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Options for the delivery of primary animal health care for livestock farmers on communal land in South Africa: Mnisi community case study

By

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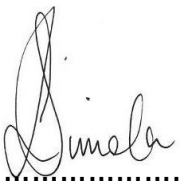
DEDICATION

To Mongi Thembelihle & Makhi Memokuhle

I owe you a lot of mommy time.

DECLARATION

I, **Langelihle Simela**, hereby declare that the work on which this dissertation is based is original and that neither the whole work nor part of it has been, is being, or shall be submitted for another degree at this or any other university, institution for tertiary education or professional examining body.



Signed …….. Date 27 July 2012

Langelihle Simela

SUMMARY

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Livestock farmers on communal land rely heavily on state veterinary services (SVS) for animal health care. State provided primary health care services are however, not readily accessible to many such communities. The study was conducted to investigate the primary animal health care (PAHC) delivery methods that are preferred by communal land-based livestock farmers, with special focus on the possibility of using community-based animal health workers (CAHW).

The study was conducted in Mnisi community in Bushbuckridge local municipality of Mpumalanga Province. Questionnaire-based interviews were conducted with 133 cattle farmers from 10 of the 15 inspection points in Mnisi community. After analysis of the data from the questionnaire surveys, group discussions were held at five inspection points to obtain clarity on the community's needs and expectations for the delivery of PAHC services. Data was captured and analysed in Microsoft Excel using descriptive statistics. Responses from the group discussions and other interviews were captured and reported on.

The respondents were predominately male (72 % of all respondents), owners of the livestock (80%) and had an average of 13 cattle each. The major reasons given for the exit of cattle from the herds were sales (38% of exits), drought (18.2%), stock theft (15.6%) and diseases (14.8%). Overall 55.1% of exits were losses while 43.7% were for beneficial purposes (1.2% of the exits from the cattle herds were not explained). The farmers perceived nutritional problems, animal diseases, access to water, stock

theft, drought and ticks/dipping the six important constraints to livestock production. Amongst diseases and disease conditions, tick burdens, lumpy skin disease and internal parasites were considered the major challenges.

Most farmers (77%) did not vaccinate their cattle. The main reason that was given for not vaccinating cattle was that vaccines were provided free by the SVS. None of the farmers felt that the vaccines were not available, not effective or too cumbersome to apply. Despite the free vaccines, 67% did not know if their cattle were ever vaccinated and or what diseases the administered vaccines prevented.

All farmers controlled ectoparasite infestation either by plunge dipping (90.2%) or use of pour-on acaricides (9.8%). Furthermore, 78% of those who dipped their cattle also used other methods to control ectoparasites, popularly, whole body and/or spot spraying as and when it was necessary. Endoparasites were controlled by 59.4% of the respondents, predominately by drenching as and when it was necessary. The alternative products for ectoparasites and endoparasites were obtained mainly from the farmers' cooperative in Hoedspruit.

For 99% of the respondents the primary providers for animal health care in Mnisi were SVS professionals (predominately Animal Health Technicians, AHTs). Other community members were consulted by 30% of the respondents. The common routes of contact were visiting the SVS offices, contact at the inspection points and calling the officials with a cell phone. Two-thirds of the farmers reported diseases to SVS and most of them (94%) were happy with the response to the reports. In general the farmers were satisfied with the accessibility of the AHTs (72%), state veterinarians (95%) and the animal clinic staff (77%). They were also satisfied with the information that they received from SVS.

The most preferred providers of animal health care were the AHTs (77%). When prompted, 92% of the respondents said they would use the services of a community-based person trained to handle animal health problems, mainly for advice on disease management, drug administration, disease surveillance, diagnosis and castration. During the group discussions, facilitating access to fodder and water were included in the tasks for the community-based persons.

Forty-two percent of the respondents said that they would use such a person frequently and 83% were willing to pay for the services in cash and/or kind. The general impression was that young people should be trained to carry out these tasks. Farmers preferred that the community-based person should work closely with the AHTs and be in contact with the farmers as frequently as 2–3 times a week to monthly.

It is concluded that farmers of Mnisi community were satisfied with the availability and accessibility of the PAHC services provided by the SVS, and in fact preferred the SVS for this service. The farmers however lacked the knowledge and ability to adequately handle the production, animal health and livestock security problems with which they were confronted. A community-based service would therefore be beneficial if it holistically addressed the critical challenges of access to fodder and water, control of diseases and ticks, ensured livestock security, and also equipped farmers to manage these challenges. It is therefore recommended that Community-based Livestock Workers could be engaged if they are adequately qualified to fulfil this role. The use of Farmer Field Schools facilitated either by AHTs or CLWs for capacitation of the farmers should be investigated. The cost implications, potential benefits and effectiveness of selected options should be explored further before conclusive decisions are taken.

It is further recommended that some effort should be invested in stimulating community cohesion amongst farmers to enable them to collectively address challenges that are common to them.

The needs for the delivery of PAHC services in Mnisi community illustrate that such services should be tailor-made for the intended beneficiary communities, taking into consideration the existing support structures, the communities' socio-cultural issues, cost effectiveness and the possible impact of the services.

LIST OF ACRONYMS

AFASA	African Farmers' Association of South Africa
AHT	Animal Health Technician
AU–IBAR	African Union Interafrican Bureau for Animal Resources
CAHW	Community-based Animal Health Worker
CASP	Comprehensive Agriculture Support Programme
CHET	Cysticercosis, Hydatidosis, Echinococosis, and Taeniasis
CLW	Community-based Livestock Worker
DAFF	Department of Agriculture, Forestry and Fisheries (of South Africa, from 2009)
DOA	Department of Agriculture (of South Africa, up to 2008)
FAO	Food and Agriculture Organisation of the United Nations
FarmNET	Farmer Information Network for Agricultural and Rural Development
FMD	Foot and Mouth Disease
GIS	Geographic Information Systems
ICT	Information and Communication Technology
NERPO	National Emergent Red Meat Producers' Organisation
OIE	World Organisation for Animal Health
PAHC	Primary Animal Health Care
RPO	Red Meat Producers' Organisation
SAARF AMP	South African Advertising Research Foundation All Media and Products Survey
SAVC	South African Veterinary Council
SVS	State Veterinary Services

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1. INTRODUCTION

1.1 OVERVIEW OF SMALLHOLDER LIVESTOCK FARMING ON COMMUNAL LAND AND THE NEED FOR PRIMARY ANIMAL HEALTH CARE

South Africa is predominantly a livestock producing country. About 70% of the South African land area (84% of agricultural land) is suitable for permanent grazing (Table 1.1), which means it is suitable cattle, sheep, goats and game production.

Table 1.1 Land area and land use in South Africa (2009)

	Area ('000 ha)	% of country area
Country area	121,909	100
Land area	121,447	99.6
Agricultural area	99,228	81.6
Permanent meadows and pastures	83,928	68.8
Arable land and permanent crops	15,300	12.6
Other land	12,978	10.6
Forest area	9,241	7.6
Inland water	462	0.4

Source: FAO STAT (2012)

Livestock production in South Africa is dualistic, with a highly developed commercial sector consisting of farmers on private ranches on one hand. On the other is a smallholder sector made up of a small number of farmers on smallholdings along with a vast group on communal land (Scholtz, Bester, Mamabolo & Ramsay 2008). The smallholder farmers range from subsistence-oriented producers, predominately on communal land to the commercially-oriented farmers, predominately on smallholdings. Estimates are that the smallholder sector holds 40% of the national cattle herd of 13.8 million, 67% of the national goat flock of 6.3 million and 12% of the national sheep flock of 24.6 million (Department of Agriculture, Forestry and Fisheries 2010a[1]).

[1] The Department of Agriculture, Forestry and Fisheries was known as the Department of Agriculture prior to 2009.

As production currently stands, South Africa is a net importer of all red meat. It is generally believed, however that the country could be self-sufficient if productivity, particularly in the smallholder sector was improved. For example, in Scholtz *et al.* (2008), the proportions of female cattle in the herds of emerging commercial and farmers on communal grazing were less than the proportion of females in the commercial farmers' herds (Table 1.2). The calving percentage achieved by developing farmers on smallholdings and those on communal land were respectively, three–quarters and less than half of that achieved by commercial farmers (Table 1.2).

Table 1.2 Comparison of the productivity of cattle herds owned by commercial, emerging commercial and communal grazing farmers of South Africa (2003)

Description	Commercial sector	Emerging sector †	Communal sector ‡
Total No. (excluding calves)	28,726	7,749	11,426
% Adult females	52%	49%	33%
% Active females	47%	48%	31%
No. of calves born	8,276	1,770	940
Calculated calving %	61%	48%	27%

Source: Scholtz *et al*. 2008

NB

† "Emerging farmers" refers to commercially–oriented farmers, often on smallholdings but could also be on communal land.
‡ "Communal sector" refers to subsistence–oriented farmers on communal land.

When the off take rates from the South African herds was compared to other major cattle producing countries of the world, it was clear that the developing sector not only had low productivity but also a much lower share of the livestock markets because of the low off take (Table 1.3).

Table 1.3 Offtake from the beef sector of South Africa compared to major beef producers of the world (2003)

Country / region	% Off–take of beef cattle
South Africa (commercial)	32
South Africa (emerging)	25
South Africa (communal)	6
Australia	28
New Zealand	37
European Union	34
United States of America	38
South America (Argentina, Brazil, Paraguay, Uruguay)	20

Source: Scholtz *et al*. 2008

In order to attain competitive levels of production that would boost South Africa's red meat output, the developing livestock sector should be supported to improve the productivity of the herds. On communal land especially, support from state agricultural extension and veterinary services is essential; more so that state services are about all that livestock farmers on communal land have access to and rely on. This is probably because their individual herds and flocks are usually too small to justify individual investment in livestock handling facilities and equipment, and the fact that they have become accustomed to the free services that are provided by the state.

Unfortunately state support tends to be inadequate and overstretched. For example, the South African veterinary services are strongly biased towards regulatory matters rather than the provision of primary animal health care (PAHC). Moreover, in 2010 the red meat industry representatives understood that 37% of the national and provincial veterinary posts were vacant (Red Meat Producers' Organisation 2011), a shortfall which would exacerbate the scarcity of PAHC services for smallholder farmers.

The history of the developing countries suggests that the trend of inadequate state provided veterinary services is more likely to continue than improve (Schillhorn van Veen & de Haan 1995; Leonard 2004). It was because of the reasons that have been expounded thus far that this study was undertaken to investigate alternative approaches to improve access to PAHC services for livestock farmers on communal land in South Africa. Such provision of services would be consistent with the present government targets for universal access to support services, and equitable growth and development (Department of Agriculture 2001, 2006; Department of Agriculture, Forestry and Fisheries 2010b).

1.2 DEFINITION OF PRIMARY ANIMAL HEALTH CARE

The Department of Agriculture, Forestry and Fisheries (DAFF) defined PAHC as 'the general care, disease prevention, parasite control, husbandry, housing and feeding of animals," (Department of Agriculture 2007). The most apt definition of PAHC within the context of this study was adopted from McCrindle, Stewart and Kwanuka (1996) as follows:

- Maintaining the health and wellbeing of livestock in the smallholder farming systems through the recognition of abnormal behaviour or appearance, and disease prevention through vaccination or parasite control. It includes treatment of minor injuries and ailments using home remedies and registered stock remedies as well as precautions when administering parasiticides and stock remedies.

The above adequately embodies the activities that are envisaged for smallholder farmers to ensure the health of their animals.

1.3 JUSTIFICATION FOR THE STUDY

Livestock farmers on communal land rely heavily on the state to provide PAHC. Unfortunately the state is not always able to do this because its departments tend to be overstretched and services of national priority take precedence over PAHC. For example, in Mpumalanga and Limpopo provinces, and of late KwaZulu Natal provinces, disease surveillance and control (especially for foot and mouth disease) in areas that border the game parks is critical for the state, more so in times of crisis. This could be done at the expense of farmers outside these areas of crisis, when SVS professionals that they depend on are deployed to deal with the crisis.

This study aimed to investigate options for acceptable, accessible and affordable PAHC that can be employed by livestock farmers on communal land. Special consideration was given to the community-based animal health worker (CAHW) programme, because it is reported to have worked well in other African countries and is endorsed by the African Union/Interafrican Bureau for Animal Resources (AU/IBAR 2003) and the World Organization for Animal Health (OIE) (AU/IBAR 2003). Moreover, the South African Directorate of Animal Health is keen to implement the CAHW-programme and has provided some guidelines for its implementation in the Draft National Primary Animal Health Care Policy of South Africa (Department of Agriculture 2008). The outcomes of this study should also be useful contribution to the University of Pretoria's PAHC Programme, which was introduced in April 2011, to, amongst other matters, develop training materials and methodologies as well as implement and assess training in PAHC (University of Pretoria 2012).

2. LITERATURE REVIEW

2.1 LIVESTOCK PRODUCTION IN COMMUNAL AREAS OF SOUTH AFRICA

Livestock farmers on communal land face many constraints to production that are related to communal grazing of livestock. Primary is the limited grazing, which may lead to gross under-nutrition of the livestock during dry periods. The limited grazing also limits the herd sizes in communal farming systems. In studies that were conducted in Limpopo, Eastern Cape and KwaZulu Natal provinces, the herds averaged between 8 and 17 cattle per household (Simela, Mahanjana & Montshwe 2006). Similar figures were reported by Kunene & Fossey (2006), in which 88% of the households in Enseleni community of uThungulu district municipality, KwaZulu Natal had between one to 20 goats and cattle. The livestock are often owned by older men who rely on their pensions, part time work and remittances for subsistence (Letsoalo, Krecek, Botha & Ngetu 2000, Kunene & Fossey 2006; Simela *et al*. 2006). In most instances the majority of the livestock owners have basic primary education. In Simela and co−workers' report (2006) the average level of formal education was five years, in Kunene and Fossey (2006), more than fifty percent of the farmers had no formal education at all and in Bembridge (1984), 68% of the respondents had some primary level of education. Thus any primary animal health care programme for livestock farmers on communal land should, amongst other factors, be compatible with the farmers' level of education, and hence their comprehension of the terminology used and concepts that are taught.

According to the livestock farmers on communal land, the most important limiting factors to livestock production are diseases and the related high mortality, stock theft, lack of feed, lack of water and lack of development finance (Simela *et al.* 2006). In northern KwaZulu Natal, similar constraints were identified (Kunene & Fossey 2006). A worrying observation in most studies of livestock production on communal land is the high losses (deaths and thefts) compared to animals that exit the herds/flock for beneficial purposes (sales and slaughter). Amongst communal land based cattle owners in Limpopo and Eastern Cape, combined exits (i.e., slaughter, sales, deaths and thefts) averaged nine and eight cattle per herd, respectively (Simela *et al*. 2006). Of these, 40% and 44% were combined sales and slaughter, respectively. Deaths

accounted for 25% and 32% of the exits, and stock theft for 35% and 24%, respectively. It is evident that losses from cattle herds on communal land should be curbed. Addressing issues of primary animal health care could reduce losses in productivity due to diseases and the mortality rates amongst livestock on communal land.

Observations in OR Thambo district municipality (Simela *et al*. 2006) illustrate the dependency of communal land based livestock farmers on state provided PAHC services and its adverse consequences. A seemingly simple action of the withdrawal of state support for dipping foremen led to highly irregular dipping in OR Thambo district municipality, and an increased incidence of tick–borne diseases (Simela *et al*. 2006). During the same period, one of the major causes of deaths amongst cattle was black quarter, because the state had also stopped providing the black quarter vaccine freely (Simela *et al*. 2006).

The foregoing exposition demonstrates that access to state supported PAHC is crucial and yet highly limited and infrequent in communal livestock production systems of South Africa (Kunene & Fossey 2006; Simela *et al*. 2006). It is therefore imperative that alternative methods of PAHC delivery that are accessible, affordable, acceptable and sustainable should be investigated and employed.

2.2 THE NEED FOR PRIMARY ANIMAL HEALTH CARE AND DELIVERY METHODS

According to the Food and Agriculture Organisation of the United Nations (FAO), "there is a need for a primary animal health care programme when the existing veterinary service cannot be extended because of financial, geographic and technical problems" (FAO 1994). In order to address this constraint in South Africa, the DAFF drafted a primary animal health care policy, whose overall objectives were to broaden access to veterinary services to rural communities in a cost effective manner; ensure improvement in the health status and production of animals; safeguard public health and contribute to overall national development (Department of Agriculture 2008). The draft policy covered broad aspects of animal health and production, which included preventive veterinary measures, disease surveillance, diagnosis, early treatment of diseases, nutrition and hygiene, livestock breeding, veterinary public health, and training and extension. The draft policy also stated that the delivery of

PAHC services should be a participatory process, which may involve CAHWs, Animal Health Technicians (AHTs), other auxiliary personnel and model/champion farmers. The DAFF envisaged that the delivery of PAHC to farmers on communal land would also facilitate the implementation of the legislation and regulations governing the production of healthy livestock, safe meat and protection of the public from zoonotic diseases (Department of Agriculture 2008). Some of the instruments and programmes that were mentioned in the draft policy are as follows:

- Improving animal health in rural areas by conceptualising and implementing preventative veterinary activities in accordance with the Animal Disease Act No. 35 of 1984 and the Animal Health Act No. 7 of 2002.
- Improving zoonotic disease control in animals and humans, through launching *inter alia* the CHET (*cysticercosis, hydatidosis, echinococosis, and taeniasis*) control programme, contributing to the improvement of the nutritional status of poor in the whole country in accordance with the Animal Health Act No.7 of 2002, Health Act No 63 of 1977 and Meat Safety Act No 40 of 2000.
- Administering and improving the implementation of the Animal Identification Act No. 6 of 2002.
- Facilitating improving livestock genetics by smallholder farmers in accordance with the Animal Improvement Act No 62 of 1998.
- Facilitating improved knowledge of smallholder farmers concerning animal management / husbandry / well-being practices in rural areas.
- Facilitating and co-ordinating the implementation of improved feeding schemes of animals in rural areas, to prevent suffering and deaths in animals and financial losses to beginner farmers during winter times and droughts, and contribute in full to the Comprehensive Agricultural Support Programme (CASP) of the DAFF.

In the following sections, some PAHC approaches that have been employed and/or are recommended for implementation within South Africa are discussed.

2.2.1 ANIMAL HEALTH TECHNICIANS

Most of South Africa's veterinary services employ a model of PAHC that is based on the AHTs as the primary contact persons with the livestock farmers. The AHT-based system has limitations in service delivery. For example, during consultations with livestock farmers in Mpumalanga province[2] and OR Thambo district municipality (Simela *et al*. 2006), indications were that there is a general shortage of AHTs to fully service the smallholder livestock farmers. Most of the farmers at the Mpumalanga Consultative Workshop on Agriculture in 2004 said that they had never had contact with AHTs or veterinarians. In OR Thambo district municipality in 2005, it was found that Port St Johns local municipality's 13 wards had only three AHTs, and Nyandeni local municipality's 23 wards had 11 AHTs. There are also severe constraints on travel as each AHT has a budget for limited mileage per month. The mandate of the SVS is disease control, which is a form of preventive primary animal health care, in contrast to treatment of disease. Evidently AHTs cannot possibly reach all the farmers on a per needs basis. It was from these observations that the National Emergent Red Meat Producers' Organisation (NERPO) concluded that a CAHW programme could improve livestock farmers' access to PAHC services.

2.2.2 VETERINARY CLINICS

Veterinary clinics could be either private or state run. Although Ahuja (2004) suggests that commercialised private practices may deliver a greater quantity and quality of clinical veterinary care than subsidised state services, it is doubtful that private practitioners would be able to run viable businesses anchored on communal land–based clientele in South Africa. In other countries, however, there has been a strong suggestion that resource–poor farmers are willing to pay for veterinary clinical services, provided they are assured of good quality service (Heffernan & Misturelli 2000; Ahuja 2004). Van den Bossche, Thys, Elyn, Marcotty and Geerts (2004) state that this is possible only under perfect market conditions, which often do not exist in Africa. Instead, private clinic services tend to be limited because of low demand for the specialised services that they offer and high start-up and operating costs (Turkson & Brownie 1999).

[2] Consultative Workshop on Agriculture, 2-3 December 2004. Mpumalanga Department of Agriculture and Land Administration, Crocodile Country Inn, Nelspruit

Mpumalanga is the only province that provides state funded veterinary clinics for livestock farmers in South Africa. Some provinces, such as KwaZulu Natal and North West employ mobile clinics. The weakness of the clinics-system of PAHC service delivery is that they may not be close enough to all the farmers that they are intended to serve. In the case of mobile clinics, farmers may not always be aware of their schedule or would the clinics necessarily be reachable when a farmer needs them most (Letsoalo *et al*. 2000).

2.2.3 COMMUNITY-BASED ANIMAL HEALTH WORKER PROGRAMME

A community-based animal health worker (CAHW) programme is one option for the provision of PAHC services at grassroots level. CAHWs are usually farmers that are selected by their peers and their communities to receive training and then provide basic animal health care and livestock management services (Catley, Blakeway & Leyland 2002). The CAHW-programme is not intended to replace a country's veterinary services but to extend the services to remote/marginalised communities which would normally not regularly receive such services from the existing government departments and private structures (Catley *et al*. 2002; Leidl, Bauman & Schenkel 2004).

Several developing countries in Africa, for example Zambia (Bainbridge 1999), Malawi (Hüttner, Leidl, Pfeiffer, Kasambara & Jere 2001), Kenya (Young, Kajume & Wanyama 2003), Ghana (Hanks, Oakeley, Opoku, Dasebu & Asaga 1999) and Tanzania (VETAID 2003) have employed this system of PAHC service delivery to farmers quite effectively. Most publications on community-based animal health care emphasise the need for acceptance and support of the programme by all stakeholders, particularly the communities in which the CAHWs operate and the country's veterinary authorities (Catley *et al*. 2002).

2.2.3.1 Prerequisites for effective CAHW-programmes

The critical prerequisites for an effective CAHW-programme programme are said to be the following (Catley *et al.* 2002; Leidl *et al*. 2004; Young *et al.* 2003):

- There should be supportive legislation and policy that make the services rendered by CAHWs legally acceptable and enable them to function as a component of para-veterinary services.
- The statutory body responsible for veterinary services should define the tasks to be performed by the CAHWs, the levels of supervision and the reporting relationships.
- An appropriate model for the CAHW-programme should be selected. The models need not be the same throughout the country.
- The CAHWs should be selected from the communities which they will serve and the selection criteria should be identified by the beneficiary communities.
- Selected trainees for the CAHW-programme should be trained by veterinarians who themselves have been trained in participatory training techniques.
- Once they have completed the training, CAHWs should be issued with certificates from the statutory body and be licensed to operate as service providers. Ideally, the licences should be renewable annually, on condition that the CAHW has passed refresher courses.
- The training programme should be followed up with adequate supervision and refresher courses. Supervision should be based on functional links with higher levels of veterinary officials in order to ensure best practices in drug usage and that the CAHWs are informed about new products on the market.
- The CAHWs should have continuous access to drugs and equipment in order to ensure continuity of the services within the communities.

2.2.3.2 Remuneration of CAHWs

The incentives for the CAHWs should be discussed during the participatory survey with the farmers, as soon as they have decided to use the programme (Catley *et al*. 2002). A suggested incentive scheme is that, after training, CAHWs should be given a basic kit to start them off. Thereafter they should be expected to charge their clients for the services they have rendered and for any drugs that they administered. Income earned in this way should be used to replenish drug supplies as well as for personal income. The remuneration system should be regulated by government.

2.2.3.3 Possible duties of CAHWs

Some of the duties that could be carried out by the CAHWs include the following (Catley *et al*. 2002; Department of Agriculture 2008; Ngeiywa & Masake 2009):

- various curative and preventative services, including use of anthelmintics, antibiotics, antiprotozoals, acaricides and vaccines;
- disease surveillance;
- organise farmers for vaccination programmes;
- livestock identification;
- breed improvement;
- facilitation of market access, and
- farmer skills development.

2.2.3.4 Advantages of CAHWs

The advantages of using the CAHWs over the conventional system that is based on government AHTs and veterinarians only, are said to be as follows (Leyland & Catley 2002; Ngeiywa & Masake 2009):

- CAHWs can be available to remote communities that would normally not be reached by urban based veterinarians.
- They supplement the usually overstretched state veterinary services.
- CAHWs are selected by and therefore trusted by the communities which they serve.
- They live within the community and are therefore readily available to offer immediate services to the farmers as opposed to veterinarians and AHTs who may take days to reach the community or never arrive at all.
- They are cheaper than AHTs because they are involved in the service delivery on a part time basis.
- They enable improved services and disease surveillance in marginalised areas.
- They have a significant effect in reducing livestock mortalities in the marginalised areas.
- They can contribute to animal identification, tracing and animal movement control in the remote areas.

- They counteract informal, poor quality services (e.g. use of cheap unregistered drugs).
- They have similar experiences of livestock keeping as the rest of the community and therefore can identify with the community problems.
- They can be a reliable source of information for state veterinarians.
- The CAHW programme creates additional jobs for the communities.

2.2.3.5 Threats to the success of CAHW-programmes

Some possible threats to a CAHW-programme include the following (Ngeiywa & Masake 2009):

- poor co-ordination and quality control of the CAHW-programmes;
- inaccessibility of livestock remedies and equipment;
- limited refresher courses for the CAHWs, and
- incoherent development assistance offering free drugs to communities in which the CAHWs operate.

2.2.3.6 Possible models for CAHW-programmes

Four models for the CAHW-programme have been worked out and are practised in Kenya (Okiwiri, Kajume & Odondi 2001). They are as follows:

Private veterinarian/animal health technician/community-based animal health worker model

In this model a private veterinarian manages the system of supplying drugs to and supervising a number of AHTs, who in turn supply and supervise a large number of CAHWs.

Private animal health technician/community-based animal health worker model

This model only uses private AHTs and CAHWs. Although there is no veterinarian involved in the business, the model is subject to inspection by a government district veterinary officer.

Pastoral associations' model

The model uses an association of livestock farmers to manage CAHWs. As part of this responsibility, the livestock keepers provide incentives and supply the veterinary drugs.

Kiosk model

A small shop that sells various domestic and food items (equivalent to the South African Spaza shop) would also sell the animal drugs. These shops are often not licensed to sell the drugs.

Of the four models, the AHT/CAHWs model was found to be economically more viable than the other models in Kenya (Okiwiri *et al*. 2001). It could better cope with the poor infrastructure, lower income and high delivery costs associated with the marginalised areas than the private veterinarian/AHT/CAHW model. The model was said to require low investment and could be established more rapidly than the one driven by the livestock farmers' associations. Since AHTs and CAHWs were well–trained and able to provide a good quality service, the AHT/CAHWs model was better than the kiosks, which only sell drugs but offer no advisory services.

2.2.4 FARMER FIELD SCHOOLS

Use of Farmer Field Schools is a capacity building method based on adult education principles, using groups of farmers (Groeneweg, Buyu, Romney & Minjauw 2006). It is said to be a dynamic process that is controlled and owned by farmers to help them transform their observations to create a better understanding of the production system.

According to Groeneweg *et al.* (2006) and Braun, Jiggins, Röling, van den Berg and Snijders (2006) the objectives of Farmer Field Schools include the following:

- Empowering farmers with knowledge and skills to make them experts in their own fields through learner-centred, field-based and experiential learning.
- Sharpening the farmers' ability to make critical and informed decisions through observation, analysis, assessment, and experimentation over a time period

sufficient to understand the dynamics of key (agro-ecological, socio-ecological) relationships so that they can make their farming profitable and sustainable.

- Sensitising farmers to new ways of thinking and problem solving.
- Helping farmers learn how to organise themselves and their communities through peer-reviewed individual and joint decision-making as well as individual and group capacity building.
- Enhancing the relationship between farmers, extension workers and researchers, so that they work together to test, assess and adopt a variety of options within the specific local conditions.

Other important aspects about the Farmer Field Schools are that the facilitators can be either farmers or extension personnel; the activities of the school address priority needs as identified by the farmers; groups of 30 – 40 farmers can participate in a school; the school ground is the field, and those who successfully complete the school receive recognition during graduation. The schools could be a stepping stone to self-sustained groups for collective marketing, lobbying and saving (Braun *et al*. 2006; Vaarst, Byarugaba, Nakavuma & Laker 2007) as well create a pool of knowledgeable farmers that can be of assistance to others in the community (Vaarst *et al*. 2007). They are reported to effectively complement existing extension services in a country (Anandajayasekerum, Davies & Workneh 2007).

2.2.5 ELECTRONIC INFORMATION DELIVERY SYSTEMS

The electronic age is increasingly impacting on the smallholder farming sector. A range of new information and communication technologies (ICTs) exists. The ICTs are powerful tools for providing farmers with the knowledge that they need to put agricultural innovations and socio-economic opportunities to best use (FAO 2005). Farmer Information Network for Agricultural and Rural Development (FarmNet) of the FAO believe that organised use of ICTs, combined with conventional media, can help farmers to exchange experiences, find common ground for collaboration and actively participate in and manage agricultural and rural development activities (FAO 2005). FarmNet has carried out successful research projects in Mexico and Chile whereby information distributed through ICTs improved farmers' access to better prices (FAO 2005).

The University of Reading has developed a computer-based programme called Livestock Guru, a multimedia programme which uses images and information delivered by voice to provide guidance on how to prevent, diagnose and treat specific animal diseases (Heffernan 2006). In developing and testing Livestock Guru, Heffernan found that far from being deprived or disinterested; the poor actively seek engagement in the knowledge revolution and have benefitted from the use of the programme (Heffernan 2006).

In South Africa, the use of computers and electronic information has been reported to improve record management and hence decision-making amongst commercial farmers in KwaZulu Natal (Woodburn, Ortmann & Levin 1994). Computers are not that common amongst developing farmers but cell phones are widespread. According to the South African Advertising Research Foundation All Media and Products Survey (SAARF AMPS), 76.3% of South Africans owned/rented or used cell phones in 2010 (SAARF 2011). The sugar industry uses this technology to distribute irrigation advice to farmers by smses (Zvomuya 2008). Likewise NERPO and the African Farmers' Union of South Africa (AFASA) use this technology to communicate with their members because virtually all of them have cell phones. The two organisations represent smallholder farmers of South Africa (NERPO being a commodity association of red meat producers while AFASA embraces all commodities). Spore magazine (2008) described the extensive use of cell phones in various African countries for services such as linking farmers and traders, advisory services, credit facilities and emergency services. Qekwana, McCrindle and Masipa (2010) illustrated how cell phone technology could be linked to Geographic Information Systems (GIS) and used receive and disseminate information about disease management for developing farmers. These cases illustrate that there is scope for the use of cell phone-linked technologies to disseminate technical information to livestock farmers in South Africa.

2.3 THE GIST OF THE PROVISION OF PRIMARY ANIMAL HEALTH CARE SERVICES

For many years delivery of agricultural support services to farmers on communal land has been top-down and input-oriented (Duvel 2000). Kroll and Kruger (1998) demonstrated that such an approach is not effective in developing livestock production on communal land. They postulate that the non–involvement of farmers

in processes that are intended to develop them leaves a wide gap of unexplored development opportunities. Therefore, in order to achieve sustainable livestock development Kroll and Kruger (1998) suggest a process that closes the gap between farmers and service institutions by promoting the empowerment of grassroots–level organisations, who they considered to be prime movers for development. Their Sustainable Animal and Range Development Programme promoted close interactions between service institutions and target groups and the re-orientation of services towards well-formulated farmer needs and demands. Unfortunately the successes and failures of the programme could not be covered at the time of publication but nonetheless it sounded logical enough to achieve sustainable development that is owned by the communities. Similar adjustments might be required for the delivery of PAHC services to developing livestock farmers; that is use of approaches that are farmer-centred, farmer-driven and help support institutions to deliver or facilitate the delivery of accessible, affordable and acceptable primary animal health care services to farmers.

2.4 PROBLEM/HYPOTHESIS

There is a need for improved delivery of primary animal health care services for livestock farmers on communal land in order to reduce losses due to diseases and the resultant deaths. The method of delivery should be acceptable, accessible and affordable as well as sustainable.

The hypothesis of the study is that farmer communities prefer a self-driven delivery of PAHC services such as the community-based animal health worker programme.

2.5 OBJECTIVES

The objectives of this study are as follows:

- Investigate the primary animal health care delivery methods that are preferred by the communal land based livestock farmers in Mnisi community.
- Specifically investigate if a CAHW programme would be the preferred option.
- Make recommendations for the improvement of PAHC service delivery to communal land based livestock farmers of South Africa.

3. METHODOLOGY

3.1 THE STUDY AREA

The study was conducted in Mnisi community in Bushbuckridge local municipality, Mpumalanga province (Figure 3.1). The study area was 29,500ha, with a perimeter of 85.5km (of which 69km borders wildlife conservation areas).

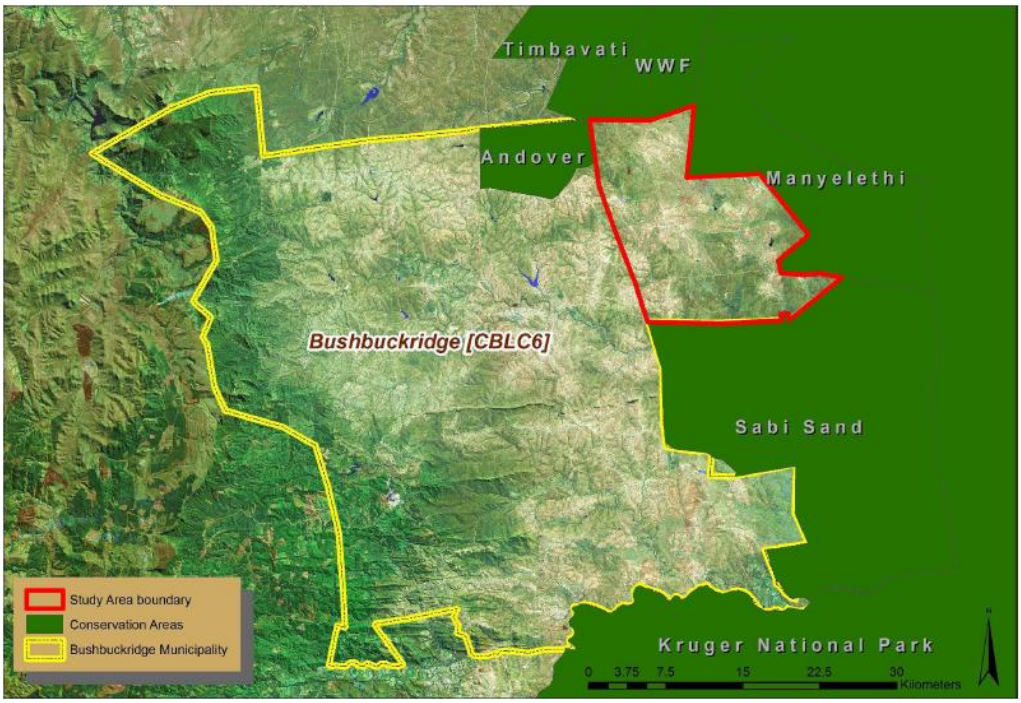

Figure 3.1 Map showing Bushbuckridge local municipality and the location of study area (red boundary)

The area had an estimated population of 40,061 in 8,555 households. According to the local veterinary services, the estimated numbers of livestock and their owners at the end of 2007 were as follows:

- Cattle = 14,398 (1,311 owners)
- Goats = 6,186 (917 owners)
- Sheep = 2 (1 owner)
- Pigs = 327 (36 owners)
- Chickens = Unknown
- Donkeys = Unknown

At the time of the study, the area had 15 inspection points for disease control, of which 13 were dipping tanks and two were crush pens. The area was served by three

AHTs, one supervisor of the AHTs and two veterinarians. Except in Hoedspruit, which is about 200km away from the Mnisi community, there was no cooperative nearby from where farmers could purchase agricultural inputs, such as remedies and livestock feed supplements.

From 2008, a series of meetings were held with the community leadership as well as community members to discuss and plan the Mnisi Community Programme, of which this study formed a component of. The questionnaire-based farmer survey described below (§ 3.2) consisted of animal health, production, marketing and human health questions to cater for the various components of the programme (Annex A). Feedback on the questionnaire survey was provided to the community in August 2010, prior to the follow up group discussions specifically on PAHC, which were conducted in December 2010.

3.2 FARMER SURVEYS

Questionnaires for the surveys were developed and tested in the field in August 2009. The questionnaire-based interviews of farmers were conducted at 10 of the 15 inspection points in Mnisi community between 9 and 20 September 2009, targeting as many willing owners (and not the herd boys) of cattle as could be interviewed during each dipping session (about 2 hours). Each interview lasted about 40 minutes, and one hundred and thirty three (133) farmers, with an average herd of 13 cattle each were interviewed (Table 3.1).

In the field, data was captured using Hewlett Packard Personal Digital Assistant devices into the Survey to Go mobile database programme (Dooblo 2009). It was later transferred to Microsoft Excel for cleaning and analysis (Microsoft Corporation 2010).

Following the analysis of the data from the questionnaire survey, group discussions with samples of the cattle farmers were conducted to follow up on some of the responses that were given in the questionnaire survey and, especially obtain clarity on the community's needs and expectations for the delivery of PAHC services.

Table 3.1 Number of farmers interviewed and their average cattle at each of the selected ten inspection points in Mnisi community

Inspection point	Number of farmers interviewed	% farmers	Average cattle/ farmer
Share	11	8	16
Seville B	6	5	13
Welverdiend A	25	19	13
Athol	16	12	21
Ludlow	13	10	10
Gottenburg	24	18	9
Clare A	7	5	14
Welverdiend B	10	8	13
Shorty	13	10	17
Thlavekisa	8	6	10
Total	133	100	13

The following were the group discussion points:

- Confirmation that the farmers need a community-based person to attend to the livestock health problems as the majority had indicated in the questionnaire based survey; ascertaining the calibre of the person that was desired, and the actual functions that he/she was expected to perform vis-à-vis the functions performed by the AHTs and other PAHC providers.
- Current structured activities of the farmers (e.g. associations) and relationship with AHTs.
- Linkage of the envisaged community-based person with the current set up.
- What would encourage or discourage farmers to use community-based assistance for animal health needs.

These discussions were held with farmers at the following five inspection points between 6 and 10 December 2010:

- Clare A (Dipping tank; Figure 3.2)
- Welverdiend A (Dipping tank)
- Utah (Dipping tank)
- Hlalakahle (Crush pens)
- Welverdiend B (Crush pens; Figure 3.3)

Figure 3.2 An example of a dipping tank (Clare A) in Mnisi community

Figure 3.3 Welverdiend B crush pens with veterinary students that were performing inspections and treating sick animals (including dogs and goats) of Mnisi community

The farmers had been informed of the group discussions by the AHTs two weeks in advance and hence expected such a meeting before the dipping and inspection sessions. On average, 13 farmers participated in each meeting (Figures 3.4 and 3.5).

Figure 3.4 Some Mnisi community farmers gathered for discussions at Welverdiend B dipping tank.

At the end of each discussion session, the farmers received a cup of a cool drink and fresh scones (but they had not been informed of this arrangement prior to the discussions; Figure 3.5).

Formal and informal interviews with role players and stakeholders in the Bushbuckridge local municipality (e.g. the AHTs; Figure 3.6) and at national level were conducted to understand the current and planned veterinary activities for PAHC as well as understand what is and is not feasible given the government structures and mandate on the delivery of PAHC services. Finally, information was drawn from government policy documents pertaining to the delivery of PAHC as well as the South African Veterinary Council's veterinary laws and ethics.

Figure 3.5 Some Mnisi community farmers enjoying refreshments at the end of the group discussions during the survey

Figure 3.6 An Animal Health Technician seated at a vantage point from where he could inspect cattle as well as record herd numbers as the cattle filed through one of the crush pens in Mnisi community

3.3 DATA ANALYSIS

The responses to closed questions from the questionnaire survey were coded and stored in Microsoft Excel. Descriptive statistical methods of Excel, such as frequency tables (Microsoft Corporation 2010) were used in data analysis (McCrindle, Cornelius & Schoeman 1997). Where possible, responses to open−ended questions of the questionnaire were collated, tallied and proportions calculated. Responses from the group discussions and other interviews were captured and reported.

4. RESULTS

4.1 PROFILE OF THE RESPONDENTS

Of the 133 respondents, 107 were the actual cattle owners (Table 4.1). The remaining 26 consisted of the wives (10), children (12), parents (2) and siblings (1) of the owners.

The heads of household were mostly men (72%), of whom 78% brought their cattle to the inspection points while 86% of the women heads did so (Table 4.1).

Table 4.1 Distribution of the heads of Mnisi community's cattle owning households by gender and presence/absence at the dip tank

Gender of household head	% cattle owner	% non–cattle owner	% total (n=133)
Women	24.1	3.8	27.8
Men	56.4	15.8	72.2
Total	80.5	19.5	100.0

A notable point raised by the AHTs was that most of the herds were composed of cattle from multiple owners, the majority of whom were working in the towns and cities and had left their livestock in the care of relatives. Therefore much as most of the farmers took care of the cattle on a day to day basis, they were not necessarily the sole decision makers about the herds under their care.

According to the farmers, 352 cattle exited the herds in a 12 months period (Table 4.2). Most of the exits (55.1%) were losses to the farmers, caused by deaths due to drought, diseases, stock theft as well as abortions, old age, dystocia and predation. Only 43.7% of the exits were beneficial to the farmers, consisting of sales and use for traditional ceremonies. The average number of animals that exited a farmer's herd for a particular reason was highest for losses due to drought (3.4), stock theft (3.2) and diseases (2.4) and for sales (2.4). Losses due to predation were heavy but affected only two farmers (4.5%).

Table 4.2 Number of cattle used or lost by cattle farmers of Mnisi community over a twelve month period (August 2008 – September 2009)

Reason for exiting the herd	Percentage of farmers (n=133)	Number of cattle	Average cattle/ farmer	% of total exits (n=352)
Sales	41.4	134	2.4	38.0
Diseases	16.5	52	2.4	14.8
Drought	14.3	64	3.4	18.2
Stock theft	12.8	55	3.2	15.6
Traditional ceremonies	9.8	20	1.5	5.7
Abortions	4.5	7	1.2	2.0
Old age	3.8	6	1.2	1.7
Unspecified	2.3	4	1.3	1.1
Predation	1.5	9	4.5	2.6
Dystocia	0.8	1	1.0	0.3

4.2 CONSTRAINTS AND IMPORTANT DISEASES OF CATTLE

The perceived major constraints to livestock production are shown Table 4.3. Nutritional problems were topmost followed by diseases, access to water, stock theft, drought and ticks. Veld fires, wildlife and access to markets were virtually not perceived as problematic.

Table 4.3 Major constraints to cattle production as perceived by cattle farmers of Mnisi community

Constraint to cattle production	Frequency	% frequency (n=133)
Nutritional problems	56	42.1
Animal Diseases	48	36.1
Access to water	43	32.3
Stock theft	38	28.6
Drought	33	24.8
Ticks/dipping	25	18.8
Veldt fires	14	10.5
Problems with wildlife	6	4.5
Marketing problems	2	1.5

Of the top six constraints, problems associated with ticks and dipping, stock theft, access to water and nutritional problems were regarded as very to extremely important by, respectively 84%, 76%, 72% and 62% of the respondents per constraint (Figure 4.1). Diseases were mostly regarded as an important constraint.

None of the stated problems were regarded as of relative or minor importance by the majority of the respondents.

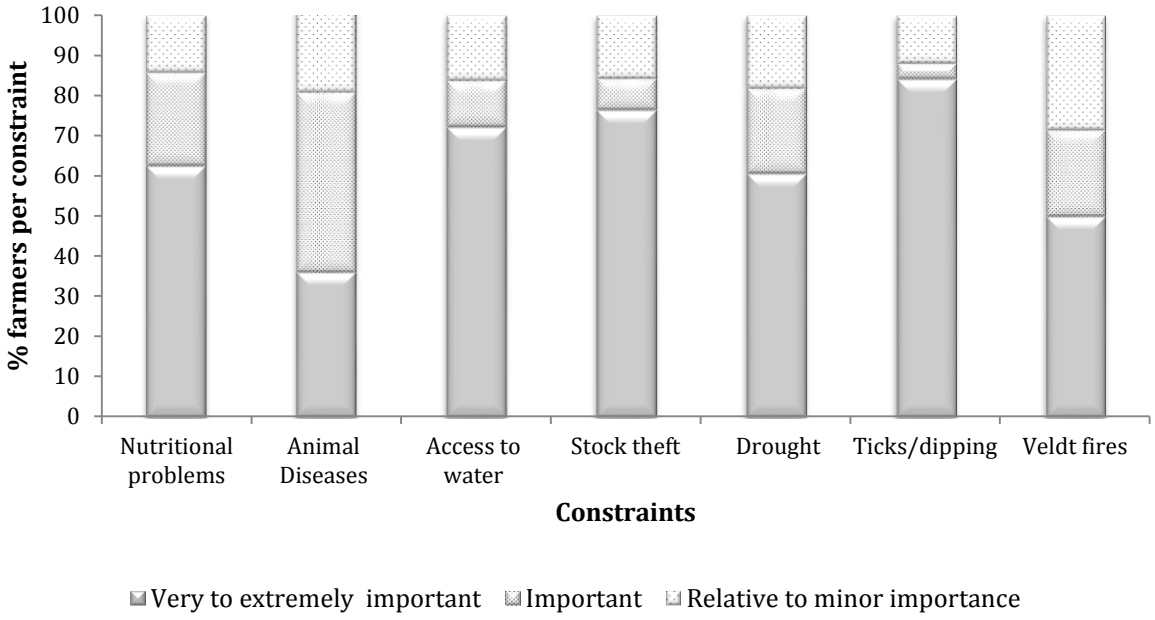

Figure 4.1 Rating of the importance of constraints to livestock production by farmers in Mnisi community

According to the respondents, nutritional problems were due to the fact that the farmers had limited grazing land for their livestock and were compounded by the frequent drought spells. Thus, farmers often found themselves without sufficient grazing to last through the dry season. Ticks were evidently a problem because much as the cattle were dipped frequently they were specifically mentioned as a very important constraint by close to a fifth of the respondents (Table 4.3; Figure 4.1) and as a an important disease condition by 31% of the respondents (Table 4.4). The seriousness of tick infestations was manifest in that many of the cows that were observed at plunge dips had teats and genitalia that were badly damaged by ticks (Figure 4.2).

Other most important diseases and disease conditions that the respondents faced were lumpy skin disease and internal parasite infestations (Table 4.4). Lumpy skin disease was listed as problematic by 31% of the respondents. Worm infections, footrot, black quarter and FMD were perceived to be a problem by between 10 and 20% of the respondents. Other disease and disease conditions received little mention.

Figure 4.2 Examples of damages to teats and genitalia that were caused by ticks to cattle in Mnisi community

Table 4.4 Percentages of respondents who provided a disease and/or disease condition perceived as most important for cattle in Mnisi community

	% of all respondents (n=133)indicating disease/condition as:		
Disease/disease condition	First major problem	Second major problem	Third major problem
Tick burdens	16.5	13.5	0.8
Lumpy skin disease	15.8	10.5	5.3
Worms	12.8	3.8	3.0
Footrot	9.8	3.0	2.3
None	9.0	30.1	25.6
Black quarter	5.3	6.0	1.5
Wounds	5.3	3.0	1.5
Three day stiff sickness	3.8	0.8	3.0
Gall sickness	3.1	3.0	3.0
Diarrhoea	3.0	0.8	1.5
Udder problems	2.3	3.0	3.0
Red water	2.3	0.8	
Anthrax	2.3		1.5
Lameness	1.6		
FMD	1.5	5.3	3.8
Mastitis	1.5	3.0	0.8
Cough	0.8		
Pneumonia	0.8		
I do not know	0.8	1.5	1.5
Other	1.5	5.3	3.8
Total	99.2	88.7	58.6

4.3 PRACTICES OF CONTROL OF DISEASES AND PARASITES

Only 20.3% of the respondents said that they vaccinated their cattle. The majority (77.4%) stated that they did not do so (because most of the vaccinations were done by the SVS, Hlukuvani Animal Health Clinic staff and veterinary students); while the remaining 2.3% said that they did not know whether or not their cattle were vaccinated. When asked what their cattle were vaccinated for, a total of 67% of all the respondents either did not know what their cattle were vaccinated for or thought that they were not vaccinated for any disease at all (Figure 4.3). Only about a quarter of the farmers that were interviewed were aware that their cattle were vaccinated for foot and mouth disease, despite that the SVS did so for all the herds. Other diseases were each mentioned by less than 10% of the sample population.

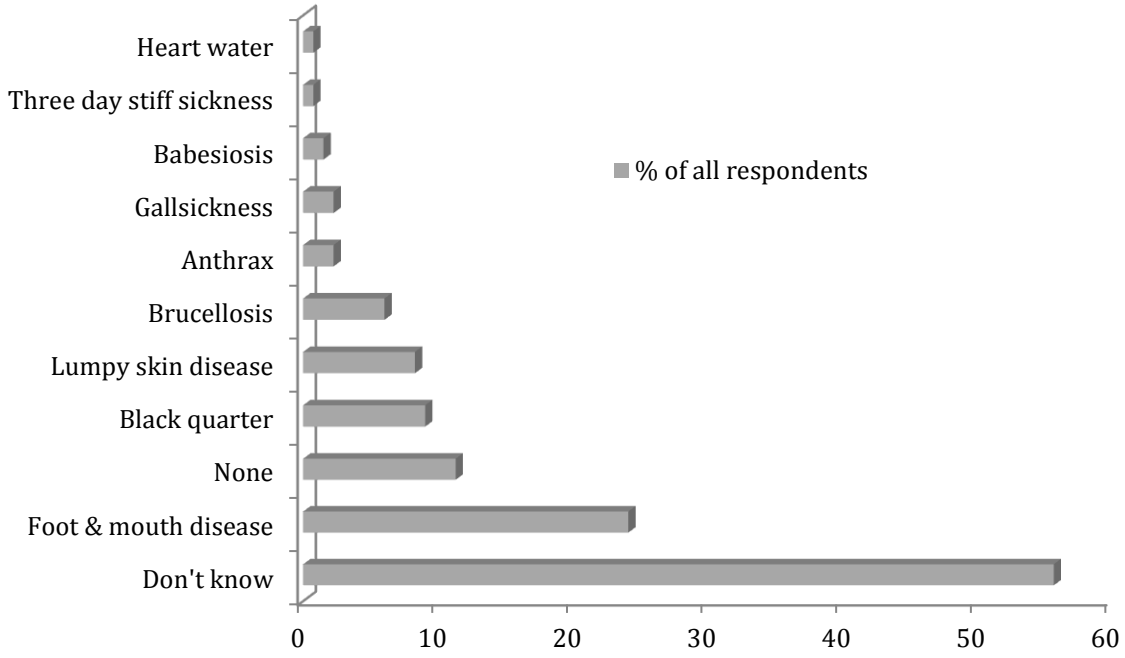

Figure 4.3 Diseases for which cattle were vaccinated against in Mnisi community, according to the knowledge of the owners

The reasons given for not vaccinating cattle are listed in Table 4.5. Foremost was that vaccines were provided for free. But over one fifth of the farmers could not provide a reason for not vaccinating their animals. Some felt that it was not necessary to vaccinate (12%) while others felt that vaccines were too expensive for them (8.3%). None of the farmers felt that vaccines were not available in their area or that they were not effective or too cumbersome to apply.

Table 4.5 Reasons given by cattle farmers of Mnisi community for not vaccinating cattle

Reason for not vaccinating	No of respondents who did not vaccinate (n=108)	% of all respondents (n=133)
Vaccines provided free	49	36.8
I do not know	30	22.6
It is not necessary to vaccinate	16	12.0
Cannot afford to pay for vaccines	11	8.3
Do not know which vaccines to use	2	1.5
Vaccines are not available	0	0
Vaccines are not effective	0	0
It is cumbersome to apply vaccines	0	0
Total	108	81.2

Figure 4.3 and Table 4.5 illustrate the limited knowledge that the farmers had about how the health of their herds was managed. The fact that two-thirds of the farmers did not know whether or not their cattle were vaccinated for any diseases, and some thought that it was not necessary to vaccinate illustrates that some of the farmers did not understand the procedures that were conducted by the AHTs at the inspection points, which included vaccination for foot and mouth disease. Furthermore the farmers had had incidences of diseases such as lumpy skin disease, three day stiff sickness (bovine ephemeral fever) and black quarter, which are preventable by vaccination. Evidently, the majority of the farmers would not have taken steps to prevent these diseases because they did not know that they ought to do so for diseases that were not covered by the SVS. This indicated a gap in the farmers' knowledge and management of their cattle's health.

All the farmers controlled ectoparasites on cattle either by plunge dipping (90.2% of the respondents) or other methods (9.8%). Furthermore, of those that used other methods such as spraying of the whole body, spot spraying or pour-on (Table 4.6), the vast majority (78% of respondents) did so in addition to plunge dipping. The fact that over three-quarters of the farmers used additional methods of tick control suggests that the state provided dipping was not effective and further confirms the importance of tick infestations to the livestock farmers, so much so that they went out of their way to control them.

Table 4.6 Methods that were used by cattle farmers of Mnisi community to control ectoparasites

Method for ectoparasite control	Number of respondents	% of all respondents (n=133)
Spray whole body	51	38.3
Spot spraying	48	36.1
Pour-on	11	8.3
Other methods*	7	5.3
Spray legs only	2	1.5
Tick grease	1	0.8
Manual removal	1	0.8
Injections against ectoparasite	0	0.0

* Other methods included Jeyes fluid and motor oil

Whole body spraying or spot spraying were the most commonly used additional methods for tick control, and were mostly employed only when it was necessary, once a week or twice a month (Table 4.7).

Table 4.7 Frequency of use of other methods for tick control by cattle farmers of Mnisi community

	% of all respondents (n=133)				
Frequency of tick control	Whole body spraying	Spot spraying	Spraying of legs	Pour-on	Tick grease
Once a week	12.8	7.5	0.8	2.3	
Only when necessary	10.5	14.3	0.8		
Twice a month	8.3	3.8		6.0	0.8
Once a month	3.0	3.0			
More than once a week	2.3	3.0			
Every six months	0.8				
Do not know	0.8	0.8			
Total	38.3	32.3	1.5	8.3	

Most of the products to combat ectoparasites were obtained from the farmers' cooperative in Hoedspruit (Table 4.8), which was some two hundred kilometres from Mnisi. Once again the importance of ticks to the farmers was emphasised by the lengths that they would go to obtain remedies against the ticks.

Only pour-on acaricides were obtained predominately from AHTs. They provided these at the two inspection points without dipping tanks. The one farmer who used tick grease and said that the source was 'himself'.

Table 4.8 Sources of products that were used to control ticks by cattle farmers of Mnisi community

	% of all respondents (n=133)			
Source of products for tick control	Whole body spraying	Spot spraying	Spraying of legs	Pour-on
Farmers' cooperative	36.8	31.6	0.8	
Animal Health Technician		1.5		6.8
Animal clinic		1.5		
Non–governmental Organisation		0.8		1.5
Local shop	0.8	0.0	0.8	
Other farmers	0.8	0.0		
Total	38.3	35.3	1.5	

The main reasons provided for not using other ectoparasite control methods, albeit by a small proportion of the respondents (5.3%), was that they felt that plunge dipping was adequate (Table 4.9).

Table 4.9 Reasons given by cattle farmers of Mnisi community for not using other ectoparasite control methods

Reason for not using other ectoparasite control methods	% of all respondents (n=133)
Not necessary, plunge dipping is sufficient	5.3
Do not know	5.3
Do not know which other product	1.5
Cannot afford to pay for other treatments	0.8
It is too cumbersome to apply other methods	0.8
Products to control ectoparasites not available	0.0
Ectoparasites do not cause problems	0.0
Do not believe other treatments are effective	0.0

It is noteworthy that none of the respondents felt that the products to control ectoparasites were not available or that ectoparasites were not a problem or that other treatments were not effective.

Internal parasite control measures were employed by 59.4% of the respondents (Table 4.10). The most commonly used methods were drenching (53.4 % of all respondents) and injections (8.3% of all respondents). Other methods were paste (0.8%) and traditional medicinal plants (1.5%).

Table 4.10 Frequency of control of endoparasites by cattle farmers of Mnisi community

Frequency of control of endoparasites	Number of respondents	% of all respondents (n=133)
When necessary	32	24.1
Once a week	7	5.3
Twice a month	4	3.0
Once a month	4	3.0
Every 2 months	1	0.8
Every 4 months	1	0.8
Every 6 months	6	4.5
Once a year	12	9.0
Do not know	4	3.0
Total	71	53.4

Endoparasite control was predominately done when necessary (24% of all respondents) or once year (9%). The source of the deworming remedies was predominately the farmers' cooperative in Hoedspruit (Table 4.11). Drench was by far the most popular and utilised by all the farmers who controlled endoparasites.

Table 4.11 Sources of remedies against endoparasites used by cattle farmers of Mnisi community

	% all respondents (n=133)		
Source of remedy	Drench	Injection	Paste
Farmers' cooperative	45.1	4.5	0.8
Animal Health Technician	4.5		
Animal clinic	2.3	2.3	
Local medicinal plants	0.8		
Do not know	0.8	0.8	
Total	53.4	7.5	0.8

Table 4.12 Reasons given by Mnisi cattle farmers for not deworming their cattle

Reasons for not deworming	No. of farmers not deworming (n=55)	% of all respondents (n=133)
Do not know	18	13.5
Endoparasites do not cause problems	13	9.8
Not necessary	9	6.8
Cannot afford to pay for other treatments	6	4.5
Do not know which other product	5	3.8
Products for endoparasites not available	2	1.5
It is too cumbersome to apply other methods	1	0.8
Use only traditional medicines	1	0.8
Do not believe other treatments are effective	0	0.0

The reasons that were given for not deworming included that the farmers did not perceive endoparasites to be problematic, viewed deworming as not necessary or could not afford to pay for the remedies (Table 4.12). However, according to the AHTs, internal parasite infections, such as bottle jaw were fairly common.

4.4 PROVISION OF ANIMAL HEALTH SERVICES

4.4.1 AVAILABILITY, ACCESSIBILITY AND ACCEPTABILITY OF PRIMARY ANIMAL HEALTH CARE SERVICES

For most of the respondents (88%) AHTs were the primary source of animal health services. Another group that was used to some extent were other informed farmers (17.3%). In fact members of the community (other farmers, farmers' union, farmers' cooperative, family members and herd boy) were used by 30% of the respondents while SVS were used by 99% of the respondents. Use of traditional healers was uncommon and private veterinarians, veterinary drug suppliers and NGOs were not used at all by any of the respondents.

The most common manner of contacting the service providers were face to face on inspection days (55%). A number of the respondents (32%) visited the offices of the service providers. The cell phone was used by 27% of the respondents to contact service providers. Public telephones were used by 10.5% of the respondents. Use of private land line phones was not common (5.3%).

Two-thirds of the respondents (66%) stated that they had to report certain diseases to veterinary officials (Table 4.13). Of those who did, 43% did so by visiting the SVS offices, 28% reported to the AHTs on inspection days and 8% reported to the animal clinic (Hlukuvani Animal Health Centre). Those who contacted the SVS office by telephone consisted of 18% who used cell phones and 5.7% who used land lines.

Most respondents were generally happy with the SVS response to reported diseases. Virtually all who reported diseases said that the officials went to check their animals (94%). Moreover most of the respondents were satisfied with the accessibility of the AHTs (72%), state veterinarians (95%) and animal clinic staff (77%).

Table 4.13 Methods used to contact state veterinary services (SVS) to report diseases by farmers of Mnisi community

Method of contact	% of those who report diseases (n=88)	% of all respondents (n=133)
Visit the SVS office to report directly	43.2	28.6
Report to AHT on inspection days	28.4	18.8
Call the SVS with a cell phone	18.2	12.0
Report to the Animal clinic	8.0	5.3
Call the SVS through a landline telephone	5.7	3.8
Report to a local who reports it to the office	2.3	1.5
Do not know	2.3	1.5
Through dipping tank committee	1.1	0.8

Only 30% were satisfied with the availability of private veterinarians. The majority had never used the services of private veterinarians (41%) and 20% of those who reported diseases were not satisfied with their availability.

In general most of the respondents (98%) were happy with the information that they received from SVS. Despite that a sizeable proportion of the respondents (65%) felt that they had some limitations in accessing veterinary services, foremost of which was the high cost of the services. (According to the officials from the SVS and the animal clinic, farmers did not pay for the consultations but had to pay for any medication that had to be administered to their livestock). Other limitations that were cited by 3 – 5% respondents included the following:

- Not enough information (5%).
- No means to contact veterinary professionals (4.5%).
- No confidence in veterinarians (4%).
- Veterinarian is too far (3%).

Other limitations were only mentioned by one respondent each, either as a first second or third limitation included the following:

- Limited availability of stock remedies.
- No dip and water.
- Not enough AHTs.
- Problems with udders and milk for calves.
- Do not agree with treatment sometimes.
- Not enough clinics.

- Problems with lumpy skin disease.
- No money; looking for free service.

4.4.2 PREFERRED METHODS FOR THE DELIVERY OF PRIMARY HEALTH CARE SERVICES

According to the respondents, the best method of delivering animal health information to livestock farmers was through AHTs (49%). The second commonly mentioned method was through farmer meetings (16.5%) and often, these were suggested as meetings between farmers and AHTs. Direct contact with state veterinarians was mentioned by only 4.5% of the respondents as a method delivering animal health information to farmers.

Other methods that were mentioned as first choice methods of contact albeit by less than 4% of the sample included the following:

- other farmers;
- telephone call to AHT;
- workshops;
- clinic;
- awareness campaigns;
- extension officer;
- informed local agent;
- radio, and
- telephone call to state veterinarian.

Other methods mentioned as second and third choice were:

- animal health brochure, and
- government.

The most preferred provider of animal health care was overwhelmingly the AHTs, as stated by 77% of the respondents. Other providers of first choice were the state veterinarians (9%), other farmer (6.8%), animal clinic (3%), self (2.3%), government (0.8%) and 1.5% did not state their preferred provider. Only 29% of the farmers stated a second choice of animal health care provider. Top of the list was the state veterinarian (29% of the respondents who provided a second choice provider).

Others were AHT (21%), other farmer (18%) and animal clinic (16%), self (11%), government (3%) and private veterinarian (3%). Third choice providers were provided by three farmers only and were other farmer, animal clinic and self.

Thirty–nine respondents proffered other responses, which were not necessarily animal health care providers but perhaps a reflection of their expectations in terms of animal health care delivery. The responses were as follows:

- awareness campaigns;
- build more clinics;
- extension officer, police;
- meetings and
- workshops with other farmers.

4.4.3 POSSIBILITY OF USING COMMUNITY-BASED PERSON FOR DELIVERY OF PRIMARY ANIMAL HEALTH CARE

When asked if they would use the services of a person from the community who has been especially trained to assist others with animal health problems, an overwhelming number of the respondents (92%) said they would, while only 6% said that they would not. (The remaining 2% said that they do not know whether or not they would).

The main functions that were envisaged for the community-based person were to advise farmers on disease management, administer drugs and conduct disease surveillance and diagnosis (Table 4.14).

Table 4.14 Most common tasks that the respondents envisaged for community-based animal health assistance in Mnisi community

	% those who would use a community-based person (n=122)	% of all respondents (n=133)
Advise on disease management	46	42
Drug administration	43	39
Disease surveillance	33	30
Diagnosis	26	24
Castration	11	10

Other functions that were mention by less than 10% of those that would use the services of a community-based person included the following:

- dehorning;
- guidance with herd management;
- market information;
- hoof trimming;
- inspection of slaughtered animals;
- calving;
- everything;
- animal identification (branding, tattooing);
- breeding;
- create traditional remedies;
- increase drug availability;
- provide medicine ;
- reproduction, and
- treatment of wounds.

Of those that would use a community-based person, 42% said they would do so frequently, 15% said it would depend on what they needed assistance with and 12% said they would do so when necessary. The remainder of the respondents (31%) did not state how frequently they would use such a person.

Of those who would use the services of a community-based person, 83% were willing to pay for the services. When asked how they would pay the community-based persons; 78% said they would do so in cash, 14% in kind and 7% in both cash and kind (and thus a total 98% of those who would use the services of a community-based person, or 90% of all the respondents, were willing to pay for the services).

Those respondents who said that they would not use a community-based person would not do so because they would not trust them; they preferred the services of AHTs or the animal clinic staff.

From the responses to questions relating to the provision of animal health care services, it was clear that the respondents were happy with the availability and

accessibility of the state veterinary services, especially the AHTs. AHTs were thus most preferred for the delivery of primary animal health care services and information. Without prompting, the use of community-based persons cropped up once, specifically as an option for the delivery of PAHC information. However, the majority of the respondents said they would use the services of a community-based person only when they were prompted to consider such an option. They felt that they needed the services of a community-based person in instances when the SVS personnel were not reachable. The main issues that they wanted covered by the community-based services (i.e. advice on disease management, drug administration and disease surveillance) were predominantly covered by the SVS and the animal clinic. During the post-survey group discussions, clarity was sought on how the farmers perceived the two tiers of service providers (i.e. state-provided and community-based) would work for them.

4.5 POST-SURVEY GROUP DISCUSSIONS ON THE PROVISION OF ANIMAL HEALTH CARE SERVICES

4.5.1 ENVISAGED ROLE FOR A COMMUNITY-BASED PERSON TO ASSIST FARMERS

After the questionnaire-based survey, group discussions were held with farmers at five inspection points. Farmers from four out of the five inspection points confirmed that they would use the services of a community-based person to assist with their livestock. They acknowledged the services from the animal clinic and the AHTs but said that these officers were not always accessible when farmers needed help.

Tick control was reiterated to be a major concern, mainly because dipping was not cleaning off all the ticks or in some instances (e.g. Welverdiend A) dipping was infrequent because of lack of water. Farmers at Welverdiend A also mentioned that the community-based assistant would also clean and refill the dipping tank.

The responsibilities of the community-based person were envisaged to go beyond animal health issues but included the following:

- Ensuring that livestock feed is easily accessible to the community. (The nearest farmers' cooperative from where farmers purchased feed supplements was

200km in Hoedspruit and hence the farmers felt that they needed someone to facilitate easier access to livestock feed supplements).

- Facilitating grazing management.
- Facilitating access to water.

Farmers at Hlalakahle had very limited grazing and water and so were quite despondent. Their response to attempts to discuss a community-based person to assist with livestock health challenges was that there was nothing any individual could do unless the cattle had adequate grazing, water and a plunge dip. There was much emphasis on the plunge dip despite the fact that the farmers were using a pour-on acaricide. On further probing the farmers responded that they needed a plunge dip because they were used to it and that it would clean off ticks from around the eyes, nose, anus and hocks better than was achieved with a pour-on. They also wanted better handling facilities, which would make the rounding up of their cattle easier.

4.5.2 CHARACTERISTICS OF THE COMMUNITY-BASED PERSON

The farmers felt that such an individual should be a government employee as they would not be able to afford his/her services. This was contrary to the responses obtained from the individual surveys were up to 90% of all the respondents were willing to pay for the services of a community-based person (§ 4.4.3 refers). When questioned about experience, three groups felt that it should be a young person. Farmers from Utah specifically stated that he/she should have a minimum of Grade 12 qualification. It was said that a younger person learns faster than older people. Farmers in Welverdiend A specifically mentioned that he/she should be a livestock farmer with experience in handling and treating animals. Qualities that were also mentioned were that the person should be able to work with the farmers, be able to perform the required tasks, be open and willing to listen to farmers, approachable, respectful and patient. These factors and qualities were said to be what would make the arrangement effective.

4.5.3 ORGANISATION OF FARMERS AND ENVISAGED LINKAGE WITH COMMUNITY-BASED WORKER

Four of the five inspection points had farmers' associations. Only Utah did not have an existing farmers' association and yet the farmers seemed fairly organised: on inspection days they picked up the acaricide from the AHT's office, cleaned and refilled the dipping tank and dipped their cattle. They seemed to have confidence in their local Chief because it was emphasised that any new developments or information should be communicated through the Chief.

Three of the four associations did not seem to serve their members up to expectation. At Clare A it was said the association's committee no longer met because of in-fights. At Welverdiend A, the farmers were very annoyed when the leader of the association walked in during the discussions, to the extent that the whole meeting was nearly aborted. The concerns were that the farmers felt that the association leaders did not look after the interests of members; they attended meetings but never provided feedback to farmers. Whereas the farmer leader at Welverdiend A said that they had a community-based assistant, the farmers claimed not to know of such an arrangement and never to have seen the purported assistant. They challenged the leader to bring him forth. At Hlalakahle the association leader stayed with the discussions for about 20 minutes and literally dominated the meeting. However when he had walked off the farmers began to express their dissatisfaction with his leadership, once again alleging that he did not represent the interests of the farmers but that the local chief provided better leadership. Welverdiend B seemed to have a functional farmers' association and the discussions there proceeded as smoothly as they did in Utah.

In all the instances the role of the associations was predominantly to manage grazing control and represent farmers at meetings. One of the downfalls of leaders of the dysfunctional associations was said to be that they did not provide the general membership with feedback from external meetings. Interestingly one leader at Welverdiend B included maintaining order amongst membership as one of the roles of the association.

4.5.4 COMMUNICATION AMONGST FARMERS AND PROVIDERS

In all instances the farmers said that they reported animal health matters to AHTs as and when they arose and usually at the inspection points. In turn the AHTs said that they discussed matters with farmers during the inspection sessions; they shared new information with farmers as and when there was something to present. In all instances there seemed to be no formal programme of interaction between the farmers and/or their associations with the AHTs. Even so, farmers preferred to receive/share information on a regular basis and as a group. They suggested that the community-based assistant should meet with them 2–3 times a week (Clare A), weekly or monthly to learn what their concerns were and provide advice, as well as be on call in cases of emergency.

When asked if they preferred that each individual farmer be trained to manage his/her own livestock primary health or to have community-based assistants do it, farmers unanimously opted for the community-based person whom they felt would be able to grasp the information better than they would. They preferred that the community-based person works closely with the AHTs in supporting them. They saw a role for such an individual despite having access to the animal clinic staff and the AHTs.

4.5.5 THE RESEARCHERS' PERCEPTIONS

From the researchers' perception, most of the problems that the farmers faced were to do with not being organised, lack of leadership and being scantily knowledgeable about primary health care for livestock. To illustrate this point, farmers at Utah seemed to have little leadership from the AHT but on the dipping mornings, they emptied the tank, refilled it, mixed the dip and carried on dipping. On completion of the discussion on the possibilities for a community-based person to assist them with livestock production issues they immediately asked when this could happen and when such a person could be appointed. Thus, farmers at Utah seemed well–organised around the management of dipping and had a keen interest in the health care of their livestock. To the contrary farmers at Welverdiend A had no water in the dipping tank and seemed not to have taken any steps to ensure that there was water in the tank or to obtain permission to use nearby tanks, one of which was about three

kilometres away. Additionally they wanted someone to remove the dirty water as opposed to organising themselves to do so. Another example is the fact farmers at Clare A and Utah both lamented the lack of feed, the inaccessible farmers' cooperative (in Hoedspruit) and lack of a shed to store feed but neither community had taken the initiative to address these seemingly simple matters. With the exception of one inspection point (Welverdiend B) there were either no farmer structures (as in Utah) or where they existed the members did not have much faith in the leadership (as in Hlalakahle, Claire A and Welverdiend A).

In line with observations made during the questionnaire survey, there was a strong sense that the farmers relied heavily on the SVS to provide primary animal health care services. The typical example was that the farmers wanted a community-based person to assist with a number of issues, which were in fact already taken care of by the SVS and as groups, were quick to point out that the state should pay for the additional services because they were poor (though in individual interviews the majority of the respondents were willing to pay for the additional services).

On the whole, the Welverdiend A farmers seemed unhappy and had complaints about most of the services offered to them, such as that cattle legs were broken during vaccination, sometimes pregnant cows aborted because they were vaccinated, and veterinary students burnt their cattle when they branded them and injured them when they drew blood. By and large, some of the farmers seemed demoralised and lacked motivation and initiative. Moreover, the problems were mostly beyond animal health issues. Thus, it seemed as if what would have been effective for the communities would have been motivation that would help them believe in themselves and show them that they could actually work together and achieve much good even with minimal external intervention and additional resources. The simple approach such at Utah could have been an ideal arrangement for the communities to begin their fight against the ticks.

Pour-on seemed more effective than plunge dipping, as was confirmed by the AHT. However, the government did not ordinarily provide pour-on acaricides, except for the two crush pens. If the communities were to purchase these acaricides, it would

cost each farmer about R2.62 to R3.50[3] per animal to treat for ectoparasites. Based on the average of 13 cattle per household, this could amount to about R34 to R45 per herd per treatment session. Van Rooyen's (2011) findings in a parallel study were that farmers were already spending between R15 and R31 on tick remedies, but evidently without much success. This implies that there is an opportunity for the farmers to work collectively, reduce their overhead costs of obtaining the acaricides and be more effective in tick control.

Informal discussions were held with the two AHTs who worked at the five inspection points and their opinion was that a community-based person would be ideal for the livestock farmers in Mnisi because they lacked advice on animal production. Their conviction was that young people would be better CAHWs because they were keen to learn, learnt fast and applied what they learnt; and had fewer interpersonal /intergroup differences than the livestock farmers. The AHTs emphasised that the farmers needed a lot of assistance with production matters, evidently because the agricultural extension services in the area were inadequate.

[3] It is assumed that farmers would obtain 20l containers of pour-on acaricide at R1,500 to R2,000 and that each 20l treats 571 cattle.

5. DISCUSSION

5.1 CONSTRAINTS OF THE CATTLE FARMERS IN MNISI AND IMPLICATIONS FOR COMMUNITY-BASED ASSISTANCE

The leading problem that most farmers were aware of was inadequate grazing land and hence shortage of animal feed, especially during the dry season. The relative impact of shortage of grazing and water and livestock diseases was seen in that amongst the topmost causes for livestock losses (diseases, drought and stock theft); drought had a relatively greater impact per individual farmer than diseases and stock theft (Table 4.2). The findings in Mnisi were similar to what has been reported for other communities on communal land in South Africa, where feed, water, animal diseases and stock theft constituted the leading constraints to production (Kunene & Fossey 2006; Simela *et al.* 2006; Maine 2007).

As in this study, it was reported in Uganda, Tanzania and Kenya that diseases, lack of feed and water shortage were the topmost constraints to livestock production by smallholder farmers in the Lake Victoria basin (Chenyambuga, Waiswa, Saimo, Ngumi & Gwakisa 2010). This corroborates earlier reports by the Livestock Development Group of the University of Reading, wherein diseases were perceived as the greater constraint for poor livestock farmers in Kenya and Bolivia (Heffernan & Pilling 2002). However in India, where production land was a major constraint as was the case in Mnisi, access to fodder and water took precedence over livestock diseases as constraints to production (Heffernan & Pilling 2002).

In the Mnisi community there seemed to be some effort to address at least two of the constraints to livestock production; namely grazing control through the farmers' associations and tick control. The challenge with ticks was notable in that it was one problem that most farmers made some effort to control by supplementing the SVS provided acaricides with the use of self-procured acaricides. Efforts to control ticks included strategic spraying for ticks, a method that is highly recommended for achieving endemic stability of tick-borne diseases (Tice, Bryson, Stewart, Du Plessis & De Waal 1998; Rikhotso, Stoltsz, Bryson & Sommerville 2005). However, the fact that tick infestations remained a menace suggests a number of weaknesses in the tick

control methods that were employed. These included infrequent dipping and possibly incorrect strength of acaricides due to infrequent cleaning and refilling of dipping tanks. Such inappropriate handling of treatment with acaricides results in reduced efficacy (Brito, Barbieri, Rocha, Oliveira & Ribeiro 2011) and increased tick resistance (FAO 2004) to the acaricides. These observations suggest that there is a need to complement the farmers' efforts to control ticks to ensure that they are able to do so effectively.

A community-based person, assisting with tick control could fulfil a role similar to a dipping tank foreman, of ensuring that the dipping tanks are cleaned when need be and the correct concentration of acaricide is used. However, Swai and Masaaza (2012) caution that CAHWs might not be effective in ensuring the correct use of acaricides if they are not properly trained and supported with refresher courses. In their study, 28.3% of the CAHW were able to correctly dilute acaricides by following the manufacturers' instructions, while 55% were inconsistent and 16.6% did not know how to perform the dilutions. The fact that in the same study, the majority of the CAHWs were able to perform other functions, such as make provisional diagnosis of common diseases (88%) and match drugs to diseases (67%) might have been a reflection of how thoroughly they were prepared to perform those tasks; an hence the importance of adequate training in such systems of service delivery (Catley *et al*. 2002; Ngeiywa & Masake 2009).

In addition to the noted diseases and infections, there were cattle health problems that farmers seemed not aware of. For example, 31% mentioned lumpy skin disease as a constraint and yet only 8% of the farmers vaccinated against the disease. Such a tendency amongst smallholder farmers has been observed elsewhere (Chenyambuga *et al.* 2010), where farmers are aware of a disease in the community but do not prevent it for some reason. In Chenyambuga *et al.*'s case, farmers did not prevent East Coast fever because they felt that they could not afford control measures. However, in Mnisi community it might have been purely out of ignorance, given that most farmers did not know which diseases their cattle were vaccinated for (Figure 4.3), and those who did not vaccinate their animals did not do so because the 'government provided the vaccines for free' (but the government vaccines did not include lumpy skin disease), or they 'did not know' why they were not vaccinating their cattle (Table 4.5).

In view of the discussed constraints, it is concluded that in order to improve livestock production in Mnisi community, interventions should first address access to fodder, water and the control of tick burdens if they are to respond to the core concerns of the farmers and be successful (Heffernan & Pilling 2002). Other diseases and disease conditions that have an impact on production but the farmers are not necessarily aware of should be attended to either in conjunction with or after the key concerns have been dealt with. A holistic approach that does not look at diseases and disease conditions in isolation but includes production factors such as nutrition, access to feed and water as well as security measures (against stock theft) would be most appropriate. It would attend to the apt expressions of the Hlalakahle farmers that nothing could improve their situation unless they had adequate grazing, water and a plunge dip (i.e. adequate tick control). It would also address the concern about the lack of advisory services on livestock production that was raised by the AHTs.

Thus, although the study sought to establish the need for the provision of community-based PAHC in Mnisi, it was evident that the need was for much more than just primary animal health care. For instance the losses due to livestock husbandry related problems (drought, stock theft and predation) were 3.4 times greater than the losses due to animal health challenges (diseases, abortions and dystocia) as shown in Table 4.2. By the same token, the frequency of production related constraints (nutrition, access to water, drought, stock theft, wild life veld fires and market access) was 2.6 times that of animal health related constraints (animal diseases and ticks) as shown in Table 4.3. This substantiates the assertion that a more holistic approach that addresses health, production and security concerns should be pursued rather than a narrow focus on primary animal health care. A similar sentiment came out of a workshop to analyse the delivery of primary animal health care services in South Asia; that the focus of primary animal health care should not be curative and prophylactic care only but also include feeding and nutrition (NDDB & FAO 2009).

The constraints to livestock production in Mnisi community were exacerbated by lack of community cohesion and the leadership gap, two aspects which are important for progress in community development. For example, in Zimbabwe, Woods, Wynne, Ploeger and Leonard (2003) found that belonging to a club was one of the driving forces for smallholder livestock farmers to implement a management practice that

was recommended by veterinary livestock technicians and had monetary costs (e.g. deworming, castration or obtaining veterinary pharmaceuticals). Walters, Cadelina, Cardano and Visitacion (1999) showed that communities that had a previous history of working together or belonged to a farmers' organisation were easily mobilised into work groups for environmental conservation projects. In contrast, communities that were not cohesive were slow to participate in activities that involved shared labour and group work (Walters *et al.* 1999). And yet, if strong leaders emerged from such communities, they were able to mobilise enthusiastic groups that were willing to take up new interventions for community development.

In the Mnisi context, the farmers in Utah demonstrated that it was possible to attain a level of community cohesion around animal health management (tick control specifically) and so could provide some leads on how to get a community in Mnisi to successfully work collectively for a common cause. Most of the other farmers and their associations seemed not to have achieved this, and hence an investigation of the underlying causes of the lack of community cohesion should be undertaken, and the causes should be addressed or taken account of in the planning and development of a community-based programme. Lessons of what not to do could be learnt from the farmers' management of grazing, which they indicated had not been successful.

5.2 THE GAPS IN THE PROVISION OF ANIMAL HEALTH CARE

Mnisi community probably had better access to primary animal health care services than most other communities that are using communal grazing land in South Africa. The AHTs visited and inspected the cattle once a week at inspection points. Veterinary students on training at the Hlukuvani Animal Health Centre visited the inspection points at least once a month (Figure 3.3). The SVS officials were also available outside the scheduled contact sessions (§ 4.4.1 refers). As a result most of the farmers felt that the SVS officials were satisfactorily accessible and responsive to their calls for assistance. The farmers were satisfied with access to vaccines and remedies for the control of endo- and ectoparasites though they were concerned about the costs of obtaining these pharmaceuticals (§ 4.4.1 refers).

The major gaps in the provision of animal health services seemed to be the following:

- Despite good access to SVS, ***farmers still wanted someone nearby to call on when the AHT and the animal clinic staff were inaccessible.*** This was a demonstration of the farmers' heavy dependence on the state to look after their livestock, predominately because of their limited skills to manage basic animal health care and production matters, and diffidence about their ability to learn as illustrated by the following:
    - The farmers' little knowledge about livestock vaccination (Figure 4.3 and Table 4.5) and the unsuccessful tick control measures even though diseases and ticks were considered a major challenge to livestock production.
    - That the topmost duties that were envisaged for a community-based assistant (Table 4.14) were already provided by the SVS, whose services and accessibility the farmers were highly satisfied with.
    - The farmers' reluctance to be taught basic animal health care and insistence on the appointment of a person who would be able to grasp the information better than they would (§ 4.5.4 refers).
- In addition to the management of health related constraints (as provided in Table 4.14 and discussed in Section 5.1 above), ***the community-based person would also be expected to also address access to feed and water***. As argued in Section 5.1, the needs and priorities of the community were much broader than a need for PAHC, and this could not be ignored even in an intervention that was mainly concerned with PAHC services.
- ***Inaccessible stock remedies and feed supplements***. The farmers raised this as a challenge, but the lack of community-driven initiative to improve their access to these products from Hoedspruit was a concern. This was a demonstration of the lack of community cohesion in addressing common problems, which was also observed in the management of grazing and dipping (e.g. at Welverdiend A inspection point).

5.2.1 POSSIBLE SOLUTIONS TO FILL IN THE GAP

Although access to PAHC services was not a major constraint in the Mnisi community, the farmers saw a role for community-based persons who could further improve the accessibility of PAHC services. However, a CAHW would only address a fraction of the

community's challenges to cattle production. Therefore, if community-based persons were employed, they would have to assume much broader duties PAHC services in order to address the needs of the farmers, and as recommended by the South Asia Pro-poor Policy Livestock Programme (NDDB & FAO 2009) and recognised by DAFF in its draft policy for PAHC (Department of Agriculture 2008). It would thus be more apt to refer to such persons as Community-based Livestock Workers (CLWs) than CAHWs.

In response to the farmers' limitations to cattle production that have been discussed thus far, possible service delivery options that could cover both PAHC and other major constraints are analysed in this section and Table 5.1, in the context of the observed socio–cultural issues amongst members of the Mnisi community.

Table 5.1: Pros and cons of the various methods of delivering primary animal health care (PAHC) services in the Mnisi community context

Method of delivery of PAHC	Pros	Cons
1. Animal Health Technician	- Readily accessible; face to face interaction at least weekly during inspection. - Checks all livestock on a weekly basis and advises farmers. - Relays any important announcements from the state veterinary services. - Could be linked to other farmer capacity building programmes such as Farmer Field Schools.	- Not always accessible outside visits to inspection points. - Provides advice but does not necessarily attend to individual animal problems. - Possibly not enough information is shared with farmers to enable then to deal with future cases and hence the farmer would be reliant on the AHT to address a recurring problem. - Advice is *ad hoc* and per needs basis.
2. Animal clinic	- The veterinary doctor and students visit each inspection point on a monthly basis. - They check and treat animals (including small ruminants, dogs and poultry) at cost recovery price. - They supply some of the veterinary medicines.	- May not always be accessible outside visits to inspection points. - Also provide treatment on a per needs basis. - The livestock owners are possibly not well informed about the disease conditions to enable them to deal with future cases or prevent them.

Method of delivery of PAHC	Pros	Cons
3. Community-based Animal Health Workers	- The farmers see a need for community-based assistance with primary animal health care. - Individuals with potential and ability to learn can be identified by the community. - Fewer individuals would be trained as CAHWs and so training can be specialised. - Individuals could be easily accessible to community members. - There were indications that community members could pay for the CAHW's services. - Individuals could be trained to deal with a broader spectrum of livestock production issues and be called CLWs. - Could be linked to other farmer capacity building programmes such as Farmer Field Schools. - Employment creation.	- Creates dependency at another level; the farmer is left to believe that the welfare of his/her cattle lies in the hands of another individual. - Does not build the farmer's own ability to look after his/her stock. - Can lead to contentions should a condition not be properly handled by the community-based assistant (e.g. as were the contentions about the veterinary students at Welverdiend A). - Reluctance of farmers to pay for the services or possible poor remuneration of the community-based person (as emanated from the group discussions). - The persons would have to be broadly skilled person in order to address, amongst other matters, access to feed and water and livestock security. - Transport of the community-based assistant would limit the radius which he/she could cover. - Would require additional funding above the current set up. - Young persons (as suggested by the community) would require a sizeable remuneration to enable them to remain within the community and not migrate in pursuit of better paying jobs.
4. Farmer Field Schools	- Farmers preferred to receive information in groups. - Small progressive groups with minimum conflicts could be targeted. - Individual learning encouraged and hence builds confidence of individual farmers to look after their own livestock. - Face to face contact - Time-bound; farmers learn and practice one aspect of production and health management within a given time.	- Learning process much slower than would be for a CLW. - Would require that the diffidence shown by the farmers be overcome and that they be convinced that it is possible for them to learn to tackle some of their constraints to cattle production. - Requires social facilitation to overcome social conflicts. - Would require additional funding above the current set up.

Method of delivery of PAHC	Pros	Cons
5. Electronic media	- Cell phone use is generally wide spread in South Africa. - Radios and TVs are prevalent and could be useful route for conveying general information. - Could be complementary to other service delivery methods.	- Heads of households who owned cell phones and land line telephone were very few in Mnisi community (20% and 1 %, respectively). - No face to face contact. - Delivers information but has no mechanisms to follow up on implementation. - Limited information can be provided to a farmer at a time through the cell phone. - Farmers would have to be trained to use cell phones beyond the basic functions of making/receiving calls and sending/receiving short text messages. - Other forms of electronic media are not prevalent. - Use of electronic media alone would not be in line with the preferred group approach to training.

Given the amount of support that was already available to the farmers and their satisfaction with the SVS, one has trepidation to only recommend the inclusion of CLWs as a second tier of service providers, without attempts to empower the farmers to deal with some of their challenges. The employment of CLWs without a farmer capacitation programme would clearly perpetuate the notion that farmers cannot help themselves where their livestock are concerned. This could have a detrimental effect once such a service is withdrawn, as was the case in OR Thambo district municipality when the dipping tank foremen were removed (Simela *et al*. 2006).

Reinforcement of the farmers' dependence and diffidence would go against the concept that a sustainable process of innovation is one which enables farmers to adapt and change as knowledge and conditions change, and allows for community empowerment and self-mobilisation (Pretty 1995). Moreover, predictions are that state provided veterinary services are more likely to continue to decline than increase (Schillhorn van Veen & de Haan 1995; Leonard 2004). This is already evident in South Africa from the withdrawal of some state provided services, such as vaccines for black quarter, anthrax and lumpy skin disease (Simela *et al.* 2006). It would therefore be prudent to equip farmers to manage basic health care and deal with some of their constraints than to continuously provide the services without empowering the farmers. This observation concurs with Maine (2007) who, after a study of communal

land-based livestock communities in Venda concluded that breaking the dependency syndrome is essential in any livestock development effort to enable farmers to be independent from government and take initiatives on their own. Thus, based on the observations made during the surveys as well as the arguments of Pretty (1995), Walters *et al*. (1999), Braun *et al.* (2006) and Vaarst *et al*. (2007) for capacitating farmers to be self-sufficient (§ 2.2.4 and § 5.1 refer), one would advocate for an approach that includes the Farmer Field Schools type of farmer training to build the confidence and ability of farmers to look after their livestock individually and as a community.

5.2.1.1 Possibilities for farmer field schools

Although the impression from discussions with the farmers and AHTs was that the farmers were not ready for the challenge of learning to address some of their constraints to production, there was some indication that farmers were interested in managing diseases, disease conditions and other constraints if they were adequately equipped to do so. This was evident from their efforts to control ticks, endoparasites to a lesser extent, and to collectively manage grazing (though unsuccessful). A farmer capacitation programme could thus be originated on these few initiatives in the community.

Elsewhere in South Africa, farmer training has been demonstrated to be effective in enabling communal land-based livestock farmers to deal with challenges with animal health. For example, Makgatho, McCrindle and Owen (2005) assisted farmers in Odi, North West Province, to report diseases and obtain a diagnosis from veterinary professionals by training them to describe necropsy lesions of carcasses and organs of cattle that had died of causes unknown to the farmer. This reduced the number of mortalities from unknown causes.

Thus, there appears to be some scope to use an approach such as Farmer Field Schools to empower the Mnisi farmers to manage their constraints to livestock production. The AHTs seemed ideally placed to be trained to facilitate the schools because they were already in frequent contact with the farmers during the inspection sessions, and the farmers generally preferred them as providers of animal health care services and information. However, because the AHTs were not always readily

available as well as the fact that their interventions would be just for animal health care and not include other constraints, it would probably be ideal to develop a farmer capacitation programme that is facilitated by CLWs. Such a programme of Farmer Field Schools that are facilitated by CAHWs has been initiated in Kenya and was reported to be serving the communities satisfactorily in its inception years (Watson 2008).

In addition to increased capacity to manage agricultural enterprises, Farmer Field Schools have been reported to build sustainable human and social capital that is needed for next step actions among farmers such as collective marketing of produce and lobbying through farmer networks, savings groups and other associations that are sustained as independent groups (Braun *et al.* (2006). As a result of its effectiveness in integrated pest management in mono-crop production systems (Braun *et al*. 2006), the Farmer Field Schools model has been adapted to various production systems, which lately include pastoral production (FAO & VSF Belgium 2009) and mixed production systems (Disaster Risk Reduction 2011). The approach has repeatedly been reported to increase farmers' skills and enable them to retain knowledge over an extended time period (Rola, Jamais & Quizon 2002; Simpson & Owens 2002; David 2007; Tripp, Wijeratne & Piyadasa 2005) and to be effective even with farmers with low levels of education and small scale of production (Davis, Nkonya, Kato, Mekonnen, Odendo, Miiro & Nkubu 2012). It therefore seems that this model of farmer training has potential to contribute to DAFF's objective of growth of successful smallholder commercial farmers, and improving the performance of the subsistence livestock sector of South Africa (Department of Agriculture, Forestry and Fisheries 2010b).

Some weaknesses have been identified in the Farmer Field School approach. A key one has been that in most cases researchers have reported very little diffusion of Farmer Field School-acquired knowledge from field school graduates to other community members (Rola *et al.* 2002; Simpson & Owens 2002; Tripp *et al.* 2005). In some instances diffusion of knowledge has occurred to some degree. For example, in David (2007) only 25% of the trained farmers were observed to be engaged in informal skills transfer to non – trained members of the community.

5.2.1.2 Possibilities for CLWs

In addition to the possibilities of providing the services that were specifically mentioned by the farmers (Table 4.14), managing the use of acaricides during dipping sessions (§ 5.1) and facilitating Farmer Field Schools (§ 5.2.1.1.), CLWs could fill in the supply gap of veterinary medicines and feed supplements. In Kenya, CAHW-linked to veterinary drug supplies have been effective in improving access to these drugs for the pastoralists (Ngeiywa & Masake 2009). If a similar approach were to be employed viably in Mnisi community, the farmers would have to be more aware of their primary animal health care needs and willing to use veterinary pharmaceutical products more regularly (e.g. vaccinate for lumpy skin and other diseases, and more of them use endoparasites when it is necessary) to make the business viable. Thus the CLWs could assist in training the farmers about basic herd health management and ensure that there is an accessible supply of the non-scheduled veterinary products as well as feed supplements that the farmers could use. The feasibility of supplying products to farmers would need to be investigated. Experience from North West province was that, in order for a service of supplying veterinary remedies to smallholder farmers to be effective, the supply system should be acceptable and accessible, and the required products should be available, affordable and within the routes that are ordinarily used by the farmers (Gehring, Swan & Sykes 2002).

Before any system of providing community-based livestock care is concluded on, the cost implications, benefits and effectiveness should be determined to assist the authorities to select the most suitable approach that meets the farmers' needs cost effectively.

5.2.2 COMPARISON OF THE POSSIBLE COSTS FOR THE DELIVERY OF PRIMARY ANIMAL HEALTH CARE

In Tables 5.2 and 5.3, the basic costs of maintaining a full time AHT, full time CLW and of training the farmers to take care of the basic health of their livestock are explored. Based on these estimates, and supposing that one AHT is assigned three inspection points (i.e. 5 AHTs in Mnisi) and one CLW to one inspection point (i.e. 15 CLWs in Mnisi), the initial outlay for farmer training would be high, but over a five year period, farmer training could be more cost effective for Mnisi community. The obvious

advantage of training farmers is that they would generally be able to handle their livestock problems themselves.

Table 5.2 Comparison of costs of establishing of an Animal Health Technician (AHT) or a Community-based Livestock Worker (CLW) primary animal health care (PAHC) system for Mnisi community

Cost line	Animal Health Technicians	Community-based workers
Basic training[1]	Done privately	R15,000
Basic salary & benefits[2]	R192,085	R94,640
3 refresher courses/year	R30,000	R30,000
Total	R227,085	R148,640
Total costs over 5 years (per AHT and per CLW)[3]	R 1,135,425	R663,200
Total costs over 5 years (5 AHTs or 15 CLWs)[3]	R 5,677,124	R 9,948,000

Assumptions:

1. AHTs cover their basic training in tertiary education institutions whereas the basic of training of a community-based person would have to be covered by the provider. Basic training for CLW is included in first year only.
2. The basic salary of AHTs was taken as the minimum of the government scale of R140, 208 – R174,117 +37% benefits. The basic salary of CLWs was based on expectations from two young men in Mnisi community who had been engaged in community development before (salary of R6,000 per month + 37% benefits).
3. Accommodation, subsistence and travel costs and the cost of equipment and provisions than are required to manage PAHC are not included. In the case of AHTs, these costs would be provided from the SVS budget. CLWs are usually given an initial kit of equipment and expected to replenish it themselves thereafter as well as to cover their transport costs in executing their duties.

Table 5.3 The estimated costs of training the farmers to do their own basic animal health care in Mnisi community

Cost line	Units and cost/ unit	1st year costs	Yr. 2 – 5 costs
Number of monthly training sessions [1]	12 months x 15 groups x 20 farmers @R25 refreshments	R 90 000	-
Training material[2]	300 farmers @ R300 each	R 90 000	-
Training facilitation	15 groups x 12 months @ R8,000 per session	R 1 440 000	-
Four refresher courses per annum[2]	Facilitation @ R8,000; Refreshments@ R25 & material @R50 per farmer	R 570 000	R 2 280 000
TOTAL[3]		R 2 190 000	R 2 280 000
Total costs over 5 years		R 2 190 000	R 4 470 000

Assumptions:

1. It assumed that each group is 20 members and they are provided with tea/juice and a scone during training; the use of the venue is free.
2. Each farmer receives a basic manual at first training and additional material during refresher courses.
3. Accommodation, subsistence and travel costs are not included

At face value CLWs earning an annual salary (+ benefits) of R94,640 per annum could be an expensive option, more so given the availability, accessibility and acceptability of the AHTs (who have a minimum qualification of a 3-year university diploma) and state veterinarians (who have a minimum qualification of a five to seven-year degree). On the other hand, well-trained and remunerated CLWs are likely to remain in the community longer and benefit more farmers that are within their reach (Watson 2008). As they would be based in the community, they could be more accessible than AHTs and other veterinary professionals and they could in fact transfer some skills to farmers as they worked with them (Mugunieri, Irungu & Omiti 2004). However, the *ad hoc* learning that could occur through a CLW – farmer interaction would not necessarily leave the farmers empowered to make informed decisions about their livestock. To that effect, the Farmer Field School model that is linked to CLWs could be ideal (Simpson & Owens 2002; David 2007; FAO & VSF Belgium 2009).

It is advised that for a CLW programme to be effective, they should be well remunerated (Watson 2008). Theoretically, some of the CLWs income could emanate from the sale of non-scheduled veterinary drugs and livestock feed supplements on a profit making basis. Such a venture could be viable given that there was no retail outlet for livestock stock remedies in Mnisi community but farmers obtained whatever they needed from a cooperative that was some 200km away from them. Experiences from Kenya show that CLWs that also distribute livestock drugs can operate successfully (Mugunieri *et al*. 2004; Ngeiywa & Masake 2009).

The possibility of incorporating CLWs in a Farmer Field School model has been suggested as it has worked elsewhere in Africa (e.g. Watson 2008; Disaster Risk Reduction 2011). In Mnisi community this could be less cost effective than the use of the AHTs who are already mostly available, in regular and weekly contact with the livestock farmers and were trusted to address farmers' animal health concerns. Conversely, CLWs could be trained to deal with much more of the farmers' challenges than just health care problems, and hence might offer a more beneficial service.

5.3 SUMMARY OF FINDINGS

The farmers of Mnisi community were satisfied with the PAHC services that were provided by the SVS. They regarded the services to be available, accessible and acceptable; and hence preferable. The notion of community-based PAHC services virtually never cropped up until it was prompted. Once prompted, the farmers saw a need for the services of community-based persons to provide PAHC. However, the envisaged tasks were largely a duplication of services that were already provided by the SVS. The key difference was that they expected the community-based persons to also address the major challenges to livestock production, mainly access to fodder and water.

In fact, as perceived by the farmers, the production related challenges were much more and had greater impact on livestock losses than the health related challenges. For that reason, it has been suggested that a community-based service in Mnisi should holistically deal with all the challenges that the farmers faced in order for it to be effective. The challenges to be addressed should not only be limited to those that were raised by the farmers but also the underlying problems of heavy dependence on state provided services, diffidence about their own ability to take care of the health of their livestock and lack of community cohesion.

6. CONCLUSIONS

It is thus concluded that, a second tier of PAHC service providers in Mnisi community is not highly essential given the adequacy of the SVS as perceived by the farmers. Community-based services could however be valuable to the Mnisi farmers if they holistically address the crucial challenges of access to fodder and water, control of diseases and ticks and ensuring livestock security. Secondly, community-based services would be beneficial if they also empowered farmers to deal with these challenges. It is thus recommended that, if community-based persons are employed, they should be CLWs, who are trained and equipped to deal with broader concerns than just animal health. Finally it would be advisable that the community-based services be linked to a farmer capacitation programme such as Farmer Field Schools, which could either be facilitated by AHT or CLWs. The former would have the advantage that they are already available and acceptable but a disadvantage that they would address a narrow spectrum of the concerns. The latter would have the advantage that they could be trained to handle a broader spectrum of concerns and would be readily accessible in the community. The cost implications, potential benefits and effectiveness of these options need to be investigated further before conclusive decisions are taken.

Whatever community-based service approach is adopted, some effort should be invested in stimulating community cohesion amongst the farmers of Mnisi to enable them to collectively deal with problems that are common to them.

The needs for the delivery of PAHC services in Mnisi community illustrate that such services should be tailor-made for the intended beneficiary communities, taking into consideration the existing support structures, the communities' socio-cultural issues, cost effectiveness and the possible impact of the services.

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ANNEX: QUESTIONNAIRE FOR THE MNISI COMMUNITY PROGRAMME

Form no:……...

MNISI COMMUNITY SURVEY

Questionnaire 1: ***Livestock Production & Health***

Q.1) Name of surveyor:_____

Q.2) Date:_____

Q.3) Name of diptank:_____

Q.4) Name of farmer:_____

Q.5) Stock card number:_____

SECTION A: Animal Health and Veterinary Services

I) CATTLE PRODUCTION INFORMATION

Indicate for each stock class the amount of animals you currently own *(If the answer is 0 then do not fill in anything)*

Q.6)	Bulls	
Q.7)	Oxen	
Q.8)	Cows (have calved already)	
Q.9)	Heifers (not yet calved)	
Q.10)	No of calves (still suckling)	

Q.11) How many cattle did you sell during the last 12 months?

Q.12) In general would you like to sell more cattle?

V1	V2	V3
Yes	No	Don't know

Q.13) Are you satisfied with the access you have to markets for your cattle?

V1	V2	V3
Yes	No	Don't know

Q.14) How many cattle did you buy during the last 12 months?

Q.15) Did you **lose/ give away** any cattle during the *last 12 months*?

V1	V2	V3
Yes	No	Don't know

If YES to Q.15, **how many** heads of cattle did you **lose/give away** during the *last 12 months* due to the following reasons?

		Number of animals
Q.16)	Stock theft	
Q.17)	Traditional practices (lobola, etc)	
Q.18)	Disease (any kind)	
Q.19)	Abortion or still born	
Q.20)	Drought	
Q.21)	Old Age	
Q.22)	Injury	
Q.23)	Dystocia (problems with calf not coming out)	
Q.24)	Predators	
Q.25)	Donation (family or other farmers)	
Q.26)	Other (no specification)	

	Yes	No	I don't know
	V1	V2	V3
Q.27) Are your cows being milked?			
Q.28) If YES to Q.27, do you sell milk from your cows?			
Q.29) Would you say cattle production is an important source of income for your household			
Q.30) Does your household have income sources other than cattle production?			

II) PERCEPTIONS TOWARDS DISEASES, DISEASE CONTROL STRATEGIES AND ANIMAL HEALTH SERVICES

Q.31) Do you think there are any benefits to controlling diseases in your cattle?

V1	V2	V3
Yes	No	Don't know

Q.32) What are the **biggest constraints/challenges** you face in farming with cattle here in Mnisi?

V1	Nutritional problems	
V2	Access to water	
V3	Marketing problems	
V4	Stock theft	
V5	Veld fires	
V6	Animal Diseases	
V7	Drought	
V8	Ticks/Dipping	
V9	Problems with wildlife	
V10	I don't know	
V11	Other...	

Are the problems/challenges related to:

		V1	V2	V3	V4	V5
		Of minor importance	Relatively important	Important	Very important	Extremely important
Q.33)	Nutrition					
Q.34)	Access to water					
Q.35)	Marketing					
Q.36)	Stock theft					
Q.37)	Veld fires					
Q.38)	Animal diseases					
Q.39)	Drought					
Q.40)	Ticks/dipping					
Q.41)	Wildlife					
Q.42)	Other 1					
Q.43)	Other 2					

We would like to know more about the **most important livestock diseases** that you encounter in your cattle.

Can you name the **most important cattle diseases** and for each disease indicate whether you applied a **treatment** and whether it was **effective** *(only describe the three most important diseases)*

Important diseases/ clinical signs *(use CODE from list below)*			**Did you spend money on a treatment and was it effective?**			
			Yes: It was effective	Yes: It was not effective	No	Don't know
			V1	V2	V3	V4
Most important	**Q.44)**	**Q.45)**				
2nd most important	**Q.46)**	**Q.47)**				
3rd most important	**Q.48)**	**Q.49)**				

CODES FOR DISEASES

D.1)	Abortion	D.20)	LSD (Lumpy skin disease)
D.2)	Anaplasmosis	D.21)	Male fertility
D.3)	Anthrax	D.22)	Malnutrition
D.4)	Babesiosis	D.23)	Mastitis
D.5)	Black quarter	D.24)	Milk fever
D.6)	Brucellosis	D.25)	None
D.7)	Calf mortality	D.26)	Other
D.8)	Corridor disease	D.27)	Other skin problems
D.9)	Cough	D.28)	Pneumonia/ Respiratory
D.10)	Diarrhoea	D.29)	Poisoning
D.11)	Dystocia	D.30)	Red water
D.12)	Fever	D.31)	Reproduction problems
D.13)	FMD	D.32)	Swelling at hooves
D.14)	Foot rot	D.33)	Swollen lymph nodes
D.15)	Gallsickness	D.34)	Three days stiffness
D.16)	I don't know	D.35)	Tick infections (ulcers, abscesses)
D.17)	Injuries	D.36)	Udder problem
D.18)	Lack of appetite	D.37)	Worms (internal parasites)
D.19)	Lameness	D.38)	Wounds

Q.50) Attitudes: We would like to know whether you agree with the following statement

Read the statement and ask the farmer whether he agrees or disagrees, whether he thinks it is true or false, when he/she does not want to form an opinion then indicate 'no opinion', try to avoid this answer

Concept of veterinary drugs: Modern drugs/treatments that have to be bought

		V1	V2	V0
		I don't agree	**I agree**	**No opinion**
Q50T1	It is necessary to immediately treat sick animals			
Q50T2	I do not want my cattle to be in contact with wild animals			
Q50T3	Everything should be done to prevent an animal from dying			
Q50T4	Wild animals may transmit diseases to cattle			
Q50T5	Traditional methods are often more effective than veterinary drugs to cure animals			
Q50T6	To control diseases in my animals I prefer to use veterinary drugs			
Q50T7	I sometimes do not know what to do when my animals are sick			
Q50T8	There are lots of extra costs that I have to spend when I want to buy drugs/treatments for my cattle			
Q50T9	For some diseases I don't buy veterinary drugs because I know other and cheaper methods to cure my animals			
Q50T10	Some veterinary drugs don't work sufficiently well against diseases			
Q50T11	I can always buy veterinary drugs when I need them for my cattle			
Q50T12	When one of my cattle is sick I discuss what we will do with the other members of my household			
Q50T13	It is easy to get professional veterinary information or advice			
Q50T14	When one of my cattle is sick I discuss what I will do with other livestock owners			
Q50T15	In the past when one of my animals was sick I received very useful information from other livestock owners			
Q50T16	I only want to use veterinary treatments that are used by other livestock owners as well			
Q50T17	I wouldn't mind being the only one in the village using a specific veterinary treatment			
Q50T18	I would like to learn more on cattle diseases			
Q50T19	The Animal Health Technician gives me clear and sufficient information about different possibilities to treat my animals			
Q50T20	The Veterinarian or Animal Health Technician will always try to give my animals the most appropriate and cheapest treatment			
Q50T21	I think I spend more money on animal health then other livestock owners			
Q50T22	Some Animal Health Technicians are not qualified enough to assist me when I have animal disease problems			

Q.51) Do you believe animals can transmit diseases to people?

V1	V2	V3
Yes	No	Don't know

Q.52) If yes to Q.51 which animal species can transmit diseases *(list animals: tick appropriate box(es))*

		Yes	No	Don't know
		V1	V2	V3
T1	cattle			
T2	goat			
T3	sheep			
T4	pig			
T5	chicken			
T6	dog			
T7	Game (wildlife)			
T8	Other			

Q.53) Do you boil milk that you get from your animals?

V1	V2	V3
Yes	No	Don't know

Q.54) What do you do with cattle that died from a disease? *(No listing, tick appropriate box(es))*

V1	Eat the meat	
V2	Burn the dead animal	
V3	Bury the dead animal	
V4	Feed the meat to dogs	
V5	Throw it away.	
V6	Throw it into the nearest river	
V7	Give away to other people	
V8	Other	

Q.55) When do you normally wash your hands? (*No listing, tick appropriate box(es))*

V1	Only when I wash myself	
V2	When my hands are dirty	
V3	After going to toilet	
V4	Before/after eating	
V5	After handling any animal	
V6	After handling sick animals	
V7	After handling any animal excreta (faeces, urine)	
V8	After handling excreta (faeces, urine) from sick animals	
V9	Other (specify)	
V10	I don't know	
V11	Before or after milking	
V12	After handling a dead animal	

III) MAIN ANIMAL HEALTH INTERVENTIONS

VACCINATION

Q.56) Can you name the diseases for which any of your cattle was **vaccinated** in **the last 12 months**?

(No listing, tick appropriate box)

V1	No disease at all	
V2	I don't know	
V3	FMD	
V4	Lumpy skin disease	
V5	Black quarter	
V6	Anthrax	
V7	Brucellosis	
V8	Babesiosis	
V9	Gallsickness	
V10	Other (specify)	

Q.57) Did you buy any vaccines for your cattle?

V1	V2	V3
Yes	No	Don't know

Q.58) If no to Q.57, indicate why you did not spend money on vaccines for you cattle

(No listing, indicate all reasons given)

V1	Because vaccines are provided for free	
V2	I cannot afford to pay for vaccines (affordability)	
V3	Vaccines are not available in this area (availability)	
V4	I do not think it is necessary (necessity)	
V5	I don't believe vaccines are effective (effectiveness)	
V6	I do not know which vaccine to use (knowledge)	
V7	It's too cumbersome to apply vaccines (willingness)	
V8	I don't know (ignorance)	
V9	Other (Specify)	

Q.59) In total how much did you spend on vaccines in the **last 12 months?** *(If no money has been spend just put 0 Rand)*

	Rand

ECTOPARASITES

Q.60) Do you use plunge dipping to control **ectoparasites** (e.g. ticks, lice, flies, mites) in cattle?

V1	V2	V3
Yes	No	Don't know

Q.61) Do you use methods other than plunge dipping to control **ectoparasites** (e.g. ticks, lice, flies, mites) in cattle?

V1	V2	V3
Yes	No	Don't know

Q.62) If YES **to Q.61** are you able to tell us more about the specific treatment(s)?

Yes	V1	No	V2

If No, go to Q.87

Q.63) If YES to Q.62, specify 1)how the treatment is applied: the **method,** 2)the **specific drug (product name)** used *or* the **traditional remedy** used, 3)the **frequency** and 4)**the source** of the product

Method: *(use number from list below)* **Q.63**		**Drug/ Traditional remedy used:** *(indicate product name or name of traditional remedy)*		**Frequency:** *(use number from list below)*		**Source** *(use number from list below)*	
V1	Spot spraying	**Q.64)**		**Q.65)**		**Q.66)**	
V2	Sport spraying of legs only	**Q.67)**		**Q.68)**		**Q.69)**	
V3	Spot spraying of whole body	**Q.70)**		**Q.71)**		**Q.72)**	
V4	Tick grease	**Q.73)**		**Q.74)**		**Q.75)**	
V5	Pour-on	**Q.76)**		**Q.77)**		**Q.78)**	
V6	Inject ectoparasite	**Q.79)**		**Q.80)**		**Q.81)**	
V7	Other	**Q.82)**		**Q.83)**		**Q.84)**	

Frequency:		**Source:**	
V1	Only when necessary	V1	Animal Health Technician
V2	More than once a week	V2	Animal health clinic
V3	Once a week	V3	Local shop
V4	Twice a month	V4	Pharmacist
V5	Once a month	V5	Local medicinal plants
V6	Every 3 months	V6	Private veterinarian
V7	Every 6 months	V7	Other farmers
V8	Once a year	V8	Cooperatives
V9	Less than once a year	V9	NGO
V10	I do not know	V10	I do not know
		V11	Other

Q.85) How much Rand did you spend in the *last 12 months* on methods to control for ectoparasites in your cattle? *(If no money has been spend just put 0 Rand)*

	Rand

Q.86) If no to Q.57, **why** do you **not** use other methods **to control ectoparasites**

(No listing, indicate all reasons given)

V1	I cannot afford it (affordability)	
V2	Products are not available (availability)	
V3	I didn't have problems with ectoparasites on my animals (necessity)	
V4	I don't think it is necessary to use other control methods (necessity)	
V5	I don't believe other treatments are effective (effectiveness)	
V6	I do not know which product to use/ buy (knowledge)	
V7	It's too cumbersome to apply other treatments (willingness)	
V8	I don't know (ignorance)	
V9	Other (specify)	

INTERNAL PARASITES (WORMS)

Q.87) Do you use any treatments to control **internal parasites/ worms** in your cattle?

V1	V2	V3
Yes	No	Don't know

Q.88) If yes to Q.87 are you able to tell us more about the specific treatment(s)?

V1	V2
Yes	No

If No, go to Q.109

Q.89) If YES to Q.88 specify 1)the treatment is applied: the **method,** 2)the **specific drug (product name)** used *or* the **traditional remedy** used, 3)the **frequency** and 4)**the source** of the product

Method: *(use number from list below)* **Q.89**		**Drug/ Traditional remedy used:** *(indicate product name or name of traditional remedy)*		**Frequency:** *(use number from list below)*		**Source** *(use number from list below)*	
V1	Drench or dose liquid	**Q.90)**		**Q.91)**		**Q.92)**	
V2	Bolus by mouth	**Q.93)**		**Q.94)**		**Q.95)**	
V3	Feed additive	**Q.96)**		**Q.97)**		**Q.98)**	
V4	Injection	**Q.99)**		**Q.100)**		**Q.101)**	
V5	Paste given by mouth	**Q.102)**		**Q.103)**		**Q.104)**	
V6	Pour-on	**Q.105)**		**Q.106)**		**Q.107)**	
V7	Other	**Q.108)**		**Q.109)**		**Q.110)**	

Frequency:		**Source:**	
V1	Only when necessary	V1	Animal Health Technician
V2	Once a week	V2	Animal health clinic
V3	Twice a month	V3	Local shop
V4	Once a month	V4	Pharmacist
V5	Every 2 months	V5	Local medicinal plants
V6	Every 4 months	V6	Private veterinarian
V7	Every 6 months	V7	Other farmers

Method: *(use number from list below)* **Q.89**		**Drug/ Traditional remedy used:** *(indicate product name or name of traditional remedy)*	**Frequency:** *(use number from list below)*		**Source** *(use number from list below)*
V8 V9 V10	Once a year Less than once a year I do not know		V8 V9 V10 V11	Cooperatives NGO I do not know Other	

Q.111) How much did you spend in the *last 12 months* on methods to control for internal parasites/worms in your cattle? *(If no money has been spend just put 0 Rand)*

	Rand

Q.112) If No to Q.83, **why** do you **not control internal parasites**

(No listing, indicate all reasons given)

V1	I cannot afford it (affordability)	
V2	Products are not available (availability)	
V3	Worm infections do not cause problems in my cattle (necessity)	
V4	I don't think it is necessary (necessity)	
V5	I don't believe other treatments are effective (effectiveness)	
V6	I do not know which product to use/ buy (knowledge)	
V7	It's too cumbersome to apply other treatments (willingness)	
V8	I don't know (ignorance)	
V9	Other (specify)	

VETERINARY EXPENDITURES

		V1	V2	V3
Q.113)	In the last 12 months did you spend money on **treating wounds & injuries** in your cattle	Yes	No	I do not know
Q.114)	If yes to Q.113 how much did you spend in the last 12 months on treating wounds & injuries in your cattle?	Rand.....		
Q.115)	In the last 12 months did you spend money on **other veterinary treatments** for your cattle?	Yes	No	I do not know
Q.116)	If yes to Q.115 how much did you spend in the last 12 months on other veterinary treatments in your cattle	Rand.....		

IV) DISEASE REPORTING

Q.117) Who normally provides animal health services to you? *(No listing, tick appropriate box)*

V1	State veterinarians	
V2	Animal Health Technicians	
V3	Staff from the Animal Clinic	
V4	Agricultural Extension Officers	
V5	Private veterinarians	

V6	Veterinary drug suppliers	
V7	Other better informed farmers	
V8	NGO workers	
V9	Traditional healer	
V10	Nobody	
V11	I don' t know	
V12	Other (specify)	
V13	Family members	

Q.118) How do you contact these service providers when you need them *(no listing, tick appropriate box(es))*

V1	Face to face during weekly inspection	
V2	Face to face when visiting them at their office/home	
V3	By public telephone	
V4	By private telephone	
V5	Through a cell phone call/sms	
V6	Don't know	
V7	Other	

Q.119) Do you have to report certain diseases to the government veterinary office?

V1	V2	V3
Yes	No	Don't know

If 'No' go to 121

Q.120)**If YES to Q.119**, how do you contact the veterinary office to report a disease that must be reported? *(no listing, tick appropriate box(es))*

V1	Visit the veterinary office to report it directly (face to face)	
V2	Report it on veterinary dipping days	
V3	Report to the Animal Clinic	
V4	Report to a local who reports it to the veterinary professional/ veterinary office	
V5	Call the veterinary professional/ veterinary office through a landline telephone	
V6	Call the veterinary professional/ veterinary office with a cell phone	
V7	Report to Animal Clinic	
V8	Don't know	
V9	Other (specify)	

Q.121) Do veterinary professionals come and check your animals after you reported them sick?

V1	V2	V3
Yes	No	Don't know

V) IDENTIFYING CONSTRAINTS & OPPORTUNITIES IN ANIMAL HEALTH CARE SERVICES

Q.122) Are you satisfied with the accessibility of the following veterinary professionals in your area? *(List the services, tick appropriate box)*

		V1	V2	V3	V4
		Yes	No	I don't know	Never had contact with these services
T1	State Veterinarians				
T2	Animal Health Technicians				
T3	Staff of the Animal Clinic				
T4	Private Veterinarians				

Q.123) Are you satisfied with the information you get from the veterinary professionals about the diseases in the area?

V1	V2	V3
Yes	No	Don't know

Q.124) What are your major limitations with regard to getting assistance with animal health problems (e.g. from AHTs and the Staff at the veterinary clinic) Can you start by giving me the most important limitation and then continue in order of preference *(no listing)*

Farmer should first give most important limitation, tick that limitation, then continue with other less important limitations in order of importance

V1	I feel no limitations	
V2	Cost are too high (affordability)	
V3	Personnel is too far away	
V4	No means of contacting them	
V5	No contact by phone	
V6	Not enough VETS in area	
V7	Not enough AHTs	
V8	No Animal Clinics in area	
V9	Too slow and don't respond	
V10	Not enough information	
V11	I do not trust	
V12	Don't know	
V13	Other (specify)	

Q.125) If Other to Q.120 then specify other limitation/challenges:

_____

Q.126) What do you think would be the best source/method to provide animal health information to you? Can you start by giving me the best source/method you think of and then continue in order of preference *(no listing)*

Farmer should first give most important source, tick that limitation, then continue with other less important limitations in order of importance

V1	Direct contact with state Veterinarian	
V2	Direct contact with Animal Health Technicians	
V3	Telephone call to State Veterinarian	
V4	Telephone call to Animal Health Technician	
V5	SMSes from State Veterinarian	
V6	SMSes from Animal Health Technician	
V7	An informed local agent	
V8	Other farmers	
V9	Computer (local information centre)	
V10	Veterinary drug agent	
V11	Animal health brochure	
V12	Newspaper	
V13	Other printed matter (specify	
V14	Radio	
V15	Don't know	
V16	Other (specify)	

Q.127) If other to Q. 126: Specify the other source of information:

_____

Q.128) I want to know who you most prefer to help you with all your animal health problems. Can you start by given the most important person or service and then continue in order of preference *(no listing)*

Farmer should first give most important person/service, tick that limitation, then continue with other less important limitations in order of importance

V1	Myself	
V2	Another more knowledgeable farmer	
V3	Animal Health Technician	
V4	State Veterinarian	
V5	Private Veterinarian	
V6	NGO Veterinarian	
V7	Veterinary drug agent	
V8	The Animal Clinic	
V9	Don't know	
V10	Other (specify)	

Q.129) If other to Q. 128: Specify the other source of information:_____

Q.130) Would you use the services of a person from your community who has been especially trained to assist others with animal health problems, if such a person was available?

V1	V2	V3
Yes	No	Don't know

If 'no' go to Q.131

If 'I don't know' go to Q.132

Q.131) If YES to Q.130, what sort of services would you expect from that person?

V1	Drug administration	
V2	Animal identification (Branding, tattooing)	
V3	Castration	
V4	Dehorning	
V5	Hoof trimming	
V6	Inspection of slaughtered animals	
V7	Market information	
V8	Disease surveillance	
V9	Diagnosis	
V10	Other	
V11	Guidance with herd management	
V12	Guidance with cattle disease management	
V13	I don't know	

Q.132) If YES to Q.130; how frequently do you think you would use these services (no listing)

V1	Frequently	
V2	Depends on the situation	
V3	I don't know	
V4	Only when necessary	

Q.133) If YES to Q.130, would you be willing to pay for the services?

Yes	V1	No	V2

Q.134) If yes to Q.130; state the type of payment would be willing to make per treatment/procedure.

V1	Cash	
V2	Kind	

Q.135) If no to Q.130; give the reasons why not *(no listing, tick the most appropriate)*?

V1	I prefer to treat my animals myself	
V2	I don't trust other locals with my cattle	
V3	I prefer Animal Health Technicians	
V4	I prefer to consult a veterinarian	
V5	I prefer the animal clinic	
V6	I prefer pharmaceutical agents	
V7	Other	

VI) SOCIO-ECONOMIC STATUS OF HOUSEHOLD

Household head

Q.136) Is the respondent the household head?

Yes	V1	No	V2

Q.137) If no to Q.132, then what is his/her relationship to household head? *(tick appropriate box)*

V1	Wife, husband, partner	
V2	Son/ daughter	
V3	Father/ mother	
V4	Sister/ brother	
V5	Herd boy/ household helper	
V6	Son-in-law/ daughter-in-law	
V7	Grandchild	
V8	Grandparent	
V9	Other family (specify)	
V10	Other non-family (specify)	

Q.138) What is the age of the household head?

	Years

Q.139) What is the sex of the household head?

V1	Female	
V2	Male	

Q.140) What is the highest education level of the household head?

V1	None	
V2	Pre-primary	
V3	Primary	
V4	Standard 6-7 / Grade 8-9	
V5	Standard 8/ Grade 10	
V6	Standard 9/ Grade 11	
V7	Standard 10/ Grade 12	
V8	Tertiary (post matric)	
V9	I don't know	

Total Household information

For each category how many people are there present in your household

Q.141)	Boys <13	
Q.142)	Girls <13	
Q.143)	Men (13-60)	
Q.144)	Women (13-60)	
Q.145)	Older men >60	
Q.146)	Older women >60	

Q.147) For every profession/income source listed, indicate whether one of your household members is currently gaining income from this activity

List all the items given one by one, for every items ask whether a household member is gaining income in this sector, or through this profession. When the answer is yes then tick the box.

V1	Cattle keeping	
V2	Other animals	
V3	Selling crops/vegetables	
V4	Agricultural wage labour	
V5	Other wage labour	
V6	Self-employment (trading, brewing, selling firewood)	
V7	Formal regular employment	
V8	Social grants pension	
V9	Social grants child support	
V10	Social grants disability	
V11	Remittances from other people	

Q.148) What is the total monthly income of your household?

This is for all the members of the households combined; make the respondent chose a category. We know it might be difficult therefore the respondent just has to pick a category.

V1	R0-499	
V2	R500-R999	
V3	R1000-R1999	
V4	R2000-R2999	
V5	R3000-R3999	
V6	R4000-R4999	
V7	R5000-R7000	
V8	>R7000	

For all the different items listed indicate for each item whether your household owns this item

List every item and ask the respondent whether somebody in the households owns this item, it the answer is yes then tick the box

	Q.149)		**Q.150)**		**Q.151)**	
	Household Items		Material of house's walls		Roofing material	
V1	A computer		Bricks		Tiles	
V2	A fridge		Cement		Corrugated iron	
V3	An electric stove		Other modern		Thatched	
V4	A TV		Stabilised mud		Other informal structure	
V5	A satellite dish		Traditional mud		Other modern structure	
V6	A motor bike		Wood			
V7	A car		Other informal structure			

****THANK YOU *****