

LIVELIHOOD STRATEGIES OF LIVESTOCK FARMERS IN THE FOOT & MOUTH DISEASE RED LINE ZONES: A CASE OF LIVESTOCK FARMERS IN VHEMBE DISTRICT



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THE FOOT AND MOUTH DISEASE TEAM COMPRISED OF THE FOLLOWING:

ABSTRACT

This report is a product of the ARD diagnostic study undertaken by a team comprised of six members from the University of Venda (UNIVEN), University of Limpopo (UL), Limpopo Department of Agriculture (LDA) and the Agricultural Research Council (ARC). The study was conducted in Matiyani and Josefa sections of Mhinga Tribal Authority area in the Vhembe District.

The objective of the study was to identify the survival strategies of livestock farmers in the red line zone in sustaining their livelihood given the Foot and Mouth Disease (FMD) as a main challenge in livestock farming as perceived by the LDA. Checklist questions were used to collect information on perceptions of livestock farmers and professionals on FMD. Participatory tools such as; stakeholder analysis, transect walks and resource mappings were used by the research team to engage with livestock farmers and other stakeholders.

The analysis of the study revealed that livestock farmers are aware of the FMD and the government policies that restrict the movement of livestock during an outbreak. The study also indicated that livestock farmers do not regard FMD as a problem, but as the disease that they can control and prevent. The study also revealed that livestock farmers depend largely on livestock keeping as their main source of income despite the vulnerability of their livestock to FMD. Other income generating activities include; crop farming, fire wood and fencing poles sales. However, the study also observed several challenges faced by livestock farmers in the two sections. Water scarcity is a major challenge followed by FMD, market access, wild animals from Kruger National Park (KNP), veld fires and deforestation. The study highlighted different roles and conflicting responsibilities of various stakeholders in the two sections.

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CHAPTER 1 - INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The Limpopo Department of Agriculture (LDA) together with the Agricultural Research Council (ARC), University of Limpopo (UL), University of Venda (UNIVEN) and ICRA commissioned three study teams to conduct the studies based on the terms of reference that were developed by the Limpopo Department of Agriculture.

One of the three studies was a participatory diagnostic study conducted to explore survival strategies of the communities in the foot and mouth disease (FMD) buffer zones in Vhembe district. Out of the four villages (Matiyani, Josefa, Maphophe and Botsoleni) in the mostly affected Mhinga Tribal Authority area, only two villages Matiyani and Josefa were selected for the study as they had the most recent outbreak (in 2006). The Agricultural Research for Development (ARD) approach and the participatory tools were used to conduct this study. The participatory nature of the approach and the selected tools were found to be appropriate in the exploration of this complex situation. This follows from the severity and complexity of the FMD which requires a working alliance or partnership among different stakeholders. The different stakeholders bring different perspective of the problem and means of mitigating it.

1.2 INTRODUCTION TO FMD

Foot and Mouth Disease (FMD) is a severe, highly contagious viral disease of cattle and swine. It also affects sheep, goats, deer, and other cloven-hooved ruminants (Mönnic., *et al* 1981). FMD is one of the animal diseases that livestock farmers in red line zones fear most (http://www.aphis.usda.gov). Once the livestock are infected with FMD, an outbreak occurs. FMD is not recognized as a zoonotic disease as no cases of animal or human transmission has been recorded. The disease is characterized by fever and blister-like lesions followed by erosions on the tongue and lips, in the mouth, on the teats, and between the hooves (Mangera, 2004). FMD is mostly present in buffalos, which are the main carriers of this disease. Closer examination reveals a red, inflamed mucous membrane of the mouth and raw, more–or-less round blisters of about 10-25 mm diameter (Mönnic.,*et al* 1981:78). Livestock get infected with FMD from sharing grazing camps with buffalos. The disease is also spread chiefly through contact with diseased and infected animals. According to Mönnic., *et al* (1981:77), the FMD can also be spread by human beings who carry the virus on shoes. Most of the infected livestock do recover, although the disease leaves them weakened. FMD causes severe losses in livestock products as it spreads widely and rapidly, hence this has grave economic as well as clinical consequences. As once there is an outbreak, export of livestock product is stopped and the containment of the outbreak cost the government money, for example, approximately R 9.7 million was spent to control and manage an outbreak which occurred in July 2006.

Areas surrounding the Kruger National Park (KNP) are susceptible to their livestock being infected by FMD. Such areas are referred to as the Red Line Zones (RLZ), also termed the buffer-zones. The spread of FMD in the RLZ is controlled by limiting movement of Livestock by the use of legal movements permits (used as a Quarantine

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measure) and vaccinating the livestock after every 6 months (Mangera, 2004). Outbreaks can also occur if the FMD virus is allowed in the country by illegally bringing swill. Swill is leftover food that comes from ships, trains and planes (Mangera, 2004).

The outbreak of FMD has negative economic consequences because it is trade sensitive and lack of efficient control can lead to trade embargos on potentially contaminated livestock products (Dyason, 2010). Livestock trading within the buffer-zone when there had been an outbreak is not a |challenge, as long as these outbreaks are controlled and eliminated within a reasonable time and do not spread into the free zone. The FMD buffer zone is situated between the FMD infected zone and the FMD-free zone and forms part of the FMD control area. Cattle within the FMD buffer zone close to the FMD-infected zone are bi-annually vaccinated against FMD.

The severity of FMD is also recognised by the Food and Agriculture Organization of the United Nations to the extent that there is an agreement called the Global Framework for the progressive control of Trans-boundary Animal Diseases (GF-TADs) with the OIE (FAO EMPRES and EU FMD Commission Secretariat, 2007). The emphasis of the agreement is to develop a coordinated approach to global and regional networking in addressing FMD surveillance gaps and promoting communication and coordination on the control measures, as proposed by Rweyemamu and Astudillo (2002). In July 2006 an outbreak was reported in Matiyani village and it spread to the adjacent sections of Josefa, Maphophe and Botsoleni. The disease was suspected to have been caused by roaming buffalos from the KNP.

1.3 PROBLEM STATEMENT

Livestock farmers in the RLZ are affected by a number of factors which include government policies that restrict the movement of livestock infected by the FMD and also prohibit the selling of such livestock during FMD outbreak. The application of such policies limits market opportunities of livestock farmers. Proximity to KNP makes the livestock prone to contract diseases as buffalos are the main carriers of the FMD. This poses a threat to the livestock farmers in RLZ as the restrictions severely inhibit their ability to raise livestock productively and to sell (Moerane, 2008).

1.4 OBJECTIVES OF THE STUDY

The objective of the study was to identify the survival strategies of livestock farmers in the RLZ used to sustain their livelihood given the FMD as a main challenge in livestock farming in the area as perceived by the LDA. The research team developed a research plan depicting a number of key questions as depicted in the figure below (Figure 1.1) which entail secondary and tertiary questions which were formulated to help with answering the central question.





Figure 0.1: Research Questions

1.5 BACKGROUND OF THE STUDY AREA

In this section, the background of the Mhinga Tribal Authority consituency is discussed. That is; the geographic location, population, natural resources, livestock composition and Infrastructure available at both Matiyani and Josefa Sections will be discussed in this section.

1.5.1 Geographical Location

The study was conducted in Mhinga Tribal Authority constituency, specifically in the Matiyani and Josefa sections adjacent to the Kruger National Park. Mhinga Tribal Authority falls under the Thulamela Municipality in Vhembe District of the Limpopo Province. It is situated \pm 50 km from Thohoyandou in 22°45′0″South and 30°54′0″East of South Africa where Luvuvhu river cuts across (<u>www.maplandia.com/../ka-Mhinga/</u>). Mhinga Tribal Authority constituency is composed of the following sections: Maphophe, Matiyani, Josefa and Botsoleni.

1.5.2 Population

Matiyani village has a population of approximately 1500 with 105 small scale livestock farmers whilst Josefa village has a population of approximately 1100 with 90 livestock farmers.

1.5.3 Natural Resources

- <u>Soil and climate type</u>: Matiyani and Josefa villages are semi –arid areas characterised mostly by sandy loamy soil in the household sites and the crop fields. Clay soil is also available next to water wells, natural dams and KNP fence. Erratic rainfall and vegetation type of the two areas encourages most residents to farm with livestock though they also depend on crop farming for their livelihood.
- <u>Vegetation type</u>: Mhinga Tribal Authority constituency is dominated by mixed vegetation (sweet and sour grass) with Acacia, Mopani trees and has more open areas which livestock farmers use as their grazing camps. According to Grwambi., *et al* (2006) sweet grasses are more palatable and are often overgrazed, while sour grass are less palatable, grow out and may become dilapidated.
- <u>Terrain</u>: Matiyani and Josefa are low lying areas with hills along the KNP border fence which is severely permeable. A map indicating areas along the KNP Border fence is contained in Figure 1.2 below.



Figure 1.2: Map of the areas along the KNP fence

1.5.4 Infrastructure

- <u>Housing</u>: The majority of Matiyani and Josefa residents reside in electrified huts, whilst few live in electrified modern houses. However, the majority of residents still depend on fire wood for household use and selling to neighbouring sections which contribute to deforestation.
- <u>Sources of Water</u>: The population in both villages have dysfunctional water taps in some households; they mostly depend on rain water which is minimal. This poses a threat to livestock and human beings as they travel long distances to access water from other available sources (Luvuvhu river and Mhinga Tribal Authority Tribal Authority), hence, other residents sell water from their boreholes.

1.5.5 Livestock Composition

Most members of the Matiyani and Josefa communities are engaged in livestock farming, especially cattle since it plays a major role in their livelihood. According to the focus group discussion, 70% of the livestock farmers are males and women livestock farmers constitutes only 30%. This was again observed in dipping tanks were only three female livestock farmers were present. However, in Josefa only male livestock farmers attended the focus group discussions. The types of cattle found in the two sections are mostly the Nguni type Bonsmara, and Brahman type and crosses of these breeds.

CHAPTER 2 - RESEARCH METHODOLOGY

This Chapter outlines the approach used to gather stakeholder perceptions on the effects of FMD at the Mhinga Tribal Authority area. A research approach termed Agricultural Research for Development (ARD) learnt during the Knowledge Acquisition (KA) phase workshops from 28 November – 15 December was applied to gain insight of the perspectives of different stakeholders on the issue. This approach was chosen as it embraces adult learning principles which were necessary to make the environment conducive for concerned stakeholders, especially illiterate farmers. A number of participatory tools and techniques helped to gather the information required within the premise of participatory diagnosis.

2.1 ARD APPROACH

ARD approach is a holistic, interactive and cyclical approach which entails the formation of partnership within individuals or organizations who share common understanding of a developmental problem or opportunity (Verbal presentation, Ngcobo, 2011). This approach guided the team in conducting a participatory diagnosis study in Mhinga Tribal Authority constituency. The focus for ARD starts with identifying a complex problem and/ or opportunities, as was perceived to have been a case in these villages with regard to farming in the redline zone with livestock. In such cases, partnership is formed by stakeholders from different disciplines, organisations and institutions in order to contribute various knowledge sources to enable the stakeholders to have common understanding of such a complex problem.

ARD follows a research procedure where the interests of all ARD partners/stakeholders are considered in identifying the root of the issue and possible solutions to help resolve it. ARD approach is an umbrella term used to describe the amalgamation of different research and participatory tools to understand such a complex challenge. It allows stakeholders to explore complex livelihoods through systems thinking, an active exploration of the various components of the issue. Involvement of different stakeholders and taking their interests into account allowed for identification of the areas of improvement on the issue explored thus enabling the research results to be implementable. ARD approach follows a cycle of stages that starts with forming partnership as presented in Figure 2.1 below.



2.2 PARTICIPATORY DIAGNOSIS

The field study was more of a Participatory Diagnosis (PD) process and made use of all the ARD principles to identify issues that need further research. The participatory tools that were used during the participatory diagnosis process include transect walk, resource map, key informant interviews, focus group interviews and ranking. PD is a method which is essential in helping farmers to make decisions about issues of concern to them. During participatory diagnosis the community concerned meet with researchers to identify and prioritise challenges to overcome, identify who in the village is most affected and nominate who in the village will be responsible for working with the 'outsiders', (in this case, the ARD research team) to solve these problems. It is distinguishable from other types of diagnosis in that farmers identify issues that are of concern to them and the research team does not develop research problems on behalf of communities and farmers. It is also regarded as a first step in engaging with stakeholders as partners in seeking ways of improving the existing farming systems. In this case PD allowed the team to identify major issues that could either be problems or opportunities of development by using different ARD tools e.g. resource mapping, livelihood analysis, transect walk and etc.

2.3 PREPARATORY PHASE

The preparatory phase took place during the knowledge acquisition phase at Tompi Seleka from the 9th to 11th January 2012. A team contract was developed which outlined responsibilities to be executed during the field phase and rules as a guideline on how the team members should conduct themselves throughout the fieldwork phase. Terms of References (TORs) were received and team members ensured that they have common understanding of these prior to embarking on the field study. Planning of how to engage with the veterinary and extension officers in the Department of Agriculture was also undertaken. The work plan was also drafted as a guideline for the

activities that needed to be carried throughout the field phase and the relevant stakeholders to approach with regards to the information needed. All the activities and dates which were executed are outlined in the work plan in (Appendix B). Two checklists outlining topics to be investigated during the field phase through interviews; one for professionals and one for farmers were developed. A research plan (Appendix A) which included the central, secondary and tertiary research questions was developed to be used to provide the team with a focus point on which to base the study during field work.

2.4 FIELD STUDY PHASE

As earlier mentioned, the field study phase was executed in the Mhinga Tribal Authority constituency, with focus on Matiyane and Josefa villages in Vhembe district. The research team started by making phone calls to the various stakeholders identified in the preparatory phase to arrange for courtesy calls.

2.4.1 Introductory meeting at Vhembe district offices in Makwarela

This initial meeting served to introduce the research team to the district managers of the LDA. A presentation was made and covered the study ToRs, background, purpose of the visit, and research and work plan. The aim of the presentation was to share the focus of the study and to establish if there was a common understanding of the research problem as well as allowing district office representatives to give input into the process for their benefits.

2.4.2 Meeting at the Thulamela Municipality in Malamulele LDA offices

A meeting was held with the municipal managers, extension and veterinary officers, appreciating that the Thulamela municipality is responsible for the agricultural services in the areas to be studied. The aim of the meeting was to identify the extension officers or veterinary officer designated to assist the research team through introduction to the village and the services of the veterinary officer responsible for sections the study area was secured.

2.4.3 Meeting at Mhinga Tribal Authority office

A meeting was then held at the Tribal Authority offices with an aim to request permission to do research and to introduce the team. The permission granted helped to secure the team against any disturbance which may arise within the study areas. This meeting helped narrow the research to only the two villages due to the time allocated to execute the task. One member of the livestock farmers was contacted by the veterinary officer and requested to introduce the team to livestock farmers and headmen of Matiyane and Josefa.



2.4.4 ARD Participatory tools and techniques

As earlier mentioned, a number of participatory tools and techniques were used. Below is a detailed outline of the tools used in the study.

Stakeholder Analysis matrix

Stakeholder analysis is a way of understanding a system through its stakeholders. It looks at their interest, objectives, power distribution and relationships. Stakeholder analysis identifies the entire primary and secondary stakeholders who have vested interest in the issues with which the project is concerned. The stakeholder' analysis is the starting point for deciding which stakeholders are important and how to enlist their support as you plan the project work. In this case, stakeholder analysis was used to identify various stakeholders who are directly and indirectly affected by the FMD accordingly.

Key informants interview

A key informant is any individual who has key relevant information and is willing to be interviewed (ICRA hand-out, 2011). Such individuals were identified and engaged by the research team as they represent the different interest groups and different perspectives of the theme being studied. This enabled the team to gain an overall view of the problem and to identify topics for more in-depth research. The rationale of using the key informants stems from the fact that, key informants interviews are essential for almost any type of study with a social dimension and they are useful in the early stages of research when researchers are still trying to gain an overall view of the problem area.

The respondents under this category were interviewed at their places of residence and work respectively. A checklist with structured (Appendix...please append the checklist) and open-ended questions was used to collect the information necessary for the research. The LDA Veterinary officers, Mhinga Tribal Authority councillor, Hlanganani forum representatives, LDA extension officers, livestock farmers and the Mhinga Tribal Authority representatives were identified as the key informants for the study. From the farmers' side information regarding their livelihood, survival strategies and their economic perspective was collected guided by the farmers' checklist guideline (refer to Appendix C) during the focus group discussions. A professional's interview checklist was also utilized to probe and gather information on the key informants' responsibilities as illustrated in Appendix D.

Transect walk

Transect walk is a systematic walk across the village with locals to learn about the range of different conditions, problems and opportunities in each part of the area. Transect walks helps in getting to know the area physically and furthermore, people generally feel more comfortable to talk when they can walk around and showing outsiders things (Keregero., *et al* 1992). Transect walks were conducted in the two villages to gather understanding of the cropping patterns, vegetation and grazing camps, to identify used/unused infrastructure, problems and opportunities in those two sections. During the transect walk semi-structured interviews were conducted which enabled visual assessment of natural resources as listed above, and the state of affairs and probing into topics as things were being observed.

Resource Mapping

A resource map is a visual representation of what the farmers perceive as their community space (Verbal presentation, Raidimi, 2011). This includes showing the shape of the community, boundary and all the major features as understood and known by the farmers. The resources, activities, problems and opportunities located are indicated in the resource map as well as the dimension and scope of issues to be investigated. The focus groups in the two villages were asked to draw maps to indicate the fields and other land uses, physical features such as land, the quality and use of water available, and the soil types.

Gender analysis

Female and male gender characteristics refer to social characteristics and social roles of people as women and men determined by the society. Female and male gender roles and relations vary within the same society or culture and between societies and cultures (FAO, 1996: 24). Gender analysis was used as one of the participatory tools to identify the differences between the roles that men and women play in the livestock farming and whether these have any bearing on the survival strategies used against FMD. The study interestingly established the involvement of men and women in practicing farming activities and how roles are divided amongst families in the two study areas.

Ranking

Ranking means putting identified issues and/or alternatives in order of importance, value or preference (ICRA hand-out, 2010). It is used in participatory exercises to facilitate discussions among stakeholders by enabling their participation in decision making on problems faced and how they are affected. Ranking is normally carried out as a visualised exercise, either with individuals or with groups of respondents (Catley, 1999). Ranking with groups generally allows quicker progress and promotes discussion. The research team asked the focus group to rank the challenges, diseases and sources of income to identify the order of severity and importance.

Focus group discussion (FGD)

Livestock farmers from the two villages were identified to conduct focus group discussion with. The team initially hoped to have 20 livestock farmers from each village to attend the focus group discussion. At Matiyane village 31 livestock farmers attended, whilst at Josefa due to the fact that it was raining on the day, only 11 attended. The FGD assisted in gaining in-depth information on the socio-economic dynamics (i.e. the social, economic and environmental aspects) on the livelihood of the livestock farmers in those two villages. The discussion was also used to verify the information gathered during the previous interaction with various stakeholders specifically, veterinary and extension officers.

2.4.5 Limitations of the Study

Due to time constraints a workshop with all stakeholders could not be held, in order to clarify each stakeholder's responsibilities as perceived by others and to share the preliminary results of the study. Other community members not keeping livestock could not be interviewed to gather their perceptions of how FMD may be affecting their short and long term livelihoods strategies.



CHAPTER 3 - ANALYSIS

This chapter discusses the main findings of the study. It is sub-divided into three sections; namely, stakeholder analysis, livelihood analysis and the challenges encountered by the livestock farmers.

3.1 STAKEHOLDER ANALYSIS

Stakeholders are individuals, institutions and organisations that are directly or indirectly affected by the issues of concern (ICRA, 2011). Stakeholder analysis was used to identify the relevant stakeholders involved in dealing with the FMD. The stakeholders were identified and interviewed using semi-structured interview to obtain their perception of FMD and its effect on the livelihoods. The purpose of this is to obtain thoughts on specific issues regarding FMD and the concomitant challenges of the disease. This section covers the different perceptions on FMD gathered from different stakeholders.

Table 3.1 Stakeholder Analysis

STAKEHOLDER	KEY STAKEHOLDER	ROLE/S	FARMERS 'RESPONSE
Chief/Induna	Yes	 Custodians of communal land & grant permission to conduct research in his sections 	N/A
Headman	Yes	 Custodians of communal land & grant permission to conduct research in his sections 	 Land allocated not considering local livestock farmers' need for land
Livestock Farmers	Yes	 Subsistence small scale farming 	 Erratic rainfall Permeable fence Limited market access
Councillor	Yes	Local govt. representative	N/A
Hlanganani Forum	Yes	• Link the KNP with farmers	Farmers didn't mention anything about the forum
LDA	Yes	 Provision of agricultural services & infrastructures 	 Provision of dipping facilities & vaccines

The LDA extension officers indicated that their main role is to prevent and control the spreading of the FMD. The control is carried out by demarcation of the areas bordering KNP as red line zones where the movement of livestock is being monitored by means of quarantines.

Using semi structured interviews; it was established that the farmers are well aware of the FMD which in their

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own language they call *Xindomdom*. They also indicated that their cattle are vaccinated twice per year to prevent infection. They are knowledgeable about government policies that restrict the movement of animals and have also indicated that this limit market accessibility. The perceptions of other stakeholders are represented in Table 3.2.

Table 3.2: Stakeholder Perception	Matrix on FMD and its Challenges
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STAKEHOLDER	PERCEPTION ON FMD AND ITS CHALLENGES	PERCEPTIONS ON SOLUTION	
LDA	Knowledgeable of the FMD	Prevention and vaccination	
	National policy and monitors compliance	Loss compensation	
Livestock farmers	Appreciate the threat of FMD, it	Prevention and vaccination	
	limits market access	Restore auction market	
Hlanganani forum	Appreciate the threat of FMD to	Prevention and vaccination	
	its members and concerned about lack of compensation	Compensation for loss	

According to the veterinary officers, the FMD outbreak occurs when there is contact between livestock and FMD carrier buffalos. This usually happens when livestock and buffalos are grazing on the same area. According to the veterinary officers, the red line zone is comprised of the following:

- Buffer with vaccination, this area is along the KNP border fence.
- Buffer without vaccination, this area is also known as the surveillance area.
- Yellow line refers to the imaginary line separating the surveillance area from the open area.



Figure 3.1: Buffer zone

Livestock from the buffer area with vaccination can be sold to those on the buffer without vaccination; however, it needs to be quarantined for 21 days, especially if sold live. Otherwise it should be slaughtered to be transported to the buffer without vaccine. Livestock from buffer without vaccination are also required to be quarantined for 21 days before they can be moved beyond the yellow line.

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3.2 LIVELIHOOD ANALYSIS

Livelihood analysis was used to gather information about different livelihood strategies of livestock farmers at Matiyani and Josefa villages as illustrated in Figure 3.1.



Figure 3.2: Livelihoods analysis

3.2.1 Livelihood Strategies

These strategies include farming activities such as livestock keeping and crop production. Other livelihoods strategies are pensions, grants, transport, fire wood selling and tuck-shop. These are the sources of income that enable the farmers to sustain food security. The contribution of each strategy is indicated by a chapatti diagram on Figure 3.3 below.



Figure 3.3: Livelihood strategies



As can be seen in the diagram above, (Fig 3.3), livestock keeping is an important strategy for the farmers interviewed. It was established that stock kept include: cattle, goats, donkeys and chickens. The categories of livestock kept are shown in Figure 3.4 below.



Figure 3.4: Categories of livestock kept

As reflected by the farmers, cattle are the main source of income and they have different reasons of keeping them. Cattle are mainly slaughtered in ceremonies (religious, funerals and weddings), to pay lobola (dowry) and used for draught power. They are sold throughout the year and this gives farmers an opportunity to generate income. Other farmers use donkeys as draught power and means of transport for income generation to sustain their livelihood. Some farmers are rearing indigenous chickens for sale and own consumption. However, goats are said to be marketable but demanding in terms of herding, hence, they are ranked low.

3.2.2 Resources

The resources found in the area were identified through the use of transect walks undertaken in the two sections as shown in Figures 3. 5 and 3.6 respectively.



Figure 3.5 Josefa transect walk

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The resource maps were later drawn based on the rough sketches drawn by livestock farmers as indicated in Figures 3.6 below.



Figure 3.6 Matiyani Village Resource Map

The analysis on resources is subdivided into natural capital, physical capital, social capital and human capital. Tables were used to further expand resource information with each sub section detailing the functionality or disfunctionality of the resource, control, access, use, current and future perceptions of livestock farmers on such particular resources in order to diagnose their overall effect on livestock farmers' livelihood in both sections.



Natural Capital

Natural capital are all formations of the earth's biosphere that provide ecosystem goods and services imperative for survival and wellbeing .Table 3.3 summarizes natural capital found in both sections.

Table 3.3 Summary of natural resources

NATURAL CAPITAL						
RESOURCES	Resource functionality or disfunctionality	Who have Control	Who access it?	Use to the community?	Farmers' current perspectives.	Farmers' future perspectives.
Livestock	Yes	Individual livestock farmers	Individual livestock farmers	Commercial, labour, cultural & traditional aspects	Provision of basics for livestock maintenance	Proper maintenance for sustainability
Vegetation	yes	No control	Community members	It encourage them to farm with livestock	Current vegetation encourages them to farm with livestock	N/A
Forests	Yes	No control	Community members	For firewood for sale & household use	Community members are contributing to deforestation	Forest control measures should be applied to prevent deforestation
Streams	Yes	No control	Community members	Access water for household use and livestock	The community is challenged by lack of water in the village for household and livestock use	Enough rainfall may assist in solving water crisis

NATURAL CAPITAL Farmers' current functionality or Farmers' future disfunctionality Who access it? perspectives. perspectives. community? Use to the Resource Who have Control RESOURCES Livestock Mountains Yes No control Community Current torn Proper members fence pose maintenance grazing life threat to of KNP fence human and will assist in animal life as human and they are not livestock protected protection from KNP against the **KNP** animals animals Wells No control Community Store rain Dry Less rain If it rain members water for contribute to properly household lack of water water may use & in wells be stored in livestock wells Dams No control Community If cleaned Water crisis Dry Store rain members water for they may may be household assist in solved use & storage & livestock availability of water Grazing yes No one Community They Suggest If grazing members take their that grazing camps camps livestock at camps be demarcated any camp as demarcated it will assist they wish to avoid in solving

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Livestock farmers in both sections indicated that their natural resources are essential for their livelihood though not fully utilized to their benefits. Grwambi *et al* (2006) indicates that economic growth in livestock depends heavily on access to natural resources. According to World Bank (2004) in Grwambi *et al* (2006) in many parts of the world the productive natural resource base is under increasing pressure. There is therefore an urgent need for policies and institutions to ensure the equitable distribution of land and water resources.

overgrazing

in future

overgrazing



Physical capital

Physical capital is tangible asset that is created by humans and somehow used in production. Table 3.4 summarizes natural capital found in both sections.

Table 3.4 Summary of Physical Capital

PHYSICAL CAPITAL						
RESOURCES	Resource functionality (Yes) or disfunctionality (No)	Who controls it?	Who access it?	Use to the community	Farmers' Current perspectives	Farmers' future perspectives.
Land	Yes	Chief	Community members	Live & exercise their livelihood on the land	Access & control consider farmers' grazing land and other communal activities	
Houses	Yes	Household heads	Household members	Residential purpose		
Fields	Partially	Individuals	Individuals & their families	Produce crops which are used for household consumptions and some for sale	Due to lack of fencing and less rain their crops are not grow perfectly	If all fields are fenced, crop farming will be considered by many to put a stop in hunger
Dip	Yes	Vet officer & farmers	Community	Assist livestock farmers to dip their animal as a preservative measure to external parasites	The government provide enough medication & vaccines to prevent & control such diseases as FMD.	Proper care by the community and service / maintenance by the LDA
Reservoir & livestock water drinking troughs	no	LDA	Community members	Assist in storage of water for household use & livestock	If the system may be reconnected it will solve their water crisis	Proper care by the community and service / maintenance by LDA

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PHYSICAL CAPITAL						
RESOURCES	Resource functionality (Yes) or disfunctionality (No)	Who controls it?	Who access it?	Use to the community	Farmers' Current perspectives	Farmers' future perspectives.
Roads	yes	Municipality	Community members	Assist the community in movements & transportation of their activities	Roads infrastructure assist in linking communities with important marketing their produce	Roads infrastructure assist in linking communities with
Abattoir & Butchery	No	Individual owners	Community members	Assist community in selling their livestock and have meat for household consumption	Livestock market limited due to lack of local abattoir	If a common livestock sale sport can be erected for livestock farmers to can sell their stock
Shops	Yes	Individual owners	Community members	Assist community in purchasing items for daily use and consumption	N/A	N/A

Table 3.5: Dipping tanks situation in both Matiyani & Josefa village

VILLAGE	DIPPING DAYS	NO OF ANIMALS	CHALLENGES	POSSIBLE SOLUTIONS
Matiyani Village	Every Wednesday	To furnish figures	 Missing of dipping days by extension officer 	 Inform farmers if won't be available
			Shortage of water	Revitalize water sources
			Shortage of medication	Enough provision by LDA
Josefa Village	Every Tuesday		 Missing of dipping days by extension officer 	 Inform farmers if won't be available
			Shortage of water	Revitalize water sources
			Shortage of medication	Enough provision by LDA



Social Capital

Social capital is where-in people with common interests' link and belongs to such groupings. These people are guided by sets of standards, values, believes and customs. Social relation contributes into collaboration with other communities and other sections. Hlanganani Forum is one of the social groupings constituted by 64 sections formed in 1984 by the sections surrounding the KNP. The reason for the formation of the Hlanganani Forum was to solve the problem of Damage Causing Livestock (DCA) in the sections around the KNP. As a social structure, Hlanganani's main task is to link communities through communication with different stakeholders including the villagers; they also have some responsibilities which were not clearly elaborated during the telephonic interview conducted with some members of the Hlanganani forum. However, some challenges like compensations during damages caused by KNP wild animals are still not addressed.

Human Capital

The analysis focused on farmers' knowledge and skills in both sections. Farmers in both sections have a livestock farming background though most are indigenous skills transferred (like cattle rearing, dipping and seasonal disease control) from one family member to another. Nevertheless, livestock farmers indicated that they use their indigenous knowledge to sustain their livestock farming in terms of diseases like *Xindomundomu*, brucellosis, lumpy skin, anthrax and others. Labour to herd livestock was also indicated by the community as one of the income generating activity amongst non-farmers. Moreover, communities in both sections indicate that livestock farming and labour flow are the major source of income; hence they value livestock farming as their bank.

3.2.3 Macro Influences

Macro influences on livelihoods farmers in Matiyani and Josefa refers to factors that indirectly affects their ways of making a living more especially on livestock production. Macro influences in Matiyani and Josefa generally includes policies, market factors and institutions. Most areas adjacent to KNP, regarded as red line zones are affected by policies including the Animal Disease Act (ADA) no. 35 of 1984. Policies have a significant influence on marketing of livestock in the red line zone. According to the "ADA" Act (no. 35 of 1984), 'no person shall import into or convey in transit through the Republic; any animal, parasite or contaminated or infectious thing except under the authority of a permit and in compliance with any condition imposed in such permit'. Livestock farmers in Matiyani and Josefa are restricted to move their Livestock and animal products across the line into the surveillance area unless they have undergone 21 days quarantine, before a permit can be granted. The management of the KNP fence has a significant impact on livestock production because if there is mismanagement, wild animals cross to the village, some of these animals kill the livestock while some pass infectious disease like FMD to the livestock. Availability of veterinary scientists and animal vaccination in the red line have an effect on the livelihoods of livestock farmers due to the fact that in areas adjacent to game farming, the livestock is exposed to many animal diseases. Market factors like availability of market influences livestock production. Water availability also affects farming (crop and livestock). Customs and beliefs have a significant impact on the livelihoods of the farmers. Most livestock farmers do not keep livestock for commercial purposes, but value livestock as source of wealth and indication of good economic standing. However, keeping larger numbers of livestock is prone to loss during drought and theft rather than those who keep less livestock and consequently some of the Livestock die of drought and some are stolen.

3.3 CHALLENGES FACED BY LIVESTOCK FARMERS

This sub-section discusses and highlights the challenges encountered by livestock farmers in Matiyani and Josefa villages. Apart from livestock being vulnerable to the FMD in the red line zones, the unavailability and access of important resources such as water, grazing camps, fence and etc are a cause of concern to the farmers. These contribute to the ineffectiveness of livestock farmers at Matiyani and Josefa villages. Table 4.1 contains the challenges or external factors that have negative impact on the livelihoods of livestock farmers. The research team together with the stakeholders identified the possible solutions to the challenges raised by livestock farmers in the red line zones. These possible solutions are also summarized in Table 4.1.

Table 4.1 Challenges encountered by livestock farmers

CHALLENGES ENCOUNTERED BY LIVESTOCK FARMERS	CAUSES	POSSIBLE SOLUTIONS
Water Scarcity	 Sporadic rainfall Dysfunctional boreholes Rivers far and limited 	 Maintenance and service of boreholes Cleaning of earth dams Harvestiing of rain water Upgrading of water purification stations
Veld fires	For hunting purposesVegetation management	 Awareness campaigns Community members to be vigilant
Foot and Mouth Disease	Carried by wild animals from the KNP	 Regular vaccination Proper fencing around the KNP perimeters Adhering to policies concerning FMD Restoration of grazing camps
Wild animals from KNP	KNP fence permeability	Restoration of a well reinforced fence
Deforestation	 Fire wood collection Poles for fencing Veld fires 	 Subsidizing electricity to indegenous households Awareness campaigns Controlled collection of fire wood
Market access	Restricted movement	Restoration of auction market in the vicinity



3.3.1 Water scarcity

Due to erratic rainfall, scarcity of water poses a serious threat to rain fed agricultural activities and grazing lands. It was indicated that dryland agriculture is one of the vital livelihood strategies in the two sections with potential maize field plantations. During the discussion with livestock farmers they indicated that if rain does not fall at that flowering stage of their maize fields, there will be low production.

As far as the grazing land is concerned, there is a vast area for cattle grazing however these grazing lands are susceptible to drought. The cattle travel long distances to drink water owed to the distance between the grazing land and available water. The farmers also mentioned that they sometimes skip dipping days due to scarcity of water.

During the transect walk with the livestock farmers, dysfunctional boreholes and cattle drinking troughs were observed. As to the reason why the boreholes and drinking troughs are not working, contradicting responses were received from the farmers and other stakeholders. The farmers perceived that the government is failing to assist in repairing the boreholes whilst, the LDA officials on the other hand explained that the two sections are very dry and boreholes cannot access water for few months. The argument given by the official was that the disfunctionality of the boreholes is not reason water scarcity, rather the area is dry.

At present the community members (including livestock farmers) pay for water for household use and for livestock from their neighbours who have boreholes in their yards. Farmers indicated that each cattle drinks about 25 litres of water per day and this is charged at R2. As a possible solution to the dysfunctional boreholes, the LDA officials took it upon themselves to follow up with the stakeholders tasked for maintenance and servicing of the boreholes. LDA officials further mentioned that some of the boreholes installed by the department have been badly managed and thereby, suggests an exposure visit to other sections that show commitment in taking care of their resources.

Other possible solutions highlighted by the councillor of the two areas were to engage livestock farmers into the idea of cleaning the available dams and harvesting of rainwater. The councillor also alluded to the fact that there should be an upgrading of water purification stations in the two areas.

3.3.2 Veld fires

The councillor mentioned that veld fires are one of the problems that lead to drought and deforestation since it destroys the grazing area for livestock. Veld fires are sometimes used for vegetation management of the grazing land but also for hunting purposes by the community members. According to the councillor of the area, community members are not aware of the negatives impact on the environment arising from veld fires. He further indicated that a solution to this challenge could be community awareness campaigns and workshops on land use and land management and the community have to be vigilant in dealing with it.

3.3.3 Foot and Mouth Disease (FMD)

The stakeholders explained FMD as a virus carried by buffaloes from the KNP. During the focus group discussion livestock farmers highlighted that FMD is not a problem anymore because of the support from the extension

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officers and veterinary officers who provide regular vaccinations and information regarding the disease. Livestock farmers are aware of the government policies concerning FMD and symptoms of FMD on infected livestock. Their challenge is that during an FMD outbreak the disease could last up to three months or more. When there is an outbreak farmers loose some of their infected livestock because they cannot sell, slaughter nor eat infected livestock.

Several possible solutions to deal with the challenge were highlighted by the different stakeholders. These are: regular vaccination for livestock, proper fencing around the KNP perimeter and making sure that all stakeholders adhere to the government policies regarding FMD. Furthermore, restoration of grazing camps could also be helpful. However, the fencing of the KNP on the side of Matiyani village is destroyed and allows the wild Livestocks to cross over to the community.

3.3.4 Encroaching wild animals from the KNP

Livestock farmers raised concerns regarding the permeability of the KNP fence because wild animals escape through the fence into the sections. Dangerous animals such as lions and leopards attack cattle, donkeys and sometimes even human beings. It was understood that these animals are supposed to be controlled (or even culled) by the Department of Environmental and Nature Conservation.

Livestock farmers also mentioned theft of livestock that resulted from broken KNP fence. They explained that thieves cut the KNP fence and put the cattle into the KNP and mend it after. Cattle are then kept for one/two weeks in the KNP until the owner give up the search for their stock and the thieves then cut the fence, remove the cattle and sell to neighbouring communities.

In all these situations livestock farmers lose their cattle and are not compensated for this loss. However, the research team had a telephonic interview with the representative of the Hlanganani forum who mentioned that there are funds available for compensation for damaged caused by KNP animals. He also indicated that there is a draft policy on that but it is yet to be finalized. The LDA disputed this fact, citing that there is no budget put aside from the department for both losses of cattle and loss of life.

The study could not get clarity on who should restore the KNP fence in order to deal with this challenge. According to the Hlanganani forum, the LDA is responsible for mending the KNP fence, but the LDA is not aware of this responsibility, instead LDA asserted that SANPARKs is the responsibility body. SANPARK could not be reached for comment during the study. Farmers perceived that the KNP is responsible for mending and managing the fence. Farmers further proposed that the KNP should install security officers to guard the fence. They went on to suggest that for all the problems mentioned above, the LDA should establish grazing camps and this could help protect livestock from being vulnerable to diseases such as FMD.

3.3.5 Deforestation

Veld fires, fire wood collection and cutting of fencing poles cause deforestation. Veld fire is a serious challenge as highlighted in Table 4.1. Both fire wood collection and cutting of fencing poles were identified as one of the income generating activities but these activities have negative effects on the environment. To deal with these problems, the councillor suggested that there should be awareness creation for community members to agree on control measures.



3.3.6 Market access

Due to restricted movements of livestock, farmers from Matiyani and Josefa villages have no access to big/formal market. They indicated that they used to sell their cattle to local butcheries and that these butcheries are no longer operating. Farmers suggested that there should be an auction in the vicinity as they currently sell during dipping days.

CHAPTER 4 - CHALLENGES OF POLICY IN SOUTH AFRICA: MARKET ACCESS AND DISEASE CONTROL TRADE-OFFS

This section seeks to explore how market access options influence disease control strategies and disease control approaches that make most sense, as pertaining to the livestock farmers concerned. Area–based disease freedom control has long been assumed to be the only option to protect the market. It certainly has merits, but also substantial costs and risks. The key question of note, is whether the changing context and marketing options require a shift from the long-assumed standard approach; or whether there other alternatives that benefit a wider group of producers, are easier to implement, yet capable of maintaining access to important export markets and foreign exchange revenues. The policy argument for safe trade base on area-based disease freedom is rooted in a traditional international policy network supported by well-funded and well-connected international institutions and commercial interest (Scoones and Wolmer, 2006 in Scoones *et al.* 2010). As such it reflects a particular set of interests and assumptions. But there are alternative views, with different implications for policy directions. Here we explore four of these, in addition to the standard approach. This analysis of changing contexts highlights some fundamental challenges to the assumptions that have dominated policy thinking and practice for decades. Trade-offs have to weigh up costs and benefits and poverty and equity impacts of different scenarios have to be evaluated (Scoones *et. al,* 2010). However, these choices are not straightforward and are highly context-dependent, reliant on particular national circumstances and local political choices about development trajectory.

				Market	access scenar	ios		
		High valu	ue(forex)/			Low-valu	ie	
		High risk	1			Low risk		
		Narrow g	jroup benefi	ts		Wider gr	oup bene	efits
		High-	Direct	Export to	Regional	Domestic	Local	
		Value	Export to	Emerging	Trade in	Urban	marketi	ing
		Export	Large	markets	SADC	markets		
High		(e.g. Europe)	retailers	(Asia)				
	Area – based disease freedom	The (high- risk, high						
Disease		cost) status quo						
Control options	Export zones with vaccination	An existir South An	ng option, co nerican comp	mparable to petition.				
	Compartmentalization	An option value exp questions conseque	n to explore, to ports, althoug s and distribu ences	for high- Ih technical Itional				
Low cost	Commodity-based trade	A key opt fully expl and certit	tion for a broa oited, but rec fication. Over	ad set of high-v quiring investm all lower cost a	alue markets - ent in product nd risk spread.	as yet not safety testing		
	Managing FMD				The over the	default – high mes, but lower es. An importan ient of the over ire	unit t all	

Figure 4.1: Market access and disease control (Adopted from Scoones at al. Al.)

CHAPTER 5 - CONCLUSIONS AND RECOMMENDATION

5.1 CONCLUSION

The prevalence of FMD virus in the Mhinga Tribal Area led to the establishment of redline zone around the four villages. The continual presence of FMD in buffalos of the Kruger National Park has negative economic consequences for livestock farmers adjacent to the park.

At Josefa and Matiyani villages, a significant number of households are dependent on subsistence small-scale farming, of which keeping cattle is the main farming activity. Crop farming is precarious due to high average temperatures and erratic rainfall. This leaves cattle being the most liquid (marketable) asset available to the majority of households notwithstanding the presence of FMD.

The presence and threat of FMD limit and at times (outbreak) prohibit bigger market accessibility by cattle farmers in particular. In this sense, the impact of FMD on these households is enormous; given the fact that cattle sale is the main source of income.

Besides being the main source of income, cattle are also viewed as an intrinsic measure of wealth in these communities. This leads to the hoarding of these livestock and this result to low off-take of cattle. In future, this may lead to overgrazing and degradation of the grazing area and subsequently reduction of the carrying capacity.

The permeability of the fence between the KNP and Matiyani village is course for concern. It increases the frequency of contact between the FMD-carrier buffalos and cattle. Given the fact that one of main measures of containing FMD is by preventing contacts between the carrier buffalos and livestock, the fence permeability leaves much to be desired.

In terms of ranking the challenges faced by both the livestock farmers and the community in general, water scarcity came up tops. This poses a serious challenge to the community's livelihoods and their wellbeing.

5.2 RECOMMENDATIONS

5.2.1 Indigenous knowledge

The fact that the communities of the two sections have their own name of FMD (*xindomdom*) caught the attention of the research team. On probing further, the team realized that these farmers have knowledge of some indigenous herbs they use to treat some of the diseases that infect their cattle. It is therefore proposed that these practices and indigenous forms of managing livestock disease be explored in further research.



5.2.2 Veld management

Since the study established that cattle are the main source of income in the two study areas, the number of cattle kept by the households is projected to increase, exerting pressure to fixed size of grazing area. There is therefore a need to create awareness to cattle owners about the importance of better grazing camps management for a sustainable veld carrying capacity.

5.2.3 Communication amongst stakeholders

There is need for establishing a forum wherein the different stakeholders work together and reach a common theme towards FMD management. It is advised that the LDA takes a lead in advancing this further

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APPENDIX A-RESEARCH PLAN



CENTRAL QUESTIC	ON: WHAT ARE THE	COPING STRATEGIE TO SUSI	ES FOR LIVESTOCK I	ARMERS IN THE RE OOD?	D LINE ZONE (MAL	AMULELE) AREA
SRQ	TRQ	Potential Answers	Information Needs	Information Source	Choice of Methods	Expected Output
hoodiləvil n mers in the who are the suolved?	What are the other income generation activities in the proximity of the red line zones?	Crop Farming Small and medium enterprises (SMME)	ldentifying farming and non-farming activities	extension officers Farmers themselves key Informants	Semi-structured interview focus group Secondary data	Livelihood strategies
iem ədt əre tedW art aregies of farı bna ənoz ənil bər i srəblodəsts	What is the role/s of different stakeholders involved?	LDA- advice farmers and provide extension services, livestock farmers- perception of FMD, Tribal officer- authority	Stakeholders Involved and their perception	Framers Secondary Data Kruger National Park(KNP) officials Key informants	Stakeholder identification matrix Stakeholder perception matrix	Formulation of forum/ committee
e nature of the vof the red line sone?	What livelihood strategies are amenable to soil, vegetation and climate types along the red line zone?	Crop farming Fire wood selling, SMME	soil fertility status, water availability and vegetation type	Extension officers Farmers and community members	Field visit, semi- structured interviews and secondary data	livelihood strategies
dt si tadW ο9ro-ecc γtimixorq	How does agro- ecosystem affect labour division in household	division of labour among household members	Identifying gender roles	Community members	Interviews, focus group and transect walk	Village map and gender analysis

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CENTRAL QUESTIG	ON: WHAT ARE THE	COPING STRATEGIE TO SUST	S FOR LIVESTOCK F AIN THEIR LIVELIH	ARMERS IN THE RE OOD?	D LINE ZONE (MAL	AMULELE) AREA
SRQ	TRQ	Potential Answers	Information Needs	Information Source	Choice of Methods	Expected Output
to tang dug to tiw stock with	How accessible is the livestock market?	Market restricted market not accessible when there is an outbreak.	Market information, government policies, outbreak information	Veterinary officers, Farmers Organizations, Extension officers	Secondary data, interview, focus group discussion	Market accessibility
uoore segues encoui n ni tremevom to r GMA ot breger	What are the contributions of livestock to rural livelihoods?	Contribute towards capital, livestock benefits (e.g. power animal draught, food security)	Statistics (how many of the livestock do they sell per year), why and when	KNP rangers, Veterinary and extension officers	Field visit, secondary data, structured interview, resource flow diagram and resource map	Contribution of livestock towards livelihoods strategies
Ahat are the What are trioi the restrictioi	How vulnerable are the livestock farmers to FMD in the proximity of the red line zone?	Outbreak of FMD threatens food security	Extent of farmers exposure to FMD	Farmers , Veterinary and extension officers	Secondary data, semi-structured interview and focus group	Food security

APPENDIX B - RESEARCH WORK PLAN



WHEN	WHAT	WHERE	мон	онм	ΥНΥ	WITH WHOM
Wed 12/01/11	Interview with Mr Mampane	LDA - Polokwane offices	Meeting	Kgabo &Richard	To get previous report and information on findings of his study conducted on FMD	Mr Mampane
Thurs 12/01/12	Courtesy call & stakeholder identification	LDA-Vhembe District	Meeting	Team members	planning (logistics)	LDA officials
Fri 12/01/13	Introduction to the chief by the extension officer	Village	Meeting	Thato, Rhudzani & Ernest	Authority from the chief	Extension officer: Mr Mabaso and the chief's right hand man
Fri 12/10/13	Interview with the	LDA Offices - Sibasa	Meeting	Leah, Hector and Richard	To get their perceptions on FMD	Veterinary officers
Sat 12/01/14	Transect walk, mapping and interviews	Village	Driving and walking	Team, traditional authority reps, ext officers & livestock farmers	to get an idea on agro-ecosystem & resources available	farmers, tribal authority reps, team, ext officers
Sun 12/01/15	Administration	Office	Discussions on observations & consolidation	Team	Compilation of the collected information	Team

WHEN	WHAT	WHERE	мон	онм	МΗΥ	WITH WHOM
Mon 12/01/16	Interviews and Discussions	Depending on the stakeholders	Interview checklist, extension officers	Team, Ext officers & livestock farmers	find out their perception on the current situation	Stakeholders (ext officers, livestock farmers)
Tues 12/01/17	Meeting Kruger National Park Reps	Kruger National Park	Meeting	Team, ext officers & KNP reps	to find out the perception about FMD & how are they affected & the possibility of livestock farmers selling their affected animals to them	Kruger National Park reps & the team
Wed 12/01/18	Focus Group Discussion	Village/Chief's kraal	Meeting	Team, livestock farmers & reps from the chief's kraal	to find out about the socio-economic information	livestock farmers
Thurs 12/01/19	Administration	office	Lodge	Team members	Review & follow-up on what we have already done	Only team members
Fri 12/01/20	Feedback	Chief's kraal	Meeting	team	presentation of preliminary findings of the study	(stakeholders), livestock farmers, chief reps



APPENDIX C- FARMERS INTERVIEWS CHECKLIST

Livelihood analysis and FMD

- What are the activities the people on the redline zone engaged in to make a living apart from farming?
- What farming enterprises are people involved in and why?
- What are the sources of income available to your household?
- What other income activities would you consider to make a living?
- Rank the sources in order of importance.
- Which type of livestock do you keep?
- What are the main reasons for keeping livestock?
- What are the main constraints in livestock farming?
- How do you manage these constraints?
- If some animals are sold, where and how they sold?

Perception on FMD epidemic

- What is your understanding of FMD?
- What do you know about government policies regarding FMD?
- What are your perceptions of the government restriction policy on FMD?
- Who provided you with the information?
- To what extent were you assisted by this person?
- To what extent is your livestock farming affected by FMD?
- To what extent is your livelihood affected by FMD?
- What measures are there to prevent the spread of FMD?
- How are you compensated for the loss of your livestock?

Access to land

• Who controls the grazing land and how?

APPENDIX D- PROFESSIONAL INTERVIEW CHECKLIST

- What is your experience in relation to FMD?
- How often does the FMD outbreak take place?
- How does seasonal calendar influence the FMD outbreak?
- What are the contributing factors to FMD outbreak?
- What is the perception of the KNP about this disease?
- What are your views on FMD in the context of livestock farmers in the village?
- What measures are in place to prevent and control the outbreaks of FMD?
- What are the policies governing livestock farming in the redline zones and during the outbreak of FMD?
- What role is extension service playing in preventing and controlling FMD?
- What are the possible income generating activities that could be initiated during the outbreak?
- How do these farmers sell their livestock and livestock products in the red line zone?
- Is there any possibility of selling the infected animals to the game reserves for consumption?