.0 to 1.7 per annum.

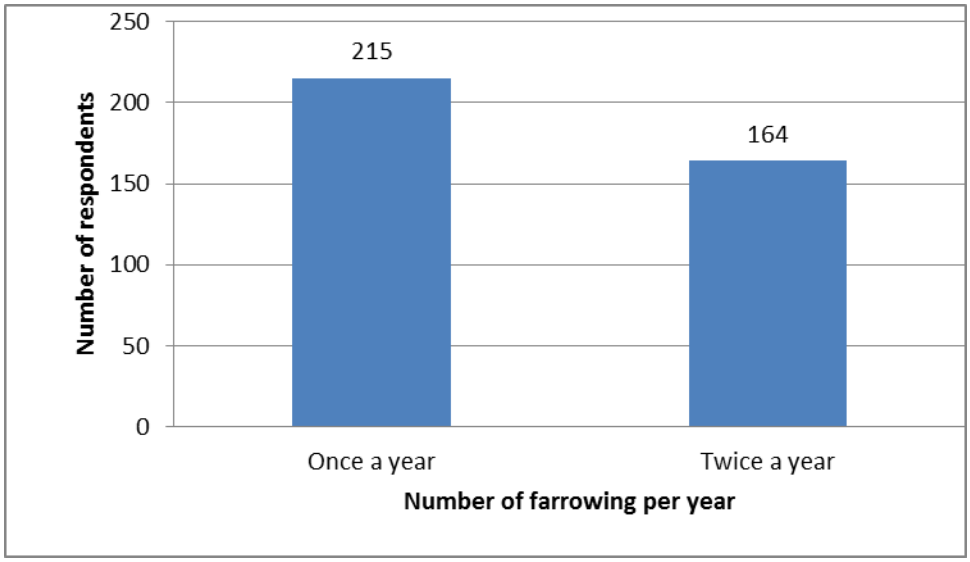

Figure 4.20: The average farrowing rate

The farrowing rate was higher in improved breeds than indigenous breeds as shown on Table 4.14. Landrace and Duroc breeds had the highest farrowing rate per sow per annum at 61% and 56%, respectively. The farrowing rate of some indigenous breeds was comparable with Large White sows raised in poor conditions.

Table 4.14: Farrowing rate of different breeds

	Pig breed			
Farrowing rate	**Indigenous (%)**	**Large White (%)**	**Landrace (%)**	**Duroc (%)**
1	58	52	39	44
2	42	48	61	56

Very few respondents (28%) said that they observed the sows during farrowing, while the majority of them (72%) said they did not know when the sows would farrow; they only saw sows and new piglets coming home after grazing in the veld. Of those who observed the farrowing, 24% of them noticed that sows farrowed more than 10 piglets, while 50% of sows farrowed 8 - 10 piglets and 25.9% of sows farrowed 7 or less piglets **(Table 4.15)**. In general, improved breeds had larger litter size than indigenous breeds.

Table 4.15: Relationship between the litter size and breed type

	Litter Size			
Breeds	**≤7**	**8 – 10**	**≥10**	**Respondents**
Indigenous	50%	41%	9%	167
Large White	29%	49%	23%	151
Landrace	32%	44%	24%	59

Most of the respondents (66.1%) indicated that they did not wean piglets at all. They let piglets to suckle until the sows refused to suckle them as shown in **Figure 4.21.** A strong relationship was observed between weaning and the farrowing rate per sow per annum. Farmers who weaned their piglets early improved the farrowing rate of sows per annum.

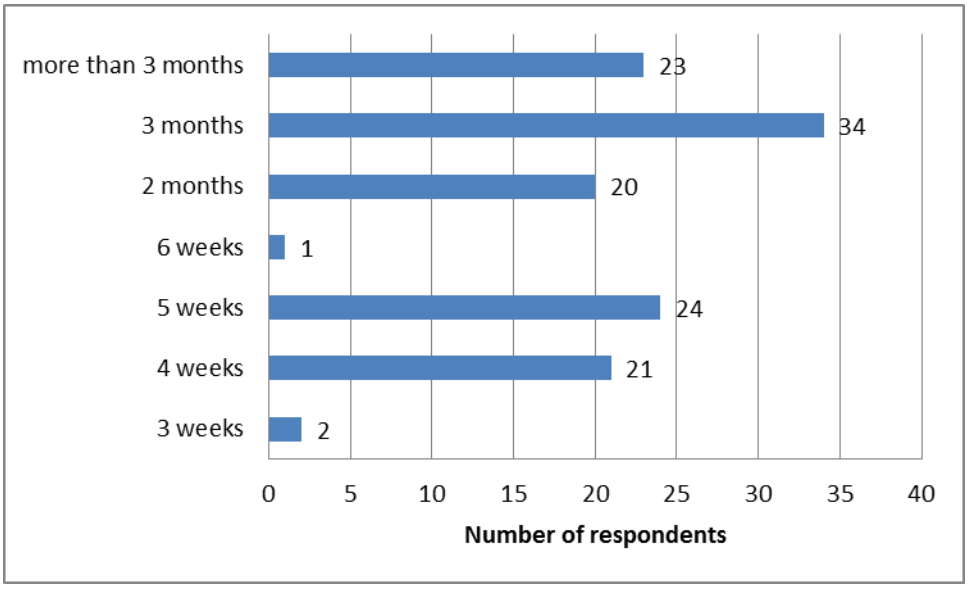

Figure 4.21: Age of piglets at weaning

Table 4.16 shows that respondents who weaned their piglets early tended to have more productive sows that farrowed more than once per annum. Respondents who sold weaners for income were the ones who mostly weaned the piglets early sold them. The weaning period varied between 3 weeks to 3 months. A strong relationship between weaning and farrowing rate was observed. Respondents who sold weaners for income were the ones who weaned the piglets regularly **(Table 4.17).**

Table 4.16: Relationship between the litter size and weaning rate

	Farrowing rate (%)		
Weaned	**1**	**2**	**Number of respondents**
Yes	43	57	128
No	63	37	247

Table 4.17: Relationship between weaning rate and the number of weaners sold

	Weaning percentage	
Sold for income	**Yes**	**Number of respondents**
Yes	73	50
No	27	50

Piglet mortality was due to disease and other environmental factors. Worm infestation was the most frequently (26%) mentioned as the cause of mortality , apart from lice (9%), mange (7.4%), loss of hair (13%) and diarrhoea (5.6%) as shown in **Figures 4.22 and 4.23.**

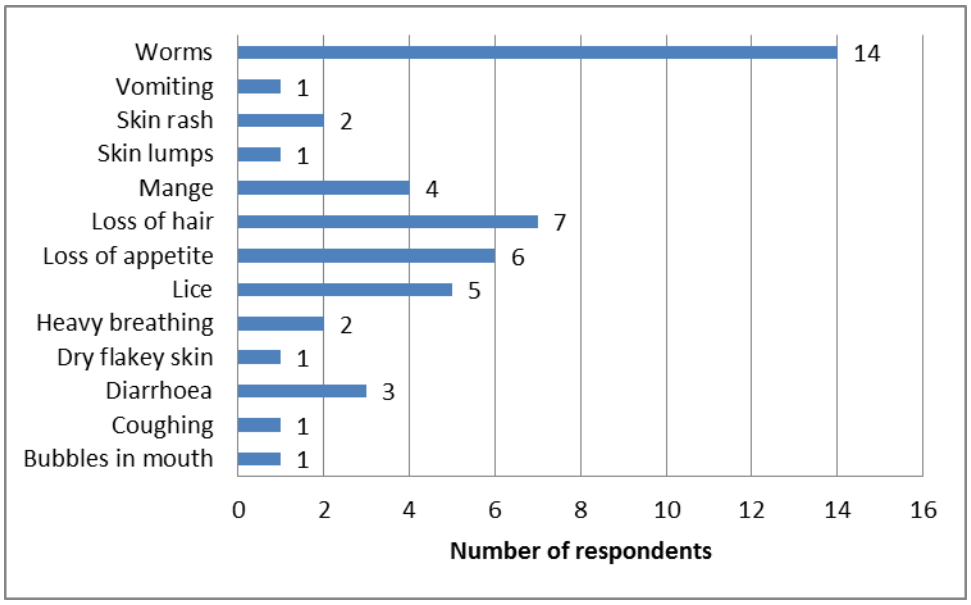

Figure 4.22: Types of diseases common in piglets

Overall, skin conditions in particular were noted as the main problem. Only 10.4% of the respondents said that they used the services of State Veterinarians (Vets). Most respondents (44.2%) did not know that they could consult Vets with regard to pigs. Some respondents (28%) viewed it as unnecessary, while 17% had no reasons because they had not experienced any mortality.

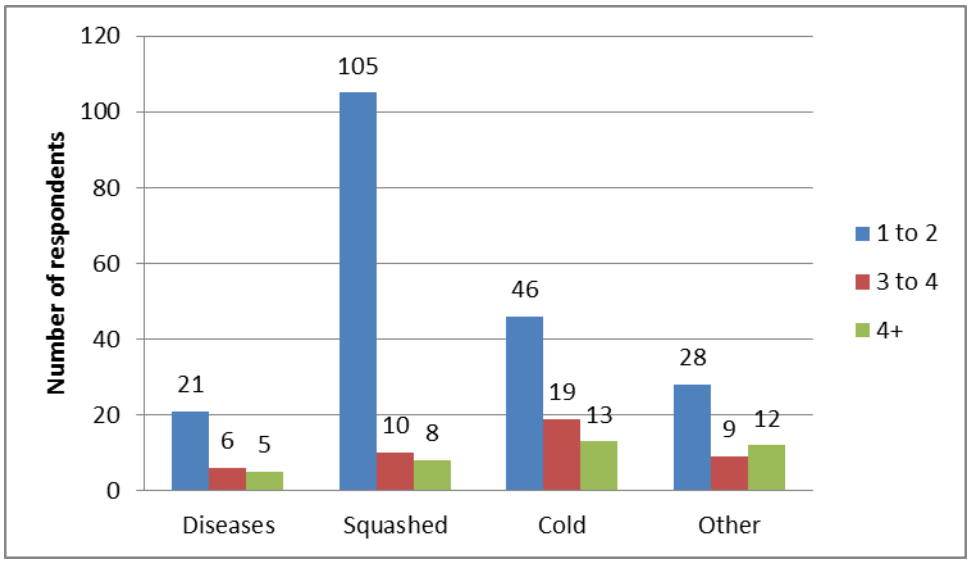

Figure 4.23: Causes of piglet mortality

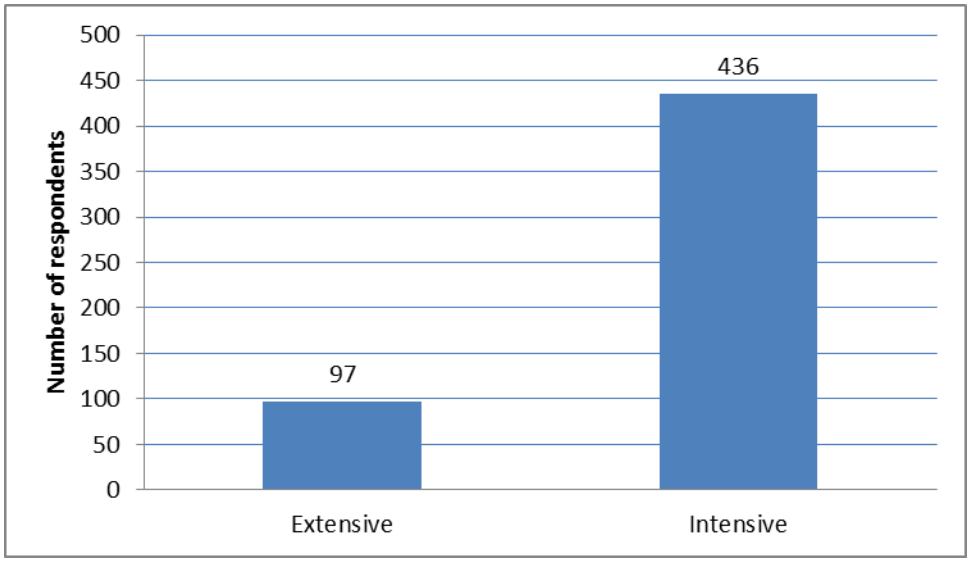

Figure 4.24: Types of pig production systems

Various rearing systems were observed. Most respondents kept their pigs under intensive systems indoors, while some let pigs roam outdoors in extensive systems as shown in

Figure 4.24 above. Pigs that were kept under intensive systems were reared in houses built of different materials and floor types **(Figures 4.25 and 4.26).** Most pig houses were those built of corrugated iron without concrete floors.

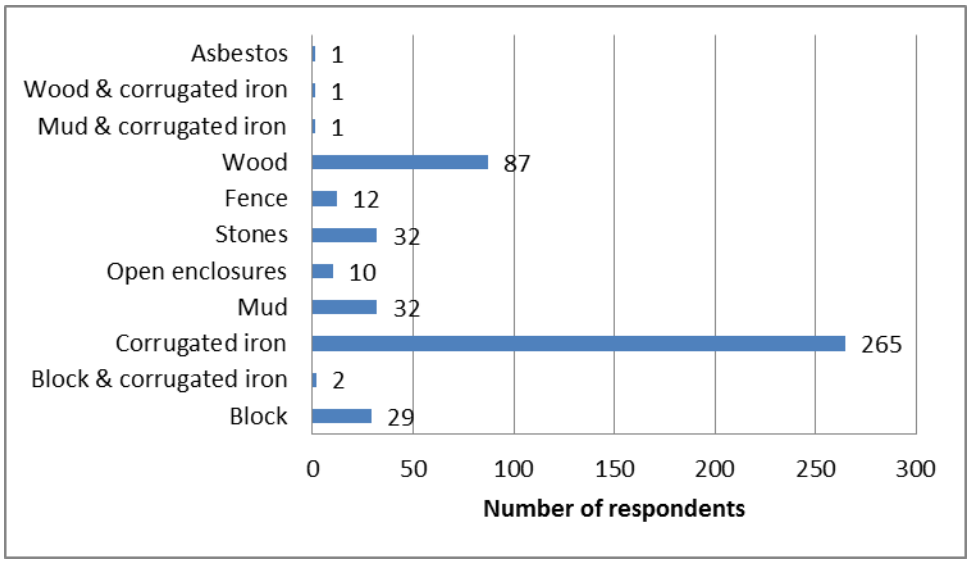

Figure 4.25: Types of houses used for pig rearing

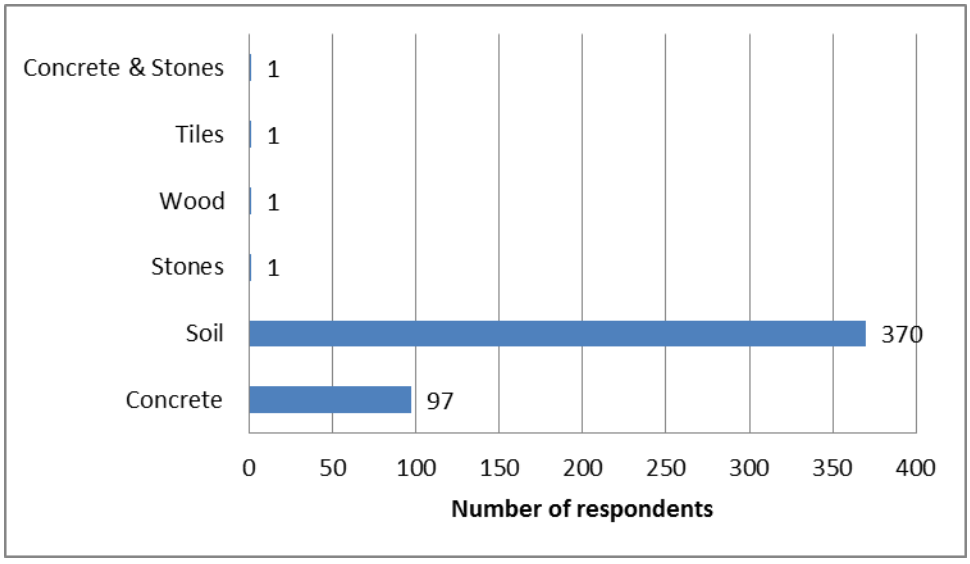

Figure 4.26: Types of floors in pig houses

Majority of respondents (80%) used swill to feed their pigs, while 16% of them fed commercial feeds and 2% fed pigs on maize and vegetables (**Table 4.18).** Farmers who

used commercial feeds had more pigs compared with those who used swill, vegetables and maize. Majority of those who had more pigs were those who were employed. Different swill types were fed to pigs depending on their sources. Swills were obtained from home kitchens and breweries. **Figure 4.27** shows that home kitchen left over was the most common type of swill used, because it was more readily available and could be mixed with Sorghum brewer's grains.

Table 4.18: Relationship between feed availability and the numbers of pigs

Feed Type	Average number of pigs
Vegetables	3
Swill	3
Maize	5
Commercial feeds	13

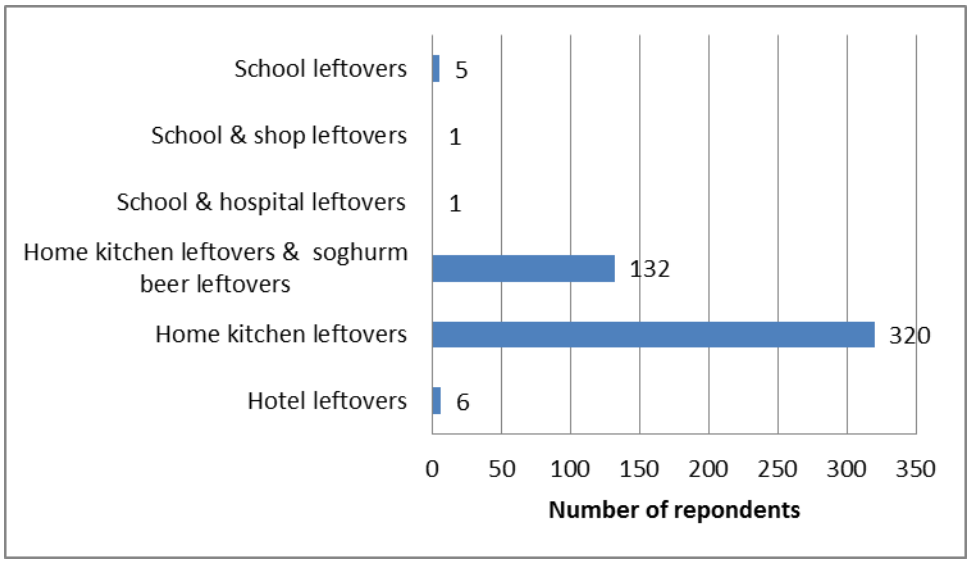

Figure 4.27: Sources of swill offered to pigs

Commercial feeds used by few farmers were purchased from various feed companies and shops. Most farmers (48%) bought their feeds from Farm Save, while 19% bought from AFGRI and 7% from Epol. Some farmers did not use only one feed company; they bought feeds from different companies depending on prevailing feed prices at the time. A large

number of respondents (65.4%) said they weighed feed before feeding, while others (35%) did not weigh feeds before feeding. They simply filled the troughs each time they offered feeds to pigs.

Most pigs were housed and provided with water in troughs inside the pens, but those reared in extensive systems had to fend for themselves in dams and rivers **(Figure 4.28).** Most respondents provided water during feeding time, while some provided water *ad libitum* **(Figure 4.29).** The rest provided water at different times ranging between once and three times a day.

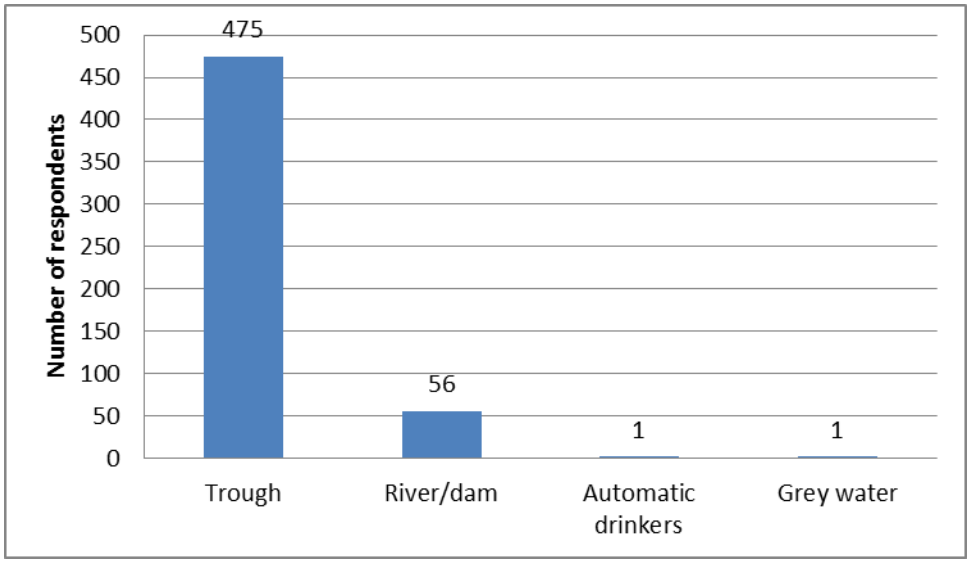

Figure 4.28: Watering systems used for pigs

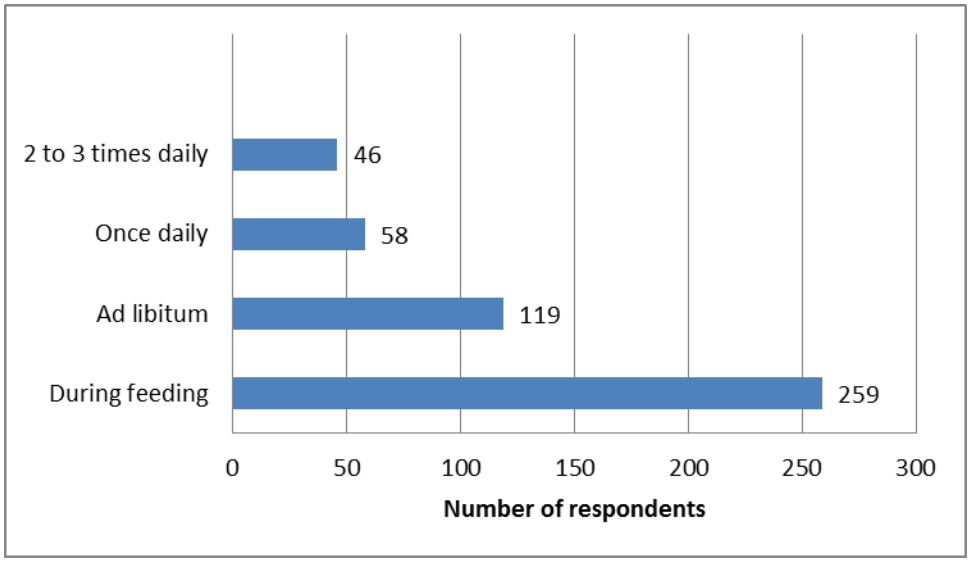

Figure 4.29: Watering frequency

Out of 2643 pigs were in uThukela District 704 of them were slaughtered for home consumption during the last 12 months **(Figure 4.30).**

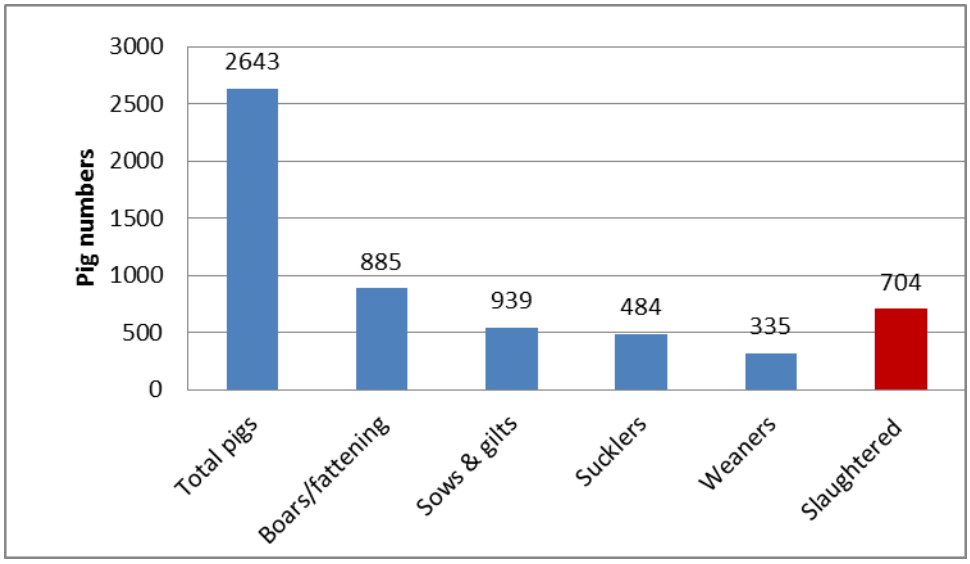

Figure 4.30: Classes of pigs kept and slaughtered for home consumption

Almost all pig farmers said they were not aware of any form of diseases control measures in their area as shown in **Figure 4.31.** Only 2% said they followed the local vaccination programme in the district. However, those who vaccinated their pigs could not provide information about the actual vaccination programme or the vaccines used.

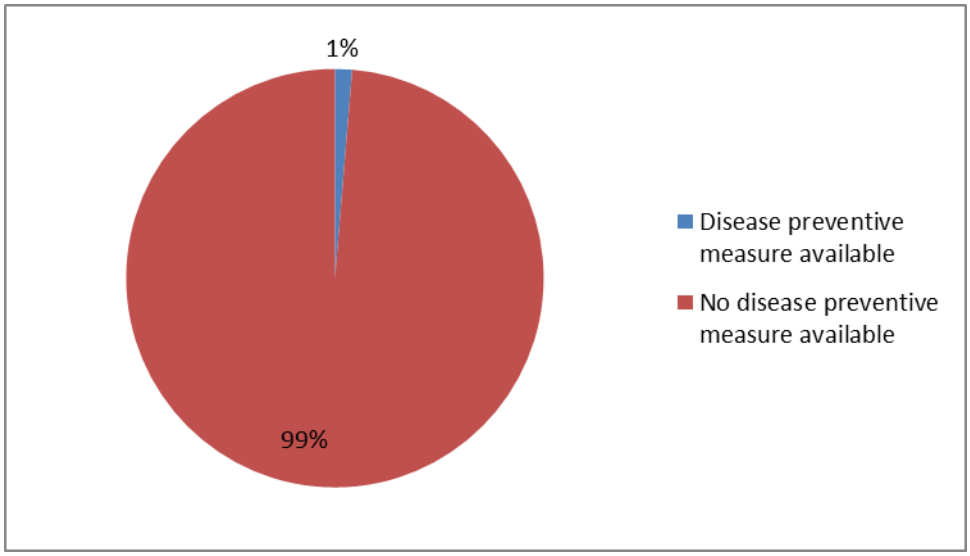

Figure 4.31: Availability of on-farm disease preventive measures

There were differences on how carcasses of pigs were disposed in the study area as shown in **Table 4.19.** Farmers who burned carcasses and those who fed the carcasses to their dogs had a higher number of pigs than those who ate them or threw them away. Farmers who consumed carcasses had less than 3 pigs.

Table 4.19: Disposal methods for carcasses

Disposal method	Average number of pigs
Eat them	3
Thrown away	4
No deaths	4
Bury them	5
Feed to dogs	9
Burn	26

Most respondents (52%) did not send carcasses to the local Vet clinics for post mortem because they thought it was unnecessary, while 26% did not know that they could send carcasses to the Vet clinics, and 20% said they could not afford the cost. Other reasons for not sending carcasses to Vet clinics are shown in **figure 4.32.**

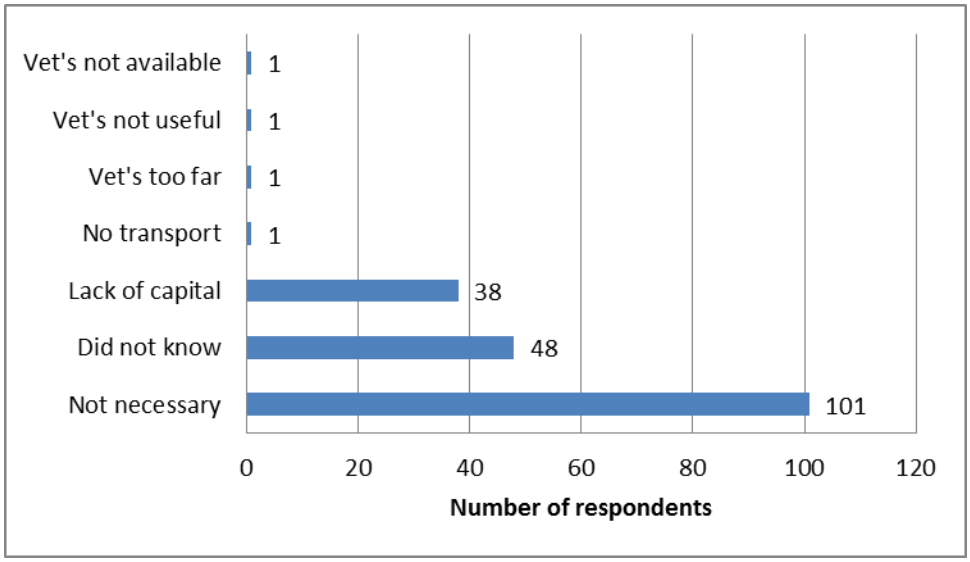

Figure 4.32: Reasons for not sending carcassess for post mortem

CHAPTER 5: DISCUSSIONS

5.1 Profile of the study area and the participants

About 75% of uThukela District is rural as indicated in the UTDM- IDP of 2012 (DSPED, 2012). Indaka and Imbabazane local municipalities have no established towns they are made up of traditional villages. The majority of people still live in traditional villages where traditional leadership under Amakhosi is common. It was observed from this study that 95% of the respondents (n = 533) lived under the Amakhosi areas. There were a total of 20 Amakhosi in the study area **(Table 4.1).** The rest of the respondents lived in town municipalities, where they have politically elected councillors.

There were 22 traditional authorities in the uThukela District (DSPED, 2012). Among the different Amakhosi areas, the number of pigs kept by respondents varied as shown in **Table 4.1.** The different Amakhosi areas were of different sizes and the total number of people living in them also varied greatly and maybe one of the reasons for the variation observed in pig numbers. As the different Amakhosi fall under different local municipalities, pig numbers were grouped according to the local municipality.

Indaka and Emnambithi had more pigs compared to other municipalities, with Imbabazane municipality having the lowest pig numbers. The size of Emnambithi (2,965.92 km^2) could have contributed to the high pig numbers. On the contrary, Indaka which was the second smallest municipality (991.71 km^2) had high number of pigs. Indaka is still more rural compared to Emnambithi and Okhahlamba where there were no formal towns (DSPED, 2012) and thus people were more dependent on agriculture or livestock keeping in particular. During the data collection, it was also evident through discussions held with the respondents in Indaka that pigs were a very important part of their lives.

Households that kept pigs in Indaka municipality were close proximity to each other as opposed to other areas such as Emnambithi where they were scattered. In this study there were more female respondents (60%), compared to males who also owned the pigs. The trend was similar in all the local municipalities **(Figure 4.1).** The high number of females owning pigs and taking care of pigs in uThukela District was similar to that observed in other countries where females were responsible for looking after pigs.

Studies by Nsoso *et al.* (2006) in Ramotswa village in Botswana, Chiduwa *et al.* (2008) in Zimbabwe, Petrus *et al.* (2011) in Etayi, Namibia and Halimani *et al.* (2012) in Zimbabwe and South Africa (2012) supported the current results. Similarly, Madzimure *et al.* (2013) in a study done in the EC province in RSA found that mainly females owned and took care of pigs as was the case in uThukela District. Petrus *et al.* (2011) reported the highest number of females (96%) (57% wives and 39% young girls) reared pigs, while Nsoso *et al.* (2006) and Halimani *et al.* (2012) reported that 75% and 69.7% females, respectively. Karimuribo *et al.* (2011) found about 70% females who reared pigs in Iringa region of Tanzania.

Results from different studies suggested that rural pig farming is mainly practiced by females in most countries. Some female respondents in uThukela District gave reasons for rearing pigs instead of other species of animals. They said that they saw it as less complicated, especially those who reared one pig for slaughter compared to rearing ruminants. As most pigs were reared intensively, the only work necessary was that of feeding and cleaning and that could be done all at once normally in the mornings. This therefore left the rest of the day free for other household chores.

In terms of home languages, it was noted almost all the people in the study area (99%) spoke isiZulu. This can be explained by the fact that, Imbabazane and Indaka were two municipalities which are still very rural and under traditional leadership, that could be the reason why other languages have not yet made it to the rural area. In Obonjaneni which falls under Okhahlamba municipality, de Villiers (2005) also reported that all the people in his study spoke isiZulu. Imbabazane and Indaka were 100% Zulu-speaking while Emnambithi and Okhahlamba had other official languages (1%) spoken as home languages. Both Okhahlamba and Emnambithi municipalities have towns and that could be why people from different regions have settled there. It was also noted that Okhahlamba municipality is closer to the Lesotho border and Ladysmith, where Southern Sotho is spoken, and people moving in because of job opportunities.

One of the challenges outlined in the uThukela IDP of 2012/2013 was high level of poverty and unemployment (DSPED, 2012). This was evident in this study where 74% of the respondents were unemployed, while 16% were pensioners and only 10% were employed. This scenario was the same across all local municipalities in the study area. Therefore, most of uThukela District (65.7%) was a poverty stricken area, especially the

more rural municipalities such as Indaka and Imbabazane (DSPED, 2012). Poverty was more evident in Indaka municipality, which had the highest unemployment rate in uThukela District.

Stats SA (2012) reported from the 2011 census that, uThukela District had 58 800 unemployed people or 35 - 39% unemployment rate. This was even higher than overall unemployment rate of 33% in KZN province as a whole. The 10% who were employed engaged in various occupations. Self employment included ownership of tuck-shops or selling food items at schools gates during lunch breaks. Some were employed by the Department of Transport as road works labourers where most of them women (through an initiative aiming at assisting women called “Zibambele”). The rest of the employed people were taxi drivers, security guards, teachers and domestic workers.

The women who were employed as road works labourers also emphasised how pigs were easier for them to keep because pigs were reared intensively. This allowed women to take care of their pigs while also being employed elsewhere. They were able to feed pigs and clean the pens before they went to work. People who were employed had more pigs to the unemployed group and pensioners as shown in **Table 4.3.** This could be due to the fact that employed people could support themselves and their families from their salaries and therefore they did not consume as many pigs as the unemployed who depended on pigs for food for their families.

Employed people could also afford to purchase other types of meat for consumption unlike the unemployed who did not have that luxury. Thus, employed people kept pigs for sale only. They also managed to feed their pigs better compared to the unemployed who struggled to feed larger numbers of pigs because feed was scarce sometimes, which forced some farmers to reduce the number of pigs. The low employment rate among pig farmers in the study area was similar to that observed by Nsoso *et al.* (2006) in Botswana (12.5%) and Kamuribo *et al.* (2011) in Tanzania of (6 %). Therefore, unemployment was a wide spread problem in other countries as well.

In other countries where pig farming in rural areas has been investigated, different authors found that pig farmers had very low education. Nsoso *et al.* (2006) in Botswana found that only 25% of the respondents had secondary education, while Kamuribo *et al.* (2011) in Tanzania reported that only 14.6% of respondents had secondary education; and in

Bangladesh, Hossain *et al.* (2011) found that only 20.8% of pig farmers had secondary or higher education. The DSPED (2012) described education as a *"gate to higher economic growth through higher level of skilled society".*

The uThukela IDP of 2012/2013 reported that education level in uThukela were improving especially between Grade 0 and 11 (DSPED, 2012). This study showed that respondents in different local municipalities the level of education varied from 0 to tertiary level **(Table 4.5)**. It also showed that uThukela District had a high number of people without education at all and those who attained up to primary education **(Figure 4.2).** The number of respondents with secondary and post Matric education in uThukela District was higher compared to rural areas in other countries. At least 35.3% had studied beyond primary education, with a few of them having higher education. In Obonjaneni (Okhahlamba), de Villiers (2005) had also noted that more school-age children were attending school as the case in this study. Respondents with secondary education and higher kept more pigs than those with little or no education at all. This could be attributed to the fact that respondents who had good education were employed in one way or another and could afford to keep more pigs for sale.

Therefore, education had an influence on the number of pigs in each municipality. Educated respondents managed to rear more pigs possibly because they were able to educate themselves and could afford to keep even more pigs as already observed that majority of those with more pigs were also employed. The educated respondents were possibly the ones who were also employed even though not all the forms of employment mentioned that required high level of education. Reasons for keeping pigs would probably differ between the educated respondents and the less educated respondents. Educated respondents would possibly view pig farming as a business.

According to de Villiers (2005) more older people were involved in agriculture, while people yonger than 30 did not want to get involved. Nsoso *et al.* (2006) found that 62.5% of the respondents in Botswana who kept pigs were over 41 years old. Kamuribo *et al.* (2011) found that in Tanzania those who kept pigs had a mean age of 38 years (range 18 -70 years). In the current study outcomes were similar to what other authors have reported earlier. Youths and respondents below 30 years were not involved in agriculture.

At least 62 % of the respondents in the study area who were involved in pig farming were over 46 years of age **(Figure 4.3).** Gcumisa *et al.* (2012) in a broiler study conducted in Sisonke District in KZN **(Figure 3.1)** also found that youths did not participate in agriculture and only older people who were mostly pensioners were involved in broiler projects. None of the respondents were below 36 years of age which supported what was observed by de Villiers (2005) in Obanjaneni with youths not being involved in agriculture. Rumosa Gwaze *et al.* (2009) in the Eastern Cape province also reported similar results which were in agreement with what de Villiers (2005) observed in Obonjaneni, where youths did not want to take part in agricultural activities.

Therefore, age influenced the number of pigs kept in the study area as was the case with education, gender and occupational status. However, the issue of fewer youths willing to participate in agriculture was a cause for concern as noted in the uThukela IDP of 2013 that raised the issue as one of the challenges facing agriculture in the uThukela District (DSPED, 2013). Youths found agricultural industry un-appealing to them.

Overall view of the study was that there were more females than males in the area of study. There were many more females than males in all the 533 households visited and probably that is why there are more female pig farmers than males in the area as already mentioned. Stats SA (2012) also reported that in the entire population in KZN there were 53% females and 47% males. Adults who were over the age of 16 years old were more females (1311) than males (956). Amongst children younger than 16 years old, 977 were girls and 961 were boys, which was not a big difference. Out of that 43 households had no adult males while 15 had no adult females.

Looking at the total number of people in the 533 households and taking into consideration that salaries contributed only 10% to the household's income **(Table 4.6),** it was easy to see why uThukela District has such high poverty. As already mentioned uThukela District is one of the poorest Districts in KZN (DSPED, 2012). It was also noted from the current study that only 10 % of the respondents were actually earning an income, because the rest were pensioners or unemployed. The high population in the area raised concerns and thus the question that came up was how did these households make a living?

Different sources of income were each household. Respondents were asked to provide information on the sources of income as well as amounts received. This subject proved

very sensitive to some as others felt if they gave the impression that they had money it would affect their requests for assistance from the local government in the future. Some farmers therefore did not divulge how much they made from particular sources, but gave an estimate of their incomes. They did not say how much they earned from the sale of pigs alone but preferred to give estimates of incomes for all livestock sales.

Even though respondents were assured through the consents forms that their information would be kept confidential they did not say much to the interviewers. Besides the salaries, other most noted sources of incomes were social grants from the government (Pension grant, child support grant and disability grant), and livestock sales **(Table 4.6).** Krecek (2004) in the Eastern Cape Province found that pension was the main source of income for the pig farmers.

According to the People's Guide by the National Treasury (2012), *"the social assistance programme is South Africa's direct means of combating poverty"*. The number of grant recipients in the country for 2012/2013 was estimated at 15.6 million (National Treasury, 2012). The different values for the social grants mentioned in the study by respondents were R1200 for old-age grant or pension, R1200 for disability grant, for R770 for foster grant and R280 for child support grant (National Treasury, 2012). The amount budgeted for grants by the Department of Social Development in KZN has increased from R1.953 billion (2011/2012) to R2.401 billion (2014/2015) as mentioned in the 2012 Budget Speech (Cronje, 2012). This budget further demonstrates how much the government has provided as a way of curbing poverty in KZN province.

Mtileni *et al.* (2009) observed that the main sources of income mentioned by most respondents in the study area differed from those mentioned by pig farmers in other countries; but similar to those mentioned in other provinces of RSA; where social grants form a large part of the income for most households. In their studies in Vhembe District (Limpopo Province), Kgalagadi District (Northern Cape Province) and in the Alfred-Nzo District (EC Province); Mtileni *et al.* (2009) found in all the areas that the social grants were the primary source of income (47.3%) for the many households. Wages or salaries contributed 30%, followed by crop sales (12.7%) and livestock sales (10%).

In South Africa, there seem to be a lot of government assistance in the form of grants as means of curbing poverty. In Botswana, sources of income included farming, salaries,

business, odd jobs and sale of traditional beer (Nsoso *et al.*, 2006). In Tanzania crop farming, livestock, business and salaries were mentioned (Kamuribo *et al.*, 2011). Livestock contribution to the livelihoods of rural people was enormous with over R1 million from livestock sales in uThukela District. Crop sales also contributed substantially although the value was lower **(Table 4.6).**

5.2 Social and economic contribution of pigs to households

The fact that pigs can be reared in intensive systems this normally allowed people with very little land to keep pigs. In some countries such as India where many pig farmers have less than 2 acres of land (Kumaresan *et al.*, 2009), and in Bangladesh where 52.8 % of pig owners do not have any land (Hossain *et al.,* 2011), but farmers were able to rear many pigs. In uThukela District the smallest land size was 0.01ha, and the largest land size was 56 ha. Emnambithi farmers owned an average of 1.69 ha per household, while Indaka and uKhahlamba farmers owned an average of 1 ha per household, and iMbabazane farmers owned even less land with an average of 0.9 ha per household. Male farmers owned slightly more land than females in the district may be because some women were wives of men who owned land. Therefore, the land was regarded as the man's property in such households. It should also be noted that the difference between the genders might not be a true reflection because some women or wives might have referred to their husband's land or jointly owned land as their own, since some men work away from home did not live in the rural areas. Respondents were also not asked whether they were household heads or not. This might have created some confusion with regard to gender and land ownership, and thus the results might be misleading to some extent.

Overall the average land size in uThukela district was about 1 ha per household. A comparison between land availability and the ownership of pigs in uThukela District with that reported by Kumaresan *et al.* (2009) and Hossain *et al.* (2011) in India and Bangladesh, respectively, farmers in uThukela District have reasonable amount of land to farm on. Since pigs in the present day can be kept in intensive systems, it leaves ample of space for other farming activities.

The results showed that education level had no influence on land size. Employed people also appeared to have more land compared to pensioners and the unemployed, probably because employed people could buy more land with their extra income. They could also afford to lease more land from farmers who needed extra income from their fallow land.

Some respondents said that they tend to lease some of their land that they not using especially ploughing fields which they could not plough due to lack of resources. This encouraged those with more financial power to lease fields in the community for their own use.

Most rural people planted different crops and kept different types of livestock (de Villiers, 2005). These findings were similar to the results obtained in the current study in uThukela District, which showed that although respondents kept pigs, they also kept other types of animals and cultivated crops. The type of livestock kept in the study area included cattle, goats, sheep and chickens. The proportions of livestock species kept per household varied as reported by different authors (Nsoso *et al.,* 2006; Ajala *et al.,* 2007; Chiduwa *et al.,* 2008; Kamuribo *et al.,* 2011; Halimani *et al.,* 2012). In KZN rural farmers kept 50% cattle, 74% goats and 19% sheep out of the total population of livestock (KZNDAE, 2012b).

Chickens were kept 90 % of respondents more than any other species other than pigs in uThukela District **(Figure 4.4)**. The types of chicken kept in the study area were indigenous chickens that roam freely and were not confined in chicken houses. These chickens were seen as easier to rear because they only needed minimal feed supplementation and hence their popularity. In uThukela District beef cattle, goats and sheep were kept by 53%, 49.3% and 19.7% of the respondents. However, respondents mentioned that the problem of stock theft was the main reason for low sheep numbers. Sheep were seen as easy targets by stock thieves. Theft of livestock in uThukela District has affected the agricultural sector negatively, as it prevents population growth (DSPED, 2013). This problem affects other ruminants in the other parts of KZN province (KZNDAEA, 2012a). Some respondents owned horses, geese, ducks and turkeys but in very small numbers. An association between the keeping of sheep and goats and between beef cattle and goats was observed in the study area. That meant farmers who kept goats were likely to keep sheep or beef cattle. Very few respondents kept dairy cattle due to lack of resources but they kept mainly Nguni beef cattle or cross none descript breeds.

Maize was the most common crop planted by 59% of the households in uThukela District **(Figure 4.5).** Maize was planted for household consumption and for supplementary feed for animals in winter. Respondents who did not plant maize cited lack of adequate rainfall

as the reason why they did not plant maize during the 2011/2012 summer rain season. Apparently there was very little rainfall over that period and without irrigation maize was not viable. According to a census done in 2007, maize was the most planted crop in uThukela District followed by potatoes which was similar to the results of the current study among pig farmers (DSPED, 2013). Different households plant different crops and mixed them according to their own needs, for selling and for home consumption. Other crops in the study area included cabbages, spinach, tomatoes, carrots, beetroot and onions in their order of importance. In terms of fruits, 71.55 of respondents planted peaches in their back yards. Other fruits were apples and grapes but only a few respondents had them.

There were more respondents who kept livestock than those who planted crops probably because of the low rainfall amount and distribution, which suited natural pastures more than crops. This gave the impression that people in the rural areas did not use their lands for planting crops and therefore they bought their foodstuffs from shops. Hence, the *"one home one garden"* initiative by the KZNDAEA was introduced to promote crop production, particularly vegetables (DSPED, 2013). KZNDAEA provided free seeds to individuals to start small home gardens as a means of alleviating poverty and to build household food security.

Food crop production of maize, potato and cabbages has remained constant in KZN as was observed by Kirsten *et al.* (1998). They found that in KZN as a whole 92.5% of people plant maize compared to the 59% who planted maize in uThukela District. This was a clear case of environmental constraints in some areas as stated by the farmers. It showed that most of KZN received above average rainfall, which allowed maize to thrive and only a small part of KZN received below average rainfall that could not support a lot of maize production.

A number of reasons were mentioned as to why pig farming was necessary or why it was more suitable for the rural areas and for people affected by extreme poverty. Holness (1991) observed that since pigs are omnivorous and can consume a variety of feeds it made them more suitable to keep. Mathews-Njoku *et al.* (2008) echoed Holness (1991) in that pigs can scavenge and survive and yet deposit protein even when they were fed on swill. Furthermore pigs grow faster compared to ruminants and are therefore much more preferred as protein sources (Whitemore, 1998; Ajala *et al.,* 2007; Hossain *et al.,* 2011), Petrus *et al.* (2011) also emphasised on the importance of the pig fat that has many uses.

Very few respondents kept pigs for investment or for manure. One percent kept pigs for the use of fat to rub on izidwaba (leather skirts worn by married women – “The Natal Witness, Scholar’s Zulu Dictionary, 1996) and also to rub fat on babies to chase away bad spirits. The chasing away of bad spirits using pig fat was also mentioned by Madzimure *et al.* (2013) in Eastern Cape Province. Some respondents in uThukela District believed that rubbing of pig fat on babies got rid of any evil spirits that could possibly harm the baby especially in public areas. The use of fat on izidwaba was similar to what Madzimure *et al.* (2013) reported about farmers who used pig fat to soften leather ropes.

Pigs do not have a lot of input requirements and require minimal labour (Carter *et al.*, 2013). In summary all these authors agreed that pigs can supply meat with very limited resources from farmers. Most respondents (63%) in uThukela District mentioned that they kept pigs for home consumption and (33%) of them kept pigs as a source of income as shown in **Figure 4.6.** These two reasons for keeping pigs were also cited by Chimonyo *et al.* (2005) and Madzimure *et al.* (2013) in Southern Africa, Ajala *et al*. (2007) in Nigeria, Petrus *et al.* (2011) in Namibia, Kamuribo *et al.* (2011) in Tanzania and Nakai (2012) in Thailand. In Kenya, Kagira *et al.* (2010) found that 98% of farmers kept pigs for income and the rest for consumption, which was the opposite of the findings of the current study. It shows that Kenyan farmers relied on other sources for food supply, which included food crops, poultry and ruminant meat and milk.

There was an association between employment and selling pigs for income. More people who were employed sold pigs for income, while most of the unemployed people used pigs for consumption, even though there was a small number that sold pigs as well **(Table 4.9).** This was expected because employed people could afford to buy other types of meat for household consumption; and they kept more pigs and slaughter some for their own use and sell others at the same time **(Table 4.3)**.

Since feed resources were scarce in rural areas, employed people could afford to feed and support their pigs for economic gain. Studies by Halimani *et al.* (2012) in Zimbabwe and South Africa (Limpopo and Eastern Cape Provinces) also showed that households that earned low incomes tended to rank home consumption and provision of fat higher among the reasons for keeping pigs. Therefore, pigs assisted rural households in the provision of meat for consumption and also income generation, as primary or secondary income. The number of those who sold pigs was bound to fluctuate at times as some

respondents mentioned that sales depended on various factors such as the availability of feed and the financial situation at the household at that time. Feed shortages at times forced farmers to sell their even if they did not rear pigs for sale and in times of difficulty when there was a desperate need for cash. The unplanned sales by some farmers resulted in the fluctuation of the number of farmers who usually kept pigs for sales and those that kept pigs for home consumption.

Different marketing channels were utilized by the pig farmers with the local markets being more popular, because they sold within their community **(Table 4.10).** Of those farmers who sold their pigs locally, 76% of them sold to their neighbours and 24% at pension pay points. The few who sent their pigs to abattoirs (10%) were those had many pigs, which could not be sold within the community alone. KZN pension pay days (where old age, disability, foster and child grants were paid), attracted huge gatherings at the local markets, where varies types of goods were also sold. The goods at the local markets range from clothes, craft works, food and varies types of meat. Some pig farmers (24%) targeted the pension days for selling pig meat as most people would have money to buy meat after receiving their grants.

The 76% farmers in uThukela District who sold their pigs to neighbours sold them as either live animals or as fresh meat. Some farmers slaughtered the pig in their homesteads and then made community members aware of the availability of fresh meat in the neighbourhood for them to come and buy. The large number of pigs sold within the local market was also observed by Nsoso *et al.* (2006) in Ramotswa village (Botswana) and Busia District (Kenya), where Kagira *et al.* (2010) found that 95% of farmers bought their pigs locally which meant that pigs were sold within the community by most rural farmers. In Etayi (Namibia), Petrus *et al.* (2011) found 90% of farmers sold to their neighbours and in India, Kumaresan *et al.* (2009) observed that 90% of the farmers also sold locally.

Madzimure *et al.* (2013) in a study in Eastern Cape Province also reported a large numbers of pig farmers selling within their communities in Ntabankulu (65%), Elundini (81%) and Ngqushwa (96%) communities. Madzimure *et al.* (2013) also found that some farmers there also sold pigs to abattoirs, butcheries and supermarkets. These results were in agreement with the current study in uThukela District. There was no clearly defined market for pigs especially live ones, except for those that sold meat on pension pay days

as established in uThukela District. The prices of meat cuts and sale days were not standardised because they were determined by individual farmers. Most respondents (72%) sold their pigs live within the community, while others (28%) sold meat only and 45% sold both live animal as well as meat.

The lack of clearly defined marketing of pigs in rural areas was observed in other countries such as Nigeria (Ajala *et al.,* 2007) and Namibia (Petrus *et al.*, 2011*).* The age and size of pigs that were sold in uThukela District varied, some sold piglets to others for rearing and mature pigs for slaughter. The variation was as a result of farmers having different reasons for selling their animals. Some sold piglets because they could not afford to rear large litters due to high cost of inputs. Lemke *et al.* (2007) observed similar practices in Vietnam, where pigs were at different ages and at any weight when there were difficult times such as feed shortages or need for cash.

With large numbers of pigs marketed within the community that left a smaller fraction that was sent to abattoirs, since 9.6% of respondents sent pigs to abattoirs. A total of 271 pigs were sold and slaughtered at abattoirs from February 2012 to July 2012. They slaughtered at different abattoirs such as Amblecyte in Winterton for most of them (40%), followed by Cato Ridge (27%) and the least preferred was Glencoe. The low number of farmers who sold their pigs to abattoirs could be attributed to the fact that livestock production in rural areas has always been seen as unproductive (Shackleton *et al.*, 2001) and that has led to the rural animals having no economic value (DSPED, 2013). Therefore, some farmers were reluctant to sell their pigs to abattoirs for fear of receiving very little cash value for them. This was one of the many challenges facing the uThukela District agricultural sector (DSPED, 2013).

Most farmers (59%) used their own transport to transport pigs to the abattoirs, while (41%) used contractors. Respondents who did not have their own transport mentioned loss of profits through hiring contractors to transport their pigs to abattoirs for slaughter. The distance travelled by 27% of farmers to Cato Ridge abattoir which was somewhere between Pietermaritzburg and Durban; was quite far from uThukela District and therefore high transport costs. The majority of farmers slaughtered the pigs themselves at their homesteads, while a few farmers slaughtered pigs at the abattoirs and then fetched the frozen carcasses from the abattoirs to sell to the community. There were no health

inspections of the meat slaughtered at the homesteads, and the meat was sold at owner's price, which sometimes proved profitable and sometimes it led to some losses.

It was difficult to determine how much profits farmers earned from the sale of pigs; and how much they lost because of high costs of inputs and transport; since farmers were not willing to divulge exactly the amounts they received from the sale of their pigs. An average of R50 was given as the standard price of a piglet was in the local market in uThukela District. But considering that some were willing to send pigs as far as Cato Ridge abattoir; might mean that they were making some profit. The age at which pigs were slaughtered varied from 5 to 18 months **(Figure 4.7).** The variation in age at slaughter depended on how long it took for pigs to reach slaughter weight; as a result of the type of housing or environment the pigs are reared in. Pigs in poor environment (too cold or too hot) did not grow well enough; or they did not get enough feed while they were growing.

Those farmers who did not feed adequate and balanced diets, such as the 81% of respondents who used swill; had their pigs taking longer to reach slaughter weight. According to Deka *et al.* (2007) in India poor feeds that lacked enough protein was a major contributor to the length of time it took for pigs to reach slaughter weight. Some farmers used commercial feeds mixed with other low quality feeds like swill to increase the quantity, which obviously affected the growth rate of pigs. Housing, nutrition and health were important determinants of profit or the lack of it for piggeries because they are closely linked (Ajala *et al.,* 2007). Management of piggeries was reported in some areas as problematic because farmers had to repair pig houses constantly because as pigs got older, they broke down their pens and ran out.

Hygiene and health were of concern as the meat was left uncovered on the tables in some instances and it was not refrigerated. Deka *et al.* (2007) in India also reported that meat was sold at the road side after slaughter because there was no formal infrastructure. In the Northwest and the Eastern Cape provinces similar conditions were observed. There were no proper slaughtering facilities and no meat inspection being conducted (Veary and Manoto, 2008, Krecek *et al.*, 2012). The issue of no meat inspection in the informal markets seen in uThukela District was also noted by Phiri *et al.* (2003) in Zimbabwe, Deka *et al.* (2007) in India, Veary and Manoto (2008) in RSA and Pondja *et al.* (2010) in Mozambique. Krecek *et al.* (2012) in Eastern Cape province found 98% of farmers slaughtering at home with 99% without meat inspection either.

Rural farmers in Zimbabwe and Mozambique sold meat in similar ways to that in uThukela District. Deka *et al.* (2007) reported that one potential risk linked to selling and buying of pork meat especially in rural markets was that of worm infestation, particularly *Taenia solium*. The worm is transferred from pigs to humans through the consumption of pork that is not properly cooked (Deka *et al.*, 2007; Veary and Manoto, 2008).

Times for marketing live pigs varied as mentioned by respondents **(Figure 4.9).** Some (53%) sold pigs all year round at pension pay points and others 45% sold during winter (May-July). Majority of those who sold throughout the year were those who sent pigs to the abattoirs, at pension pay points and those who sold piglets. A few farmers sold pigs in different months of the year, depending on farmers' needs or when pigs were available or ready for slaughter. The 76% that sold meat and animals that were ready for slaughter within the community, mentioned that they preferred selling in winter as there was a high demand of pork because the weather was cold and meat did not decompose as quickly.
Similar comments were noted from farmers those that kept pigs for their own consumption. Most of them said that they slaughtered pigs in winter, because they did not have fridges, thus it was better to slaughter in winter since the meat could be kept fresh for longer. Petrus *et al.* (2011) in a study in Namibia reported that farmers sold pigs in cases of emergency and consumed pigs during Christmas celebrations and marriage ceremonies which was not the case in uThukela District.

Pigs in this study area were sold at times when farmers needed money but respondents did not mention slaughtering them on any special days or ceremonies. An interesting belief linked to selling and slaughtering of pigs in winter was that the weather was cold but also because there were no thunderstorms in winter. Thunderstorms are believed to spoil the meat if they occur while there was fresh meat and therefore some farmers would not slaughter pigs during summer. Most of the respondents (88%) did not have any challenges with regard to religion or culture because they kept pigs and ate pork. Respondents who had challenges (7%) it was mainly due to religious beliefs. Churches, family members or neighbours did not want pigs around them because they believed that pigs have demons and that they destroy *izibethelo/muthi* (traditional medicine used to strengthen and protect the household).

Some respondents (1%) mentioned that mothers-in-law did not like pigs while their wives (abomakoti) liked them mostly because of religious reasons. It is common in most rural

areas for sons not to move out of their homes when they got married and hence the wives had to move in with the in-laws which results in clashes over pig keeping. Respondents also had different views about the relationship between *muthi* and pigs. Some felt that pigs helped to stop witchcraft from coming into the homestead while others felt that pigs destroyed *izibethelo/muthi* used in protecting the household. In the Eastern Cape province, Madzimure *et al.* (2013) reported that farmers believed in the use of pork mixed with some concoctions chased away evil spirits as was mentioned by some respondents in uThukela District as well. In general, uThukela District was not affected by religious and culture beliefs, although a few farmers believed that pigs have certain powers be it good or bad.

"Meat consumption per capita in developing countries is considerable lower than that in developed world" (Gill, 1999). As mentioned already, DAFF (2012a) reported that the p*er capita* consumption of different meat types in RSA in 2010/2011 was 4.6 kg/yr, 2.9 kg/yr, and 17.07 kg/yr for pork, sheep, shoats, beef and veal, respectively, and 34.91 kg/yr for white meat (poultry and fish). Per capita consumption of red meat as a whole in the period of 2010/2011 was 24.47 kg/yr, which was lower than that of white meat (DAFF, 2012a).

Respondents in the study area ranked meat consumption according to their preferences as order 1 = most, 3 = average and 6 = least). Out of all meat types chicken was ranked first (1^{st}), followed by beef (2^{nd}), pork (3^{rd}), mutton/lamb (4^{th}), chevon (5^{th}) and fish and turkey (6^{th}). **Figures 4.10 to 4.14** showed the ranking of the different meat types. The high preference of chicken was also reported DAFF (2012a), which showed that white meat was consumed by the majority of people in RSA. The ranking was similar to how the respondents in the study area ranked the different types of meat. As observed in the DAFF statistics (DAFF, 2012a) meat prices fluctuated and that might have influenced how people decided on which type of meat buy. The price of poultry and pork (R/kg) was relatively low compared to beef and mutton (DAFF, 2012a) and could influenced people to prefer white meat because it was relatively cheaper and more affordable.

The other reason that could have influenced the high consumption of white meat in uThukela District was that chickens were the most popular species that was kept by 90% of the respondents besides pigs **(Figure 4.4);** and hence chickens and pigs were more readily available for consumption. Chevon was the least consumed type of meat goats were only slaughtered for special occasions particularly traditional ceremonies. This was

also reported by ARC – ANPI (1999) and Rumosa Gwaze (2009) in KZN and EC; who observed that goats were mostly used for traditional ceremonies and not as regular meat sources. Mutton was viewed as expensive and mostly consumed on special days during festive seasons. Due to stock theft people have stopped preferring sheep as they were prone to theft as highlighted in uThukela District (DSPED, 2013).

5.3 Production systems

A large number of farmers could not recall the exact date when they started keeping pigs as most have been doing it for some time now and therefore could not be specific on how many years they have been farming with pigs. Half of the respondents had more than 6 years of experience in farming with pigs, while 35% had been involved between with pig farming for 2 to 5 years, and the rest 14.8% were new entrants with less than a year of experience **(Figure 4.15).** Experience in this context dealt with the number of years a respondent had farmed pigs or been working with pigs.

The importance of pig farming in the rural areas in uThukela was clearly demonstrated by the many respondents who had farmed pigs for more than 6 years and the others who were just starting out. One assumption that could be drawn from a relatively long-term involvement in pig farming would be that the experience gained would have had an impact on production. And therefore production parameters such as the frequency farrowing per sow per annum, would have been at least twice a year because of management skills they have gained. Management of the sows would include practices such as correct feeding and housing, timely breeding of gilts and sows, spotting animals on heat, and weaning of piglets. If all these practices were done as required it would lead to high production.

This was however not the case because there was no difference in the frequency of farrowing between experienced and less experienced farmers. Majority of the repondents said their their parents kept pigs before them. Therefore, most respondents in the sudy area had been around pigs for a long time before they owned pigs of their own. Some respondents who had grown up in housholds that kept pigs knew which breeds their parents kept, while others did not know the breeds but the colour of the pigs. As observed in **Figure 4.16,** most respondents (72%) frequently mentioned the Indigenous breed, which was reffered to as *“inanki”* by the people in uThukela District, as the most popular breed kept by their parents, while only about 12% of them kept Large White and Landrace breeds. Other breeds also mentioned were crosses of Indigenous with the exotic breeds.

Although most of the respondents had vast experience only a few had actually attended some form of training in pigs rearing. Out of the 533 respondents, only 17 have attended some form of pig training courses. Majority of the courses attended were those that were conducted by KZNDAE (59%) and Zakhe Agricultural College of Agriculture (11.8%) in Baynesfield (KZN). The other respondents attended training on private/commercial pig farms or they were employed there at some stage. Most of the courses offered were 2 to 3 days (53%) and 2 to 3 weeks, while the rest were 3 to 6 months for those offered on private farms. The pig production courses offered by the KZNDAE were mainly for beginners as a way of introducing pig production and were conducted twice yearly. Since the courses were conducted over a short period of less than a week, they did not transfer adequate knowledge and skills to farmers.

An association was found between the training and the frequency of farrowing per sow per annum. The type of training improved farmers' knowledge and skills in pig production. It helped farmers to provide the right environment for breeding sows as shown in **Table 4.10.** The trained farmers realised higher farrowing frequency (at least twice a year) than untrained farmers. This demonstrated the importance of having farmer education even though the courses were sometimes too short. The training provided much needed breeding management skills that allowed farmers to know when to breed gilts and sows for better productivity. That meant that trained farmers made more profit from selling more piglets than untrained farmers. Training of pig farmers was therefore better at increasing farm productivity and household food security than the experience young farmers gained because of growing on the farms. That realisation suggested that having some years of experience or being around pigs for long did not automatically mean higher productivity. As was mentioned by Botha and Lombard (1992) cited by de Villiers (2005) training is an important determinant of success as those who were willing to be trained became better farmers and more successful than those had no training at all.

The Windsnyer and the Koelbroek are two breeds known to be indigenous to RSA (Ramsey *et al,* 2000). Indigenous pigs are sometimes referred to as local or unimproved breeds (Robinson and Penrith, 2009; Petrus *et al.,* 2011). Exotic pigs such as Large White and Landrace have gained popularity in the rural areas and smallholder farms. Halimani *et al.* (2012) reported that a number of factors have led to indigenous pigs being sidelined. One of the most noted reasons was negative perception about both the pig and the environment where they are raised; and historical biases against local pigs and free range

production systems" (Lekule and Kyvsgaard, 2003). The bias against indigenous pigs extends to carcass grading schemes in abattoirs. The focus has been on production of lean meat using specialised breeds such as Large White and thus farmers get penalised for local pigs that were considered too fatty (Chimonyo and Dzama, 2007 cited in Halimani *et al.*, 2012). As was also stated by Hoffman *et al.* (2005a) breed was crucial in factors that influenced consumer perception of meat product and very limited information was available on meat quality of indigenous pigs.

Indigenous breeds have some good attributes as well; and some authors have noted why these types of pigs may be better for rural farmers than exotic breeds. Chiduwa *et al.* (2008) in a study in Zimbabwe observed that one of the advantages of rearing indigenous pigs was that they were more resilient to adverse situations and lack of inputs and were therefore more suitable for the resource-poor farmers. According to Zanga *et al.* (2003) cited by Chiduwa *et al.* (2008) indigenous pigs were more adapted to local conditions and are less prone to diseases and parasites compared to the exotic breeds. Exotic breeds bred for high input and output in controlled environments and thus it difficult for them to thrive under rural production systems (Chimonyo *et al.,* 2005). Lemke *et al.* (2007) noted that the use of exotic breeds was a challenge for resource-poor farmers as these breeds were high yielding but also an economic risk due to high input requirements.

Thus, to replace indigenous pigs in order to increase productivity and more income would be contradictory because of increased cost that must be incurred to achieve high production from exotic breeds (Lemke *et al.*, 2007). Crossbreeding of exotic breeds with indigenous breeds has also been criticized because it is thought that exotic breeds weaken the indigenous breeds by lowering their resistance to diseases; although crosses might require lower inputs compared to exotic breeds (Madzimure *et al.*, 2013). In the rural areas, most respondents said that they kept indigenous pigs or *"amananki"* because of their small size compared to exotic breeds. Large White, Landrace, Duroc, Large Black and Pietrain were the exotic breeds kept by a few respondents. Some farmers said that the breeds they kept were non-descript because was no controlled breeding.

Although indigenous pigs are still kept by many people in the rural areas in uThukela District, the number of farmers who keep exotic breeds has increased. Ocampo *et al.* (2005) in Columbia, Chiduwa *et al.* (2008) in Zimbabwe and Madzimure *et al.* (2013) in Eastern Cape province of RSA found that indigenous pigs were still the most popular

breeds in these countries. **Plates 5.1 to 5.6** show some of the different types of pigs that were kept by the farmers in the study area. They included pure breeds, crossbreeds and non-descript types because of uncontrolled breeding in extensive production systems.

Plate 5.1: An indigenous crossbred sow with its litter in an extensive system;
Source: Gcumisa (2012)

Plate 5.2: An indigenous boar kept for fattening
Source: Gcumisa (2012)

Plate 5.3: An indigenous crossbred sow foraging in the fields after harvesting
Source: Gcumisa (2012)

Plate 5.4: Large White weaners in an extensive system
Source: Gcumisa (2012)

Plate 5.5: An indigenous gilt in an extensive system
Source: Gcumisa (2012)

Plate 5.6: A group of Large White weaners confined in a pen
Source: Gcumisa (2012)

As already stated under marketing most of the pigs in uThukela were sold locally to neighbours **(Table 4.10),** and as a consequence 80% of respondents also bought their breeding stock from the local community, while 12.6% of them selected their breeding stock from their own herds, and only 5% bought their stock from breeders and stock sales. The long term effect of the closed circle of selling and buying of pigs could result in inbreeding. In some areas there were farmers who were known suppliers of pigs and most respondents bought their stock from them. That meant that the genetic variation in pigs in uThukela will remain constant in the long run.

The high proportion of replacement stock bought from the community was similar to that observed by Kagira *et al.* (2010) in Kenya where 95% of the farmers bought their stock from other farmers, while only 3% bought their stock from improved breeds. As observed in uThukela only 5% bought their stock from breeders and stock sales which were generally exotic breeds sold by commercial farmers and breeders. Madzimure *et al.* (2013) in the Eastern Cape province found lower results where 64% of farmers bought replacement breeding stock from other farmers, while others selected from their herds.

With regard to breeding and the use of boars some farmers said that they did not own boars, they relied on boars from other farmers. Boars were shared among farmers, by either owning a boar collectively and that boar was then shared among the group of farmers; or a neighbour's boar was borrowed at times at a small fee. Madzimure *et al.* (2013) found that 66% of farmers borrowed boars from their neighbours, which demonstrated that it could be a common practice among the rural farmers. As observed majority of respondents who bought their breeding stock from breeders also sent their pigs to abbatoirs for slaughter. The main breeder who was mentioned and used by most respondents (41%) was Amblecyte commercial stud farm and abattoir in Winterton area. Farmers preferred different breeds. Some respondents (38%) said they had no reasons for choosing the breeds they used, which mean't that as long as they were pigs they would buy without any preferential selection of particular breeds.

While 23% of respondents selected pigs specifically for meat using exotic breeds and others 12.3% bought whatever breeds were available at the time as shown in **Figure 4.19.** Other reasons mentioned were selection of breeds that grow fast and those that do not deposit too much fat; hence, the increase observed the number of farmers using exotic breeds in uThukela District. Controlled breeding was practiced by 41% of the respondents,

while the rest the respondents allowed their pigs to breed anyhow, because male and female pigs were left to roamed around freely in the veld. That resulted in inbreeding of very young gilts which led to poor growth and general performance.

An association was noted between controlled breeding and the frequency of farrowing per sow per annum. Respondents who controlled breeding hade slightly higher frequency of farrowing per sow per annum and therefore more piglets per annum **(Table 4.12).** Pigs can give birth twice a year and through controlled breeding. This could be achieved by practicing proper stock management such as regular weaning of piglets, which shortened unproductive time and improved fertility rate, farrowing frequency and weaning rate.

Another association was found between controlled breeding and litter size **(Table 4.13).** Controlled breeding resulted in larger litters, which could be beneficial to the farmer in terms of piglets born per annum. On the other hand, it could also be argued that larger litters meant more costs in raising the piglets, but for those farmers who sold piglets could benefit much more. The age at first service for gilts varied among the respondents. Some respondents (7.5%) bred gilts at less than 6 months, while 32% of them bred their gilts at 6 to 8 months, 21% of them at 8 to 12 months; and the rest (29%) bred gilts at 12 months of age. The different age groups of gilts at first service could be influenced by a number of factors. The early breeding age of less than 6 months was considered doubtful because gilts reached sexual maturity at 9 to 12 months according to Smith (2006).

However, Mukota pigs of Zimbabwe were reported to reach sexual maturity as early as 3 months (Holness, 1991 cited by Chimonyo *et al.*, 2010). Hossain *et al.* (2011) in Bangladesh found that the average age at sexual maturity was 6 months in gilts. The different ages mentioned by Holness (1991), Smith (2006) and Hossain *et al.* (2011) brings in the breed factor. The type of breed being used could also have an effect on the variation observed of age of sexual maturity in gilts. Ocampo *et al.* (2005) found that the age of gilts at first service was sometimes delayed in indigenous as a result of their slow growth, which contradicted what was reported by Holness (1991) (cited by Chimonyo *et al.,* 2010), who said that indigenous Mukota gilts in Zimbabwe reached sexual maturity at only 3 months.

That posed a question of whether sexual maturity on gilts could be influenced by region as the different authors referred to indigenous pigs found in different parts of the world.

However, with farmers not keeping good records it was difficult to establish the exact age when they bred their gilts. Records could assist in identifying the exact age at first service and so that the variation in age could just be a result of different management practices or individual judgement.

In uThukela District most of the respondents (56.7%) said that their sows farrowed once per annum, while 43.3% farrowed at least twice a year **(Figure 4.20).** This is similar to what Chiduwa *et al.* (2008) observed in Zimbabwe. Some respondents said that they kept the farrowing rate low purposely as a way of avoiding high cost of feeding more pigs from subsequent litters. It was also noted that breed factor affected farrowing rate per sow per annum to some extent. About (58%) of indigenous pigs gave birth once a year, which was similar to 52% of Large White breed. On the other hand 61% of Landrace sows farrowed twice a year compared to 48% of Large White sows as shown in **Table 4.14.**

Pigs gave birth to more than one young which could increase their numbers very fast in a short space of time. In Botswana, Nsoso *et al.* (2006) found that with Tswana pigs the most common litter size was 5 to 8 piglets per sow. In uThukela District it was noted that litter size varied from 7 to over 11 piglets per farrowing. Overall (16%) of sows farrowed 11 or more piglets per litter, while 44% farrowed 8 to 10 piglets and the rest (40%) farrowed 7 or less piglets. Breed type was found to have influence the litter size. There was an association between indigenous pigs and small litter size as well as between Large White and large litter size. The Landrace breed fell in between the indigenous and improved breeds.

The different litter sizes observed in the study area concur with what different authors have reported regarding the exotic breeds which have higher productivity but also higher input requirements (Chimonyo *et al.*, 2005, Lemke *et al.*, 2007). Respondents were asked if they observed and cared for sows during farrowing. Only 28% of the respondents said they observed the sows during farrowing, while 72% said they did not because their sows were scavengers in external rearing systems. The respondents who did not observe the farrowing said that they did not even know when sows were in pig and when they were due to farrow; they only noticed when the sows returned home with piglets after grazing in the veld. Two of the reasons for not observing pigs during farrowing were mainly due to lack of record keeping and also due to uncontrolled breeding. Therefore, farmers did not have the information at hand to know what was happening with their sows.

According to Williams (2003) weaning age for piglets has changed dramatically over the years since the 1950s, from about 8 weeks to the current 22 - 26 days of age in many pig producing countries. The early weaning though has resulted in many problems and challenges especially with regard to nutrition, housing, health, behavioural and environmental requirements of piglets (Williams, 2003). Caring of piglets weaned at a younger age has become a problem because of the new improved requirements and even worse for the rural farmers that wean early.

Respondents in uThukela District who weaned their piglets at all, did so at very different times ranging from 3 weeks to over 3 months of age **(Figure 4.21).** A strong relationship was observed between weaning and farrowing rate. Respondents who weaned their piglets tended to have their sows farrowing more than once per annum **(Table 4.16).** It has already been mentioned that weaning assisted the sow conceive earlier and farrow twice a year, because it shortened the lactation period. Respondents who sold pigs for income were the ones who weaned their piglets regularly **(Table 4.17).**

Nsoso *et al.* (2006) reported in Ramotswa village of Botswana farmers weaned piglets at 4 months of age and in Zimbabwe Chiduwa *et al.* (2008) reported that farmers weaned piglets at 6 to 8 months of age. The difference in the age at weaning as reported in this study and by other authors could be due partly to rural farmers in Botswana and Zimbabwe not being able to afford to the high cost of rearing piglets. Uncontrolled weaning and the long lactation periods have a number of negative effects on performance and health of sows. That resulted in sows not getting back on oestrous after the piglets stop suckling (Ocampo *et al.*, 2005), which was partly due to the loss of body condition (Kugonza and Mutetikka, 2005). With the sows not coming back on oestrus they became unproductive for most of the time which could be over 3 weeks (Kugonza and Mutetikka, 2005) and hence, it was found that sows of most respondents only farrowed once a year.

Therefore, sows require time and more feed to get their bodies in good condition again before breeding. Respondents who kept pigs for sale wanted their sows to farrow twice yearly and to have reasonable litter sizes for them to make good incomes. However, farmers who kept pigs for home consumption were not too concerned about weaning. **Plates 5.7 and 5.8** were taken by the author to show the “thin sow condition” mentioned by Kugonza and Mutetikka (2005) and of sows loosing body condition as a result of long lactations.

Plate 5.7: A sow in poor condition after a long lactation period
Source: Gcumisa (2012)

Plate 5.8: Sows in poor condition still lactating
Source: Gcumisa (2010)

Most of pig mortality was observed in the early life of piglets as was also reported by Ajala *et al.* (2007) and Kamuribo *et al.* (2011). That could have been caused by a number of factors including diseases, piglets getting squashed by sows, bad weather conditions and predation (Madzimure *et al.*, 2013). A number of diseases that affected piglets such as worm infestation, skin related problems (mange, lice and loss of hair) and diarrhoea were observed in the study area.

The pig diseases mentioned farmers in uThukela District were also reported by a number of authors. Ajala *et al.* (2007) in Nigeria, Kagira *et al.* (2010) in Kenya, Hossain *et al.* (2011) in Bangladesh and Kamuribo *et al.* (2011) in Tanzania reported on the same diseases mentioned in uThukela District. That suggested that these diseases were common in rural areas in most developing countries. The types of worms commonly identified in pigs were of big concern as Chaline (2011) highlighted that the two most dangerous parasitic infections transmitted by pork were caused by worms; such as the round worms (Trichinosis) and tapeworms *Taenia solium* (Cysticercosis); which are still common in many African countries (Chaline, 2011).

In this study, piglets getting squashed by sows were reported as one of the major causes of mortality in piglets followed by exposure to cold **(Figure 4.23).** Respondents in rural areas do not have farrowing crates or creep areas. Thus, sows were prone to squashing their piglets that tended to lie next to them for warm. Chills or cold was also reported by Haynes (2001) as a common cause of mortality in piglets born with very little hair and fat.
It showed that farmers did not provide beddings or suitable environment for piglets to keep warm enough after farrowing. This was the case of pigs which were reared in free range or extensive systems, coupled by the fact that farmers did not keep records to know when sows were due to farrow, so that they could provide sows and piglets with the right environment. Under intensive conditions as well where there were no records, it will be difficult for farmers to know when sows were close to farrow and provide beddings. All these were management practices that needed to be taught to farmers. Other causes of mortality were mostly accidental and did not occur frequently, which included drowning or being eaten by dogs. Preparation for safe farrowing areas with beddings to provide warmth for the piglets is an important requirement in well managed piggeries.

Very few respondents (10.4%) said they have ever consulted with the State Veterinary Department (Vets) to report about the health of their pigs. Most respondents (44.2%) did

not know that they could consult Vets regarding the health of their pigs, while (28%) of respondents did not see the need for treating pigs; and 17% said they had not experienced any mortality. Similar responses were observed by Mutua *et al.* (2010) in Kakamega District, in western Kenya where farmers did not know that they could consult Vets when their pigs fell sick.

Phiri *et al.* (2003) mentioned that pigs do not require large areas of land to rear like ruminants, because pigs could be reared intensively in small areas. That was one of the reasons which made pig farming more suitable for the rural and smallholder farmers. Pigs can be kept under different systems confined in a house (intensive) or be kept outside to roam on their own (extensive). In the past pigs were allowed to roam around, under free range systems where they could consume anything they found in the veld. However, that has changed with intensive farming systems being introduced and animal disease control being enforced (Chaline, 2011).

In uThukela District most of the pigs were kept under intensive system (82%) with only 18% being kept under extensive or semi-intensive system. Ajala *et al.* (2007) in Nigeria found that smallholder farmers in Kaduna State provided housing for their pigs. That demonstrated that rural farmers in uThukela District also provided some kind of houses their pigs, although pigs were generally perceived as scavengers roaming around as was the case in the Eastern Cape where free range pig farming is widely practiced (Mafojane *et al.,* 2003). Confining pigs was said to be an essential way of preventing diseases such as cysticercosis (Lekule and Kyvsgaard, 2003) and preventing pre-weaning mortality (Madzimure *et al.*, 2013). Veary and Manoto (2008) mentioned that in rural area where pigs scavenged, they had access to human sewage which further spreads diseases. Krecek *et al.* (2004) estimated the number of free ranging pigs owned by emerging farmers and resource-poor farmers in RSA at 25%.

Pigs kept under extensive systems in uThukela District roamed around the community and some slept under trees. Some farmers said that pigs were allowed to roam around especially after harvesting in the fields to scavenge on the leftovers. Ajala *et al.* (2007) and Chiduwa *et al.* (2008) also reported that in Nigeria and Zimbabwe farmers let pigs to roam in the fields after harvesting and kept them confined during planting seasons. The large number of farmers who kept pigs confined in housed in uThukela District was more than the number of farmers in Kakamega in Kenya, where 61% of farmers who did not

provide any shelter for pigs at all. Pigs were forced to sleep under trees or next to homestead (Kagira *et al.,* 2010) similar to the extensive system observed in uThukela District.

Similarly, in Bangladesh Hossain *et al.* (2011) found that free range system was the most popular system, where pigs scavenged freely in villages. The same scenario was reported in Botswana where farmers kept their pigs extensively (Nsoso *et al.,* 2006). Kagira *et al.* (2012) points out that the low costs involved in rearing pigs extensively seemed beneficial to the rural resource-poor farmers and was the main reason for farmers using this system as was observed in Busia District, Kenya. **Plates 5.9 to 5.10** depicts the two different types of production systems (intensive and extensive) that were found in uThukela District; and **Plates 5.11 to 5.16** depicts the types of houses used to rear pigs in uThukela District under intensive system.

In this study it was found that pigs kept under intensive systems were housed in houses built of different materials and floor types. Material used was dependent on the farmers' resources. Therefore, majority of farmers used material that was available or lying around. The different types of houses and materials used are shown in **Figure 4.25 and Plates 5.11 to 5.16.** Corrugated iron was the most used material, with wood being used to a lesser extent.

Mud and block/brick houses observed in uThukela such were similar to those observed by Ajala *et al.* (2007). The mud brick houses that were observed by Ajala *et al.* (2007) and used by most farmers in Kaduna District, Nigeria were not so popular in uThukela District. The floors the majority houses were just plain soil, while a few were made of concrete **(Figure 4.26)** similar to what Kagira (2010) observed in Kenya where 96% of the shelters had mud floors and only 4% being concrete. Nissen *et al.* (2011) found that only 16% of houses had soil floors in Uganda. Floors raised above the ground in some pig houses were observed in Uganda where 59% of the pens were slatted and raised above ground (Nissen *et al.*, 2011).

Plate 5.9: A sow and piglets in an extensive system
Source: Gcumisa (2012)

Plate 5.10: Pigs in an intensive system; Source: Gcumisa (2012)

Plate 5.11: A pig pen built of wooden poles
Source: Gcumisa (2012)

Plate 5.12: A pig pen built of corrugated iron
Source: Gcumisa (2012)

Plate 5.13: **A pig house built of bricks, steel pipes and wire mesh**
Source: Gcumisa (2012)

Plate 5.14: A pig pen built of wire mesh and covered in used feed bags
Source: Gcumisa (2012)

Plate 5.15: Pigs inside a house with concrete floor
Source: Gcumisa (2012)

Plate 5.16: Pigs in a house with a muddy floor
Source: Gcumisa (2012)

Feed is one of the most important inputs in pig production. According to Smith (2006) feed costs take 75 – 80% of total variable costs in the pig production. Commercial feeds are mainly constituted from maize, wheat or sorghum as energy sources and soya bean as the protein source. Grains make up between 55 - 70% of rations (Smith, 2006). Most crops that were used in pig feeds increased in prices between August 2011 and August 2012 (DAFF, 2012b), from R1 907/ton to R2 650/ton for white maize; R1 909/ton to R2 644/ton for yellow maize; R3 006/ton to R3 478/ton for wheat; R3 316/ton to R5 394/ton for soybean. The increase in commodity prices had an impact on the feed prices because of the raw materials form a very large portion of pig feeds. As already mentioned by Smith (2006) that feed costs about 75 -80% of total production costs, this makes feed the most expensive input in pig farming. It is because of the high feed costs that farmers in rural areas do not buy commercial feeds and tend to use alternatives in feeding their pigs. Lekule and Kyvsgaard (2003) also noted that most small-scale pig farmers could not buy commercial feeds.

The pig was described by Haynes (2001) as the *"most nearly parallel to humans of all farm animals"* because pigs can make use of energy and protein from vegetable and animal sources. That made pig feed more expensive in many developing countries because pigs compete for with humans in their feed requirements; and there isn't enough supply of raw materials (Petrus *et al.,* 2011). Majority of the respondents in uThukela District (81%) said that they use swill to feed their pigs, while 16% of them fed pigs on commercial feeds and 2% fed them maize grains and vegetables. Chikwanha *et al.* (2007) mentioned that rural farmers in the Southern Africa were dependent on locally available feed resources for feeding their animals as observed in uThukela District where farmers fed even vegetables to pigs.

A strong relationship was observed between the total pig numbers and the type of feeds commonly used **(Table 4.18).** Farmers who fed pigs on commercial feeds seemed to have more pigs compared to those who fed them on swill, vegetables and maize. Majority of those who had more pigs were the ones who were employed and also sold their pigs. Thus, farmers who were more financially secure either because of being employed or because they kept more pigs; were the ones who were able to buy feeds while the majority of respondents could not.

Madzimure *et al.* (2013) reported that feed scarcity observed in rural areas was one of the reasons behind small-scale pig farmers not growing their production. Swill or *"isilothi"* formed 81% of pig feeds in uThukela District. The feed came from different sources such as schools with government feeding schemes, hospitals, hotels and game reserves. Farmers were able to get leftovers for their pigs. Some respondents got swill from the nearest townships or from neighbours who had no pigs. Farmers who needed swill left empty containers at particular households and collected the swill on particular days when the containers were full. For this gesture the farmers gave away one piglet to each household in return for the swill. All the different sources of swill provided farmers with mixtures of different types of feed used in these areas. The most used type of swill was that derived from home kitchen wastes and leftovers as indicated in **Figure 4.27**.

Sorghum brewer's grain or *"amavovo"* were also mentioned as of swill which was mixed with kitchen leftovers by some farmers in uThukela District. Petrus *et al.* (2011) also found that 53% of farmers in Etayi, Namibia made use of by-products from local brewing industry to feed their pigs. That was also reported by Nsoso *et al.* (2006) in Botswana and Ajala *et al.* (2007) in Nigeria; who showed that local beer residues mixed with kitchen wastes were fed to pigs. Holness (1999) (cited by Nsoso *et al.*, 2006) also mentioned the wide use of brewing by-products by many small-scale pig producers in Africa.

Mtileni *et al.* (2013) found that rural farmers fed kitchen wastes and maize to chickens. With over 90% of farmers in uThukela having chickens as well as pigs this showed that there was bound to be feed shortages if livestock numbers were not kept low. Chiduwa *et al.* (2008) noted that most rural pig farmers kept pig numbers low because of not having enough feed. Some respondents fed their pigs once in the morning and majority did not weigh or measure feed before offering to pigs. Chiduwa *et al.* (2008) in Zimbabwe, Kagira *et al.* (2010) in Kenya found that farmers fed kitchen wastes to their pigs. Kumaresan *et al.* (2009) in India and Nissen *et al.* (2011) in Uganda also found that pig farmers also made use of kitchen wastes and crop residues. The different types of swill fed to pigs demonstrated how pig diets were similar to those of humans.

The problem with feeding swill to pigs has been that of disease spread as mentioned by Haynes (2001), who said that swill could be hazardous as it could harbour pathogenic organisms that may infect pigs. In this study none of the respondents said that they cooked or boiled swill before feeding to their pigs. According to Robinson and Penrith

(2009) feeding of kitchen wastes from hotel restaurants and hospitals was against the law in RSA unless it was boiled for 60 minutes to destroy germs that could be in the swill. In countries such as Vietnam, India and Laos the practice of cooking swill before feeding to pigs was observed (Lemke *et al.*, 2007; Kumaresan *et al.*, 2007; Phengsavanh *et al.*, 2010).

Of the 16 % respondents in uThukela District who fed commercial feeds to their pigs, some said that they sometimes mixed commercial feeds with swill or vegetables before feeding to pigs. The low number of farmers using commercial feeds in uThukela District was slightly higher than that observed by Kagira *et al.* (2010) in Kenya, where 5% of farmers supplemented pigs with commercial feeds. Ocampo *et al.* (2005) reported less than 2% of the farmers in Columbia used commercial feeds compared to 8.12% in India (Kumaresan *et al.,* 2007), and 6% in Laos (Phengsavanh *et al.*, 2010) who fed pigs on commercial feeds or concentrates.

In this study it was found that the commercial feed used was bought from a variety of reputable feed suppliers in RSA. Most farmers said they bought from different companies depending on which supplier offered the cheapest price. One of the constraints for many farmers (48%) was that of transporting the feeds to their homes, which forced them to buy feeds from nearby sources such as Farm Save; that was found in the different towns in uThukela District. In addition, 19% of farmers bought their feeds from AFGRI and 7% from Epol (7%).

A small number of respondents mentioned weighing feeds before feeding but when asked which scales they used and how much they fed it became clear that they did not know. Some admitted that they did not feed according to guidelines, but according to their own discretion and feed availability. In determining the amounts to be fed to pigs it was found that farmers used the age and physiological state of pigs (Hossain *et al.*, 2011) and also the availability of feed (Kagira *et al.*, 2010). Farmers in uThukela District mentioned similar methods of determining the amounts of feed required to feed the number of pigs on the farms. Pigs were fed in a variety of feeding troughs and structures. P**late 5.17 to plate 5.21** show the type of troughs used for feeding pigs in uThukela District.

Plate 5.17: Swill fed to pigs in a plastic container
Source: Gcumisa (2012)

Plate 5.18: Pigs feeding from an old open tyre
Source: Gcumisa (2012)

Plate 5.19: Weaners feeding from an old open tyre
Source: Gcumisa (2012)

Plate 5.20: Pigs feeding from a group feeder
Source: Gcumisa (2012)

Plate 5.21: Water for pigs in plastic containers built onto the ground
Source: Gcumisa (2012)

Out of dietary components, water is the most essential nutrient although often over looked (Haynes, 2001). As most of the pigs were housed, water was provided for them from different sources and at different times. Majority of farmers who used intensive systems provided water in troughs, while the rest of pigs in extensive systems drank from rivers and dams **(Figure 4.28).** One farmer kept 75 pigs and had an automated system which provided water through nipple drinkers. Another water source mentioned by one respondent was grey water from the households in an extensive system. The respondent believed that the pigs enjoyed the grey water.

As has already mentioned most pigs were fed on swill and hence the most of the water was provided during feeding only, and in most cases it was mixed with the swill **(Figure 4.29).** The practice of mixing water and swill and only providing water with feed was also observed by Kumaresan *et al.* (2007) in India and in Laos (Phengsavanh *et al.*, 2010). One hundred and nineteen farmers had water available in troughs all the time, while the rest provided water once a day or more than once. Respondents offering water more than once a day mentioned that it depended on the weather. On hot days, water was provided more than once. Therefore, pigs did not receive adequate water especially those receiving water mixed with feed.

An average of five pigs per household was observed in uThukela District with an average of 1 pig slaughtered for home consumption per annum. A total of 2629 pigs were counted in the study area **(Figure 4.30).** The number of pigs was made up of boars and fattening animals (34%), sows and gilts (36%), weaners (12%) and piglets (18%). Boars were grouped together with fattening animals because most respondents only kept one pig, which was always a male but was not used for breeding.

A number of respondents only kept between 1 and 2 pigs at a time for fattening and slaughter in winter. The average number of pigs per household observed in uThukela was higher than that observed by Chiduwa *et al.* (2008) in Zimbabwe (3.3 pigs); by Nakai (2008) in Thailand (4.1 pigs); and by Kagira *et al.* (2010) in Kenya (3.6 pigs). The average number of 5 pigs per household in uThukela found in this study was higher than that reported in an earlier study (0.32) by Muller and May (1987) in the same area.

Majority of farmers who kept pigs for fattening and for home consumption kept boars only. The reason for keeping boars was that most of the farmers did not want to breed and in order to make sure that no uncontrolled breeding occurred, they sold boars. The boars sold for meat were kept in confinement until they were ready for slaughter. Most of boars were bought after winter and kept until the next winter when they were slaughtered. The keeping of intact boars by the respondents was contrary to what was reported by Nsoso *et al.* (2006) in Botswana who said that few intact boars were kept for slaughter because of possible undesirable taint in pork. Nakai (2012) in Thailand found that farmers castrated most male piglets in litters as a way of controlling breeding in semi intensive systems. The practice of castrating piglets was not practised in uThukela District since no farmer mentioned it during the survey. Neither did respondents mention anything about undesirable taint in meat from the boars. Therefore, the undesirable taint in meat mentioned by Nsoso *et al.* (2006) in Botswana could be dependent on other factors such as breed and the growth rate of different types of pigs.

Bonneau (1982) (cited by Dunshea *et al.,* 2001) reported that as male weaners developed and matured they acquired what is termed ‘boar taint’ as a result of accumulating androsterone and skatole substances which affect the taste of meat. In countries like Australia and New Zealand in the past practiced slaughtering male weaners before they reached sexual maturity or by castrating them, especially if they were destined for abattoirs (Dunshea *et al.,* 2001). Boar taint increases with the age of the boar (Dunshea *et*

al., 2001). In rural areas castrating male piglets serves two purposes, firstly to get rid of the boar taint in the meat and to control unplanned breeding, because only the intact boars can breed.

Almost all respondents (98%) in uThukela District did not know of any diseases control measures or any bio-security measures in place **(Figure 33)**. Only 2 % said that they vaccinated their pigs regularly but, none of them could give the name of the vaccination programme or the vaccine which was used on their pigs. This left question marks on whether the respondents vaccinated or not; and whether they used the right vaccines or because they could have been given medications for other ailment but not vaccines. Some respondents said that they have never seen a sick pig, while some reiterated that they did not know that they could consult government Vets to treat their pigs. The non existence of vaccination programmes in uThukela District was echoed by Petrus *et al.* (2011) in Etayi, Namibia, who reported that respondents in that study were amazed to hear that pigs can be treated or vaccinated. Ajala *et al.* (2007) on the contrary found that over 60% of respondents in Kaduna, Nigeria, vaccinated their pigs against diseases regularly. Kumaresan *et al.* (2009) found that 37.8% of pigs in India were vaccinated. That showed that in other countries farmers vaccinated their pigs regularly.

About half of respondents (59%) in uThukela District said that they have not experienced pig mortality within their herds, and yet there was poor disease control observed in the area. Of those who experienced regular mortality, 25% of them burned the carcasses, 8% of them fed carcasses to dogs and 2.1% of them ate the carcasses. Farmers who burned or fed carcasses to their dogs kept many pigs than those that ate or threw the carcasses. Respondents who consumed carcasses had very few pigs, which kept solely for home consumption.

The majority of respondents (99.6%) did not send pigs for post mortem, because they felt that it was not necessary to do so **(Figure 4.32)**. Kumaresan *et al.* (2009) in India also observed similar reaction from farmers. A number of reasons were mentioned by respondents for not sending dead pigs for post mortem. Most of them (52%) felt that post mortem was not necessary, while 26% of them did not know that they could send pigs for post mortem; and 20% of them said they could not afford the cost of transport to the Vets clinic.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Introduction

***"Lack of opportunities rather than resistance to change is the main bottleneck to the development of the livestock industries in these areas"* – Bembridge (1979).**

Literature on pig production in Africa and Asia clearly indicated that pigs are kept by many people in rural areas for different reasons. The uses vary from country to country, but the two most important ones are: the provision of protein in many households; and source of income. A number of other reasons exist but one common fact is that pigs make a difference in the livelihoods of rural people. With most African countries facing severe poverty there have to be other means of providing for the family and this is where agriculture and pigs in particular play a role in poverty alleviation and food security.

In this study which was conducted in the uThukela District in KZN, it was evident that the district faced severe poverty as was the case for KZN province as a whole. People residing in the rural areas tended to be most affected by poverty. Keeping of indigenous pigs was more appropriate for rural farmers because these pigs are known to be hardy, resistant to diseases, and require minimal inputs. Since meat consumption required some wealth, indigenous pigs in particular provided a source of protein that could be exploited without major inputs from farmers. Changes have occurred in pig production over the years and farmers need to adapt to the new practices especially if they would like to keep exotic pig breeds and shift from producing for consumption to produce for income generation.

6.1 Conclusions

Pig production and practices observed in the rural areas of uThukela District were similar to those observed in other RSA provinces and in many other developing countries. Women were the most involved in keeping and raising pigs in uThukela District. Fewer males kept pigs but the number of pigs they kept was higher compared to females who kept fewer pigs.

Employment status and education level of farmers were the two important determinants of the number of pigs owned. Farmers who were employed owned more pigs, and similarly the higher the level of education the more the number of pigs they owned. Employment also determined the reasons for keeping pigs. Employed farmers were the ones who mainly sold pigs. The unemployed farmers mostly kept pigs for home consumption. Majority of farmers kept pigs for home consumption and for income generation. Thus, pigs provided a source of protein for the majority of households and extra income for those who sold their pigs.

Pigs and chickens were the most popular species in the rural areas. Chicken meat was the most preferred meat followed by beef, pork, mutton and chevon as the least consumed. At least one pig was slaughtered per household yearly. Indigenous pigs were still the most popular pigs in the study area. Exotic pigs were few but their numbers were increasing.

Religious and cultural beliefs were not major obstacles to pig farming and pork consumption in uThukela District. Only a few people in the community had problems with both pig farming and consumption of pork due to religious groups and churches around them that prohibited the keeping of pigs and consumption of pork, which they considered a taboo. Others were affected by cultural beliefs, especially those who believed in traditional medicines/*muthi/izibethelo*. They associated pig with evil and they believed that interfered with their *muthi/izibethelo*.

Majority of the farmers had experience in pig farming because they lived or worked on farms that kept pigs for a long time but that did not improve their production skills. Very few farmers had been trained in pig production and the rewards for such training were evident in terms of improved management practices (especially breeding management) and higher production. Thus, trained farmers did better than untrained farmers.

Management and care of gilts, sows and piglets was a big problem in uThukela District. Farmers did not have selection criteria for breeding stock. There was poor management between services and weaning periods. Piglets got squashed by sows or died from exposure to cold, which were major concerns. Diseases were not commonly encountered especially in piglets. There was very low mortality as a result of diseases. Vaccination and biosecurity measures did not exist. Treatment of sick pigs was minimal, mainly because

farmers did not know that Vets could also treat pigs. Disposal methods for carcasses revealed that some farmers with very few pigs consumed the carcasses.

Most of the farmers with few pigs were unemployed and in poverty. Pigs were kept mainly in intensive systems. Structures were poorly constructed mainly with different locally available materials without concreted floors. Mud floor were a big challenge during wet seasons because pigs made mud pools.

Swill was the common feed for pigs in most households. The main concern was the spread of diseases from swill, but because of feed shortages, farmers did not have other resources. Commercial feeds were used by a few farmers, especially those who kept pigs for sales and those who sold their pigs to abattoirs. These farmers understood the importance of good nutrition for pigs destined for slaughter.

Opportunities were there if farmers could manage their pigs properly. Water for pigs was provided only during feeding and sometimes mixed with the feed. That was a problem, especially with unbalanced feeds and hot weather. It was one of the causes of poor pig performance in the study area.

Time taken for pigs to reach slaughter weight was a problem for some farmers because of poor feeds and underfeeding. Therefore it took a long time before pigs attained slaughter weight. The cost of rearing the pigs for extra months meant that farmers were not making any profit. Farmers utilized different markets both formal (abattoirs and butcheries) and informal (pension pay points and neighbours) to sell their pigs live or as pork meat. Informal markets were not organized, farmers sold pigs throughout the year, especially in winter, and prices were determined at the point of sale.

6.2 Recommendations

Results of the current study have shown that pig farming in uThukela District is an important economic activity, which fulfilled a social and economic household needs. It is therefore necessary to assist those farmers through mentoring to make pig farming more successful in the rural areas of KZN; as means of alleviating poverty and eliminating food insecurity in uThukela District. It is therefore of utmost importance for KZNDAEA to

support the pig farmers in rural areas by equipping them with knowledge and skills to improve the quality of pigs sold in market; for better economic gains.

The low youth involvement in agriculture is of great concern because it creates a problem when the current farmers will no longer be able to work or are deceased it will certainly mean that farming will have stopped in those households. Majority of households had an average family size of 8 people who were poorly educated and unemployed. With that comes the issue of dependency, especially on government grants because there are no other sources of income in most cases. Therefore, it is crucial that youth are motivated and shown the importance of agriculture to eliminate the stigma that sometimes accompanies agriculture by magnifying its gains. This issue has been addressed by the current IDP for uThukela District. This will improve number of youth involved in agriculture and in other employments in the rural areas. The KZN government should increase bursaries for more youths to study agriculture through Cedara and Owen Sithole Colleges that are managed by KZNDAEA.

There is a gap between KZNDAEA and the rural people with regard to the marketing of livestock and related products. It is necessary for the government to study and understand the local market; with the view of developing marketing infrastructure on one hand; and on the other the government should empower farmers with knowledge and skills on issues such as hygiene, healthcare and animal welfare; so that they can improve livestock production and sales. This does not necessarily means that the government should interfere with the local market. What is required is for the government to develop standards and market places or auctions for pigs, so that local farmers can meet buyers on regular basis.

Recently KZNDAEA initiated auctions for cattle where rural farmers sell their cattle, which have become very popular. Possibly similar development is required for pigs to have more organized marketing. This will improve animal disease control and the quality of meat sold. It will also improve the economic status and household food security of pig farmers. KZNDAEA should work with the Department of Health to improve the handling and selling of meat in the local markets. This will prevent the spread zoonotic diseases. Research is also necessary to investigate the zoonotic diseases and any other diseases that could affect pigs and people through scavenging pigs and consumption of pork. There should also be stricter health programmes/vaccination programmes and the involvement of

KZNDAEA animal health technicians to mentor pig farmers to observe the required healthcare and biosecurity routines on their farms to prevent the spread of animal diseases. Disposal of carcasses of dead pigs need to be looked into to educate farmers not to damp/throw away or eat carcasses to prevent the spread of zoonotic diseases. Farmers should be encouraged to dispose carcasses as required by Biosecurity and Disease Prevention Act.

Respondents used limited resources to the best of their ability, but proper feeding, housing and controlled breeding needed urgent attention. They neglected proper animal husbandry such as keeping of records, care and handling of sows, piglets and using quality breeding stock. Inbreeding could be avoided by selling pigs to other districts in KZN and also buying breeding stock from outside the district. It is also necessary to establish alternative feed sources other than swill that could be grown in the area for the development of indigenous breeds, than can be kept by rural farmers to meet their economic needs and household food security.

Indigenous breeds are hardy and able to survive on limited resources in rural areas. Therefore, research into non conventional feedstuffs should be encouraged and shared with farmers to improve pig production in the district. It is important that to ensure that indigenous breeds do not fade away from the rural areas of KZN. Farmers educated on the importance of the pure bred indigenous pigs and their strengths such as their resistance to diseases; and their ability to thrive in resource scarcity. Research for the improvement of indigenous breeds should be encouraged for the preservation of the gene pool in the province.

The KZNDAEA should investigate the possibility of introducing smaller, easily movable pig houses that can be used by farmers keeping one or two pigs for fattening only. The advantage of a movable house is that it could be moved to cleaner and dry areas when required. Raised floor houses that are used in other countries could also need to be investigated and adopted, since there are some that are already being used for goats in the province.

Lastly, good management of pigs is the main catalyst of good production. Farmers should be trained on how to keep financial and production records and to view pig farming as a business which needs better management; for them to realise economic freedom and food

security. Pigs have a place in the lives of the rural people of KZN whether it’s for income generation or for home consumption. Farmers need mentoring in different aspects of production, nutrition, health, housing and management; because pig production has the potential of supporting many households in the rural areas of KZN.

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THE APPENDIX

KWAZULU-NATAL DEPARTMENT OF AGRICULTURE, ENVIRONMENTAL AFFAIRS AND RURAL DEVELOPMENT

FARMING SYSTEMS RESEARCH QUESTIONNAIRE

Private Bag X6005, Hilton, 3245

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THE UNTOLD STORY OF THE PIG FARMING SECTOR OF RURAL KWAZULU-NATAL: A CASE STUDY OF UTHUKELA DISTRICT

QUESTIONNAIRE NUMBER

.....

INTERVIEWER'S NAME

……..

DATE OF INTERVIEW

.....

A. PROFILE OF STUDY AREA AND THE PARTICIPANTS

1. GENERAL INFORMATION (STUDY AREA)

MUNICIPALITY	
WARD	
WHO IS THE INKOSI OF THE AREA	
GPS CO-ORDINATES OF HOMESTEAD	

2. DEMOGRAPHIC QUESTIONS (PIG FARMER)

2.1 GENDER	FEMALE [ ] MALE [ ]
2.2 HOME LANGUAGE	
2.3 OCCUPATION	
2.4 LEVEL OF EDUCATION	[ ] NO FORMAL EDUCATION [ ] PRIMARY EDUCATION [ ] SECONDARY EDUCATION [ ] COLLEGE EDUCATION [ ] UNIVERSITY EDUCATION
2.5 AGE GROUP IN YEARS	[ ] <25 [ ] 25 -35 [ ] 36 – 45 [ ] 46 – 55 [ ] 56 – 65 [ ] >65

3. SIZE OF HOUSEHOLD (FAMILY & PEOPLE RESIDING IN HOUSEHOLD)

AGE GROUP	NO. OF MALES	NO. OF FEMALES
ADULTS (+16 YEARS)		
CHILDREN (< 16 YEARS)		

4. HOW MUCH INCOME IS DERIVED FROM THE FOLLOWING SOURCES?

	RANDS/MONTH	RANDS/YEAR
SALARIES		
PENSION (OLD AGE)		
CHILD SUPPORT GRANT		
DISABILITY GRANT		
HOME INDUSTRIES		
CROP SALES		

LIVESTOCK SALES		
CONTRIBUTIONS FROM FAMILY MEMBERS, BOARDERS		
OTHER (SPECIFY)		

B. THE SOCIAL AND ECONOMIC CONTRIBUTION OF PIGS TO HOUSEHOLD

5. ANIMALS AND CROPS FARMED AND LAND AVAILABILITY

5 .1 HOW MUCH LAND DO YOU OWN (HA)……

5.2 DO YOU FARM WITH THE FOLLOWING (TICK AS MANY AS APPROPIATE)

BEEF CATTLE	
DAIRY CATTLE	
GOATS	
SHEEP	
PIGS	
CHICKENS	
RABBITS	
CRAFT PLANTS	
MAIZE	
SORGHUM	
MEDICINAL PLANTS	
POTATOES	
SUGAR CANE	
FRUIT (IF YES, SPECIFY BELOW)	
VEGETABLES (IF YES, SPECIFY BELOW)	

OTHERS (IF YES, SPECIFY BELOW)	

5.3 WHY DO YOU KEEP PIGS (TICK APPROPIATE ANSWERS)?

SELLING TO RAISE INCOME	
HOUSEHOLD CONSUMPTION	
MANURE	
INVESTMENT	
OTHER (SPECIFY)	

6. MARKETING

6.1 WHICH MARKETING CHANNELS DO YOU USE?	[ ] PENSION POINTS [ ] ABATTOIRS [ ] BUTCHERIES [ ] NEIGHBOURS [ ] OTHER (SPECIFY)
6.2 HOW DO YOU SELL YOUR PIGS?	[ ] LIVE [ ] FRESH MEAT [ ] OTHER (EXPLAIN)

6.3 AT WHAT TIME OF THE YEAR DO YOU USUALLY SELL PIGS AND WHY?

……

……

……

……

6.4 DO YOU FACE ANY RELIGIOUS OR CULTURAL CHALLENGES WITH REGARD TO KEEPING PIGS AND PIG MARKETING? EXPLAIN.

……
……
……
……

7. RANK YOUR FAMILY MEAT CONSUMPTION PREFERENCES (1 – MOST, 3 – AVERAGE AND 6 – LEAST)

WHICH MEAT TYPE DOES YOUR FAMILY CONSUME MOST?	[ ] PORK [ ] BEEF [ ] CHICKEN [ ] MUTTON [ ] CHEVON [ ] OTHER (SPECIFY)

C. <u>PRODUCTION SYSTEMS</u>

8. EXPERIENCE AND PIG TRAINING

8.1 HOW LONG HAVE YOU BEEN FARMING WITH PIGS?	[ ] <1 YEAR [ ] 2 – 5 YEARS [ ] >5 YEARS, SPECIFY
8.2 DID YOUR PARENTS KEEP PIGS?	[ ] YES [ ] NO
8.3 IF YES ABOVE, CAN YOU DESCRIBE THE TYPE OF PIGS THEY FARMED WITH	
8.4 DID YOU ATTEND ANY PIG TRAINING COURSE ON PIG REARING?	[ ] YES [ ] NO
8.5 IF YES, NAME THE INSTITUTION THAT GAVE THE COURSE	
8.6 HOW LONG WAS THE COURSE?	[ ] 1 DAY [ ] 2 – 3 DAYS [ ] 1 WEEK

	[ ] 2 – 3 WEEKS [ ] MORE THAN 3 WKS, SPECIFY.

9. BREEDING STOCK

9.1 WHICH TYPE OF PIGS DO YOU FARM WITH? DESCRIBE THE TYPE OF PIG IF NOT KNOWN.	[ ] INDIGENOUS (KOLBROEK/WYNDSNER) [ ] LARGE WHITE [ ] LANDRACE TYPE [ ] DUROC [ ] OTHER (DESCRIBE)
9.2 WHERE DO YOU BUY YOUR BOARS AND SOWS FROM (BREEDING STOCK)?	[ ] NEIGHBOURS [ ] STOCK SALE [ ] BREEDERS [ ] SELECTION WITHIN THE HERD
9.3 IF BREEDER, GIVE THE NAME OF BREEDER	
9.4 WHAT ARE YOUR REASONS FOR PREFFERING THE BREED YOU USE?	

10. REPRODUCTION MANAGEMENT

10.1 DO YOU CONTROL WHEN THE BOARS MATE WITH THE SOWS (BREEDING)?	[ ] NO “UNCONTROLLED “ [ ] YES “CONTROLLED”
10.2 AT WHAT AGE DO YOUR GILTS, FIRST GET SERVED?	[ ] < 6 MONTHS [ ] 6 – 8 MONTHS [ ] 8 –12 MONTHS [ ] >12 MONTHS
10.3 HOW OFTEN DO YOUR SOWS GIVE BIRTH PER YEAR?	[ ] ONCE [ ] TWICE
10.4 HOW MANY PIGLETS ARE BORN PER LITTER (ESTIMATE)?	[ ] < 8 [ ] 8 – 10 [ ] >10
10.5 DO YOU OBSERVE SOWS DURING FARROWING (BIRTH)?	[ ] YES [ ] NO
10.6 DO YOU WEAN YOUR PIGLETS (STOP PIGLETS FROM SUCKLING)?	[ ] YES [ ] NO

10.7 IF YES, AT WHAT AGE DO YOU WEAN?	[ ] 3 WEEKS [ ] 4 WEEKS [ ] 5 WEEKS [ ] OTHER (SPECIFY)

11. PIGLETS MORTALITIES

11.1 IF POSSIBLE NAME THE DISEASES OR THE SIGNS OF THE DISEASE PIGLETS DIE

FROM.....

.....

.....

.....

11.2 HOW MANY PIGLETS DIE APPROXIMATELY FROM EACH LITTER?

DISEASED				SQUASHED				COLD/FREEZING			
0	1 - 2	3 - 4	> 4	0	1 - 2	3 -4	> 4	0	1 - 2	3 -4	> 4

OTHER (EXPLAIN BELOW)			
0	1 – 2	3 – 4	> 4

……

……

.....

……

.....

11.3 DO YOU INVOLVE STATE VETERINARIANS OR ANIMAL HEALTH TECHNICIANS TO INVESTIGATE MORTALITIES OF PIGLETS?

YES	
NO	

11.4 IF NOT, WHY?

……

……..

12. PIG HOUSING

12.1 WHICH OF THESE BEST DESCRIBES THE WAY YOU REAR YOUR PIGS	[ ] EXTENSIVE - PIGS KEPT OUTDOORS [ ] INTENSIVE - PIGS KEPT INDOORS
12.2 IN WHICH OF THESE BEST DESCRIBES THE WAY YOU HOUSE YOUR PIGS?	[ ] BLOCK HOUSES [ ] WOODEN HOUSES [ ] CORRUGATED IRON HOUSES [ ] OPEN ENCLOSURES [ ] MUD [ ] OTHER (SPECIFY)
12.3 FLOOR TYPES INSIDE PENS	[ ] CONCRETE [ ] WOODEN [ ] SOIL [ ] OTHER (SPECIFY)

13. NUTRITION

13.1 WHAT DO YO FEED YOUR PIGS? (TICK APPROPIATE ANSWERS)	[ ] COMMERCIAL FEED [ ] VEGETABLES [ ] BREAD [ ] SWILL (DESCRIBE) [ ] OTHER (DESCRIBE)
13.2 IF COMMERCIAL FEED IS USED WHERE IS IT PURCHASED? (TICK APPROPIATE ANSWERS)	[ ] MEADOW [ ] EPOL [ ] AFGRI [ ] DE HEUS [ ] EVER-TRADE [ ] OTHER (SPECIFY)

13.3 DO YOU WEIGH THE FEED GIVEN TO ANIMALS?	[ ] YES [ ] NO			
13.4 HOW MUCH DO YOU FEED PER PIG PER DAY IN KILOGRAMS IF FEED IS WEIGHED?	WEANERS < 35 KG	PORKERS 21 - 50 KG	SOWS & BOARS	BACONERS > 51 KG
13.5 WHICH BEST DESCRIBES THE PROVISION OF WATER?	[ ] PIGS DRINK FROM A WATER TROUGH PROVIDED IN PIG STY. [ ] PIGS DRINK FROM A RIVER NEAR BY/ ANIMALS GO TO WATER [ ] OTHER (SPECIFY)			
13.6 IF WATER IS PROVIDED, HOW MANY TIMES A DAY IS WATER GIVEN?	[ ] WATER AVAILABLE ALL THE TIME [ ] WATER AVAILABLE ONLY DURING FEEDING [ ] OTHER (SPECIFY)			

IF YOU SAID YOU DON'T USE COMMERCIAL FEED, DESCRIBE HOW THE PIGS ARE FED AND THE AMOUNTS THEY ARE

FED.....

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14. PIG NUMBERS

14.1 NUMBER OF PIGS (TOTAL)	
14.2 NUMBER OF BOARS	
14.3 NUMBER OF SOWS & GILTS	
14.4 NUMBER OF SUCKLING PIGS	
14.5 NUMBER OF WEANERS	
14.6 NUMBER OF FATTENING PIGS	
14.7 HOW MANY PIGS DID YOU SLAUGHTER FOR HOME USE DURING THE PAST 12 MONTHS?	
14.8 HOW MANY ADULT PIGS (NOT PIGLETS) DIED DURING THE LAST 6 MONTHS?	
14.9 HOW MANY SOWS ABORTED IN THE LAST 6 MONTHS?	

15. ABATTOIR SLAUGHTERINGS

15.1 AT WHAT LIVE-WEIGHT DO YOU SELL YOUR ANIMALS	KG
15.2 AT WHAT AGE DO YOU SELL YOUR ANIMALS	MONTHS
15.3 HOW MANY PIGS HAVE YOU SOLD OVER THE LAST 6 MONTHS.	
15.4 WHICH ABBATOIR DO YOU SELL YOUR PIGS	
15.5 WERE ANY PIGS REJECTED BECAUSE OF DISEASE OR ANYTHING ELSE?	[ ] YES [ ] NO
15.6 IF YES IN 15.5, EXPLAIN THE REASON FOR REJECTION.	
15.7 HOW DO YOU TRANSPORT YOUR PIGS TO THE SALE OR ABATTOIR	[ ] OWN TRANSPORT [ ] CONTRACTOR [ ] OTHER (SPECIFY)

16. BIOSECURITY AND HEALTH

16.1 DO YOU HAVE ANY MEASURES TO PREVENT DISEASES ENTERING YOU PIGGERRY?	[ ] YES [ ] NO
16.2 IF YES, DESCRIBE	
16.3 DO YOU HAVE A VACCINATIONATION PROGRAMME FOR YOUR PIGS?	[ ] YES [ ] NO
16.4 IF YES, BRIFLY MENTION THE VACCINES USED & WHEN?	
16.5 DO YOU SEND DEAD PIGS FOR POST MORTEM?	[ ] YES [ ] NO
16.6 IF NOT ABOVE, WHAT DO YOU DO WITH DEAD PIGS?	[ ] EAT THEM [ ] BURY THEM [ ] FEED TO DOGS [ ] OTHER (SPECIFY)
16.7 WHAT ARE THE REASONS FOR NOT SENDING PIGS FOR POST MORTEM?	[ ] LACK OF CAPITAL [ ] NOT NECESSARY [ ] OTHERS (SPECIFY)