CHALLENGES FACING COMMUNAL FARMERS TO IMPROVE CATTLE PRODUCTION AND MARKETING SYSTEMS IN NAMIBIA: CASE STUDY FROM OMAHEKE REGION

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By

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PHILOSOPHIAE DOCTOR

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DEDICATION

This dissertation is dedicated to my parents, Erastus Kazandu Hangara and Rubaldine Kazondana Hangara, who never had the privilege to attend school.

The dissertation is also dedicated to the loving memory of Mr. Alfred 'Ali' Tjiposa. Your dream has been fulfilled and I am with you always.

I declare that this thesis hereby submitted for the degree of Doctor of Philosophy at the University of the Free State, is my own independent work, and that I have not previously submitted the same work for a qualification at/in another University/faculty". I hereby forfeit any copyright of this thesis to the University of the Free State.

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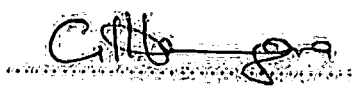

Gabriel Ngungaa Hangara

03-01-2011

Date

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LIST OF ACRONYMS

BSE	Bovine Spongiform Encephalopathy (or "mad cow")
DEES	Directorate of Extension and Engineering Services
FANMEAT	Farmer Assured Namibian Meat
FAO	Food and Agriculture Organisation
FMD	Foot and Mouth Disease
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GRN	Government Republic of Namibia
ILCA	International Livestock Centre for Africa
LSU	Large Stock Unit
MCA	Millennium Challenge Accounts
MAWF	Ministry of Agriculture, Water and Forestry
MAWRD	Ministry of Agriculture, Water and Rural Development
Meat Board	Meat Board of Namibia
MEATCO	Meat Corporation of Namibia
MET	Ministry of Environment and Tourism
NDTF	National Drought Task Force
NPFS	Namibia Programme for Food Security
SPSS	Statistical Package for Social Sciences
UNDP	United Nations Development Programme
WLS	Weighted Least Square

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CHAPTER 1 INTRODUCTION

This chapter discusses the background, motivation and problem statement, contribution of the study, objective of the study, methodology and data used for the study, study area and outline of the thesis.

1.1 Background

Namibia is rated to have the driest climate in sub-Saharan Africa and has naturally low agricultural productivity (Kruger & Lammerts-Imbuwa, 2008; Carbera, Cochran, Dangelmayr, D'Aguilar, Gawande, Lee, Speir & Weigand, 2007, NPFS, 2007). Namibia with its independence in 1990 inherited a dualistic agricultural sector of freehold and non-freehold (communal) farming from the apartheid regime (Mendelsohn, Janvis, Rogerts and Robertson, 2002). The agricultural sector, which sustains approximately 70 % of the Namibian population either directly or indirectly (Mushendami, Biwa & Gaomab II, 2008), creates jobs and has multiplier effects on the economy (Carbera, *et al.* 2007).

Broadly, the sustainability of agricultural production in Namibia is hampered by a number of factors. These include climatic and weather conditions, soil and terrain conditions, land tenure systems, lack of infrastructure, inputs and transportation costs, marketing constraints, lack of finances, competition, and low literacy and accompanying low management levels of farmers (Food and Agriculture Organisation (FAO), 2008; Mushendami, *et al.* 2008; Solomon, Qin, Manning, Alley, Bernstein, *et al.* 2007).

More than 60 % of Namibia's population lives in the rural parts of the country where livestock production is the predominant economic activity that sustains the livelihoods of rural households (Kressirer & Kruger, 1995). Similar work by Mendelsohn (2006) shows that livestock farming is the single most important agricultural activity for both commercial and communal sectors. In communal production systems, cattle performs a variety of functions by providing milk, draught

power, transport, meat, manure, income, hides and skins (Kruger & Lammerts-Imbuwa, 2008; MAWF, 2007; Dovie, Shackleton & Witkowski, 2006; Simela, Montshwe, Mahanjana & Tshuwa, 2006; Anon, 2004; Talavera, Katjimune, Mbinga, Vermeulen & Mouton, 2000).

In a study conducted to examine the need for technical agricultural research in the communal areas, Kressirer and Kruger (1995) found that, unlike communal farmers, commercial farmers have access to services that enable them to achieve a high standard of livestock production and rangeland management. Examples of such services include markets for de-stocking, veterinary services for animal care and disease control, credit and loan facilities, and information to market prices. Due to neglect, there is a limited data base in the communal areas of Namibia on which to estimate needs and speficic problems (Directorate of Engineering and Extension Services (DEES), 1994).

1.2 Motivation and Problem Statement

Literature on managerial practices and marketing constraints of cattle farmers from Omaheke communal areas is limited. There is a need to improve cattle productivity through managerial practices and to improve market throughput by understanding the current practices and addressing bottlenecks. Besides the little literature available, there is inconclusive information on cattle managerial and marketing practices and constraints regarding the adoption of best practices in the communal areas of the Omaheke region.

The communal areas of the Omaheke region are endowed with cattle that contribute to livelihoods and the economy of Namibia. Several authors have indicated that the communal cattle farmers' objectives and practices are a consequence of many years of interaction within a social and ecological environment which relies on specific knowledge (Coppolillo, 2000; Mapinduzi, Oba, Weladji & Colman, 2003; Oba & Kotile, 2001; Sheunyange, Oba & Weladji, 2005; Turner & Hiernaux, 2002). The communal cattle farmers in Namibia receive agricultural support services from state extension and veterinary departments. Besides agricultural support services provided by the government extension and veterinary officials, in agreement with Zhen and Routray (2003), farming systems and farmer situations are specific; and the "broad blanket" approach currently being employed may not address all problems affecting the sustainability of cattle production in the communal areas. Thus, in order to support communal cattle farmers, as

shown by Qamar (2002), information about the current production situation will assist agricultural support providers to develop support programmes that are situation specific.

The improvement of cattle productivity and marketing can play a significant role in alleviating food insecurity and poverty in the communal areas (Mhlanga, 2000). Van Rooyen and Gartside (1999) showed that animal husbandry practices are a major area of improvement for the future. Investigating the managerial and marketing practices regarding cattle production in the rural communal areas of the Omaheke region will not only provide appropriate information, but could lead to better understanding of the objectives, knowledge and practices of cattle farmers, and spell out possible opportunities and potentials that could further be developed. Further, this could lead to finding innovative solutions for the development of alternative production practices that could improve production and contribute to economic and viable cattle production systems.

Therefore, a study was undertaken during 2008 and 2009 to examine the efficiency and constraints of cattle managerial practices and marketing systems in four communal areas of the Omaheke region.

1.3 Contribution of the Study

The issues analysed provide a case study for sustainable cattle production systems in Namibia because they addressed five pillars of a sustainable production system. Firstly, by analysing farmers' management practices in terms of managerial practices, grazing and water management, the maintenance of a productive base of agriculture over time (**biological productivity**) and the protection of natural resources and prevention of soil and water degradation (**protection**) and stewardship towards the land and water (**social acceptability**) was considered. Secondly, by analysing marketing strategies employed by farmers, the economic viability of the production system (**viability**) was considered. Thirdly, by analysing land (grazing) management, veld fire control strategies, and drought preparedness and mitigation strategies, the reduction of the level of production risk (**security**) was considered (Figure 1.1).

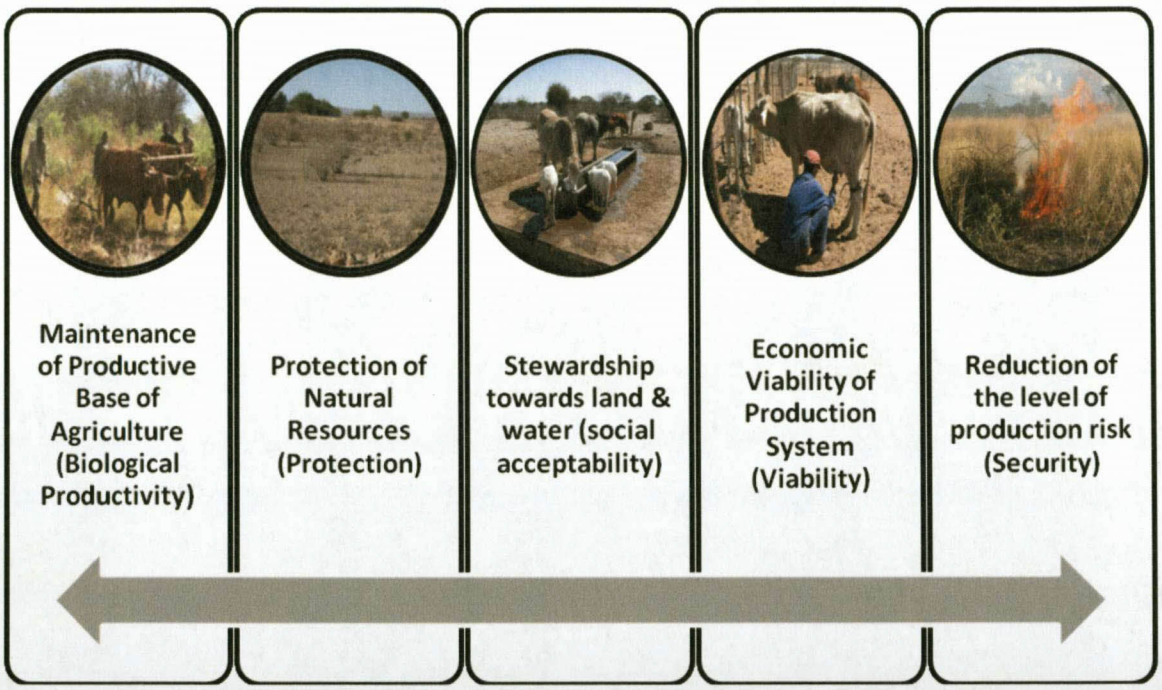


Figure 1.1 Five pillars of sustainability (adapted from Groenewald, 2004)

This research will contribute to the area of sustainable cattle production in Namibia in the following manner:

- It involves research that will stimulate analytical and critical thought to cattle production system in communal areas of Namibia.
- It uncovers bottlenecks in the five pillars of a sustainable production system, namely are biological productivity, protection of natural resources, social acceptability, economic viability and reduction of production risk.
- It covers the communal areas of the Omaheke region as a case study and the lessons learnt will be disseminated to other similar areas in Namibia through farmers' days, and thus will create a better understanding of sustainable cattle production systems in Namibia.
- The findings of this study will contribute to or influence a policy amendment or formulation to ensure that production practices on communal lands meet the needs of today without compromising the ability of future generations to satisfy their needs.

1.4 Objectives of the Study

The study aimed at examining the efficiency and constraints of cattle managerial practices and marketing systems and was undertaken in four of the Omaheke region's communal areas, namely Epukiro, Otjinene, Otjombinde and Aminius.

The specific objectives of the study were to:

- Identify the most crucial managerial aspects having a negative effect on sustainable cattle production
- Examine the sustainability of cattle supply chain management from farmer to processor
- Examine the access of market information to farmers
- Examine the factors affecting the supply of cattle to the market

1.5 Methodology and Data Used

1.5.1 Data Collection

The study consisted of two parts; the first part dealt with cattle managerial practices and the second part examined the efficiency of and constraints in cattle marketing in the Epukiro, Otjinene, Otjombinde and Aminius communal areas of the Omaheke region.

The first part of the study focused on interviewing communal farmers that were registered with the Meat Board of Namibia in order to characterise cattle production system. A total of 57 villages were randomly selected and 570 farmers were interviewed from these villages (ten farmers per village), as shown in Table 1.1.

Table 1.1 Sample size for managerial practices analysis

Description	**Epukiro**	**Otjinene**	**Otjombinde**	**Aminius**	**Total**
# of villages selected	12	16	10	19	57
# of farmers interviewed	120	160	100	190	570

A simple random sampling was undertaken to select the specific number of villages and farmers to be interviewed in each communal area, as shown in Table 1.1. In collaboration with the

officials of the farmers' association operating in that particular communal area, all villages in that communal area were listed, names were placed in a hat; and a certain number of village names drawn. The selection of 570 farmers to be interviewed in those randomly-selected villages involved listing the names of all Meat Board of Namibia registered farmers in that particular village and drawing names of ten farmers to be interviewed, regardless of the number of cattle they owned. The 570 farmers' sample is fairly representative, and accounts for 10 % of communal farmers within those four communal areas.

Questionnaires were administered by the researcher and trained enumerators in vernacular language (OtjiHerero) under the supervision of the researcher. The questionnaire captured data on production systems, managerial practices and support services. Annexure 1 shows the questionnaire which consisted of close-ended questions for qualitative and quantitative data respectively. The questionnaire took a maximum of 45 minutes; depending on how much the farmer was willing to disclose.

The second part of the study involved the collection of marketing information through interviews from 100 farmers, three farmers' associations and four co-operatives in the four communal areas, as well as an auctioneer and a beef processor (or their representatives) in the Omaheke region (Table 1.2). With this study, emphasis was given to the marketing of live cattle. A purposive[1] method of sampling technique was applied to collect data to examine efficiency and constraints in cattle marketing in four of the Omaheke region's communal areas. The respondents were chosen for a particular purpose on the basis that they were involved in cattle marketing and that they were "typical" of a group or represented diverse perspectives on an issue (Leedy & Armrod, 2000).

Questionnaires were administered by the researcher and trained enumerators in vernacular language (OtjiHerero) under the supervision of the researcher. The questionnaire captured data on communal farmers' marketing practices and Annexure 2 shows the questionnaires which consisted of open-ended questions for qualitative and quantitative data respectively. The second questionnaire took a maximum of 30 minutes to complete.

[1] Purposive sampling is a non-probability sampling method, which is also known as judgement sampling (ILCA, 1990). According to Kerlinger (1986), this method is characterised by the use of judgement and a deliberate effort to obtain representative samples from a particular group or individual to participate in a research.

Personal interviews with key informants from the farmers' associations, farmers' co-operatives, and livestock auctioneers and beef processor were made by the researcher on cattle marketing issues. Annexure 3 and 4 shows the questionnaires which consisted of open-ended questions for qualitative and quantitative data respectively. The questionnaire took a maximum of 30 minutes to complete.

Table 1.2 Sample size for marketing systems practices analysis

Description	**Epukiro**	**Otjinene**	**Otjombinde**	**Aminius**	**Gobabis**	**Total**
No. of communal farmers	25	25	25	25		100
No. of farmers' associations	1	1	1			3
No. of farmers' co-operatives	1		1	2		4
No. of auctioneers					1	1
No. of processors					1	1
Total	**27**	**26**	**27**	**27**	**2**	**109**

1.5.2 Method of Analysis

Data from questionnaires were entered into Microsoft Excel spreadsheet and descriptive statistical analysis done using Statistical Package for Social Sciences (SPSS). The chi-squared test for independence was used to examine whether knowing the value of one variable helps to estimate the value of another variable. Also, the chi-squared test for homogeneity was used to examine whether four populations have the same proportion of observations with a common characteristic. ANOVA was used for herd composition and mortalities comparisons amongst the four study areas. The above data was analysed in Chapters 4 and 5.

In terms of examining the factors affecting the supply of cattle to the market (Chapter 6), a Weighted Least Square (WLS) was used. The model was written as follows:
Sales (each farmer) = f(Average producers' price, average cost of inputs (cost of supplements, fuel, feeds, vaccination, etc.), average rainfall, access to market information, accessibility to markets, average family sizes, other sources of income, number of cattle owned).

The expected sign and justification is discussed in Chapter 6 (pages 93 -95).

1.6 Study Area

The study was carried out in the four communal areas of the Omaheke region, which are Epukiro, Otjinene, Otjombinde and Aminius (Figures 1.2 and 1.3). As shown in Figure 1.3, the Otjombinde communal area is labeled as Tallismanus, although Tallismanus is a main town in that communal area. The Omaheke region is one of Namibia's 13 political regions, demarcated by the Second Delimitation Commission of 1988, and is located in the eastern part of the country (National Planning Commission (NPC), 2006). Further, Namibia is divided into four Foot and Mouth Disease (FMD) control zones: an infected zone, buffer zone, surveillance zone, and free zone; and the Omaheke region falls within the free zone (Kruger & Lammerts-Imbuwa, 2008).

Namibia has a total land area of 84,612 km^2 (National Programme for Food Security (NPFS), 2007), and the Omaheke region occupies 10.3 % of the country's total land surface. The Omaheke region occupies the eastern central part of Namibia bordering with Botswana, and cattle ranching is the dominant economic activity (Coetzee, 2009). The region has also been publicised as the largest livestock farming area in southern Africa and one of the most profitable farming regions in Namibia (Suzman, 1995). The name, Omaheke, is derived from the Herero word for "sandveld" and this name reflects the agro-ecological situation of, in particular, the eastern part of the region (DEES, 1994)

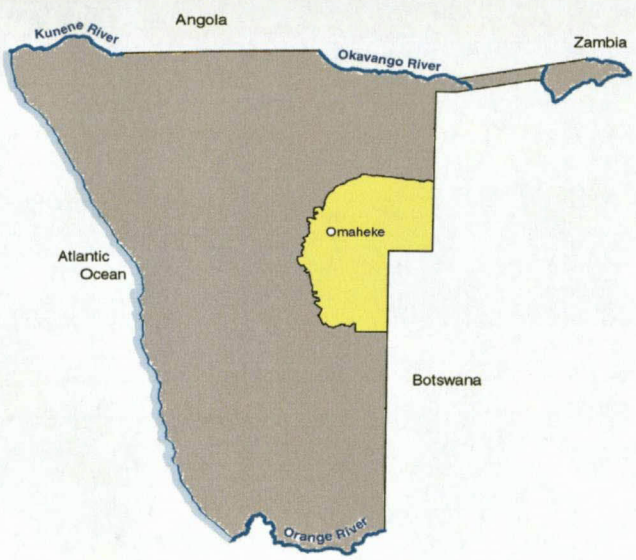


Figure 1.2 Omaheke region on Namibian map

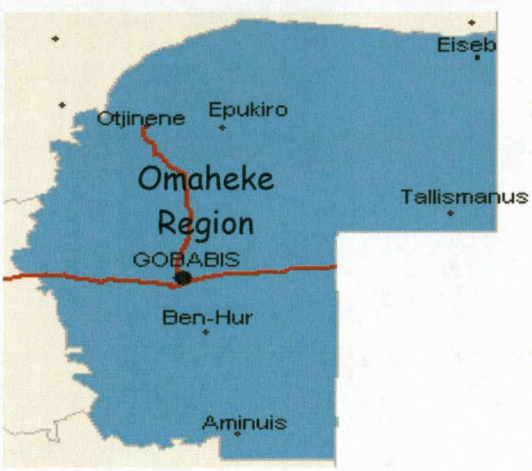


Figure 1.3. Communal areas of Omaheke

In terms of FAO and World Bank (2001) classification of farming systems, the study area falls under the pastoral system which is characterised by extensive cattle rearing, mainly for subsistence and traditional exchange. The study areas were managed by the Herero administration under the second tier government, and were not established to enable black pastoralists to develop commercial agriculture (Adams & Werner, 1990).

The rainfall in The Omaheke region in Namibia is extremely variable and unpredictable from year to year and from month to month (Carbera, *et al.* 2007; Mendelsohn, 2006; McPeak, 2003; Christelis & Struckmeier, 2001). The long-term average annual rainfall of the study area varies between 300 mm and 400 mm each year. Mean annual precipitation in the southern Omaheke range from 200 mm and 400 mm, whereas in the northern Omaheke region ranges between 300 mm and 500 mm (Mendelsohn, *et al.* 2002). The wet season is usually between October and March.

In terms of temperature, the records for Gobabis show mean monthly maximum temperatures ranging from 22^0C to 32^0C and mean monthly minimum temperatures ranging from 2^0C to 17^0C. The warmest months are December and January, and the coldest are June and July (Millennium Challenge Accounts (MCA), 2006). Winds in this area are usually from a north-easterly direction throughout the year (Mendelsohn, *et al.* 2002).

The dominant soils for the Omaheke region are Kalahari sands that dominate the eastern and northern regions. These soils are formed from wind-blown sand and are usually up to one metre deep (Mendelsohn, *et al.* 2002). According to Mendelsohn *et al.* (2002), the sandy texture allows water to drain rapidly through the soil, leaving very little moisture at depths to which most plant can reach. These soils have a very low water-holding capacity and a poor inherent fertility status (Mendelsohn & El Obeid, 2005).

The communal areas of the Omaheke region are located in Tree-and-shrub Savanna (Mendelsohn, *et al.* 2002). Specifically, they are located in both the Forest Savanna and Woodland and the Camelthorn Savanna (Christelis & Struckmeier, 2001). The Camelthorn Savanna is an open savanna with good grass cover, where the camelthorn, *Acacia erioloba*, is the dominant tree, while the Forest Savanna and Woodland are dominated by broadleaved woodlands (Mendelsohn, *et al.* 2002).

1.7 Outline of the Study

Chapter 2 reviews the sustainable agriculture and its elements, and its interpretation and application in the context of Namibia. Chapter 3 focuses on a literature review on cattle production under pastoral and communal systems. Chapter 4 presents the results of a survey that focused on cattle production systems, managerial practices and support services. Chapter 5 presents the findings of a survey that examined the sustainability of cattle supply chain management from farmer to processor and the access of market information to cattle farmers. Chapter 6 presents the results of the factors that affect the supply of cattle to the markets in the four Omaheke communal areas. Chapter 7 deals with the general conclusions and recommendations of this study.

CHAPTER 2 SUSTAINABLE AGRICULTURE

2.1 Introduction

An exhaustive literature review is not the aim of this chapter. Rather, the aim is to present a review on sustainable agriculture and to give specific attention to define the terms sustainability and sustainable agriculture, and to discuss the requirements for sustainable agricultural production systems, and the principles considered in the evaluation of sustainability. Moreover, this chapter presents an overview of the sustainability of agricultural production systems in the context of Namibia.

2.2 Definition of Sustainability

The dictionary defines the word "sustainable" as what can be kept up or prolonged over a long time period (Wagner, 1999). Pretty (1998) highlights the difficulty in giving precise and absolute definitions of sustainability, and suggests that it is important to clarify what is being sustained, for how long, for whose benefit and at what cost, over what area and measured by what criteria. On the other hand, Wylie (1996) argues that sustainability means different things to different people. However, the key aspect is that production needs should be maintained and continued over time.

Groenewald (2004) defines sustainability as management and conservation of resources, and orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. According to Lockeretz (1988), sustainability implies a time dimension and the capacity of a farming system to endure indefinitely.

Different researchers show the dynamic nature of sustainability that can include notions of limits to resource availability, environmental impact, economic viability, biodiversity and social justice

(Harmsen & Kelly, 1992). The dynamic nature of sustainability's fundamental components, which are ecological (spatial and temporal relations, diversity, stability and resilience); economic (resource distribution and allocation); and social (equity, access, stewardship and institutions) makes it difficult to develop precise and long-term operational definition (De Vries, as cited by Viederman, 1993).

2.3 Definition of Sustainable Agriculture

There are many definitions of sustainable agriculture, which has different meanings to different people (Mason, 2003; Jayaratne, Martin & Wit, 2001). Karami and Mansoorabadi (2008) define sustainable agriculture as the successful management of the resources of agriculture to satisfy changing human needs, to conserve the environment, and to increase biological resources. Mason (2003) defines sustainable agriculture as both a philosophy and a system of farming that empowers the farmer to work with natural processes to conserve resources such as soil and water, whilst minimising waste and environmental impact.

Sustainable agriculture is a management system for renewable natural resources that provides food, income and livelihood for present and future generations while maintaining or improving the economic productivity and ecosystem services of these resources (Rao & Rogers, 2006). Most definitions of sustainable agriculture include the following institutional values: (i) discriminating use of land resources; (ii) resource conservation and enhancement of environmental quality; (iii) economic viability; (iv) increased and stabilised productivity; (v) enhanced quality of life; (vi) intergenerational equity; and (vii) buffer against risks.

The concept of sustainable agriculture is also a function of the scale of operation – ranging from a single farmer's field, a farm, or a watershed to an ecosystem, a country, a continent, or the Earth as a whole (Eswaran, 1991). Consequently, it is important to define the concept of sustainable agriculture in the context of the society in which it exists. An elementary aspect of the concept is that it be based on the value systems of social, political, economic, religious and other institutions.

Pretty (1995) and Röling (1994) view sustainable agriculture as a process for learning and not as a single model or package to be imposed. Pretty (1998) further advises that sustainable

agriculture does not prescribe a defined set of practices, technologies and policies due to continuous need for changing and adaptation.

2.4 Sustainable Agricultural Production Systems

Smyth and Dumanski (1993) identify five requirements that can be functional: biological productivity, protection of natural resources, economic viability, social acceptability, and reduction of the level of production risk (security). The requirements can be considered "pillars" on which a sustainable system is built. Relevant indicators are required to measure the requirements (pillars) (Smyth & Dumanski, 1993). Because the same indicators are often used in different ways to assess more than one pillar, a three-level model was designed, made up of requirements, criteria and indicators (Farshad, 1997). Further, it is crucial to establish thresholds – a threshold provides a baseline for an indicator against which sustainability can be assessed. A range of threshold values and trends are required for a particular indicator and should be consistent with the rating of diagnostic factors in the FAO (1983).

Sound resource conservation is an integral part of sustainable agricultural systems (Safley & Oyer, 1991). According to Altieri (1987) and Ikerd (1990), an agricultural production system must be ecological sustainable or it cannot persist over the long run, and thus cannot be productive and profitable. Likewise, a system must be productive and profitable over the long run or it cannot be sustained economically – no matter how ecologically sound it is (Stenholm & Waggoner, 1990).

2.5 Sustainability of Agricultural Production Systems in the context of Namibia

Namibia with its independence in 1990 inherited a dualistic agricultural sector of freehold and communal farming from the apartheid regime (Mendelsohn, *et al.* 2002), and the agricultural sector sustains approximately 70 % of the Namibian population, either directly or indirectly (Mushendami, *et al.* 2008). The agricultural sector creates jobs and has multiplier effects on the economy (Carbera, *et al.* 2007).

The sustainability of agricultural production in Namibia is hampered by several other factors, as illustrated in Figure 2.1, adapted from Mushendami *et al.* (2008). Other researchers have also

identified reasons accounting for the low overall productivity in sub-Saharan Africa, which are discussed below (Kuvare, Maharero & Kamupingene, 2008; FAO, 2008; Mendelsohn, 2006; Walter, Jackson, Perkins & Decalo, 2001).

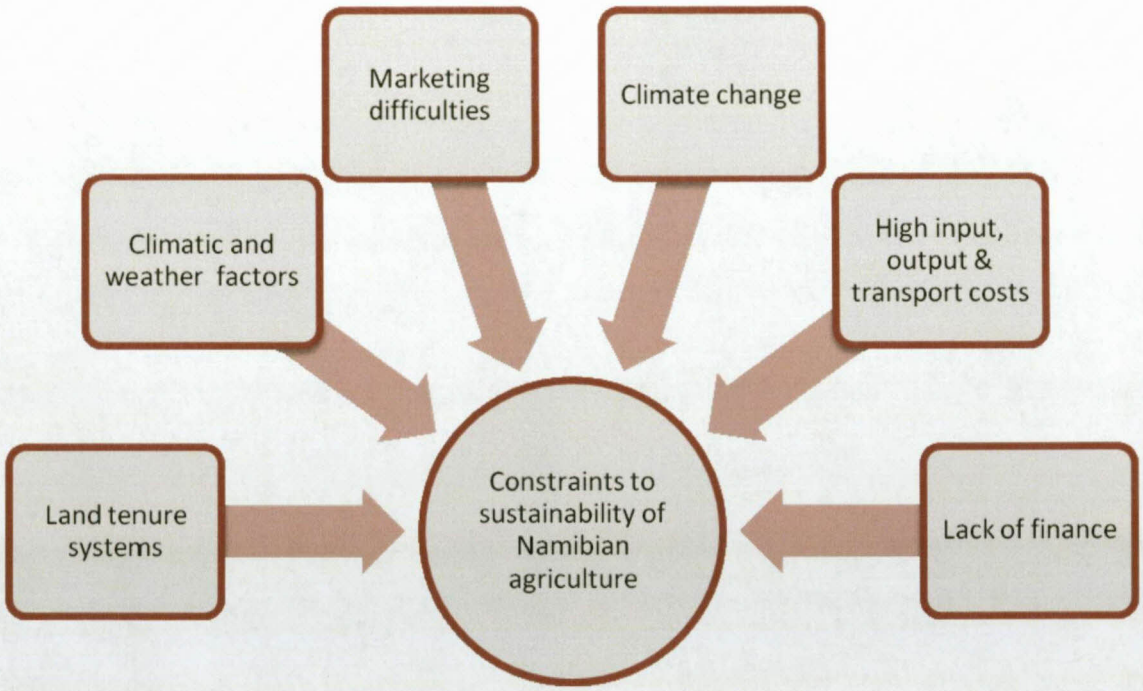


Figure 2.1 Constraints hindering sustainability of agriculture in Namibia (adapted from Mushendami, *et al.* 2008)

Land tenure systems: Following independence, Namibia opted to maintain both freehold and communal tenure lands (Mendelsohn, *et al.* 2002). Without title deeds, this denies communal farmers access to credit due to a lack of collateral to offer against borrowing (Kaakunga & Ndalikokule, 2006; Mushendami, *et al.* 2008). The land tenure system in communal areas has a direct effect on management practices and the availability of grazing resources (Suzman, 1995). Jones (1993) cites that the lack of clear tenure arrangements is a disincentive to long-term planning and the sustainable use and management of resources. In support, the Ministry of Environment and Tourism (MET) (1997) reported that lack of secure communal land tenure is a major contributing factor to land degradation as people seek to maximise individually for their own benefit. This is at the cost of long-term sustainability of the resource use and leads to competition amongst users (Dewdney, 1996).

Climatic and weather factors: Namibia is rated to have the driest climate in sub-Saharan Africa with a mean annual rainfall of approximately 270 mm (Carbera, *et al.* 2007). Drought is a

common phenomenon in Namibia (Kuvare, *et al.* 2008). The majority of Namibian soils (97 %) have less than 5 % clay content, resulting in low water-holding capacity and a deficiency in both macro- and micro nutrients (National Drought Task Force (NDTF), 1997). The poor soil texture renders a vast part of Namibia unsuitable for the rain-fed cultivation of maize and wheat crops (Mushendami, *et al.* 2008; Mendelsohn & El Obeid, 2005).

Marketing difficulties: Mushendami *et al.* (2008) state that there seems to be limited markets for some produce and inadequate numbers of marketable products in Namibia, for example in the livestock sector. A typical example is that under the Cotonou agreement, Namibia exports deboned meat to the EU in terms of an annual quota of 13,000 tonnes of beef (Price Waterhouse Coopers, 2005) and this quota is never met. Other factors constraining marketing include a small market due to a relatively small population, small market demand, lack of market development in most communal areas, trade barriers and international competition (Mendelsohn, 2006).

Climate change: Climate change will have an effect on the productivity of crops and livestock in Namibia (Mushendami, *et al.* 2008; Kuvare, *et al.* 2008). In agreement with Kaiser and Drennen (1993), the economic effects on agriculture due to climate change in the Namibian context will take the form of a reduction in farming profitability, investment and growth, prices, supply, demand, trade flows, biodiversity, productive capacity of soils, carrying capacities and regional competitive advantage.

High input, output and transport costs: According to Mendelsohn (2006), as a result of vast distances, most Namibian farm produce cover high costs in terms of transport, inputs and outputs. The importation of most of the production inputs coupled with transport increase the overall production costs (Mushendami, *et al.* 2008).

Lack of finance: An absence of or a poor provision of financial resources is a key limiting factor to the agricultural sector (Mushendami, *et al.* 2008). According to Kaakunga and Ndalikokule (2006), the collateral required by financial institutions denies communal farmers access to credit. Without widespread access to credit, famers cannot acquire production inputs, such as seeds, machinery; and improvement on smaller farming units is hampered (Norton, Alwang & Masters, 2006).

CHAPTER 3 CATTLE FARMING UNDER COMMUNAL SYSTEMS

3.1 Introduction

The aim of this chapter is to present an overview of cattle production under communal systems. The chapter will focus on the role of cattle, ownership, managerial practices, risks and mitigation strategies employed in communal production systems, and the availability of support services.

3.2 Role of Cattle

According to Livestock in Development (1999), livestock contributes to people's livelihoods in a variety of ways (Figure 3.1). Nkosi and Kirsten (1993) categorise livestock functions into social, economic and cultural roles.

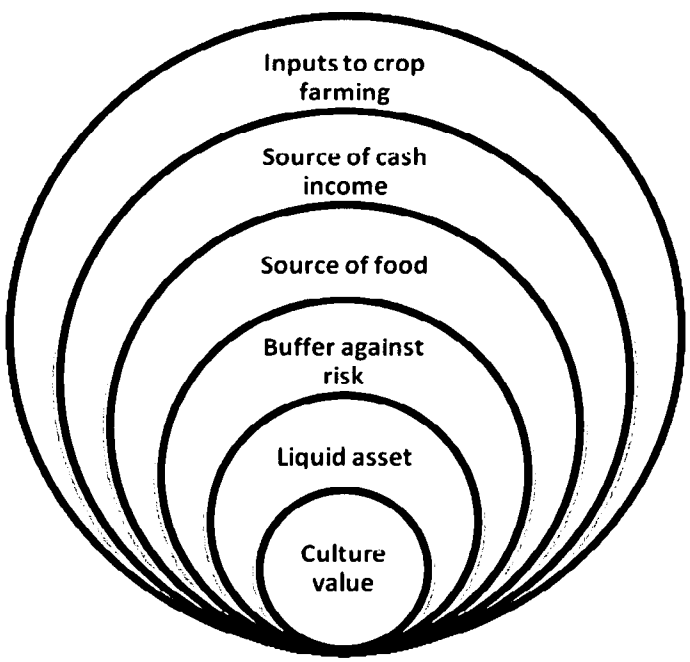


Figure 3.1 Ways of livestock contribution to people's livelihoods (adapted from Livestock in Development, 1999)

In third world countries, cattle are source of income and food security through their provision of milk, draught power, transport, meat, manure, income, hides and skins (Kruger & Lammerts-Imbuwa, 2008; MAWF, 2007; Dovie, Shackleton & Witkowski, 2006; Simela, *et al.* 2006; Thornton, Kruska, Henninger, Kristjanson, Antieno, *et al.* 2002; Whande, 1999). Anon (2004) indicates that livestock products in many African countries contribute in excess of 20 % to 30 % of GDP and over 35 % when animal power and manure is added (Winrock International, 1992). In terms of global meat supply, approximately 10 % of this is sourced from extensive livestock systems in the dry-lands (Winrock International, 1992). According to Yaron, Janssen and Maamberua (1992), cattle are a main source of wealth, serve as a social status indicator, and are given as 'bride price or lobolla' (Chimonyo, Kusina, Hamudikuwanda & Nyoni, 1999). Further, cattle can serve as a secure risk-free investment and a source of savings to meet particular cash needs (Dovie, *et al.* 2006; Talavera, *et al.* 2000; Van Rooyen & Gartside, 1999).

Metzger (1994) and Malan (1974) report that cattle are the major entreprise in Namibia, specifically in communal areas in the Omaheke, Otjozondjupa and Kunene North. The Herero society of Namibia have a stigma attachment for large herds of cattle, and cattle are principally associated as a symbolic representation of wealth among the Herero community (Healy, 1996).

In addition to being sold to meet immediate households' financial needs, cattle are used as payment for village fines and taxes (Dovie, *et al.* 2006). Talavera *et al.* (2000) report that nearly all punishments or fines are made in the form of cattle. Further, oxen in the Kunene region are reserved for funerary rites (Paskin, 1990).

3.3 Ownership of Cattle

Livestock ownership in the Omaheke communal areas is not clear, and in some instances, livestock owned by a household belong to the entire family rather than to the individual household head (Ministry of Agriculture, Water and Rural Development (MAWRD), 2003). Cattle herds of wealthier farmers are divided among less well-to-do relatives for use and custody (Dovie, *et al.* 2006; Cornu, 1999).

3.4 Managerial Practices

Several managerial factors, such as poor diseases and parasites control, lack of feed resources and poor rangeland management, affect the productivity of cattle in communal areas (Bester, Matjuda, Rust & Fourie, 2003; Chimonyo, Kusina, Hamudikuwanda, Nyoni & Ncube, 2000; Montshwe, 2006; Musemwa, Chagwiza, Sikuka, Fraser, Chimonyo and Mzileni, 2007).

Cattle farming in communal systems is generally hindered by poor infrastructure and common land ownership, making cattle farming difficult (Mendelsohn, 2006). In the crop producing communal areas of Namibia, cattle are traditionally herded, especially during the crop-growing season, and kraaled at night (Tapscott, 1990; Van Rooyen & Gartside, 1999). After harvest, cattle graze on the stubble and stalks of either maize or millet. Van Rooyen and Gartside (1999) state that cattle are kraaled at night and only go out during the day for grazing and drinking water. Tapscott (1990) further reports that, during periods of grazing shortages and often during the crop-growing season, farmers move their livestock to cattle posts.

Access to water in the Omaheke region is a crucial issue, while access to pasture has been proven to be the biggest challenge (Suzman, 1995). Suzman (1995) reports that cattle farming has been a marginal activity in the Omaheke region because of the water scarcity and high variable rainfall, both geographically and seasonally.

In the Hereroland West and East communal areas, Metzger (1994) states that Otjiherero-cattle, derivatives of the Sanga cattle which were crossed extensively with Afrikaner cattle, were the dominant breed. Even though some European bulls were used, there was a definite shift towards Brahman cattle. In the non-crop producing communal areas of Namibia, most cows are milked for household consumption (Metzger, 1994). Under this management practice, cows have to come to the homestead once a day. Around noon, the cows leave the homestead in search of grazing areas and return to the pens the next morning in search of their calves. Upon their return, the cows are penned and milked. Once milked, the cows stay with their calves for a few hours, and thereafter the cycle starts repeats itself (Metzger, 1994).

Suzman (1995) reported on the occurrence of pasture deterioration which results in grass seeds not being replenished, and hardier and less nutritious plants taking their place. In areas further away from established water points, grazing is more abundant, but the lack of water and presence of poisonous plants (*Dichaphetalum cymosum*) make these areas extremely difficult to utilise, except during the raining season (Suzman, 1995).

McDowell (1972) reports that the control of grazing is difficult on communal grazing lands. Due to a lack of clear tenure arrangements, this makes planning and the sustainable use and management of resources, including grazing veld, difficult (Jones, 1993). There are no regulating laws and traditional authorities no longer have the power or ability to effectively administer land tenure and administration (Adams & Werner, 1990; Suzman, 1995).

Smit (2000) shows that overgrazing is evident near settlements and limited water points. Anderson (1984) reports that farmers in communal areas have little incentive to manage the land which thus makes improvement difficult. In the absence of secure communal land tenure, wealthier livestock-owners have fenced areas off communal land in some areas and begun digging private wells (Kaakunga & Ndalikokule, 2006; Suzman, 1997). On the other hand, the carrying capacities of grazing areas in communal areas have been exceeded by more than double the recommended figures of 20 hectares/LSU (Healy, 1996). The MAWRD (2003) study in the Omaheke region shows that 67 % of the respondents indicated that they do not have enough grazing throughout the year; only 33 % of the respondents indicated that they have enough grazing for the whole year.

Talavera *et al.* (2000) report that the largely nomadic lifestyle of the Himba makes for an excellent rotational grazing system. Further, these effective grazing management strategies are employed in Kunene region:

- During the dry season when grazing resources are becoming poor around main settlements, most cattle are taken to cattle posts or emergency grazing areas (Talavera, *et al.* 2000; Beunison, Silverside & Bordon, 1998);
- Grazing committees are established to ensure good grazing management, with fines to offenders (Talavera, *et al.* 2000; Behnke, 1998); and
- Restricted grazing areas are established in the Epupa area, where herders are banned from grazing these areas during the raining season and the early dry season (Talavera, *et al.* 2000).

3.5 Risks and Mitigation Strategies

Cattle farming under communal areas are faced by a variety of threats. The most serious of these threats are low and variable rainfall, droughts, veld fires, and bush encroachment. Livestock production is heavily dependent on rainfall; however, the erratic and unpredictable nature of rainfall becomes a challenge for communal farmers (McPeak, 2003; Christelis & Struckmeier, 2001). McPeak (2003) indicates that nutritional inadequacy is a severe seasonal constraint in dry areas, and the most feasible solution to improve livestock productivity in dry areas involve integrated applications of current knowledge rather than new technologies. Biophysical and socio-economic models that include policy considerations that influence rangeland productivity could be used to predict the effects of fluctuations in herd sizes, rainfall, and land tenure (McPeak, 2003). Of great benefit to communal farmers will be early warning systems and drought predictions.

Droughts are endemic to southern Africa and have negative economic impacts on rural household livelihooods for both beef and crop industries (FAO, 2008; Kuvare *et al.* 2008; Government of Republic of Namibia (GRN), 2002; Bhalatora, 1985; Brattan, 1987; Downing, 1987, 1988, 1992; De Waal, 1989, 1991; Devereux, 1992; Devereux and Naerra, 1996; Benson and Clay, 1994; Tiffen, 1994; Adkisson & Devereux, 1995; Sweet, 1998). Livestock production volumes decreased during the following years of relative droughts: 1970/71, 1981/82, 1996/97, 2000/01 and 2003/04 (Ministry of Agriculture, Water and Forestry (MAWF), 2007). Communal cattle farmers often hang on to their cattle as long as possible until their herds are drastically reduced by drought (Behnke & Scoones, 1992). Malan (1974) found that farmers in Kaokoland were dividing their cattle and moving them to outlying cattle posts or even giving part of their herds to relatives (Cornu, 1999). This risk-minimising practice acted as an insurance in the event of a disaster (Hvidsten & Kavari, 1997).

Namibia is also affected by veld fires. As reported by Trigg (2000), large parts of vegetation is burnt annually in the Omusati, Otjozondjupa, Oshikoto and Omaheke regions of Namibia, and these fires are unplanned and uncontrolled (Prinsloo, 2001). Due to veld fires, cattle are forced to walk long distances searching for grazing, and their body conditions decline. Van Rooyen and Gartside (1999) report that poisonous plants (*Dichapetalum cymosum*) are abundant in areas where veld fires have occurred. Coupled with the effects of veld fires, the effects of bush

encroachment have begun to affect Namibia, and livestock production has declined as a result (Carbera, *et al.* 2007; Schutz, 2007).

3.6 Agricultural Support Services

The Omaheke communal areas are home to several government offices, such as those for Extension Services, Veterinary Services, and Rural Water Supply. Specifically, the Extension Service office is advising farmers on agricultural-related topics such as animal nutrition, marketing, breeding, and health. This is done when farmers physically visit the extension offices, via telephonic conversations, or when extension staff are in the field and attending public events (MAWRD, 2003). One-on-one extension is also very common outside official working hours (MAWRD, 2003).

CHAPTER 4 PRODUCTION SYSTEM, MANAGERIAL PRACTICES & SUPPORT SERVICES IN OMAHEKE COMMUNAL AREAS[2]

ABSTRACT

A total of 570 farmers in four communal areas of the Omaheke region were interviewed, who were registered under the Meat Board of Namibia. This chapter focuses on characterising the cattle production system; studying the managerial practices employed and accessing the availability and utilisation of support services. The main constraints identified in the production system are an incorrect bull-to-cow ratio (1:38), low calving percentage and cattle mortalities and losses. The main causes of cattle mortalities and losses in communal areas are drought, diseases, straying and theft; with a farmer losing an average of ten cattle per year. The managerial practices found to negate sustainable cattle production are weaning practices and record keeping. Communal cattle farmers are not utilising the available agricultural support services and constraints identified in the production system and shortcomings found in the managerial practices could be addresed if farmers can visit the extension and veterinary offices for advice. A policy is needed to guide the management of grazing resources in communal areas. A conducive policy environment should also be created by government to establish tailor-made micro-financing to rural farming communities in order to have economically viable cattle production systems in communal areas.

Key words: Cattle; communal farmers; managerial aspects.

4.1 Introduction

Cattle play an important role in the socio-economy of the farmers in the communal areas through the provision of milk, meat, income through sales and use at social functions (Kruger & Lammerts-Imbuwa, 2008; MAWF, 2007). Cattle standing at 185 535 are the most populous

[2] Submitted to the International Journal of Agricultural Sustainability.

species in the communal areas of the Omaheke region in terms of number as reported by MAWRD (2003). Goats come second with a population of 73 783.

The implementation of the recommendations of the Odendaal Commission in 1970 negatively affects farmers on homelands or communal areas created on marginal farmland (Namibia Vision 2030, 2004). Unlike commercial farmers, communal farmers do not have access to services that enable a farmer to achieve a high standard of livestock production system and rangeland management; such as markets for de-stocking, veterinary services for animal care and disease control, credit and loan facilities, information on research or market prices (Carbera, Cochran, Dangelmayr, D'Aguilar, Gawande, *et al.* 2007; Mendelsohn, 2006).

These recommendations, enforced by the colonial administrations, created a skewed income distribution (United Nations Development Programme (UNDP, 2007). Therefore, the means to increase communal livestock farmers' income and standard of living in the Omaheke region is through the improvement of livestock production and marketing efficiency. Van Rooyen and Gartside (1999) indicate that animal husbandry practices are a major area of future improvement.

This chapter presents the results of field surveys that were undertaken in 2008 in four communal areas of the Omaheke region. The surveys focused mainly on the cattle production systems, managerial practices and support services to identify bottlenecks. The survey will recommend alternative solutions to the bottlenecks.

4.2 Literature Review

Namibia is one of the driest countries in Africa, located in the south of the Sahel. Almost the entire country can be classified as arid and semi-arid (Kruger & Lammerts-Imbuwa, 2008; Carbera, *et al.* 2007). More than 60 % of Namibia's population lives in the rural parts of the country where livestock production is the predominant economic activity, which sustains the livelihoods of rural households (Mendelsohn, 2006). Mendelsohn (2006) reported that livestock

farming is the single most important agricultural activity for both commercial and communal sectors.

Understanding farmers' objectives, perceptions and experiences are crucial in bringing about improvement in communal cattle production (Musemwa, Mushunje, Chimonyo, Fraser, Mapiye & Muchenje, 2008; Dovie, Shackleton & Witkowski, 2006). Access to credit and land tenure rights have been some of the constraints of livestock farming in communal areas (Kaakunga & Ndalikokule, 2006). According to Maree and Casey (1993), the lack of farming knowledge, lack of finance and inability to exercise control in communal grazing systems are the major reasons for the low level of adoption of cattle management practices. The lack of reliable agricultural information has been severe particularly in communal areas (Montshwe, 2006). Cattle in communal systems are generally managed with an absolute minimum of infrastructure; and upgrading of livestock through individual mating is virtually impossible with communally owned grazing (Maree & Casey, 1993).

Several managerial practices, such as planned breeding, weaning, selection, vaccinations and parasites control are not conducted. In most cases, this is due to a lack of knowledge and existing conditions (infrastructural shortcomings and land tenure rights) within communal farming systems (Mendelsohn, 2006; Bester, Matjuda, Rust & Fourie, 2003; Chimonyo, Kusina, Hamudikuwanda, Nyoni and Ncube, 2000; Montshwe, 2006; Musemwa, Chagwiza, Sikuka, Fraser, Chimonyo & Mzileni, 2007). Metzger (1995) reported that due to lack of knowledge, animal diseases were difficult to identify in the communal areas of the Omaheke region. Metzger (1994) and Whande (1999) reported that the major causes of cattle losses in communal areas were livestock diseases, drought, wandering off or straying, theft and ticks infestations.

4.3 Methodology

4.3.1 Sampling

To characterise the cattle production system in the communal areas, 570 farmers from 57 villages were randomly selected and interviewed. The sample is fairly representative and

represents 10 % of farmers registered under the Meat Board of Namibia from these communal areas.

4.3.2 Data Collection and Analysis

A structured interview questionnaire with closed-ended questions was used to gather data from the 570 farmers in the Omaheke region's communal areas. The data collection process involved a group of trained enumerators and took place during 2008. Data from questionnaires was entered into MS Excel spreadsheet by the researcher and descriptive results analysis done using Statistical Package for Social Sciences (SPSS).

4.4 Results and Discussions

The majority of respondents were males (69.8 %); 51.9 % were between 18-49 years, and 47.7 % were 50 years of age or more.

4.4.1 Production System

4.4.1.1 Herd Composition

The average herd size per household was 66 animals (Table 4.1) in the Omaheke region's communal areas, with a minimum of two and a maximum of 386 cattle. However, the 2001 livestock census of the Directorate of Veterinary Services showed average household ownership to be estimated at 42 head of cattle (MAWRD, 2003).

The herds of the Omaheke communal farmers constisted a very high percentage of females (74.3 %). This is an indication that these communal farmers tend to have many cows and heifers to increase productivity and derive benefit from milk and meat. There are no oxen in the herds, and in agreement with this study, results from Metzger (1994) show that the steers are sold before they are fully grown oxen.

Table 4.1 Herd composition, calving percentages and bull:cow ratios in four study areas

Category	Herd composition per communal area				Total for study areas	Percent of total herd (average)
	Aminius	Epukiro	Otjinene	Otjombinde		
Cows	42±136	41±244	30±814	38±138	38±145	57.6 %
Bulls	2±1.671	2±0.882	1±1.377	1±0.983	1±1.357	1.5 %
Oxen (>3 years)	1±4.984	1±0.488				
Heifers (1-3 years)	13±175	10±133	10±116	10±86.86	11±135	16.7 %
Steers (1-3 years)	5±52.23	6±69.52	2±16.88	3±44.83	4±42.43	6.1 %
Calves (<1 year)	13±131.13	11±111	11±127	12±109	12±122	18.1 %
Total	76±396.9	71±558.9	54±1075.3	64±379.7	66±445.8	100.0 %
Calving %	31 %	26.8 %	36.7 %	31.5 %	31.5 %	
Bull:cow ratio	1:21	1:21	1:30	1:38	1:38	

As shown in Table 4.1, the average bull:cow ratio in the study areas is 1:38, and far exceeds the recommended average ratio of 1:25 (Rothauge, 2006; Mendelsohn, 2006). When comparing the four communal areas, Aminius and Epukiro are within the recommended ratio, but Otjinene and Otjombinde are beyond this recommended ratio. A correct bull:cow ratio maximises conception and fertlity, enabling every cow to calf yearly. The calving percentage of 31.5 % is very low, as shown in Table 4.1. In commercial cattle farming, a calving of 75 % and above is ideal (Mendelsohn, 2006). This low calving percentage is comparable to the figures reported by Nthakheni (2006) of 35.6 %. The low calving percentage under the current production system in the communal areas of the Omaheke region seem to point to specific causal factors, such as a high percentage of non-productive breeding females, high bull:cow ratios, nutritional problems, land tenure system, and poor managerial practices.

4.4.1.2 Purpose of keeping cattle

Cattle are kept by communal farmers for a variety of reasons, but mainly to fulfill three important roles, namely social, economic and cultural roles. An indication of the most important reasons why cattle are kept in the Omaheke region's communal areas was obtained by asking respondents to name the reasons why they keep cattle. The results are summarised in Figure 4.1.

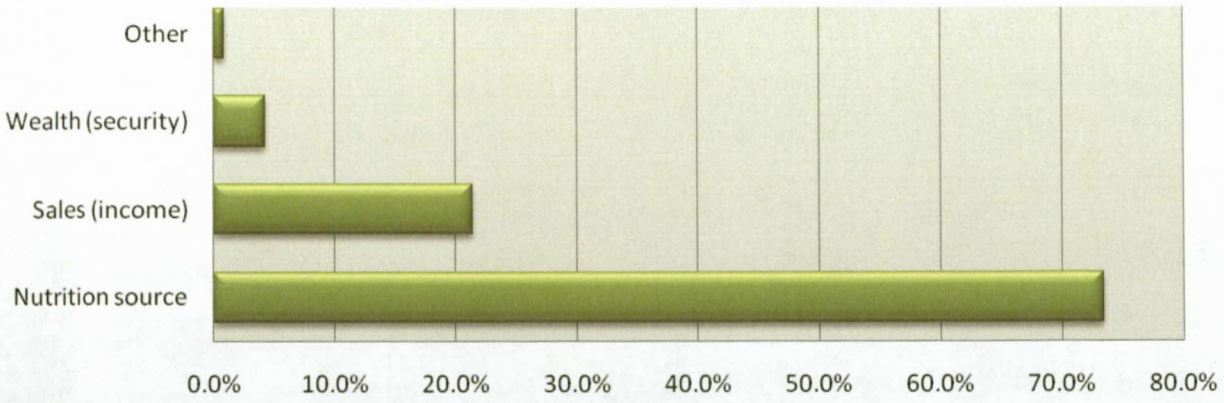


Figure 4.1 The respondents' rating for the purpose of keeping cattle (2010)

As shown in Figure 4.1, the cattle are kept as a source of nutrition, and in agreement with this study, results from Wilson, Diallo and Wagenaar (1985) show that milk constitutes a major part of the diet in the Omaheke region's communal areas and influences herd structure. An important production objective of these communal farmers is thus to have as many cows as possible to produce milk for human consumption (Figure 4.2), as well as to generate cash from the sale of males not needed for reproduction. This finding is in agreement with the work of Winrock International (1992).

Figure 4.2 A cow milking in a communal area of Omaheke (source: Gabriel Hangara)

4.4.1.3 Breed Preferences

Figure 4.3 shows the preferences of breeds by farmers in the four study areas. As indicated in Figure 4.3, the cross breed is the prefered breed (61 %) followed by the Exotic Zebu (Brahman) breed (22 %) in the Omaheke communal areas. Differences between the four communal areas were analysed using a Chi-square test. Only 3 % and 4 % of farmers in Aminius and Otjombinde respectively preferred the indigenous breed. The breed preferences in Epukiro are quite different in comparison with the other three study areas, given that the combined preference for indigenous and European breeds constitutes 33 %. The farmers' preferences between the indigenous breed, exotic Zebu breed, cross-breed and European breed vary significantly ($p<0.05$) in the four areas. Farmers' reasons for these preferences were that cross-breeds are dual purpose in terms of milk and meat production. The low preference for the indigenous breed was because they fetched low prices when marketed, whereas the European breeds are easily infested by external parasites.

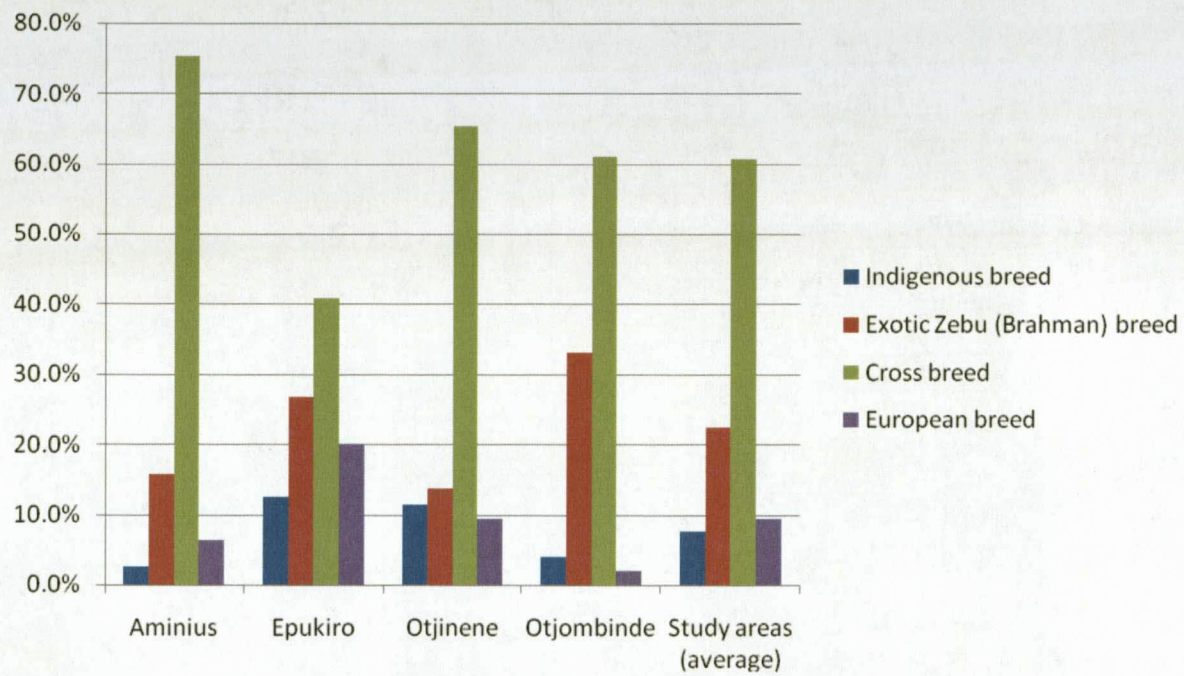


Figure 4.3 Percentages of farmers indicating their breed preference for keeping (2010)

4.4.1.4 Water Supply

The respondents indicated that 92 % of the communal farmers get water from boreholes as a source of water, and the majority of cattle walk less than one kilometre to the water point (68.8). The reliability[3] of existing water sources was rated as 78.1 % reliable, 13.5 % fairly reliable and 8.4 % as unreliable. The water quality of existing main water sources is relatively good, and only 6.5 % of respondents reported that the quality of existing water sources is poor due to a high salt content.

In order to secure a steady supply of water, the water sources should be managed effectively. The study revealed that the government established Village Water Point Committees are managing the water sources (93.9 %), whereas other means accounted for 3.9 % and non-existent 2.3 % respectively. The Ministry of Agriculture, Water and Forestry, through its Rural Water Supply department, trains and mentors village water point committees; and then hand-over water points to these committees to manage autonomously (Figure 4.4).

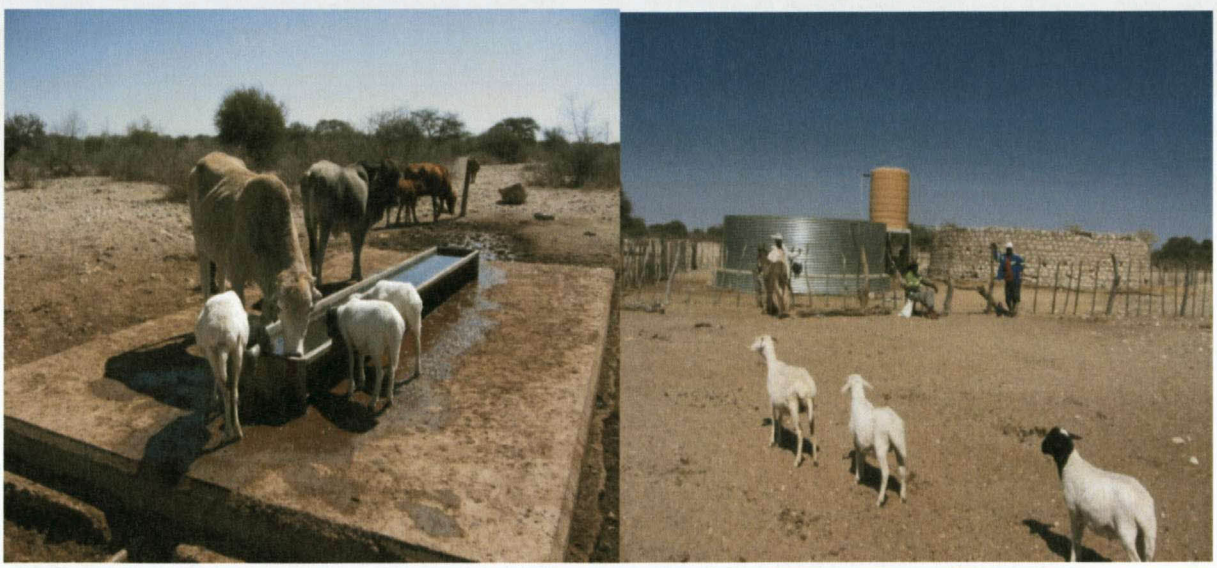


Figure 4.4 A village water source under the management of a water point committee in Epukiro

[3] Reliability means to have a continuous supply of water.

4.4.1.5 Grazing Management

The availibility of feed resources to any farming enterprise cannot be over-emphasised. The respondents were asked to indicate the source of grazing for their cattle, and in response, the majority (84.2 %) mentioned the open communal grazing veld as the main source of grazing. A further question was posed to find the grazing system employed, and 86 % of respondents indicated to be employing a free roaming grazing system. With the free roaming grazing system, each household makes its own decisions regarding where to graze its animals.

Figure 4.5 gives a summary of the condition of grazing areas in the Omaheke region's communal areas. When looking broadly at all study areas, as shown in Figure 4.5, only a quarter of respondents (24 %) indicated that the condition of grazing areas was poor. Differences between the four communal areas were analysed using a Chi-square test. The study reveals that grazing conditions are better in Aminius, followed in descending order by Otjombinde, Otjinene and Epukiro. As a result, differences between good, fairly good and poor grazing conditions vary significantly ($p<0.05$) in the four study areas. Investigations should be undertaken to identify and document the grazing management practices employed in Aminius, and if proven to be viable, this strategy could be duplicated in other communal areas. Also, investigations should be undertaken to find the cause of the relatively poor rating of grazing conditions in the Epukiro communal area.

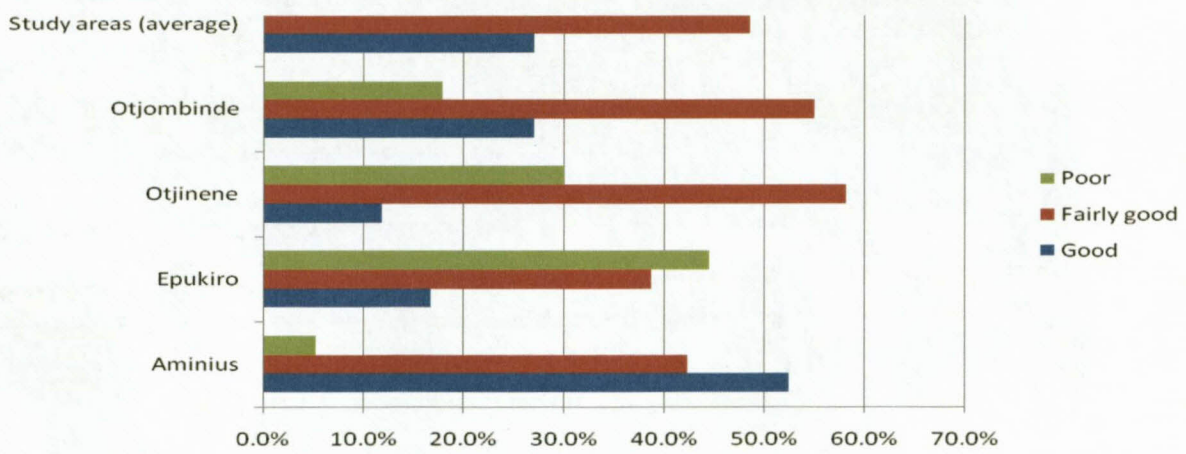


Figure 4.5 Condition of grazing areas in communal areas of Omaheke region (2010)

Table 4.2 presents the farmers' responses to the management of grazing areas, distance covered by cattle grazing areas and the daily grazing hours in the four study areas. The majority of respondents indicated that the village committees are managing the grazing areas. When a query was made to the respondents with regard to the distance covered by cattle to the grazing areas, as shown in Table 4.2, cattle are walking between 6 to 10 kilometres to grazing areas (63.3 %). The distance to the grazing areas is one of the indicators of feed resources availability.

Table 4.2 Farmers' responses to management, distance covered and daily grazing hours

Characteristic	**Aminius**	**Epukiro**	**Otjinene**	**Otjombinde**	**Study areas (average)**
n	190	120	160	100	570
Management of grazing areas (%)					
Village committee	92.6	92.5	93.1	98	93.7
Other	3.2	6.7	5.6		4
None	4.2	0.8	1.3	2	2.3
Distance covered to grazing areas (%)					
<1 km	3.2	3.3	3.8	3	3.3
1-5 km	25.3	27.5	25.6	16	23.6
6-10 km	65.8	52.5	58.8	76	63.3
>10 km	4.2	15	10.6	5	8.7
Don't know	1.6	1.7	1.3		1.2
Daily grazing hours (%)					
1-7 hours	5.8		13.8	9	7.4
8-11 hours	60.5	15.8	73.6	37	50.6
12-24 hours	33.7	84.2	12.6	54	42

A further question was posed regarding the daily grazing hours. Livestock are accorded various grazing hours, depending on farming systems and management practices employed. As shown in Table 4.3, only 7 % of the farmers graze their cattle between 1 and 7 hours, 51 % graze their cattle between 8 and 11 hours, while 42 % graze their cattle between 12 and 24 hours. Interestingly, Epukiro has a high percentage in the grazing hour range of 12 to 24 hours, whereas Otjinene has a low percentage (12.6 %) in the grazing hour range of 12 to 24 hours. Some farming communities in rural areas keep the cattle in kraals at night and only let them out

during the day for grazing and drinking water. This low percentage of grazing hours in Otjinene might be as a result of such a practice.

In many areas of Namibia, most pastures burn every year and these fires resulted in substantial loss of grazing areas. A question was asked to establish whether veld fires occur in the study areas, and if so, how frequently. In response, a large proportion of respondents (66.5 %) indicated that veld fires are not being encountered in the study areas, while the remaining respondents (33.5 %) indicated that veld fires happen about once yearly due to lightning, and that these fires are exstinguished through community intervention.

4.4.1.6 Mortalities and Losses

As indicated in Figure 4.6, drought, diseases, straying and theft are the four major causes of livestock losses. The mortalities due to disease, straying and theft seem to point to management systems employed, while those due to drought seem to point to nutritional problems. As shown in Table 4.3 above, the distance covered to grazing areas that range from six to ten kilomentres indicates that feed resources are low in terms of quantity and quality, and when drought hits, the animals are heavily affected. The mortalities caused by diseases could be greatly reduced through effective utilisation of agricultural support services available. The herding practice elsewhere in Namibia and beyond has proved an effective way to reduce livestock losses through predation, theft and straying. The adoption of the herding practice would likely reduce and even eliminate the straying and theft incidences.

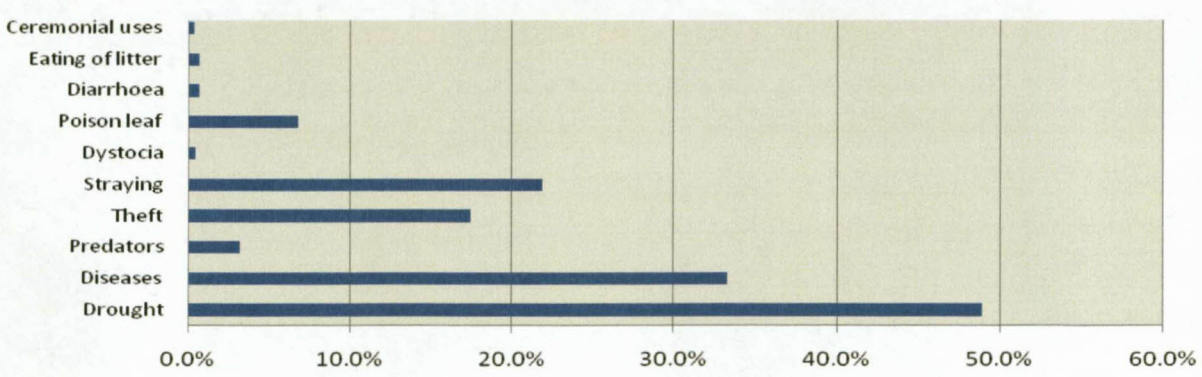


Figure 4.6 Main causes of cattle mortalities and losses in Omaheke communal areas (2010)

Table 4.3 shows the mean±standard deviations and percentages for herd mortalities and losses in the study areas. As indicated in Table 4.3, the cows had the highest death incidence amongst cattle and, on average, a farmer lost ten cattle annually. Thus, the overall herd mortality rate is 15 % in the study areas. Aminius has the highest number of mortalities while Otjinene has lowest. Interestingly, no mortalities or losses have been reported for bulls across all four study areas, and it implies that bulls don't die or maybe do stay around long enough to die.

Table 4.3 Cattle mortalities and losses in study areas

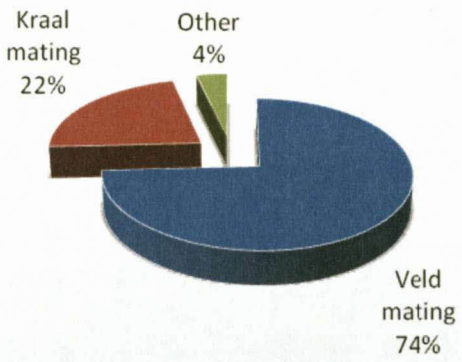
Category	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)	Percentage of total herd
n	190	120	160	100	570	
Cows	6±43.4	5±27.5	3±10.9	4±11.7	5±27.6	50 %
Heifers (1-3 years)	4±17.0	3±6.3	1±5.1	1±3.2	2±19.0	20 %
Steers (1-3 years)	2±6.9	2±2.6		1±1.6	1±3.7	10 %
Calves (< 1 year)	3±10.1	3±4.1	1±4.9	2±3.3	2±6.0	20 %
Total	15±77.4	13±40.5	4±20.9	8±19.8	10±56.3	100 %

4.4.2 Managerial Practices

4.4.2.1 Mating Practices and Selection

As shown in Figure 4.7, the veld mating[4] system is the dominant mating practice employed by farmers in the study areas. The farmers employ this mating system because of limitations in infrastructure and land availability. To a lesser extent, kraal mating is practised by farmers who fenced off small camps for the bulls and only allow bulls to meet the cows at kraals during day-time when the cows return for milking and drinking water. Further, Figure 4.8 shows that the majority of farmers prefer to use multiple sires[5]. The practice of multiple sires ties in well with the veld mating system employed as it enables any cow on heat to be serviced by bulls in the vicinity.

[4] Veld mating means cows and bulls move together all year round and there are no distinct times where breeding takes place.
[5] Multiple sires means to have many bulls run and mate freely with cows.



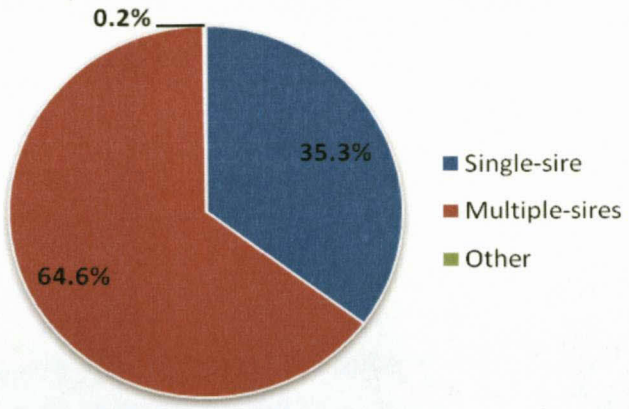


Figure 4.7 Mating systems employed (2010) Figure 4.8 Sire mating practices employed (2010)

Figure 4.9 shows the various ways used to acquire bulls by farmers in the study areas. As shown in Figure 4.9, 71 % of respondents indicated to have acquired bulls through means such as buying bulls from commerical farmers, neighbouring communal farmers and taking bulls from their own herds. Almost 30 % of respondents do not own bulls and as a result greatly benefit through the veld mating system employed which enables their cows are mated by multiple sires. As indicated, the sire:dam ratio is high in the study areas (Table 4.2), and the trend of not owning a bull has put tremendous pressure on available bulls to service cows on heat. Due to this fact, over utilisation may result in bull fatique and poor libido. The trend of not having sufficient bulls may result in reproduction and production losses because not all the cows will be mated when on heat. In the end, both the reproduction and production losses constitute an economic loss because the farmer has invested in the upkeep of that animal during a certain period of time and has not received a return in the form of a marketable calf.

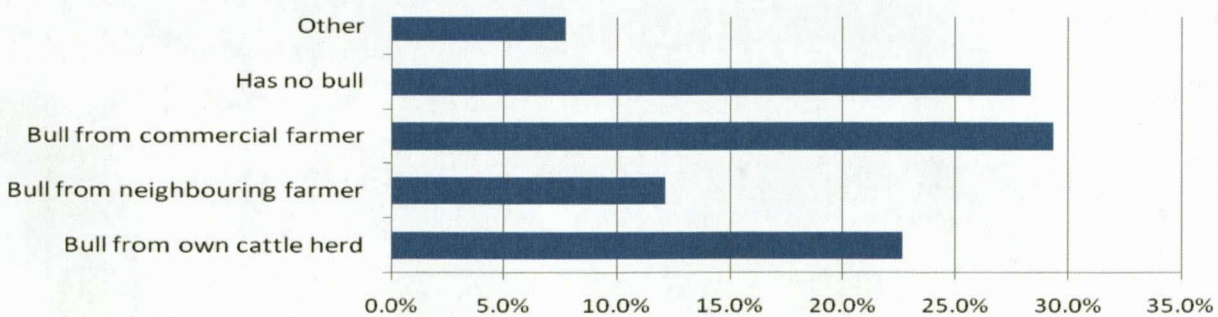


Figure 4.9 Bull acquisition in the four study areas (2010)

The mating ages for young bulls and heifers is shown in Figure 4.10. The majority of respondents indicated that they do not know the age at which bulls should first mate, as shown in Figure 4.10. 74 % of the respondents mate heifers from the age of 12 to 36 months. As shown in Figure 4.10, some respondents (36.5 %) indicated that heifers are mating when they come on heat, ranging from an age of 12 to 24 months; while 38 % indicated that heifers are mated from 25 to 36 months. Ideally, heifers should be first mated when they have reached the minimum target weight for that particular breed. Under the current farming system which is dominated by the employment of free roaming grazing and veld mating practices, it is difficult to control the mating age and weights of the heifers.

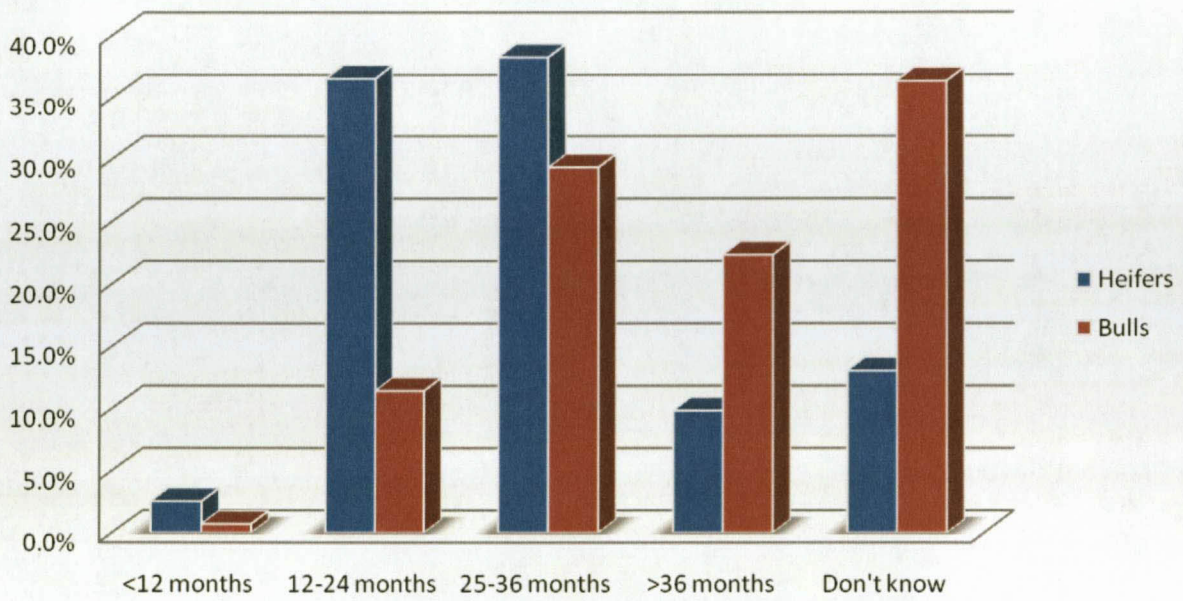


Figure 4.10 Ages at first mating of heifers and bulls in study areas (2010)

4.4.2.2 Cattle Identification

Cattle identification is a statutory requirement in Namibia. Communal farmers apply different techniques to identify their cattle, and the commonly used ones are branding with a hot iron, tattoing, earmarking and eartagging. Identification is important for traceability reasons and for enabling farmers to distinguish their livestock from those of other farmers. As indicated in Table 4.4, farmers who prefer to use a combination of techniques are represented in other[6] (42.5 %), followed by 35 % of branding with a heated iron, and 20 % of earmarking. Differences between

[6] Other means that farmers use a combination of variuos identification techniques.

the four communal areas were analysed using a Chi-square test. As a result, there were significant differences ($p<0.05$) between identification techniques used in the four study areas. Tattooing and eartagging with plastic tags was ranked the least used method; although the Meat Board of Namibia, through the FANMEAT scheme, introduced eartagging with special plastic eartags for traceability. It is mandatory that livestock farmers be registered with the Meat Board of Namibia as producers, and that they brand their livestock in order to market their livestock. When registered, each producer is issued with a certificate and membership card bearing a unique brand number. Thereafter, the producer makes his own branding iron bearing this unique number. Earmarking is one of the oldest and cheapest identification methods used for many years in the study areas. A sharp knife is used to cut unique patterns on the ears of animals. This practice requires precision and skill.

Table 4.4 Identification, castration and dehorning techniques used in the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
n	190	120	160	100	570
Identification method (%)					
Branding with hot iron	31.6	30.8	33.1	50.0	35.1
Tattooing	-	-	-	2.0	0.4
Earmarking	2.1	-	40.6	45.0	20.0
Eartagging with plastic tags	-	-	6.9	1.0	2.1
Other	66.3	69.2	19.4	2.0	42.5
Castration method (%)					
Knife	16.3	4.2	5.0	4.0	8.4
Elastrator (ring)	48.4	68.3	33.8	61.0	50.7
Burdizzo	17.4	11.7	43.8	21.0	24.2
None	8.4	12.5	15.6	12.0	11.9
Other	9.5	3.3	1.9	2.0	4.7
Dehorning method (%)					
Use of hot iron	82.6	90.8	86.9	92	87.2
Use of polled bulls	0.5	-	-	1.0	0.4
None	16.3	9.2	12.5	7.0	12.1
Other	0.5	-	0.6	-	0.4

When a further query was made as to when identification is done, 56.3 % of respondents indicated that identification is done when calves are between three to six months. The Stock

Brands Act of 1995 requires all animals of six months to be branded with the owner-registered brand.

4.4.2.3 Castration and Dehorning

Communal farmers in the study areas apply different techniques to castrate and dehorn their cattle. The most commonly used castration methods are with a knife, elastrator and burdizzo; while with dehorning, a hot iron is placed over the emerging horn and turned around to form a brown ring around the horn bud. With regard to the right age of castration, 50.4 % of respondents indicated that they castrate from three to six months, whereas. 29.5 % indicated between six to 12 months.

The majority of farmers castrate with the elastrator (51 %), followed by burdizzo (24 %), and only 8 % use the knife (see Table 4.4). The elastrator method involves a rubber ring being applied which cuts off the blood flow to the testicles and results in the testicles drying up. On survey about frequency of castration, 52.6 % of respondents indicated that they perform castrations once yearly, 27 % indicated twice yearly (27 %) and 12.3 % do not castrate at all. The trend in the latter is due to the fact that weaner calves are sold without being castrated.

Dehorning is one of the most important managerial practices. It minimises injury to other cattle and horned cattle should be dehorned as young as possible. As shown in Table 4.4, the majority of farmers (87.2 %) use the hot iron technique, while 12 % do not dehorn at all. With regard to the right age of dehorning, 50 % of respondents indicated that they dehorn from three to six months, whereas 30 % indicated between six to 12 months. Similar to castration, on survey about frequency of dehorning, 55 % of respondents indicated that they perform dehorning once yearly, whereas 24 % indicated twice yearly.

Cattle should be dehorned while under the age of six months. In cases where the horn is a bit big, it should be cut off with a sharp knife or a dehorning plier before using a wood-heated iron. After dehorning, cattle should be inspected until healing has taken place, and any infected should be treated. The communal farmers can greatly reduce the labour effort involved in dehorning and benefit through the use polled bulls. The government extension department should promote the adoption of polled bulls in its extension work.

4.4.2.4 Weaning

The practice of weaning calves is one of the key cattle managerial practices that can be used in cattle herds in extensive production systems to improve herd productivity. The main objective of weaning is therefore to enable a cow to calve every year by allowing her to regain condition after weaning. Communal farmers apply different techniques to wean their calves, and the commonly-used methods are phyiscal separation[7], the use of nose ring[8] and natural weaning[9]. As indicated in Table 4.5, the natural weaning method predominates in the study areas (39.1 %), followed by physical separation (34.4 %) and the use of a nose ring (23.3 %). The respondents using physical seperation and nose ring techniques indicated to wean calves from six to nine months of age. Ideally, calves should be weaned when they are seven months old (Rothauge, 2006).

The farmers in the study areas indicated that they keep cattle for the provision of milk and meat (nutrition source), and thus the natural weaning practice that predominates is linked to the reason why cattle are kept in the study areas. As shown in Table 4.5, when looking at a specific area, physical separation practice is employed more in the Epukiro and Otjombinde communal areas respectively. This practice is adopted in those two study areas because Otjombinde was initially earmarkerd for the white settlers and demarcated into commercial farms with camps; while in Epukiro, illegal private fencing took place, as reported by Healy (1996).

The natural weaning practice predominates in Otjinene, while in Aminius the use of nose rings predominates. Considering the benefits of weaning and its contribution to overall herd reproduction and productivty, and given the limitations in infrastructure in the study areas, the use of the nose ring as a weaning method seems to be best option in terms of cost.

[7] Physical separation means separating a calf from the cow with an aid of a fence.
[8] A nose ring is a plastic device or a wire that is pushed through the nose which has a lot of wires in a circle at the end.
[9] Natural weaning means that the calf is left with the cow until they naturally separate.

Table 4.5 Weaning techniques used in the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
n	190	120	160	100	570
Weaning method (%)					
Physical separation	28.4	48.3	21.9	49.0	34.4
Natural weaning	36.3	30.8	50.6	36.0	39.1
Use of nose ring	32.1	19.2	23.1	12.0	23.3
Other	3.2	1.7	4.4	3.0	3.2

4.4.2.5 Parasites Control, Vaccination and Disease Control

Ticks infestations account for cattle losses in communal areas (Metzger, 1994; Whande, 1999). As a result, farmers in the study areas apply different techniques to control external parasites on their cattle. As indicated in Figure 4.11, the most common control mechanism is pour-on remedies, according to 40 % of the respondents. Tick grease and dipping each accounts for 16 % respectively, while hand picking accounts for only 4 %. The farmers' seriousness in controlling external parasites effectively will contribute to improved productivity.

In terms of internal parasites control, the majority of interviewed farmers (78.4 %) do not treat endo-parasites. The few farmers (21.6 %) who do control internal parasites are dosing their cattle once or twice yearly.

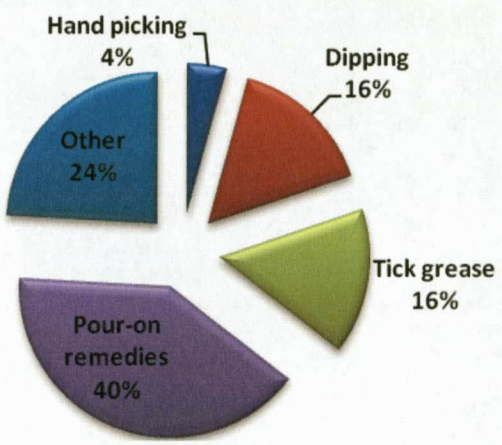


Figure 4.11 External parasites control methods used

The four most prominent cattle diseases in the study areas are botulism, blackquarter, anthrax and brucelossis (see Figure 4.12). A study conducted by Metzger (1994) identified Botulism and Black-quarter as the major diseases killing cattle. Similar to the above finding, this study finding shows that 86 % of respondents are concerned about Botulism, and 43 % about Black-quarter.

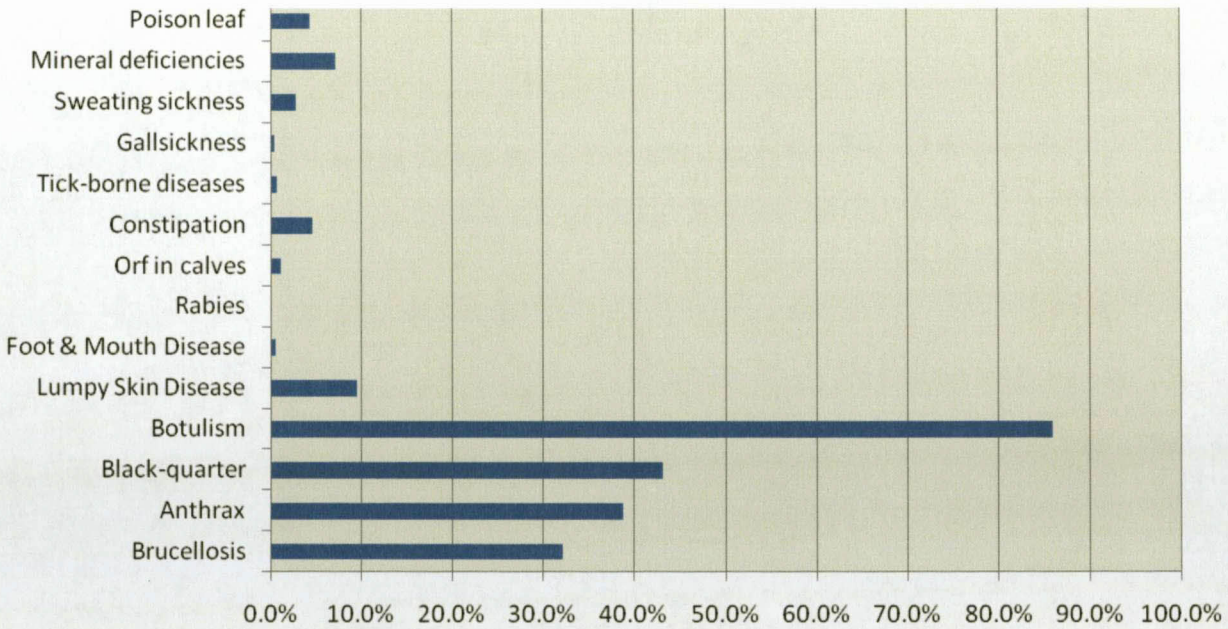


Figure 4.12 Prominent cattle diseases in the study areas (2010)

As indicated in Figure 4.13, the farmers mainly vaccinate annually for immunity against brucellosis, botulism, anthrax and blackquater. Further, 66.3 % of respondents indicated that the first immunisations for calves are done between three and six months of age.

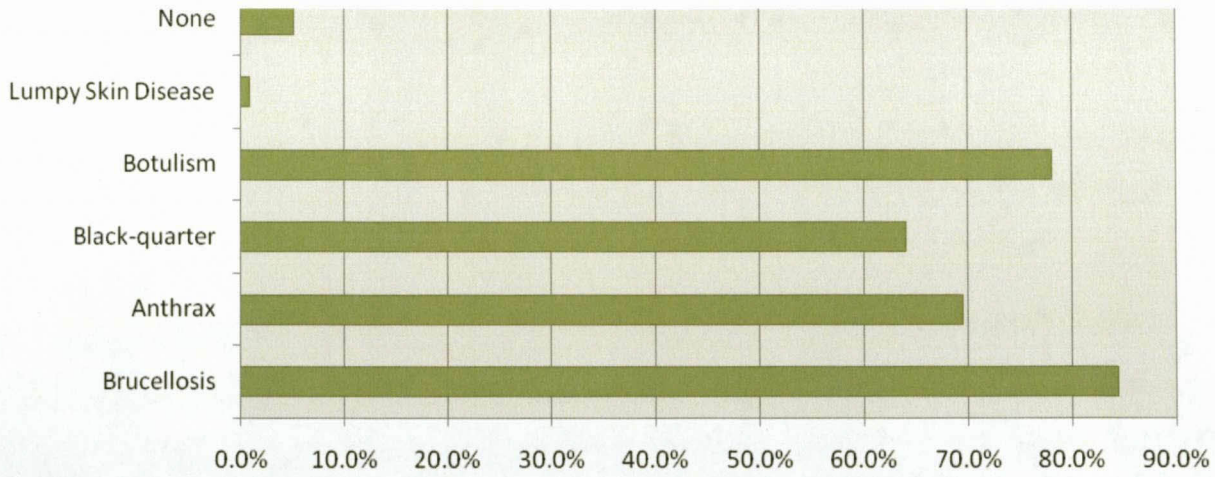


Figure 4.13 Cattle annual immunisations in the four study areas (2010)

An enquiry was made regarding the responsible body for immunising cattle in the study areas. In response, 92.1 % of respondents indicated that individual farmers are responsible for cattle immunisation in the study areas. A second question sought to establish the seasons when both the initial and annual booster immunisations were administered. As shown in Figure 4.14, 63.6 % of farmers vaccinate during summer, 14.8 % during autumn, 12.1 % during winter and 6.2 % during spring.

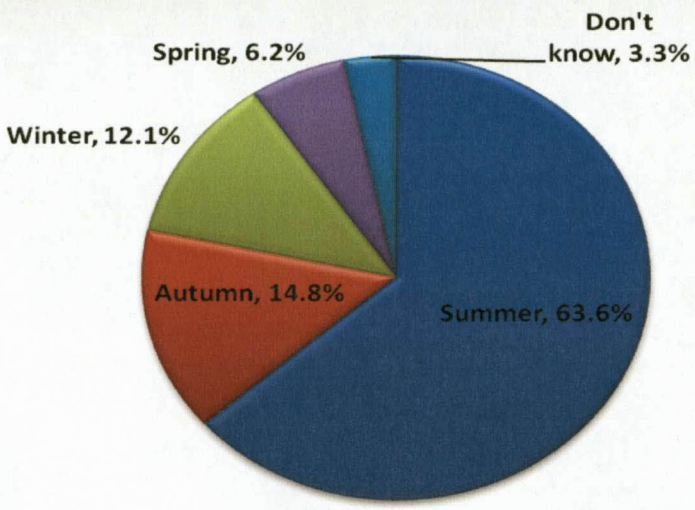


Figure 4.14 Season of cattle immunisations in Omaheke communal areas (2010)

4.4.2.6 Supplementation

According to Roodt (2007), the grass forage in Namibia has low phosphorus (P) content due to the P-deficiency and high Calcium (Ca) content of most soils in Namibia. Cattle need at least 25g P/day and if not supplemented, cattle develop the typical deficiency symptom "pica" in many areas of Namibia, which is as shown in Figure 4.15. Pica is characterised by chewing stones, bones and other unusual objects (Roodt, 2007). Phosphorus deficiencies decrease feed intake, conception rates, ovarian activity, and cause anoestrus (Lopez, Kanitz & Moreira, 2004). Cows deficient in calcium have an increased incidence of dystocia, retained placentae and prolapsed uterus (Lanyasunya, Musa, Yang, Mekkiand & Mukisira, 2005).

The majority of respondents (63.3 %) are supplementing their cattle more than four times yearly with home-mixed phosphate licks (56.8 %) and readily mixed phosphate licks (30.7 %). These findings are in agreement with that of MAWRD (2003). In terms of the season of supplementation, the majority of respondents (59.2 %) are supplementing their cattle with phosphate licks throughout the year.

Figure 4.15 Eating of litter as a sign of P-deficiency (source: Gabriel Hangara)

Drought is a common phenomena in Namibia and cattle farmers employ different strategies to prepare for the drought and mitigate its impact. According to Rothauge (2001), planning for drought and drought preparedness should be a fundamental part of livestock production in an arid country. A first question was asked to find out which mitigation strategies farmers employ in the study areas before the drought. As shown in Figure 4.16, licks supplementation (56.9 %) is the main mitigation strategy employed before the drought in the study areas. The building of fodder banks accounts for 17 %, while relocating to other areas within a district accounts for 11.4 %.

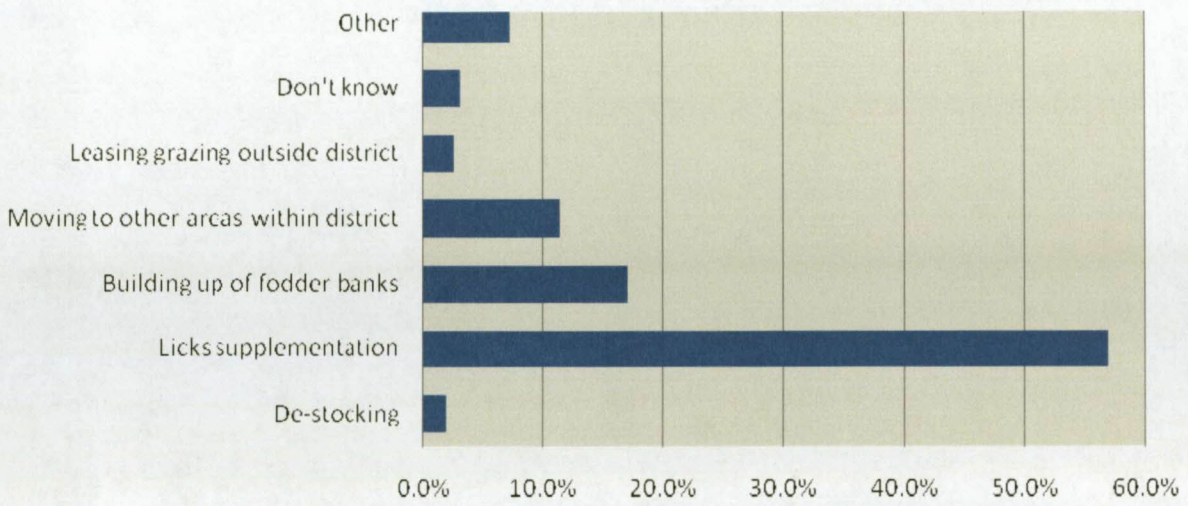


Figure 4.16 Mitigation strategies employed before drought in the study areas (2010)

A second question was asked to find out which mitigation strategies are employed by farmers during the drought. Licks supplementation was again cited as the main mitigation strategy employed during the drought (see Figure 4.17). To a lesser extent, farmers are providing their cattle with protein and energy feeds (24.6 %). During the drought, many farmers will concentrate on destocking, but this is not the case in these study areas.

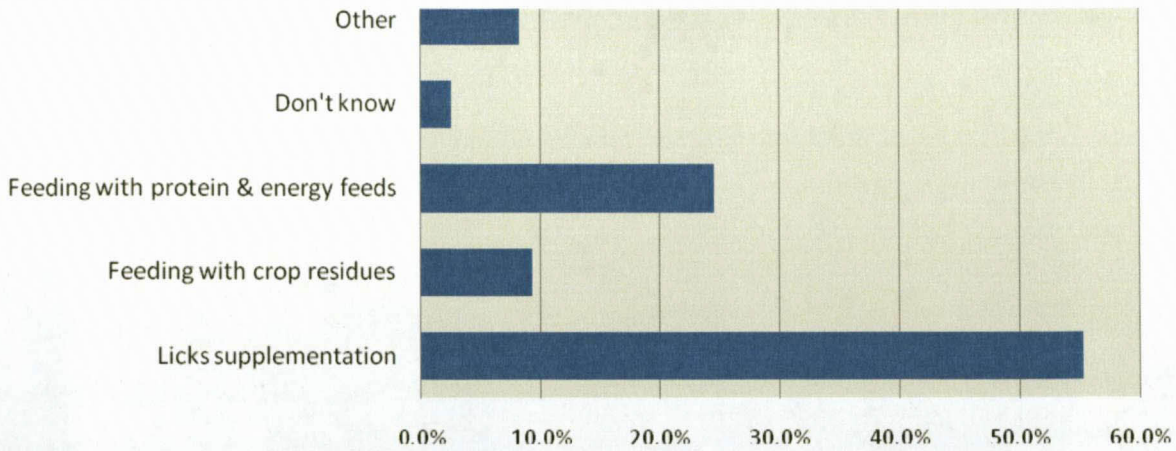


Figure 4.17 Mitigation strategies employed during drought in the study areas (2010)

Figure 4.18 shows the mitigiation strategies employed after a drought in the study areas. The majority of respondents (88.9 %) indicated to provide licks supplementation. After the drought, many farmers will concentrate on restocking, but this is not the case in these study areas as indicated by only a few farmers (3.2 %) who restock.

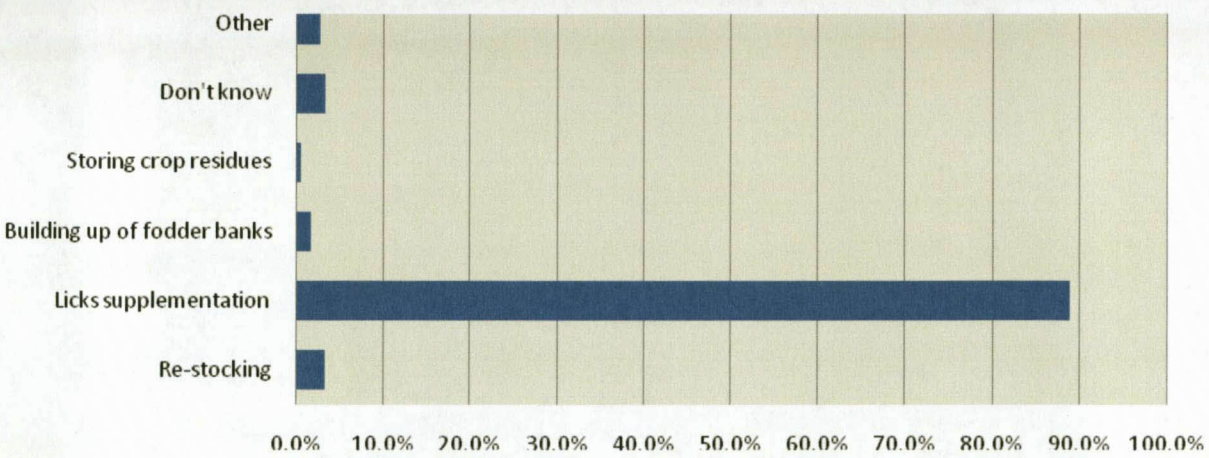


Figure 4.18 Mitigation strategies employed after drought in the study areas (2010)

4.4.2.7 Record Keeping

Record keeping is very crucial to any farming enterprise, be it for subsistence or commercial farming. Table 4.6 shows the recording keeping trend in the study areas. As shown in Table 4.6, only 5 % of respondents indicated to keep cattle records, which include births, mortalities, sales, acquisitions, disease incidences and treatment records, and licks supplemtantions. Differences between those who kept records and those who did not keep records were analysed using a Chi-square test. As a result, there were significant differences ($p<0.05$) between those who keep records and those who do not keep records in the four study areas.

Table 4.6 Record keeping in the study areas

Characteristic	**Aminius**	**Epukiro**	**Otjinene**	**Otjombinde**	**Study areas (average)**
n	190	120	160	100	570
Record keeping (%)					
Yes	4.2	11.7	4.4	1.0	5.3
No	95.8	95.6	95.6	99.0	94.7

4.4.3 Support Services

4.4.3.1 Agricultural Advice and Training

The Ministry of Agriculture, Water and Forestry plays a dominant role in the public agri-service area. The Ministry provides different services, such as extension, advice, veterinary and rural water supply in the four communal areas of the Omaheke region. However, when asked "how frequently farmers visited" for advice, as indicated in Figure 4.19, 73.5 % of respondents indicated that they never paid visits to the local extension office, and 63.5 % never paid yearly visits to the veterinary office for agricultural advice. In terms of training, only 13 % of respondents had received agricultural training during the last five years.

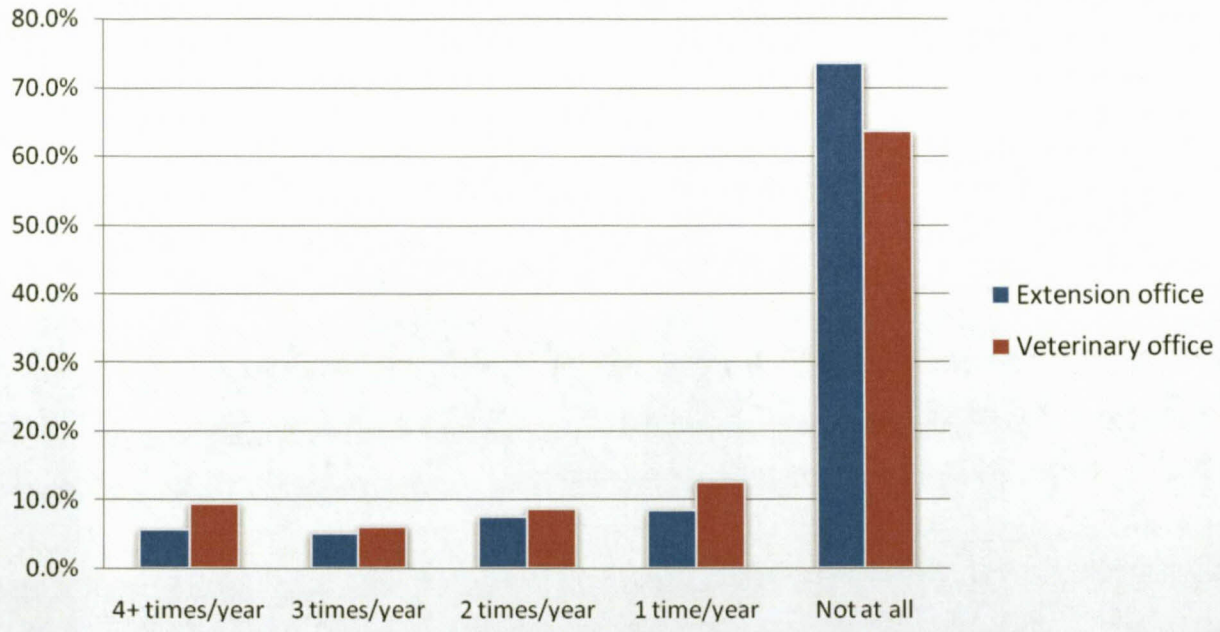


Figure 4.19 Visit frequencies to agricultural support services (2010)

4.4.3.2 Agricultural Credit

From the 570 respondents, 69 % indicated that there was no source of agricultural credit in communal areas. Although 31 % indicated that there were credit services, they were located at a distance of more than 200 kilometers from the farm. In terms of credit, only 5 % of respondents indicated to have received credit to buy cattle (particularly bulls) during the last five years. The Agricultural Bank of Namibia provides production loans to farmers to acquire breeding stock and farmers use these loans to buy bulls in order to increase their production.

4.5 Conclusions

This chapter focused on characterising the production system; studied the managerial practices employed and accessed the availability and utilisation of support services.

4.5.1 Production Systsem

The study revealed that cattle are kept mainly as a source of nutrition and, justifying this important production objective, the average herd size per household is 66 animals and consists

of a high percentage of females. The cross breeds are the preferred breeds and preference varies signficantly ($p<0.05$). The availability of water and grazing was found not to be a constraint to cattle production, although cattle covers an average of six to ten kilometres to grazing areas. The study found that the grazing conditions in Aminius were rated far better than those in the other study areas. Therefore, further research is needed to investigate and document the grazing management practices employed in Aminius, to duplicate these in other communal areas if viable. Also, research should be undertaken to find the cause of the relatively poor rating of grazing conditions in the Epukiro communal area. A policy is needed to guide the management of grazing resources in communal areas. Finally, the establishment of village grazing management committees would likely go a long way in conserving grazing resources and enabling sustainable cattle production.

The main constraints identified are incorrect bull:cow ratio, low calving percentage and high cattle mortalities and losses. The incorrect bull:cow ratio has severe consequences for production systems because it affects the conception and fertility of the herd. This, in fact, results in a production loss to farmers because every cow is expected to calf every year. The introduction of bull schemes with clear guidelines in terms of utilisation and ownership could address these shortcomings. Such an intervention requires a joint effort between the government and private sector. If and when such a programme is introduced, preference should be given to the Otjinene and Otjombinde communal areas because the bull:cow ratio is beyond the recommended ratio of 1:25.

The low calving percentage (31.5%) under the current production system in the communal areas of the Omaheke region seemed to point to specific causal factors like a high percentage of non-productive breeding females, an incorect bull:cow ratio, nutritional problems and poor managerial practices. The incorrect bull:cow ratio proved to be the main reason for low calving percentages.

The main causes of cattle mortalities and losses in the communal areas are drought (49%), diseases (33%), straying (22%) and theft (18%), and a farmer loses an average of ten cattle per year. This loss of ten cattle per year is a great loss to a farmer with an average herd size of 66 cattle. The mortalities due to disease, straying and theft seemed to point to shortcomings in managerial practices employed, while those due to drought may point to nutritional problems.

The mortalities caused by diseases could be greatly reduced through effective utilisation of agricultural support services available. The herding practice elsewhere in Namibia and beyond proved an effective way to reduce livestock losses through predation, theft and straying. The adoption of the herding practice should encouraged because it will reduce and even eliminate straying and theft incidences.

4.5.2 Managerial Practices

The study showed that the veld mating system with multiple sires is the dominant mating practice employed by farmers in the study areas. The adoption of this mating practice is in conformity with some limitations in infrastructure and land availability. Almost 30% of farmers do not own bulls and this might be a contributing factor to low calving percentages identified as a constraint under the production system.

The farmers are employing sound managerial practices in terms of cattle identification, castration, dehorning, control of external parasites, immunisations against brucellosis, botulism, anthrax and blackquater and supplementation. The communal farmers can greatly reduce the labour effort involved in dehorning and benefit through the use of polled bulls. The government extension department should promote the adoption of polled bulls in its extension work.

The managerial practices that negate sustainable cattle production are weaning practices and record keeping. Natural weaning practice predominates in the study areas and this practice prolongs inter-calving periods of cattle. Considering the benefits of weaning and its contribution to overall herd reproduction and productivty, and given the limitations in infrastructure in the study areas, the use of the nose ring as a weaning method seems to be best option in terms of cost and practicality for communal cattle farmers. In terms of record keeping, only 5% of farmers in the study areas keep records of births, mortalities, sales, acquisitions, disease incidences and treatment records, and licks supplemtantions. Records are an important management tool that can guide farmers. Thus, both public and private agricultural service providers should embark upon farmers' training in record keeping and to highlight its importance. Tailor-made recording files in local langauges, if not available, should be developed for communal farmers.

4.5.3 Support Services

Cattle farmers in the study areas are not utilising the local public agri-service offices for advice and training. Constraints stated in the production system and shortcomings found in the managerial practices could be addresed if farmers can visit the extension and veterinary offices for advice.

Proactively, both the local public and private agri-service providers should embark on awareness raising regarding the mandatory services they offer to the communal farmers; and should offer training according to training needs identified if resources allow. In addition, a further study should be undertaken to ascertain why farmers are not visiting public agri-service providers offices for advice while they are faced with challenging production and managerial problems.

Also, the study shows that there are no agricultural credit facilities in the communal areas of the Omaheke region. Agricultural credit lending institutions should decentralise their services to enable farmers access to credit. Further, communal farmers' access to credit is mostly hampered by the collateral (security) demanded by financial institutions. There are under-developed legal and regulatory systems with regards to title deeds of land in rural areas and other assets that could be used as collateral. A conducive policy environment should be created by government to establish tailor-made micro-financing to rural farming communities in order to have economically-viable cattle production systems in communal areas.

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CHAPTER 5 CATTLE SUPPLY CHAIN MANAGEMENT AND ACCESS TO MARKET INFORMATION BY CATTLE FARMERS[10]

ABSTRACT

The study examines the efficiency and constraints in the cattle supply chain management from farmer to processor, and the accessibility of market information to communal farmers for the betterment of cattle marketing systems in the four communal areas of the Omaheke region. Questionnaires were developed and administered to communal farmers, farmers' associations, an auctioneer and a beef processor using purposive sampling. The main reason for selling cattle is to generate cash for purchasing food and basic necessities; and significant differences ($p<0.05$) were found between farmers' responses to the main reason for selling cattle in the four study areas. The steers constitute the main preferred type of cattle for sale, and this product is not what the local slaughter market wants. Auctions organised by farmers' associations are the most preferred marketing channel, although preference differed significantly ($p<0.05$) across the four study areas. The farmers are not satisfied with the existing market and satisfaction levels of farmers differed significantly ($p<0.05$). The study reveals that the majority of farmers do not know the quality criteria used by buyers when determining prices for cattle classes and grades ($p<0.05$). The accessibility of market information was found not to be a constraint. The constraints facing the communal cattle farmers include low prices offered for cattle, buyers' late arrival or no show, slow payment process and buyers running out of cash. Those found to be facing auctioneers and buyers operating in communal areas include the buying of poor quality cattle and few numbers of cattle offered for sale. The lack of essential and safe facilities at market outlets was expressed as a constraint to cattle farmers, auctioneers and buyers in the study areas. The study recommends strengthening the capacity of farmers' associations in terms of human and financial resources, training communal cattle farmers in managerial and marketing practices and provision of essential facilities at livestock market outlets.

[10] Submitted to the African Journal of Agricultural Research.

Key words: Communal farmers; cattle; supply chain management; cattle marketing; communal areas.

5.1 Introduction

The Namibian livestock farming activity is dominated by beef production which is produced predominantly in the Omaheke, Otjozondjupa and Kunene regions (Mushendami, Biwa & Gaomab II, 2008). The Omaheke communal areas are rich in livestock, and accounted for 185 535 cattle or 43 % of the 426 680 cattle found in the region (MAWRD, 2003). Even though the region is rich in cattle resources, cattle marketing in communal areas faces a lot challenges (Fitter, Kressirer, Kroll, Kruger, Neumann & Werner, 2001).

Cattle off-take from the Omaheke communal areas is low and, in agreement with IFAD (2003), the off-take is hindered by physical access to markets, which include distances and transportation costs; structure of the markets which is characterised by uneven relationships between farmers, market intermediaries and consumers; and producers' lack of skills, information and organisation.

Communal cattle farmers lack understanding of how the market operates; and they constantly complaining about low prices and weak bargaining power. Improved cattle market participation is among the critical requirements for communal farmers to be successful in order to contribute to the economic growth of the country and enhance the livelihoods of communal farmers. This will only be realised if communal farmers can have better access to cattle markets and information. This will also provide incentive to invest in improved managerial practices.

This chapter examines the efficiency and constraints in the cattle supply chain management from farmer to processor and access to market information by communal farmers in order to give information that will assist in the improvement of cattle marketing systems in the four communal areas of the Omaheke region. The chapter will focus specifically on cattle marketing, producers' satisfaction, pricing system, accessibility of market information, distribution and transportation systems, institutional arrangements, logistical arrangements and major constraints.

5.2 Literature Review

5.2.1 Cattle Marketing

According to Ricketts and Rawlins (2001), the role of marketing in agriculture is to facilitate ownership transfer while ensuring that farmers or producers get adequate profit while conveniently meeting the consumers' needs. This viewpoint is supported by Bekure and Tilahun (1983), who state that marketing is a mechanism through which producers exchange their livestock for cash.

In the Omaheke region, communal farmers market their livestock through auctions, permits and private sales to other farmers (commercial or neighbouring communal farmers) (MAWRD, 2003). Livestock marketing infrastructure is distributed at strategic places in communal areas of the Omaheke region (MAWRD, 2003). According to Fitter *et al.* (2001), the main problems encountered with livestock marketing in communal areas are a lack of competition from buyers, insufficient marketing infrastrucutures, and a lack of understanding and knowledge about prices and market economics among livestock farmers.

Bad roads, distances to markets, transport logistics and the high cost of moving livestock to markets, poor marketing infrastructure, lack of marketing herd size, and low purchasing power of buyers have been identified as some of the constraints to livestock marketing by small-scale farmers (Mushendami, *et al.* 2008; Mendelsohn, 2006; National Department of Agriculture, 2005; National Emergent Red Meat Producers' Organisation (NERPO), 2004; Stroebel, 2004).

5.2.2 Cattle Market Supply Chain

Various definitions of the supply chain concept are offered in the literature (Awad & Nassar, 2010; Chopra & Meindl, 2004; Lau & Lee, 2000; Lankford, 2004; Yuen, 2009). Yuen (2009) describes a supply chain as a group of organisations, activities and people who are involved in the product and/or service movement from the source to the end user. Awad and Nassar (2010) described a supply chain as a system that facilitates inter-enterprise co-operation and collaboration with suppliers, customers and business partners. According to Lau and Lee

(2000) and Yuen (2009), the process begins with the farmer/producer and finishes with the consumer (Figure 5.1).

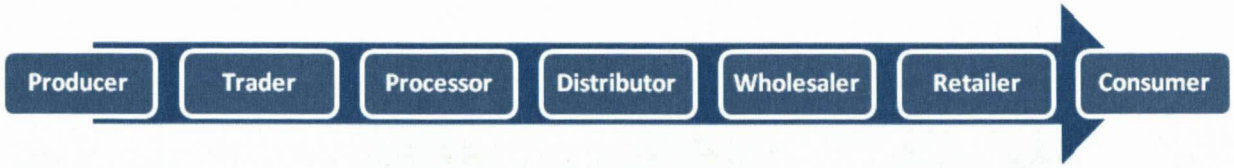

Figure 5.1 Cattle market chain (adapted from Lau & Lee, 2000; Yuen, 2009)

Lau and Lee (2000), among other authors, describe each of the role players in the market chain as follows:

- A farmer/producer raises the cattle, determines produce readiness for sale and sells them to the trader.
- A trader is anyone who buys cattle from a farmer or producer and then sells it to a processor. Traders can be feedlots, speculants, etc.
- A processor is anyone involved in the cleaning, separating, handling and preparation of a food product before it is ready to be sold to the distributor.
- A distributor stores the food until a request is received to transport the food.
- A wholesaler is a person or store that sells to the retailer, having purchased fresh or processed food in large quantities.
- The retailer or food service operator is the end of the marketing chain. A retailer or food service operator is a person or store who or that sells directly to the consumer. The retailers and food service operators further process or prepare it for consumption by consumers (Ricketts & Rawlins, 2001).

Cooper (1990) indicates that the economic chain reaction that begins with the consumer or food purchaser sends a signal to the retailer, wholesaler, distributor, processor, grader, packer, trucker, harvester, producer and others to replace that food for the next purchase.

5.2.3 Marketing Channels

As reported by MAWRD (2003), farmers in the Omaheke region have many marketing channels at their disposal to sell their cattle to. Kruger and Lammerts-Imbuwa (2008) described these different markets as:

- *Direct marketing to the Abarttoir* – Meatco have two abatoirs in Windhoek and Okahandja, and Witvlei Meat has one abartoir at Witvlei. All these abatoirs slaughter cattle for export purposes.
- *Auctions* – commonly held in communal areas and usually organised and scheduled by auctioneers that are responsible for bringing sellers and potential buyers together. The farmer pays commission to the auctioneer which is deducted from the selling price. In communal areas, farmers' organisations usually organise these auctions and get a commission for this from the auctioneers.
- *Permit days* – only take place in communal areas south of the Veterinary Gordon Fence. The permit days involve a single buyer buying livestock at pre-determined prices on a given day at a given venue.
- *Speculators* – are informed traders who move around and buy livestock according to their individual needs. These entail individuals owning butcheries or representing feedlots in South Africa.

5.2.4 Cattle Grading Characteristics in the Market

The most important characteristics in Namibia according to which live cattle and beef carcasses are graded are weight, age of the animal, fatness of the carcass, conformation of carcass and sex (Kruger & Lammerts-Imbuwa, 2008). The classifications A, AB, B and C are indications of age, while grades 0, 1, 2, 3, 4, 5 and 6 indicate the thickness of subcutaneous fat. There are five conformation types that vary from 1 (very flat) to 5 (very round) and the market prefers conformation types 3 (medium), 4 (round) and 5 (very round) respectively.

5.2.5 Access to Market Information within the Supply Chain

Limited access to information was identified as one of the constraints causing low-cattle market off-take rates in communal production systems (Musemwa, Mushunje, Chimonyo & Mapiye, 2010). The importance of having access to information in the supply chain cannot be over emphasised and the key to the seamless supply chain is making available undistorted and up-to-date market data at every node of the supply chain (Childhouse & Towill, 2003). Yuen (2009) reports that information sharing and trust between and among stakeholders is an essential element for any successful supply chain. Lack of price information, feedback information from

marketing centres to the producer were identified as agricultural constraints (Hersman, 2004; World Bank, 2006)).

If the information is available but cannot be shared by the supply chain members, its value degrades exponentially (Kwon & Suh, 2005). By making information available about the prevailing market conditions, type of product in demand, quality, quantity, price and market opportunities will greatly benefit stakeholders in the supply chain to work as a unit and help them better understand the needs of the end customers and enable them to timely respond to market changes (Coetzee, Montshwe & Jooste, 2004). Further, once made available and shared amongst stakeholders with the supply chain, this information can be used as a source of competitive advantage (Novack, Langley Jr & Rinehart, 1995; Jones 1998).

5.3 Methodology

5.3.1 Sampling

The study focused on the cattle supply chain management **from farmers to processers** as depicted in Figure 5.2.

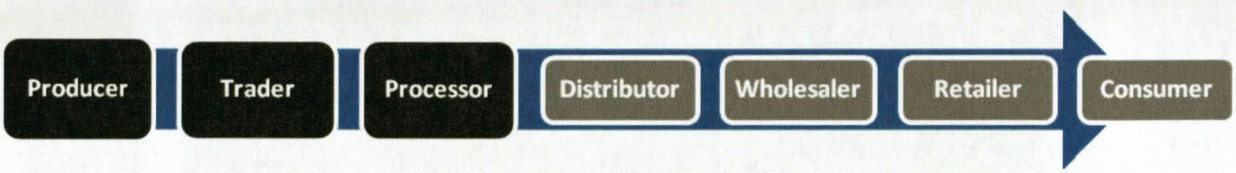

Figure 5.2 Main role players in cattle supply chain

Using purposive sampling, 100 farmers were interviewed using a structured questionnaire with open-ended questions during September 2009 and October 2009. Eight representatives of key informative institutions involved in cattle marketing in the Omaheke region were also interviewed, such as: a beef processor (Meat Corporation of Namibia), an auctioneer (Karoo Ochse), farmers' unions in communal areas (Eastern Epukiro Farmers' Association, Otjinene Famers' Association, Aminius Farmers' Association, Otjombinde Farmers' Association), and farmers' co-operatives (Namibia Farmers' Co-operative and Pamwe Farmers' Co-operative).

The respondents were chosen for a particular purpose on the basis that they were involved in cattle marketing and also because they were "typical" of a group or represented diverse perspectives on an issue (Leedy & Armrod, 2000). Since these farmers or bodies' officials are located or operate in the Omaheke region, they are the most likely to represent the local population.

5.3.2 Data Collection and Analysis

A structured interview questionnaire with open-ended questions was used to gather data. Data from questionnaires were entered into MS Excel spreadsheet and descriptive results analysis was done using Statistical Package for Social Sciences (SPSS).

5.4 Results and Discussions

5.4.1 Cattle marketing, satisfaction and pricing system

5.4.1.1 Main reason for selling cattle

Cattle are sold by communal farmers for a variety of reasons, mainly to fulfill economic roles. An indication of the most important reasons why cattle is sold in the study areas was obtained by asking respondents to name the reasons why they sell cattle and the results are summarised in Table 5.1. Differences between the four communal areas were analysed using a Chi-square test. The data used was categorical and not numerical data. Therefore, Chi-square test was then the suitable method instead of Analysis of Variance (ANOVA). As shown in Table 5.1, the main reason for selling cattle, according to 82 % of the respondents, is to generate cash for purchasing food and basic necessities. The only respondents who sell cattle to generate cash to cover festivals, funerals and ritual costs are from Aminius (36 %) and Otjombinde (28 %) respectively. Only respondents from Otjombinde indicated selling cattle to generate cash for purchasing production inputs, meaning that in the other three study areas, farmers use off-farm income to buy production inputs. As a result, there were significant differences ($p<0.05$) between farmers' responses to the main reason for selling cattle in the four study areas.

Table 5.1 Farmers' responses to reasons for selling cattle in the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Main reason for selling cattle (%)					
Cash to buy food and basic necessities	64.0	100.0	100.0	64.0	82.0
Cash to cover festivals, funeral and ritual costs	36.0	-	-	28.0	16.0
Cash to buy production inputs	-	-	-	8.0	2.0 %

The type of cattle offered for sale seems to be largely a function of the type of cattle farmers are prepared to sell. As shown in Table 5.2, 85 % of respondents prefer to sell steers, while the other cattle categories represent all together less than 15 %. This marketing trend is in agreement with findings of Metzger (1994) who reported that farmers in Omaheke communal areas are weaner producers.

Table 5.2 Farmers responses to cattle type selling preference in study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Cattle type selling preference (%)					
Dry cows	-	3.3	0.6	-	0.9
Culled cows	2.1	4.2	3.1	4.0	3.2
Oxen	1.1	-	-	-	0.4
Heifers (1-3 years)	-	2.5	1.3	-	0.9
Steers (1-3 years)	83.7	80.0	88.8	88.0	85.1
Calves (<1 year)	2.6	4.2	1.3	2.0	2.5
Other	10.5	5.8	5.0	6.0	7.2

5.4.1.2 Marketing Channels Options

Cattle communal farmers have two marketing channel options to sell their cattle through either the formal or informal markets. The formal market involves selling at auctions, permits and to

export abattoirs while the informal route involves selling to fellow farmers, small butcheries and individual speculators. As shown in Table 5.3, the study survey shows that 58.6 % of responses indicated the farmers sell at auctions organised normally by farmers' associations, followed by permits organised by farmers' associations (29.6 %). Only 1.1 % of farmers sell cattle to export abattoirs (see Table 5.3).

Under the current market channel options, the majority of respondents (53.9 %) sell less than ten cattle yearly as shown in Table 5.3. Differences between the four communal areas were analysed using a Chi-square test. There were significant differences ($p<0.05$) between the number of cattle sold yearly in the four study areas.

Table 5.3 Marketing channel options and number of cattle sold by individual farmer

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Marketing channel options (%)					
Permits organised by farmers' associations	-	57.5	0.6	99.0	29.6
Permits organised by private buyers	-	37.5	-	1.0	8.1
Auctions organised by farmers' associations	95.8	2.5	93.1	-	58.6
Meatco	2.1	-	1.3	-	1.1
Other	2.1	2.5	5.0	-	2.6
Number of cattle sold per year (%)					
<10	44.2	52.5	66.9	53.0	53.9
10 – 19	28.9	31.7	18.8	33.0	27.4
20 – 30	16.3	7.5	6.3	10.0	10.5
>30	7.4	5.8	-	2.0	4.0
Don't know	-	1.7	-	-	0.4
Not Applicable*	3.2	0.8	8.1	2.0	3.9

* Refers to those farmers who do not sell cattle at all

The respondents were asked to give an assessment of the existing cattle market supplied on a three-point scale, varying from one (not satisfied) to three (very satisfied). The survey revealed

that the majority of farmers (65.8 %), as shown in Table 5.4, are not satisfied with the existing market because private buyers (92 %) are setting the market prices for their cattle. Differences between the four communal areas were analysed using a Chi-square test. There were significant differences ($p<0.05$) between satisfaction levels of farmers in the four study areas.

Table 5.4 Farmers' satisfaction with existing cattle market supplied

Scale	Very satisfied	Fairly satisfied	Not satisfied
Percentage	3.3	30.9	65.8

5.4.1.3 Pricing of Various Cattle Classes and Grades

The off-take is bound to be influenced by the price that cattle farmers are offered or expected to receive. Communal farmers in Namibia are complaining that the prices offered for their livestock at market places are low, and further argue that they do not set the price for their livestock. Figure 5.3 shows the farmers' responses on who determines the prices for cattle classes and grades in the study areas. As shown in Figure 5.3, the majority of respondents (78 %) indicated that the cattle buyers are the determinants of prices for cattle classes and grades.

In support of views expressed by cattle farmers, as shown in Figure 5.3, the auctioneer interviewed indicated that at auctions, a farmer has the right to accept a price or to withdraw his livestock, depending on his satisfaction with the price offered by the buyer. In terms of selling to export abartoirs, both the auctioneer and processor interviewed indicated that a farmer has no power over the price offered.

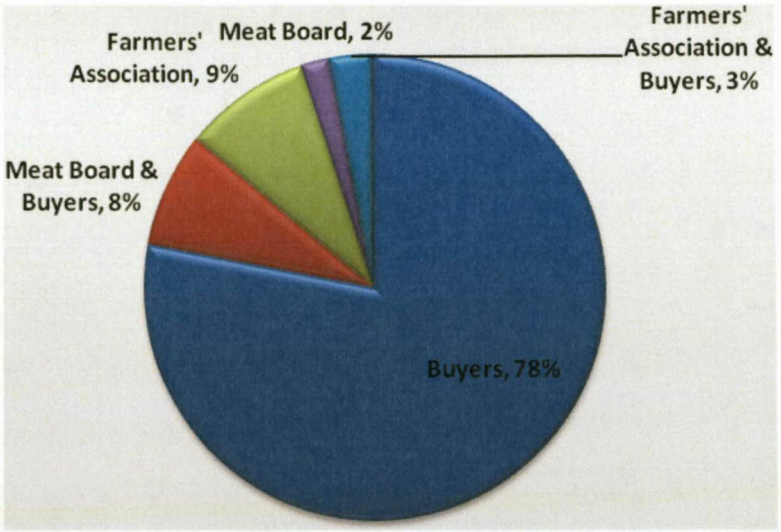

Figure 5.3 Determinants of cattle prices in the study areas (2010)

The price offered for live cattle and beef carcasses is linked to a set quality criteria. In Namibia, live cattle are graded according to weight, age and sex, while beef carcasses are graded according to weight, age of the animal, fatness of the carcass, and conformation of the carcass (Kruger and Lammerts-Imbuwa, 2008). Knowing and understanding the quality criteria used to determine prices for cattle classes and grades by communal farmers will facilitate the marketing of cattle. In an attempt to assess the respondents' awareness regarding the buyers' quality criteria, they were asked to give an indication of whether they know the quality criteria or not. Table 5.5 shows the farmers' responses, and the majority of respondents (63 %) indicated not to know the buyers' quality criteria used when determining prices for cattle classes and grades. On the contrary, the auctioneer and processor interviewed indicated that communal farmers were to a large extent aware of buyers' quality criteria. Differences between the four communal areas were analysed using a Chi-square test. As shown in Table 5.5, farmers in Aminius (52 %) and Otjombinde (52 %) are better aware of the quality criteria than those of Epukiro (20 %) and Otjinene (24 %). Farmers' opinions on the buyers' quality criteria vary significantly ($p<0.05$) in the four study areas. International Livestock Centre for Africa (ILCA) (1990) clearly indicated that information about the factors which determine buyers' preferences may indicate potential areas for improvement.

Table 5.5 Farmers' responses on buyers' quality criteria awareness in the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Awareness on buyers' quality criteria (%)					
Yes	52.0	20.0	24.0	52.0	37.0
No	48.0	80.0	76.0	48.0	63.0

Another question, asked to those respondents (37 %) who indicated that they were aware of the buyers' quality criteria, required listing the specific quality criteria or factors considered by buyers when prices are determined for cattle classes and grades, and Table 5.6 presents the findings. As shown in Table 5.6, the respondents indicated a wide range of quality criteria used to determine prices for cattle classes and grades.

Table 5.6 Farmers' opinions on quality criteria the buyers use in determining prices

Quality Criteria	%
Live weight and age	3.0
Age and body condition	3.0
Live weight and prices in the market	4.0
Buyer expenses when coming to auction	7.0
Animal health status and body condition	14.0
Animal health status and dehorning	3.0
Dehorning, castration and branding	1.0
Live weight and body condition	27.0
Animal body condition	15.0
Live weight and dehorning	1.0
Number of cattle offered for sale	1.0
Age and sex	2.0
Live weight	8.0
No idea	11.0

A similar question asked to farmers about the specific quality criteria or factors that are being considered by buyers when prices are determined for cattle classes and grades was asked to the key informants of the farmers' associations, farmers' co-operatives, auctioneer and processor. The views of the farmers' associations, farmers' co-operatives, auctioneer and

processor are presented in Table 5.7. The responses of the key informants are in agreement with those of Kruger and Lammerts-Imbuwa (2008), who reported that the factors that determine the price paid by cattle buyers are weight, age, body condition, fatness and conformation.

Table 5.7 Key informants' responses to quality criteria cattle buyers use in determining prices

Farmers' Associations and Co-operatives	**Auctioneer**	**Processor**
Live weight Appearance of the animal and body condition Age Fatness	Quality of animal (conformation) Live weight Dehorning and castration	Age (A, AB, B, C) Fatness Live – and – carcass weight Conformation

5.4.2 Access to Market Information

5.4.2.1 Market Information in Communal Areas

Figure 5.4 shows the farmers' responses regarding the source of market information to cattle farmers in the study areas. As shown in Figure 5.4, 87 % of respondents indicated that the farmers' associations are the main source of cattle market information for farmers in the study areas. The key informants of farmers' associations, farmers' co-operatives and the auctioneer and processor interviewed were in agreement with the responses provided in Figure 5.4. The market information provided by farmers' associations entail announcements of sales event dates, venues and prices on offer for cattle categories.

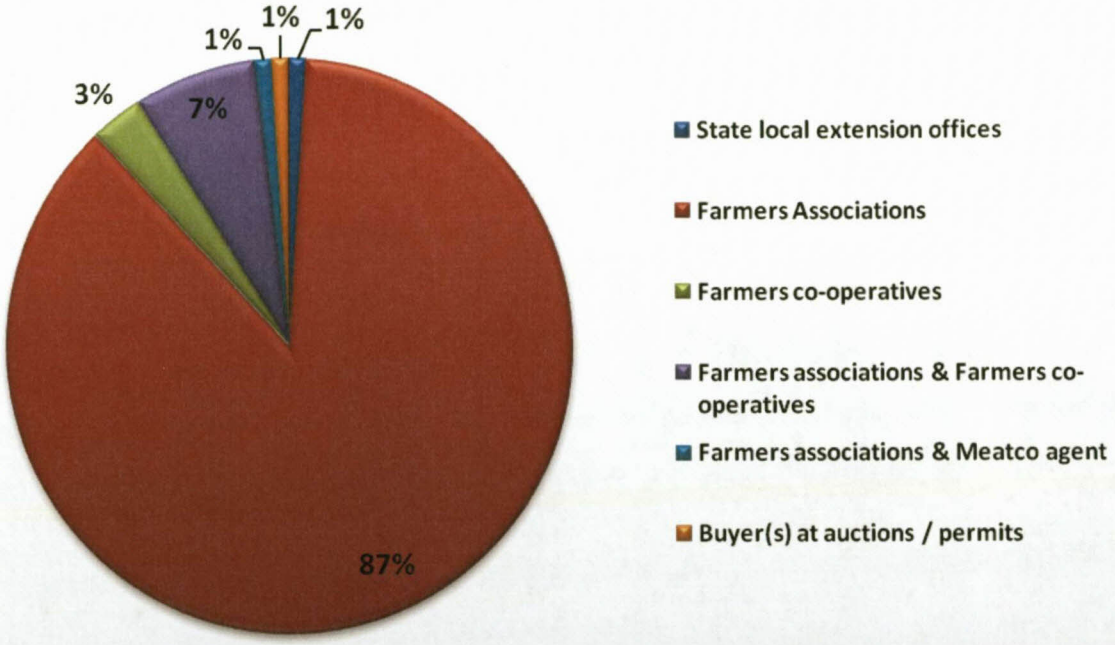

Figure 5.4 Source of market information for communal cattle farmers (2010)

5.4.2.2 Market Information Channel (Medium)

A compatible information channel enhances communication, reduces risk and supports the efficient transfer of information. The respondents were asked to give an assessment of the market information channels (mediums) on a five-point scale, varying from one (not important) to five (most important). The survey revealed that the majority of farmers (92.9 %), as shown in Table 5.8, rated the radio as the most important medium to transmit market information in communal areas. The radio was also cited as the most important medium by key informants of farmers' associations, farmers' co-operatives, and the auctioneer and processor interviewed. As shown in Table 5.8, the study survey ranked farmers' associations second, followed in descending order by cellular phone services, placing of information posters at strategic places, word of mouth, newspapers and internet-related services. The newspapers were ranked second least because they are only available in Gobabis town, which is approximately 200 kilometres away from the study areas. The internet-related services were ranked least and not important.

Table 5.8 Rating of market information channel (medium)

Source of market information	Rating (%)				
	Most important	Important	Fairly important	Less important	Not important
Radio	92.9	7.1			
Local farmer association	9.1	84.1	4.5	1.1	1.1
Newspaper	5.6	5.6	33.3	5.6	50.0
Internet-related services				9.1	90.9
Cellular phone services		14.0	58.1	7.0	20.9
Word of mouth		7.7	38.5	46.2	7.7
Placing of market information posters at strategic places	9.1	9.1	54.5	27.3	

5.4.2.3 Strategies to Improve Market Information Accessibility

A query was made on how market information access can be improved in the Omaheke communal areas and the results are shown in Figure 5.5. The respondents cited, amongst others, the distribution of yearly marketing calendars in villages as crucial (50 %), whereas increasing radio announcement frequencies accounted for 15 % of the survey. A combined approach of having marketing calendars and frequent radio announcements were viewed as a solution by 12 % of respondents.

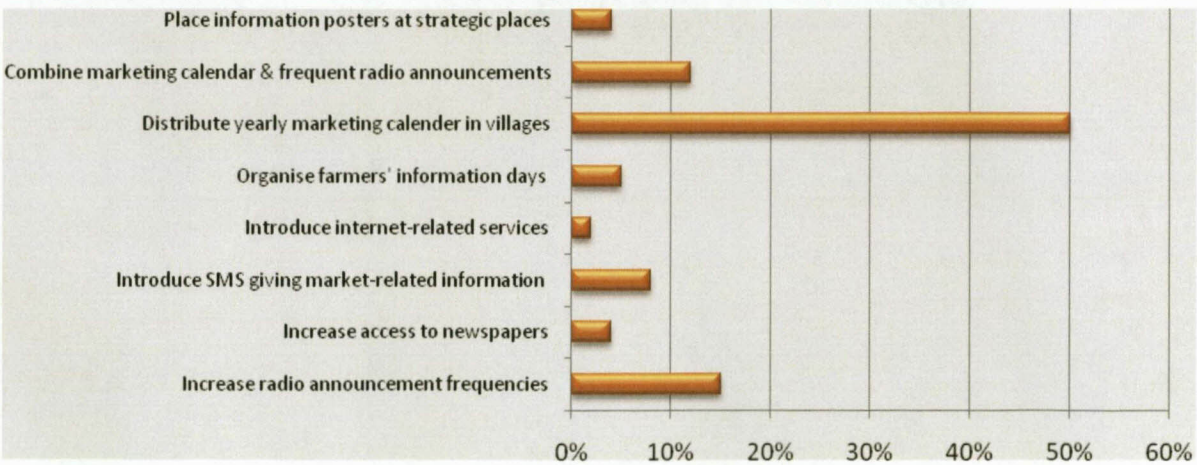

Figure 5.5 Strategies to improve market information accessibility (2010)

5.4.3 Distribution and Transport Systems

5.4.3.1 Distance to Markets

The livestock marketing facilities are located at strategic places in the study areas and the distances to these outlets vary from one village to another. Therefore, communal cattle farmers make choices about the market outlets to use. The farmers' responses regarding distance to the market outlets utilised is shown in Table 5.9. The majority of respondents (61.2 %) indicated that the average distance from their villages to the nearest market outlets supplied ranges between 10 and 30 kilometers (Table 5.9). As shown in Table 5.9, most farmers utilise the market outlets that are within the 50 kilometres range. The low responses for distances of more that 50 kilometres is an indication that only a small fraction of communal farmers access markets outside communal areas.

Table 5.9 Farmers' responses for distance to markets utilised

Scale	<10 km	10-30 km	31-50 km	>50 km	Don't know
Percentage	12.3	61.2	19.2	5.8	1.1

5.4.3.2 Cattle Transportation Modes to Markets Supplied

Cattle farmers in study areas use a variety of methods to transport their cattle to markets. Table 5.10 shows the results of transport modes utilised in the study areas to access markets within the communal areas. Differences between the four communal areas were analysed using a Chi-square test. As shown in Table 5.10, a combination of transport modes (79 %) are utilised to access internal markets within study areas and these include driving cattle to the market place on foot, using horses, donkeys and vehicles. As a result, there were significant differences ($p<0.05$) between the transportation methods used to access markets within the four study areas.

Table 5.10 Transportation methods used to access markets within the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Transport for markets within communal areas (%)					
Driving cattle on foot	-	8.0	4.0	4.0	4.0
Driving cattle using horses / donkeys	8.0	4.0	-	-	3.0
Hiring vehicles	-	-	4.0	44.0	12.0
Using own vehicles	8.0	-	-	-	2.0
Other	84.0	88.0	92.0	52.0	79.0

The markets outside the study areas are accessed only through hired vehicles (37 %), which was confirmed by the auctioneer and processor interviewed. The bulk of respondents (63 %) indicated that they do not sell cattle to markets outside the study areas and these markets comprise mainly of export abattoirs (see Table 5.11). Differences between the four communal areas were analysed using a Chi-square test. A reason for the low marketing percentage to outside markets is that communal cattle farmers are weaner producers and this product falls below slaughter market weight requirements. As a result, there were significant differences ($p<0.05$) between transportation methods used to access outside markets in the four study areas. The weaned calves from communal farming areas first go to the commercial farms or feedlots until they are ready for slaughter. Kruger and Lammerts-Imbuwa (2008) indicate that all slaughter cattle must have a live weight of at least 450 kilograms and be reasonably fat.

Table 5.11 Transportation methods used to access markets outside the study areas

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Transport for markets outside communal areas (%)					
Hiring vehicles	16.0	28.0	12.0	92.0	37.0
Not selling	84.0	72.0	88.0	8.0	63.0

5.4.4 Logistical Arrangements Prior to Marketing

As a series of logistical arrangements needs to be in place prior the marketing of cattle, which amongst others, include setting a marketing plan, conforming to statutory requirements in terms vaccinations, branding and ear-tagging, acquisitions of movement permits and arranging transport. In an attempt to assess whether the respondents are setting up marketing plans in advance, they were asked to give an indication of whether they have a market plan in place. A marketing plan entails studying the market and enables a farmer to decide on where and how many cattle to sell when the farmer can obtain higher profit. Table 5.12 shows the farmers' responses on having a marketing plan in place. Differences between the four communal areas were analysed using a Chi-square test. As shown in Table 5.12, only 45 % of respondents indicated to have marketing plans in place in the four study areas. This means that over 50 % of farmers in the study areas do not have marketing plans and sell cattle on an ad hoc basis when the need for cash arises. The study reveals that the practice of having a market plan in place is better in Epukiro, followed in descending order by Aminius, Otjombinde and Otjinene. As a result, there were significant differences ($p<0.05$) between farmers' responses on having marketing plans in advance in the four study areas.

Table 5.12 Farmers' responses on having a marketing plan in the study areas

Characteristic	**Aminius**	**Epukiro**	**Otjinene**	**Otjombinde**	**Study areas (average)**
Do you have a marketing plan in place? (%)					
Yes	52.0	56.0	32.0	40.0	45.0
No	48.0	44.0	68.0	60.0	55.0

In addition to marketing plans, the respondents were requested to state the other logistical arrangements that should be fulfilled by cattle farmers before they can market their cattle. As indicated in Figure 5.6, the respondents cited that crucial statutory requirements that should be fulfilled include: vaccinations, branding and ear-tagging, and the completion of necessary FANMEAT documentation and obtaining movement permits. As shown in Figure 5.6, from farmers interviewed, 48 % ranked vaccination, ear-tagging, movement permits and FANMEAT documents as important, whereas branding, ear-tagging, transporting and the FANMEAT card was ranked second with 39 %. The remaining requirements represent only 13 %. These logistical arrangements are in agreement with those reported by Toto (2007).

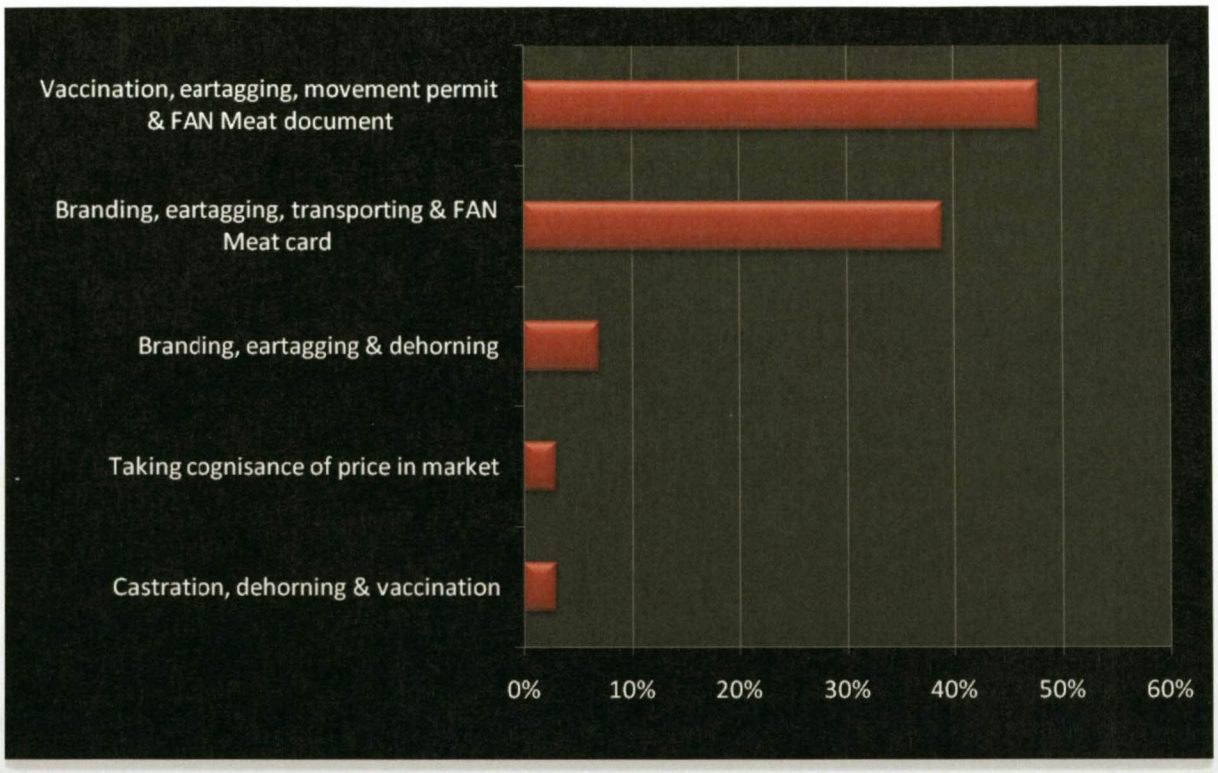

Figure 5.6 Logistics fulfilled by communal farmers before marketing cattle (2010)

Similar to cattle farmers, the farmers' associations in the study areas are expected to put a series of logistical arrangements in place prior to the marketing of cattle. In this regard, the respondents were asked to mention the logistical arrangements that should be fulfilled by the local farmers' associations before marketing can take place in communal areas. Figure 5.7 shows the responses of farmers regarding the logistical arrangements expected from farmers' associations. As shown in Figure 5.7, from farmers interviewed, 53 % ranked organisation of the sale event as important, and ranked the verification of FANMEAT documents at the sale event as second with 23 %. The remaining requirements represent only 24 %. The organisation of the sale event in this study entails looking for buyers, deciding on the sale event date (if the date was not fixed already in marketing calendar), and the announcements of the sale event.

Figure 5.7 Logistics fulfilled by farmers' associations before marketing (2010)

5.4.5 Institutional Arrangements

Figure 5.8 shows strategies indicated by farmers in the study areas on how the supply of cattle to market can be increased. The respondents (56 %) cited the offering of market-related prices as the most important strategy that will increase the supply of cattle from study areas to the market (Figure 5.8). Having a limited number of auctions to create demand for cattle was ranked second with 7 %, while farmers' education in managerial practices, farmers' education in marketing practices, the erection of marketing facilities and distribution of yearly marketing calendars in villages were each ranked third with 5 %. The offering of market-related prices has to do with the capacity of the farmers' associations and co-operatives in the study areas to bargain with cattle buyers. For the cattle farmers to receive market-related prices, the cattle market in the study areas should be determined by supply and demand. This will be achieved through having limited numbers of auctions or permits in the study areas to create demand for cattle in the market and as well offering many cattle for sale to attract many buyers.

Figure 5.8 Strategies to increase the supply of cattle to the market (2010)

5.4.6 Major Constraints in Cattle Marketing

5.4.6.1 Constraints Faced by Cattle Farmers

The surveys with cattle market participants (farmers, the auctioneer and processor) revealed major constraints in cattle marketing in the study areas. Figure 5.9 presents constraints faced by cattle farmers when marketing their cattle. As shown in Figure 5.9, the price offered is the bone of contention for the majority of cattle farmers in the study areas. It was found that 28 % of respondents felt that they should set prices, whereas 16 % indicated the lack of essential facilities at market outlets as a constraint. Other constraints indicated each accounting for 8 % were buyers' late arrival or no show-up, slow payment process and buyers running out of cash. The low prices offered have to do with the bargaining power of the farmers' associations or farmers' co-operatives when negotiating with buyers. The essential facilities lacking at market outlets include toilets and shade. The slow payment process is a result of manual verification and payment method employed. There are no banking facilities in communal areas except in Aminius, meaning that if a buyer runs out of cash, driving to Gobabis town is the only option, which is approximately 200 kilometres away to get the cash; and in most cases, farmers collect

their money the next day. Through this scenario, farmers incur extra costs in terms of transport and meals.

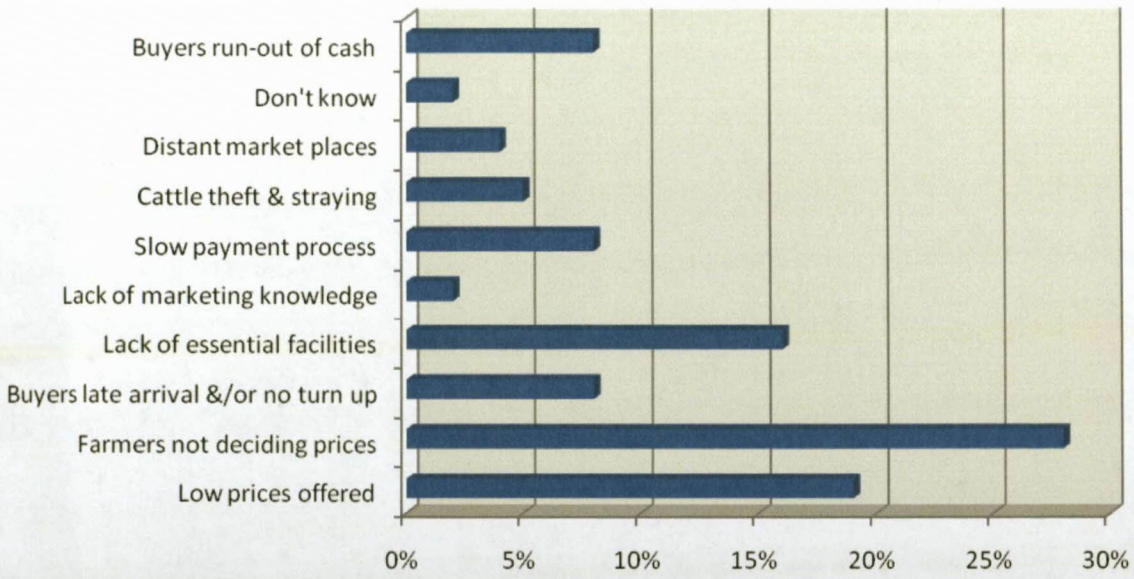

Figure 5.9 Farmers' constraints when marketing cattle in communal areas (2010)

The respondents were asked to give their views on how the constraints experienced by communal farmers when marketing their cattle can be addressed. Table 5.13 presents the respondents' views on how the constraints can be addressed. As shown in Table 5.13, 48 % of respondents indicated that regular meetings should be held between stakeholders to discuss common problems. The need to improve institutional arrangements was expressed by 22 % of respondents, followed by 17 % of respondents, who indicated that the market should be determined by supply and demand. The provision of farmers' training on marketing was proposed by 12 % of the respondents. Differences between the four communal areas were analysed using a Chi-square test. There were significant differences ($p<0.05$) between the farmers' opinions on how constraints can be addressed in the four study areas. The improvement of institutional arrangements should include the erection of essential facilities and services at market outlets, provision of banking facilities, establishment of community police to curb stock theft and crime at market outlets and timely announcement of sale events and prices on offer per cattle categories. To enable the cattle market to be governed by demand and supply, the farmers' associations should strive towards holding limited auctions and having many buyers at auctions.

Table 5.13 Farmers' opinions to address constraints when marketing cattle

Characteristic	Aminius	Epukiro	Otjinene	Otjombinde	Study areas (average)
Farmers opinions on how constraints can be addressed (%)					
Market to be determined by supply and demand	24	24	4	16	17
Regular meetings to discuss common problems	28	60	72	32	48
Provide training on marketing	20	12	-	16	12
Improve institutional arrangements	28	4	20	36	22
No idea	-	-	4	-	1

5.4.6.2 Constraints Faced by Auctioneers and Buyers

The constraints faced by auctioneers and buyers operating in study areas as viewed by respondents are presented in Table 5.14 in no chronological order. As shown in Table 5.14, 35 % of respondents indicated to have no idea regarding the constraints faced by auctioneers and buyers. Other constraints of which each accounted for 14 % were buying of poor quality cattle and lack of essential and safe facilities at market outlets. The offering of few cattle for sale was also highlighted as a constraint to auctioneers and buyers (13 %).

Table 5.14 Farmers' views on constraints faced by auctioneers and buyers

Constraint	Frequency	Valid percent
Buying of poor quality cattle	14	14 %
Buying of cattle with diseases	5	5 %
Injuries to cattle during transit	3	3 %
Few number of cattle offered for sale by farmers	13	13 %
Price disputes at sales events	5	5 %
Lack of essential & safe facilities at market outlets	14	14 %
Long distances to market outlets	6	6 %
Late delivery of cattle to market outlets by farmers	5	5 %
No idea	35	35 %
Total	100	100 %

After listing the constraints as shown in Table 5.14, the respondents were asked to indicate how these constraints facing the auctioneers and buyers in communal areas can be addressed. The respondents' opinions on how the constraints can be addressed are presented in Figure 5.10.

As shown in Figure 5.10, 40 % of respondents indicated that the provision of training for farmers would be a solution. A large proportion of respondents (33 %) indicated that they had no idea, 18 % indicated the need to improve institutional arrangements, 5 % indicated that regular meetings should be held between stakeholders to address the constraints, and 4 % indicated that the market should be determined by supply and demand. Differences between the four communal areas were analysed using a Chi-square test. There were significant differences ($p<0.05$) between the farmers' opinions on how the auctioneers' and buyers' constraints can be addressed in the four study areas. The training for farmers should focus on the cattle quality required and on the operations of buyers. The improvement of institutional arrangements should include the erection of essential facilities and services at market outlets, cattle inspection prior marketing, tarring of roads and strict regulations on cattle delivery. Timely announcements regarding market prices by farmers' associations would enable the cattle market to be governed by demand and supply.

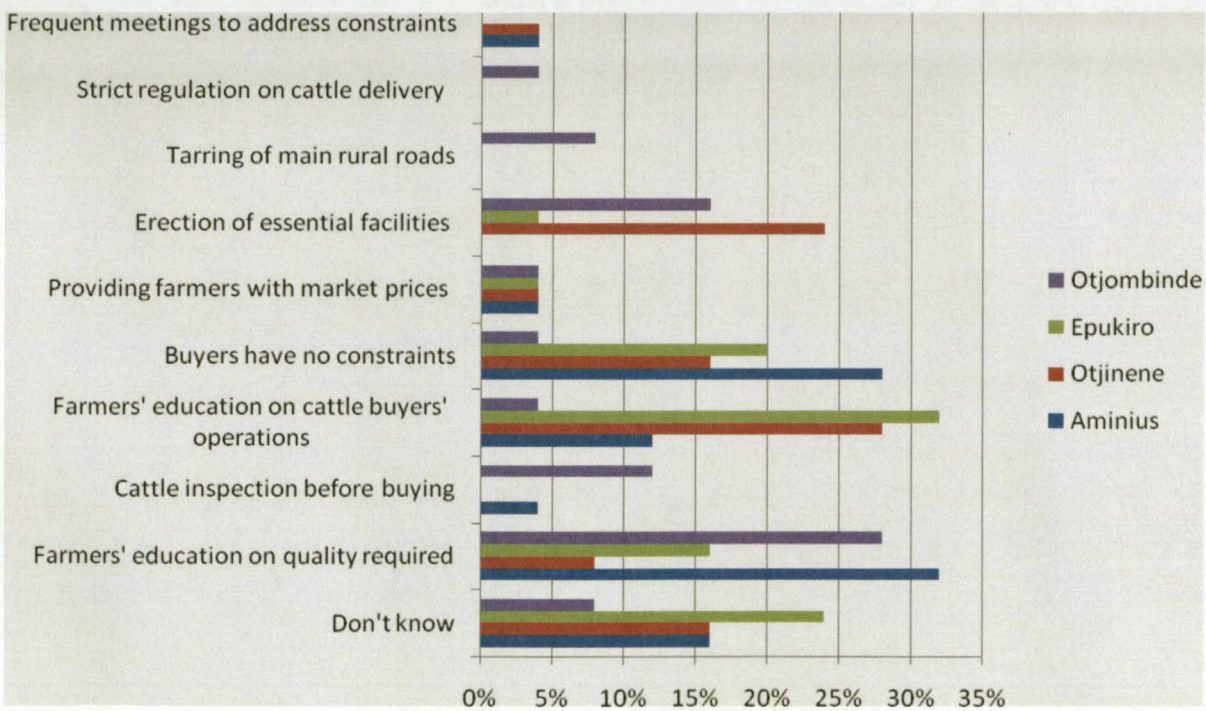

Figure 5.10 Addressing constraints of auctioneers and buyers

5.5 Conclusions

This chapter examined the efficiency and constraints in the cattle supply chain management from farmer to processor, and the access to market information by communal farmers. The chapter focused specifically on cattle marketing, producers' satisfaction, pricing system, accessibility of market information, distribution and transportation systems, institutional arrangements, logistical arrangements and major constraints. The analysis of data collected in this chapter has turned up numerous findings.

5.5.1 Cattle marketing, satisfaction and pricing system

The study found that the main reason for selling cattle is to generate cash for purchasing food and basic necessities. Farmers' responses to the main reason for selling cattle vary significantly ($p<0.05$) in the four study areas. The steers constitute the main preferred type of cattle for sale, showing that communal cattle farmers are weaner producers, and that this product is not what the local slaughter market wants for export purposes. The weaned calves from communal farming areas first go to the commercial farms or feedlots until they are ready for slaughter.

The preference for marketing channels differed significantly ($p<0.05$) across the four study areas. Farmers from both the Aminius and Otjinene study areas prefer to use auctions organised by farmers' associations; those from Otjombinde prefer to sell through the permit days organised by the farmers' association; whereas those from Epukiro prefer both permit days organised by farmers' assocations and private buyers. Cattle farmers in the study areas sell less than ten cattle yearly, and significant differences ($p<0.05$) were found between the number of cattle sold yearly in the four study areas. The survey revealed that the farmers are not satisfied with the existing market because buyers are setting the market prices, and satisfaction levels of farmers vary significantly ($p<0.05$).

The buyers use a set of quality criteria to determine the price for cattle classes and grades. Surprisingly, the study reveals that the majority of farmers do not know these quality criteria used by buyers when determining prices for cattle classes and grades, and farmers' opinions on the buyers' quality criteria in the four study areas vary significantly ($p<0.05$). Therefore, public

and private agricultural service providers in the study areas should embark upon farmers' education and awareness raising on cattle quality required by the market and how market operates and prices determined.

5.5.2 Accessiblity of market information

The study revealed that farmers have access to market information. The farmers' associations are the main source of market information for cattle farmers in the study areas, whereas the radio is the most important medium that transmits market information in communal areas. The farmers' associations should strive to have yearly marketing calendars distributed in villages and have frequent radio announcements to enable farmers to make informed decisions of when and where to sell.

5.5.3 Distribution and transportation system

The distances to local market places were found not to be a problem in the study areas because the majority of farmers reside within a range of between 10 and 30 kilometers to the nearest market outlets. To access local markets within communal areas, the study found that combinations of transport modes are utilized. These include driving cattle to the market place on foot, using horses, donkeys and vehicles. Transportation methods used to access markets within the four study areas vary significantly ($p<0.05$). The study also revealed that only a small faction of communal farmers access markets outside communal areas and are accessed only through hired vehicles. Transportation methods used to access outside markets vary significantly ($p<0.05$) in the four study areas.

5.5.4 Logistical arrangements prior to marketing

Over 50 % of farmers in the study areas do not have marketing plans and sell cattle on an ad hoc basis when the need for cash arises. Significant differences ($p<0.05$) were found between farmers' responses on having marketing plans in the four study areas. The essence of marketing is to sell to obtain higher profit, but selling ad hoc can be disastrous. More work needs to be done to empower communal farmers in terms of knowledge and advice on when, where and which cattle type to sell to obtain higher profit. Further, farmers in communal areas

should be assisted in order to maintain financial reserves in the form of solvency and liquidity to carry their farming operations through periods of hardships. This calls for the provision of banking facilities in communal areas.

Namibian livestock farmers south of the veterinary cordon fence are expected to comply with statutory requirements before they can market their livestock. The study found that communal farmers in the study areas are complying with crucial statutory requirements, such as vaccinations, branding, ear-tagging, completion of necessary FANMEAT documentation and obtaining movement permits that enable them to market their cattle. Further, the farmers' associations and co-operatives are found to be playing a crucial role of organising the sale events in the study areas. Their roles entail looking for buyers, deciding on a sale event date (if the date was not fixed already in the marketing calendar), and the announcements of the sale event in radio. Therefore, the farmers' associations and co-operatives should be strengthened in terms of human and financial resources.

5.5.5 Institutional arrangements

The farmers repeatedly requested to be offered market-related prices for their cattle. The offering of market -related prices firstly has to do with the quality and quantity of cattle offered for sale. Secondly, it will depend on the capacities of the farmers' associations and co-operatives in the study areas to bargain with cattle buyers. For the cattle farmers to receive market-related prices, the cattle market in the study areas should be determined by supply and demand. This will be achieved through having limited numbers of auctions or permits in the study areas to create demand for cattle in the market, as well as offering many cattle for sale to attract many buyers.

5.5.6 Major Constraints

The study found key constraints facing the communal cattle farmers as follows: low prices offered for cattle, the lack of essential facilities at market outlets, buyers' late arrival or no show, slow payment process and buyers running out of cash. The low prices offered have to do with the bargaining power of the farmers' associations or farmers' co-operatives when negotiating

with buyers. The essential facilities lacking at market outlets include toilets and shade. The slow payment process is a result of manual verification and the payment method employed. There are no banking facilities in the communal areas except in Aminius, meaning that if a buyer runs out of cash, driving to Gobabis town is the only option which is approximately 200 kilometres away to get the cash and in most cases, farmers collect their money the next day. The key constraints found to be facing auctioneers and buyers operating in communal areas include the buying of poor quality cattle, lack of essential and safe facilities at market outlets, and the few numbers of cattle offered for sale.

To address these constraints, the stakeholders in the meat industry should upgrade the existing or construct new infrastructure. Now that price is found to be a discentive to off-takes in communal areas, interventions which aim to improve the market price or the value of the cattle should be explored. These interventions may be in the form of direct measures like price-scheme support and indirect measures, such as upgrading the quality of cattle sold by breed improvement schemes, improvement of managerial practices through producer education of cattle quality required by the market and how market operates, and reducing the costs of marketing by improving infrastructure and offering transport subsidies.

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CHAPTER 6 FACTORS INFLUENCING SUPPLY OF CATTLE TO THE MARKET[11]

ABSTRACT

A variety of reasons are offered for low cattle off-take rates in communal farming areas. The market off-take in northern communal areas of Namibia is 2 % and 20 % from communal farmers south of the veterinary cordon fence. The objective of the study was to examine the factors influencing the supply of cattle to the market from communal farming areas of the Omaheke region in Namibia, that could be transformed to contribute to economic and viable cattle production systems. The study was conducted in four communal areas of the Omaheke region, namely Aminius, Epukiro, Otjinene and Otjombinde. Questionnaires were developed and administered to 100 communal farmers using purposive sampling. The study showed that the number of cattle owned, cost of production inputs, accessibility to market information, accessibility to local markets and rainfall have significant influence ($p<0.01$) on cattle sales in these communal areas. The study recommends the formation of cattle marketing groups that can lower transaction costs, increase the bargaining power, increase access to information and increase participation into markets. A conducive policy is needed to address the serious, embedded institutional deficiencies that limit many communal farmers from taking advantage of market opportunities, for example the lack of information, farmers' organisations, credit system and property rights system.

Key words: Communal farmers; supply factors; cattle marketing; sales.

6.1 Introduction

A variety of reasons are offered for low cattle off-take rates in communal farming areas. From an economic point of view, off-take rates of between 5 and 10 % from communal farming sectors are considered very low, compared to 25 % in the commercial sector (Nkhori, 2004). In terms of Namibia, Kruger and Lammerts-Imbuwa (2008) reported that the market off-take in the

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northern communal areas is 2 %, and 20% from communal farmers south of the veterinary cordon fence.

The low off-take rates from communal farming areas stem from some hindering factors. Some of these factors influencing the supply of cattle to the market in communal production systems include the presence of markets, access to information, herd size, farmers' ages, rainfall, soil fertility, access to credit, access to good transportation, low market prices, farmers' education levels, land tenure, access to advisory services and training (Musemwa, Chagwiza, Sikuka, Fraser, Chimonyo & Mzileni, 2007; Mendelsohn, 2006; Fitter, Kressirer, Kroll, Kruger, Neumann & Werner, 2001).

Mendelsohn (2006) estimated that 70 % of all live exports of cattle are originally bought from communal areas, and thus there is huge potential for communal farming areas to contribute to the Namibian GDP. Understanding the factors influencing the supply of cattle from communal areas will contribute to the development of appropriate strategies and programs for the betterment of marketing systems. This knowledge will benefit the farmers, public service providers, financial institutions and policy makers.

This purpose of this chapter is to determine the factors that influence the supply of cattle to the market from the communal farming areas of the Omaheke region.

6.2 Literature Review

6.2.1 Determinants of Economic Growth

Teweldemedhin (2009) in his study identified four reforms that can help many developing countries to increase growth in farm output and employment. These are land distribution, agricultural research, rural infrastructure and markets. Labour-intensive farm growth tends to increase productivity and rural non-farm growth and improve food availability (Teweldemedhin, 2009).

The study's findings from Teweldemedhin (2009) on the determinants that can contribute to financial success show that the ratio of government payments to total production value, tenure,

enterprise diversification, cost control, education, yield and debt-to-asset ratio found to be significant factors can influence at least one financial success measure.

Teweldemedhin (2009) reported that the following factors have potential to influence the level of success: size and type of farm operation, sources of information, importance of farm labour and off-farm income, use of information technology, marketing practices and research, extension and education needs. In addition, the results showed that more successful farmers use production systems that are diverse, adopt measures to control costs and use marketing strategies that seek the highest level of profit.

6.2.2 Market Institutional Arrangements

Teweldemedhin (2009) and Kherallah and Kirsten (2002) note that institution can be viewed as the structural framework for social interaction, focusing on conventions and rules as co-ordinators of social behaviour and economic interaction. On the other hand, a market is often defined as a medium where change of ownership for goods and services takes place.

Five alternative marketing chains, which may stimulate agricultural output market supply, are identified by Timmer, Falcon and Pearson (1983). A number of marketing functions may be performed at any point in the chain. These are assembly, storage, processing, financing, distribution and grading. These functions share two prime characteristics: they add value to the product and they require a variety of inputs to perform (Cramer, Jensen & Southgate, 2001). Provided that each function is positive, firms and individual entrepreneurs (including farmers) will find it profitable to compete to supply the service entailed. For instance, for a pre-packed vegetables, the consumer pays a price slightly higher than the farm-gate price as the retailer charges for the processing function. The difference between these prices is what is usually known as the marketing margin. Cramer *et al.* (2001) define a marketing margin as the difference between the price that consumers pay for the final good and the price received by farmers for the agricultural product or raw product. Marketing margins can be observed at any level where prices are determined, e.g. retail-wholesale margin or wholesale farm-gate margin.

Agricultural economists group market institutions into two broad categories: those facilitating exchange (auctions, grading, and standards, etc.) and those altering the economic structure and economic performance of the market (Christy, 2001).

6.2.3 Marketing Situation in Namibia

The marketing situation in Namibia exhibits a number of diverging issues. For most of the communal farmers, access to a good roads network might not be the only problem. Other barriers related to institutional factors may be responsible for the apparent lack of access to markets (Mendelsohn, 2006). Understanding these issues requires a methodology that will facilitate inclusion of all the different situations or types of situations to ensure a well representative sample. The categories are formulated according to common trends that are characteristic of the different situations and should be thought of in relation to those observed in literature. These can be listed as:

Type 1: Little or no marketing

The main characteristic of this type of marketing is that there is little or no marketing on the scheme; regardless of the amount of produce they obtain at any given season. Factors such as a lack of transport and long distance from markets are hypothesised to be the reasons for this situation (Mendelsohn, 2006).

Type 2: Farm gate sales

This type of marketing is characterised mainly by the attraction of buyers to the farming area. The buyers include small and medium entrepreneurs aiming to resell the produce and may come from the village and surrounding areas, as well as individuals buying for household consumption. Buyers organise their own transport and produce is sometimes sold directly from the field (Kruger & Lammerts-Imbuwa, 2008).

Type 3: Organised transportation and active sales

The dominant characteristic of this type of marketing is the fact that the farmers are actively involved in the marketing of their produce, not only in selling but also transporting the produce to the potential buyers. This marketing is also characterised by a relatively high level of organisation. This is so partly due to the necessity of such organisation in terms of identifying the potential markets for instance and bringing down the costs incurred through transportation. It also requires more capital to organise own trucks (Kruger & Lammerts-Imbuwa, 2008).

6.2.4 General Categories of Factors Affecting Supply Response

Labys (1973) classifies five general categories of factors which can influence the supply of cattle to markets. These determinants are economic, ecological, technological, institutional and uncertainty.

Economic determinant

Economic determinants involve the process of acquiring inputs and the disposal of the product in the market (Labys, 1973). The important aspects are the price of cattle in the market; prices of production inputs; cattle herd size (assets) and debt to calculate the asset/debt ratio.

Ecological determinant

The ecological determinants, such as rainfall and other climatic factors, have a positive impact on the availability of beef animals to be marketed (Carbera, Cochran, Dangelmayr, *et al.* 2007). The cattle herd size and the amount of beef to be produced per unit of land is both dependent on the quantity and quality of natural pasture (Mendelsohn, 2006). According to Kuvare, Maharero and Kamupingene (2008), the vulnerability of the Namibian livestock industry to droughts is a major handicap.

Technological determinant

Technological or technical improvement shift the production function upward and enable farmers or producers to find it profitable to increase output at the same ratio of product to factor prices (Tomek & Robinson, 1972). Although the impact of technical innovations varies, Laubscher (1976) reports substantial progress in this regard.

Institutional determinant

According to Teweldemedhin (2009), the determinant in this category relates to the intervention of structures (both public and private) and their programs. In the context of Namibia, past policies favoured "white agriculture" leading to increased income disparities, and inequitable access to resources, inputs and markets (Mendelsohn, 2006).

Uncertainty determinant

The uncertainty involves aspects such as price uncertainty; political developments (within the country, within neighbouring countries and globally); availability of export markets; exchange

rate; and fluctuations in currencies, environmental and climatic conditions (Mushendami, Biwa & Gaomab II, 2008; Kuvare, *et al.* 2008; Mendelsohn, 2006).

6.2.5 Determinants of Domestic Supply Response

6.2.5.1 Changes in Production Costs

The most common categories of production costs for beef cattle industry may include purchased feed and supplements, raised feed, grazing, cattle, indirect, and interest costs (Ricketts & Rawlins, 2001). In the beef cattle industry, production costs are constantly fluctuating due to weather conditions, feedstuff and input prices, animal performance, domestic and export markets, technology, and agricultural policies. The Meat Board (2007) reported that Namibia's on-hoof marketing of cattle and export of chilled and frozen de-boned cuts and frozen de-boned cuts to South Africa has been on a declining trend since 2005. This decline can be associated with the high feedlot input costs which lead to low weaner prices (Meat Board, 2007). Both Mushendami *et al.* (2008) and Mendelsohn (2006) conclude that due to high transaction costs, the total production costs increase and income realised decreases with an increase in distance from service and information centres.

6.2.5.2 Climatic Conditions

Communal farmers in Namibia are confronted with a harsh uncompromising natural environment, incipient drought, and progressive natural degradation (Mushendami, *et al.* 2008; Kuvare, *et al.* 2008; Carbera, *et al.* 2007; Mendelsohn, 2006).

6.2.5.3 Access to Market Information

A farmer uses market information such as trends, market conditions, type of product in demand, quality, quantity, price and market opportunities to make crucial management decisions and direct the farming operations (Coetzee, Montshwe & Jooste, 2004; Stroebel, 2004). Makhura (2001) identified access to market information as an important determinant of market participation. The proximity to market information centres influence both production costs and

income derived from agricultural produce (Mendelsohn, 2006). Provision of market information thus will make markets more accessible (Montshwe, 2006).

6.2.5.4 Number of Cattle Owned

Participation in the marketing system has more to do with the number of cattle owned (Mendelsohn, 2006). In support of this view, Heierli and Gass (2001) argue that ownership of productive assets such as cattle can pave the way for participation in economic activities.

6.2.5.5 Off-farm Income

According to Mendelsohn (2006), the majority of farmers in Namibian communal areas depend on off-farm sources for additional income and valuable safety nets. Off-farm remittances greatly influence livestock disposals, and as a typical example, access to other sources of income such as from social grants and employment may lead to the farmers not selling cattle to meet daily needs and production costs (Nthakheni, 2006). Off-farm income is a good injection to livestock farming (Teweldemedhin & Kafidi, 2009)

6.2.5.6 Infrastructural Obstacles

Remote locations with poor state of roads results in high costs of moving livestock to markets and hinder marketing efficiency (Mendelsohn, 2006). The shortcomings of infrastructure seriously impede the physical flow of livestock to market (Mendelsohn, 2006). The major problems identified by Mendelsohn (2006) hindering market participation in communal areas of Namibia are lack of adequate transport and poor marketing infrastructure.

6.2.5.7 Education Levels of Producers

The levels of producer education and awareness play a great role in market participation. Stroebel (2004) emphasises the importance of strengthening awareness creation of marketing issues in the extension service. Related to education, producers who are literate are able to interpret market information and adopt new technologies to meet the market demands (Nthakheni, 2006).

6.2.5.8 Producers' Objectives

Communal farmer production objective may be geared towards keeping cattle as sources of milk, blood, dung, meat, security, or status, and therefore sold ad hoc when the need for cash arise rather to maximise income (Mendelsohn, 2006).

6.2.6 Determinants of Supply to International Markets

6.2.6.1 Changing Consumers' Food Demand

According to General Agreement on Tariffs and Trade (GATT) (1994), the factors that influence change in consumers' food demands include health concerns, ageing population and stagnant household incomes. Changes in consumer demand negatively affect farmers, and Frick and Groenewald (1999) revealed that information about the type of product in demand will greatly benefit small-scale farmers. Lack of feedback information from marketing centres to the producer was identified as an agricultural constraint (Barnes, Awumbila & Akro-Meusah, 1996).

6.2.6.2 Changing Technology

Developing countries may not adapt new technologies due to a variety of reasons, as summarised from different researchers' findings (Mushendami, *et al.* 2008; Kaakunga & Ndalikokule, 2006; Mendelsohn, 2006):

- Transaction costs
- Limited access to information
- Lack of and access to credit
- Insufficient human capital
- Social acceptability of introduced, albeir imposed, change
- Aversion to risk
- Inappropriate transport infrastructure

Norton, Alwang and Masters (2006) identify the lack of capital to finance the increased inputs purchase necessary for technological change in agriculture as a constraint.

6.2.6.3 International Market Integration

Van Driel (1973) cites hygiene standards and trade restrictions as possible factors that might influence the pattern of trade. Koo, Karemera and Taylor (1994) categorise trade restrictions into qualitative restrictions and quantitative restrictions. Developing countries like Namibia have a natural comparative advantage in the production of cattle to export beef; but bringing this potential to fruition requires reliable disease control and traceability systems in accordance with international sanitary standards (Carbera, *et al.* 2007).

6.2.6.4 Changing Incomes

Boland, Boyle and Lusk (2002) cited that as incomes increases in developed countries, there is a shift towards more natural and organic foods. As a result, regulations are becoming even more stringent. There is a positive relationship between consumption of beef and income received (World Bank, 1993).

6.2.6.5 Livestock diseases

According to Steiger (2006), livestock diseases such as Avian Influenza (Asia and Europe), foot and mouth disease (FMD) in Brazil and Argentina, and bovine spongiform encephalopathy (BSE) (Europe, North America, and Japan) continue to impact global trade and are a cause for great concern. The BSE problem resulted in export falls in the United States, and consequently benefited Brazil whose exports have grown over 1 metric tons (Steiger, 2006).

Steiger (2006) reports that Brazil is the world leader in beef exports by quantity, while Australia is the world's leader in beef exports by value as it is able to sell into some of the premium markets from 2001 to 2005. In terms of risk, the Brazilian beef industry had minimal risk of BSE, but it is still being challenged by periodic outbreaks of foot and mouth disease (Steiger, 2006). Other potential threats for the Brazilian beef industry have been documented (Matthey, Fabiosa & Fuller, 2004; Zylbersztajn & Pinheiro, 2001). Steiger (2006) stresses that the

implication of FMD also faces Argentina. In case of Namibia and Botswana, both countries have free-roaming African Buffalo which are the primary carriers of Foot-and-Mouth Disease (Carbera, *et al.* 2007).

6.3 Methodology

6.3.1 Sampling

Using purposive sampling, 100 farmers were interviewed using open-ended questionnaires in the four cattle farmers in the Omaheke region's communal areas during September 2009 and October 2009. The respondents were purposefully chosen on the basis that they are involved in cattle marketing and that they are "typical" of a group or represent diverse perspectives on an issue (Leedy & Armrod, 2000).

6.3.2 Data Collection and Analysis

After testing was done for possible heteroscedasitcity, normality and autocorrelation, the model found that there was a high correlation among the variables. As a result, instead of using Ordinary Least Square (OLS), the study applied Weighted Least Square (WLS) using the package SPSS, the purpose was to remedy the heteroscedasitcity problem and the dependent variable was weighted. The model is written as follows: Sales (each farmer) = f(Average producers price, average cost of input (cost of supplements, fuel, feeds, vaccination, etc), average rainfall, access to market information, accessibility to markets, average family sizes, other sources of income, number of cattle owned). Table 6.1 indicates the expected sign in relation to a variable.

Table 6.1 Variable identification for determinants of sales

Variables	Expected sign	Variable definition
PRP	+	Producer price
CINPUT	+/-	Cost of input (i.e. feeds, fuel, etc.)
RFALL	+/-	Rainfall
AMI	+	Access to market information
ACCESSL	+/-	Accessibility to local market
ACCEXPO	+/-	Accessibility to export market
FSIZE	+/-	Family size
OINCOME	-	Off-farm income
OWNERSHIP	+	Number of cattle owned

Justifications for expected sign to independent variables are discussed as follows:

- √ Producer price is expected to have a positive relationship to sales, the higher producer price attracts more farmers to increase their sales volume. According to Cramer *et al.* (2001), price is a signal that guides decision makers to increase or reduce supply to the market.
- √ Input cost (i.e. feeds, fuel, etc) is expected to have a direct or indirect relationship on the livestock farmers' sales volume. A study by Teweldemedhin and Conroy (2010) showed that livestock represents a renewable resource, is well suited to small-scale farming and used as local transport. The animals survive on natural grazing and inputs and contribute to local food production with milk, meat, manure and offspring. The use of livestock to pull carts facilitates carrying domestic water and fuel, thereby generating additional time that labourers can use for other productive tasks. In addition, animal power requires little or no foreign exchange; as a result, farmers prefer to keep livestock in terms of cash or any other asset (Teweldemedhin & Conroy, 2010). On the other hand, during high inflation to meet their basic needs, farmers are forced to send to market, at whatever price. Consequently, farmers are suffering high input cost and low producer price, and living under a series of cost squeeze scenarios (Teweldemedhin & Conroy, 2010).
- √ Rainfall will have both positive and negative relationships to sales. Farmers will be forced to sell cattle if rainfall is poor for fear of losing cattle as result of fodder shortages. Meadows and White (1979) found a relationship between rainfall and cattle sales.
- √ Access to market information will have a positive relationship with sales. As reported by several authors, farmers will sell more cattle if they have access to market information (Montshwe, 2006; Nkhori, 2004). The expected sign for AMI would be positive.
- √ Accessibility to the market is expected to have both a positive and negative relationship to sales, because when markets are near, farmers will sell more cattle and vice-versa (Mahanjana, Esterhuizen & Van Rooyen, 2001).
- √ Family size is expected to have both positive and negative relationships with sales, because farmers with big families will be forced to sell many cattle to meet these households' needs and vice-versa (Stroebel, 2004).
- √ Off-farm income is expected to have a negative relationship with sales, because families with off-farm income will sell few cattle. The expected sign would be negative (Mendelsohn, 2006).

√ Number of cattle owned is expected to have a positive relationship with sales. The participation in the marketing system has to do with the number of cattle owned by an individual farmer; and farmers with more cattle will generate high marketable surplus (Mendelsohn, 2006). In addition, livestock keeping provides a great flexibility for getting money to meet immediate family needs (Stroebel, 2004).

6.4 Results and Discussions

Table 6.2 presents the results of the determinant of market supply among the communal farmers in the study area. The overall explanatory power is quite high at 95 %. Except OINCOME, ACCEXPO and FSIZE (not significant as reported in Table 6.2), all other variables were found to be statistically significant at a 1 % significance level.

Table 6.2 Weighted Least Square estimates of determinants of market

Independent Variable	Estimated Coefficient	"t" – Value
OWNERSHIP	1.000	0.00006*
CINPUT	0.000132	3.50*
OINCOME	-0.000027	-0.0395
SINFO	-0.000016	-3.596*
ACCESSL	-0.000012	-7.018*
ACCEXPO	-0.000014	-0.799
FSIZE	0.000012	0.603
RFALL	0.00000237	2.85*
Intercept	0.0000667	6.82*
DW-statistic	1.80	
R^2	0.97	
Adjusted R^2	0.95	
Prob (F-statistic)	0.0000	
Number of observation	100	

***Denotes significance at the 1 % levels**

The positive estimated coefficients indicate that scale effects dominate proximity effects, resulting in a positive coefficient and significance. The 1 % significance level of the variable implies that the estimated coefficients had a strong effect on the level of supplying more livestock to the market. That shows that, for example, an increase of 1 % ownership leads to an increase of sales volume by 1 % (see Table 6.2).

The negative estimated coefficients have the reverse implication, implying that increasing 1 % in these estimated coefficients will decrease the value of sales by the estimated coefficients percentage.

Generally, the estimated coefficients do not have much weight to influence the producers' decision, implying that communal farmers in this area are not following the economics of supply and demand concept. Rather, their decision might be based on other household needs.

6.4.1 Input Cost

The results indicate that there is a significant and positive relationship between the cost of inputs and cattle sales. As mentioned earlier, even though farmers' decisions at the communal area are driven by other family basic needs, with the issue of global warming, incidence of continuous drought and flooding, farmers are forced to apply supplement to feed their animals; vaccine and medicine costs are further factors that necessitate farmers having to take their livestock to the market.

This study suggests strongly advocates the formation of cattle marketing groups that can lower transaction costs, increase access to information and increase participation into formal markets, thereby increasing the bargaining power. By aggregating into larger associations such as inter-group associations, small scale farmers have the potential to achieve even greater economies of scale in accessing services, information, infrastructure and markets. As far as transport is concerned, costs can easily be cut if these groups use the same transport to the market. By transporting in bulk, farmers stand a better chance of getting good discounts from transport firms as compared to transporting as individuals and in small quantities.

6.4.2 Ownership

As expected, the results show that an increase in the number of cattle owned by an individual farmer leads to an increase in the sales volume. Similar findings were reported for South Africa (Montshwe, 2006), Kenya (Bellemare & Barrett, 2004) and Botswana (Nkhori, 2004). The estimated coefficient is also relatively bigger compared to the other variables, implying that the ownership has a significant influence on the farmers' capacity to take their animals to the market. This means if ownership increases by 1 % in the communal area, the response of

farmers to take cattle to the market will be increased by the same percentage. The P-value also shows this is significant at 1 % (Table 6.2).

6.4.3 Rainfall

The results in Table 6.2 indicate that rainfall has significance influence at 1 % levels. However, the estimated coefficient carries less weight, which indicates that livestock farming does not get influenced much by the variability of rainfall/weather. Although it positively influences the decision to destock their herd, this implies that farmers might use other risk management mechanisms to cope with weather variability. Common sense dictates that livestock farming is a long term investment which is relatively tolerant to drought comparing to short term investment (crops); and with a slower response to the variability of weather.

6.4.4 Access to Market Information

The source of information has a direct association to the institutional structure. Institutions have a critical role in reducing costs and can influence the development and organisation of economic activity. These results call for a revisit of the policies and institutional framework, and enriching farmers with information on the factors that affect performance. An innovative policy-making process is necessary to support communal farms beyond the farm gate.

There is a need for improving access to institutions and to remove current distortions in the livestock marketing in Namibia, to facilitate the flow of information and functional markets mechanisms that allow competition and market entrance by emerging farmers, so as to enable farmers to participate. High transaction costs become particularly problematic to communal farmers. To reduce this cost requires significant transfers of information about the source or any credence attributes of commodities being transacted (Teweldemedhin, 2009). The result of this study shows that there is an inverse relationship between the source information and volume of sales. This means that as barriers to the source of information increase, so the volume of sales will reduce, implying that the current policy advice should focus on the effects of policy distortions and adequate attention should be given to the serious, embedded institutional deficiencies that limit many communal farmers or smallholder areas from taking advantage of market opportunities, e.g. a lack of information, adequate contract systems in the buying and selling process, farmer organisations, credit system and property rights system. These

institutional deficiencies require intensive and long term attention if globalisation is to offer opportunities for smallholder development (Teweldemedhin, 2009). The challenge of economic development therefore is to identify sources and reduce transaction costs of increasingly complex forms of trade. This is achieved through the development of institutions that support trade, by making available information (on markets and technologies), protecting property rights and providing effective mechanisms for enforcing agreements (Teweldemedhin, 2009). The challenges of communal farmers in Namibia can be summarised on the following points:

- As most of the farmers do not have their own means of transport, they rely on contractors or neighbours and some expensive hired transport because of relatively small production capacity. These means are sometimes inaccessible themselves because of the poor roads network in most rural areas.
- Long distances over which produce has to be transported to reach the market network.
- Poor roads infrastructure.
- Lack of market information and means to disseminate such information which is critical for the survival of small farmers in the increasingly competitive marketing environment.

6.4.5 Family Size

The result shows that family size is not significant (Table 6.2). The finding is not in agreement with the findings of Ouma, Obare and Staal (2003) in Kenya. Even though the family size is not significant, the positive sign of the FSIZE was shown as hypothesised. It indicates that family members are dependents on the farm. Responsibility and creativity increases as the farmer wants either to avoid risk or to obtain better income for the family.

6.4.6 Off-farm Income

Off-farm income (OINCOME) indicates a negative estimated coefficient, implying that the more farmers engage in off-farm activities, does not increase the sales capacity (Table 6.2). The off-farm income may be used as a good cash injection to their livestock farming enterprise. This means that farmers have good income support to survive from both production and business risks. The off-farm income helps many farming households because it diversifies risk.

6.5 Conclusions

The objective of this chapter was to examine the factors influencing the supply of cattle to the market from the communal farming areas of the Omaheke region of Namibia with the aim to contribute to the economic and viable cattle production systems. Factors identified as having a significant influence on cattle sale volumes include: number of cattle owned, cost of production inputs, accessibility to market information, accessibility to local markets and rainfall.

This study strongly suggests the formation of cattle marketing groups that can lower transaction costs, increase access to information and increase participation into formal markets, and increase the bargaining power. By aggregating into larger associations such as inter-group associations, small-scale farmers have the potential to achieve even greater economies of scale in accessing services, information, infrastructure and markets. As far as transport is concerned, costs can be easily cut if these groups use the same transport to the market. By transporting in bulk, farmers stand a better chance of getting good discounts from transport firms as compared to transporting as individuals in small quantities.

There is a need for improving access to institutions and to remove current distortions in the livestock marketing in Namibia, facilitate the flow of information and functional markets mechanisms that allow competition and market entrance by communal and emerging farmers, so as to enable farmers to participate. The result of this study shows that there is an inverse relationship between source information and volume of sales, which mean that as barrier to source of information increase defiantly will reduce the volume of sales, implying that the current policy advice should focus on the effects of policy distortions and adequate attention should be given to the serious, embedded institutional deficiencies that limit many communal farmers from taking advantage of market opportunities, e.g. a lack of information, adequate contract systems in the buying and selling process, farmer organisations, credit system and property rights system. These institutional deficiencies require intensive and long-term attention.

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CHAPTER 7 GENERAL CONCLUSIONS AND RECOMMENDATIONS

7.1 Major Conclusions Drawn from this Study

7.1.1 Production System, Managerial Practices and Support Services

The study found some constraints that are hindering cattle production in communal areas. The main constraints identified in the production system were incorrect bull:cow ratio, low calving percentage and cattle mortalities and losses. Linked to the production system, the main causes of cattle mortalities and losses in the communal areas are drought, diseases, straying and theft, with a farmer losing an average of ten cattle per year. The managerial practices found to negate sustainable cattle production are weaning practices employed and record keeping. Further, the study found that communal cattle farmers are not utilising the available agricultural support services; and constraints identified to be hindering the production system and shortcomings found in the managerial practices could be addresed if farmers visited the state extension and veterinary offices for advice and training.

7.1.2 Cattle Supply Chain Management and Access to Market Information

Understanding and knowing what the market wants is important. The study revealed that the majority of farmers do not know the quality criteria used by buyers when determining prices for cattle classes and grades. The accessibility to market information was found not to be a constraint. The major constraints facing the communal cattle farmers include low prices offered for cattle, buyers' late arrival or no show, slow payment process and buyers running out of cash. Those constraints found to be facing auctioneers and buyers operating in communal areas include the buying of poor quality cattle and the few number of cattle offered for sale. The lack of essential and safe facilities at market outlets was expressed as a constraint to cattle farmers, auctioneers and buyers in the study areas.

7.1.3 Supply of Cattle to Market

The rationale for promoting cattle sales from communal farming areas should start with the understanding of factors that influence the potential for success. The study showed that the number of cattle owned, cost of production inputs, accessibility to market information, accessibility to local markets and rainfall have a significant influence on cattle sales in these communal areas.

7.2 Major Recommendations from this Study

As indicated in the conclusion section, the majority of farmers do not know the quality criteria used by buyers when determining prices for cattle classes and grades. The study recommends the training of communal cattle farmers in managerial and marketing practices to enable farmers to produce cattle of the quality required by the market, to make farmers understand how the market operates and how prices are determined. The farmers' associations and co-operatives are playing a crucial role in cattle marketing in communal areas, and should thus be strengthened in terms of human and financial resources.

A policy is needed to guide the management of grazing resources in communal areas. This policy should be emulated from current rural water supply policy which empowers and tasks rural communities to manage their water resources through established village water point committees.

The results of the study on factors influencing the supply of cattle to the market from the communal farming areas of the Omaheke region of Namibia call for a revisit of the policies and institutional framework. The formation of cattle marketing groups will lower transaction costs, increase the bargaining power, increase access to information and increase participation in markets. A conducive policy is needed to address the serious, embedded institutional deficiencies that limit many communal farmers from taking advantage of market opportunities, e.g. a lack of information, farmers' organisations, credit system and property rights system.

Access to credit was found to be a constraint to sustainable cattle production in communal areas. There are under-developed legal and regulatory systems with regards to title deeds of

land in rural areas and other assets that could be used as collateral. Thus, a conducive policy environment should be created by government to establish tailor-made micro-financing to rural farming communities in order to have economically viable cattle production systems in communal areas.

Finally, the provision of key infrastructure and services such as better roads, marketing facilities, banking services and production inputs outlets will improve cattle production and marketing in communal areas. Better roads will enable access to inputs and markets. Access to banking facilities will enable farmers to maintain financial reserves to carry their farming operations through periods of hardships. It has been proven that participation in the marketing system has more to do with the number of cattle owned, but a balance should be maintained between stock owned and grazing resources available.

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SUMMARY

The objective of the study was to examine the efficiency and constraints of cattle managerial practices and marketing systems in the four communal areas of the Omaheke region. The specific objectives of the study were to identify the most crucial managerial aspects having a negative effect on sustainable cattle production; to examine the sustainability of cattle supply chain management from farmer to processor; to examine the accessibility of market information to farmers and to identify the factors influencing the supply of cattle to market. The study was conducted in four communal areas, namely Aminius, Epukiro, Otjinene and Otjombinde of the Omaheke region in Namibia during 2008 and 2009. Questionnaires were developed and administered to 670 communal farmers and key informants of 3 farmers' associations, 4 farmers' co-operatives, a cattle auctioneer and beef processor. Data from questionnaires were entered into MS Excel spreadsheet and descriptive results analysis was done using Statistical Package for Social Sciences (SPSS). In terms of examining the factors influencing the supply of cattle to market, Weighted Least Square (WLS) was used.

The main constraints identified in the production system were incorrect bull:cow ratio (1:38), low calving percentage and cattle mortalities and losses. The main causes of cattle mortalities and losses in the communal areas are drought, diseases, straying and theft, with a farmer losing an average of ten cattle per year. The managerial practices found to negate sustainable cattle production are weaning practices and record keeping. Communal cattle farmers are not utilising the available agricultural support services and constraints identified in the production system and shortcomings found in the managerial practices could be addresed if farmers visited the extension and veterinary offices for advice.

In terms of marketing, the farmers were found to not be satisfied with the existing market and satisfaction levels of farmers differed significantly ($p<0.05$). The majority of farmers do not know the quality criteria used by buyers when determining prices for cattle classes and grades ($p<0.05$). The accessibility to market information was found not to be a constraint. The

constraints facing the communal cattle farmers include low prices offered for cattle, buyers' late arrival or no show, slow payment process and buyers running out of cash, whereas those found to be facing auctioneers and buyers operating in communal areas include buying of poor quality cattle, and few number of cattle offer for sale. The lack of essential and safe facilities at market outlets was expressed as a constraint to cattle farmers, auctioneers and buyers in the study areas.

The factors found to have an influence ($p<0.01$) on cattle sales in these communal areas are the number of cattle owned, cost of production inputs, accessibility to market information, accessibility to local markets and rainfall.

Besides identifying challenges and constraints, the study pulled out policy-relevant findings and contextualises them for the Namibian situation. Firstly, a policy is needed to guide the management of grazing resources in communal areas. Secondly, the results of the study on factors influencing the supply of cattle to the market from the communal farming areas of the Omaheke region of Namibia call for a revisit of the policies and institutional framework to address the serious, embedded institutional deficiencies that limit many communal farmers from taking advantage of market opportunities. Thirdly, there are under-developed legal and regulatory systems with regards to title deeds of land in rural areas and other assets that could be used as collateral. Thus, a conducive policy environment should be created by government to establish tailor-made micro-financing to rural farming communities in order to have economically viable cattle production systems in communal areas.

Key words: Cattle; cattle farmers; managerial practices; cattle marketing; supply chain management; communal areas; supply factors, sales.

ANNEXURE 1

All information provided will be treated as STRICTLY CONFIDENTIAL

Questionnaire: Cattle Management Practices Analysis

The objective of this questionnaire is to assess the management practices of communal cattle farmers. This study will present alternative solutions to cattle managerial challenges faced by farmers. Thus your information is extremely important to complete this survey, and it will be used only for the above-mentioned purposes. No information will be used for any other purpose.

1.0 RESPONDENT INFORMATION

1.1 Gender of Farmer

Male	01
Female	02

1.2 Age of Farmer

< 17 years	01
18-49 years	02
50+ years	03

1.3 Marital Status of Farmer

Single	01
Divorced	02
Widowed	03
Married	04

2.0 HERD SIZE & COMPOSITION

2.1 Cattle Herd Size & Composition

(at present)

____	Total #
____	# Cows
____	# Bulls
____	# Oxen (> 3 years)
____	# Heifers
____	# Steers (1-3 years)
____	# Calves (< 1 year)

2.2 How many calves are born from your herd yearly?

(RING 1 CODE)

Less than 10	01
Between 11 & 20	02
Between 21 & 30	03
More than 30	04
Don't know	05

3.0 ROLE OF CATTLE IN EPUKIRO SOCIETY

3.1 Role of cattle in your society

(RING 1CODE AT EACH)

Nutrition Source	01
Sales (Income generation)	02
Bride's Price (Lobola)	03
Draught power (ploughing)	04
Transport (carts, sledges)	05
Family Wealth / Security	06
Other _____	07

4.0 CATTLE BREEDS

4.1 Cattle breed(s) farming with

(RING 1 CODE)

Indigenous (*Bos indicus*)	01	_____
Exotic Zebu (Brahman)	02	_____
Composite	03	_____
European (*Bos taurus*)	04	_____

5.0 WATER SUPPLY

5.1 Source of Water for your cattle

(RING 1 CODE)

Borehole (communal)	01
Borehole (own)	02
Well	03
Pan / Earth dam	04
Other _____	05

5.2 Distance covered by cattle to main water source

(RING 1 CODE)

Less than 1 km	01
Between 1 & 5 km	02
Between 6 & 10 km	03
More than 10 km	04
Don't know	05

5.3 Supply of existing main water source

(RING 1 CODE)

Reliable	01
Fairly reliable	02
Not reliable	03

5.4 Quality of water of existing main source

(RING 1 CODE)

Good	01
Fairly good	02
Poor	03

6.0 GRAZING MANAGEMENT SYSTEM

6.1 Source of grazing for your cattle

Open Veld (communal)	01
Open Veld (private)	02

(RING 1 CODE)

Camps (communal) 03
Camps (private) 04
Other _____ 05

6.2 Distance covered to grazing areas

(RING 1 CODE)

Less than 1 km 01
Between 2 & 5 km 02
Between 6 & 10 km 03
More than 10 km 04
Don't know 05

6.3 Condition of existing grazing areas

(RING 1 CODE)

Good 01
Fairly good 02
Poor 03

6.4 Grazing management system employed

(RING 1 CODE)

Free roaming in open veld 01
Herding 02
Continuous grazing in a camp 03
Rotational grazing in camps 04
Other _____ 05

6.5 Management of grazing land in your area

(RING 1 CODE)

Traditional authority 01
Village committee 02
None 03
Other _____ 04

6.6 Daily grazing time of your cattle

(RING 1 CODE)

1 - 7 hours 01
8 – 11 hours 02
12 – 24 hours 03

7.0 MORTALITIES & LIVESTOCK LOSSES

7.1 How many of your cattle died from January to December last year?

_____ Total #
_____ # Cows
_____ # Bulls
_____ # Oxen (> 3years)
_____ # Heifers
_____ # Steers (1-3 years)
_____ # Calves

7.2 Main Causes of Livestock Losses from January to December last year?

(RING CRUCIAL 2)

Drought 01
Disease 02
Predators 03
Theft 04
Straying/Lost 05
Other _____ 06

8.0 MATING PRACTICES & SELECTION

8.1 Mating practices employed

(RING 1 CODE)

Veld mating	01
Kraal mating	02
Artificial Insemination	03
Other _____	04

8.2 Sire (bull) Mating Practices

(RING 1 CODE)

Single-sire mating	01
Multiple-sire mating	02
Other _____	03

8.3 Bull acquisition and selection

(RING 1 CODE)

Bull from own cattle herd	01
Bull from neighbouring farmer	02
Bull from commercial farmer	03
Other _____	04

8.4 Age at first mating

(RING 1 CODE)

	Heifers	Bulls
Less than 12 months	01	01
Between 12 & 24 months	02	02
Between 25 & 36 months	03	03
More than 36 months	04	04
Don't know	05	05

9.0 BRANDING & EARMARKING

9.1 Strategy used when branding and earmarking your cattle

(RING 1 CODE)

Branding using hot iron	01
Tattooing	02
Earmarks	03
Eartags (Metal)	04
Eartags (Plastic)	05
Other _____	06

9.2 How many times did you brand and earmark your cattle from January to December last year?

(RING 1 CODE)

4+ times yearly	01
3 times yearly	02
2 times yearly	03
1 time yearly	04
Not at all	05

9.3 Age at branding and earmarking

(RING 1 CODE)

Less than 3 months	01
Between 3 & 6 months	02
Between 6 & 12 months	03
More than 12 months	04
Don't know	05
Not applicable	06

10.0 CONTROLLING OF EXTERNAL PARASITES

10.1 Strategy used to control ticks on cattle

	Hand Picking	01
	Dipping	02
(RING 1 CODE)	Tick grease	03
	Pour-on remedies	04
	Other _____	05

10.2 How many times did you control ticks on cattle from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

11.0 CONTROLLING OF INTERNAL PARASITES

11.1 Strategy used to control worms on cattle

	Dosing	01
(RING 1 CODE)	None	02

11.2 How many times did you control worms on cattle from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

12.0 CASTRATION

12.1 Castration method used on your cattle

	Knife	01
	Elastrator (ring)	02
(RING 1 CODE)	Burdizzo	03
	None	04
	Other _____	05

12.2 Age of cattle during castration

	Less than 3 months	01
	Between 3 & 6 months	02
(RING 1 CODE)	Between 6 & 12 months	03
	More than 12 months	04
	Don't know	05
	Not Applicable	06

12.3 How many times did you castrate your cattle from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

13.0 DEHORNING

13.1 Dehorning method used on your cattle

(RING 1 CODE)

By hot iron	01
By breeding – use a polled bull	02
None	03
Other _____	04

13.2 Age of cattle during dehorning

(RING 1 CODE)

Less than 3 months	01
Between 3 & 6 months	02
Between 6 & 12 months	03
More than 12 months	04
Don't know	05
Not Applicable	06

13.3 How many times did you dehorn your cattle from January to December last year?

(RING 1 CODE)

4+ times yearly	01
3 times yearly	02
2 times yearly	03
1 time yearly	04
Not at all	05

14.0 VACCINATIONS & CONTROLLING OF DISEASES

14.1 Most important cattle diseases in your area

(RING CRUCIAL 3)

Brucellosis (contagious abortion)	01
Anthrax	02
Black-quarter	03
Botulism	04
Lumpy skin disease	05
Foot and mouth disease	06
Rabies	07
None	08
Other _____	09

14.2 Annual immunisation for cattle in your area

(RING CRUCIAL 3)

Brucellosis (contagious abortion)	01
Anthrax	02
Black-quarter	03
Botulism	04
Lumpy skin disease	05
Foot and mouth disease	06
Rabies	07
None	08
Other _____	09

14.3 Age of calves during first immunisation (vaccination)

	Less than 3 months	01
	Between 3 & 6 months	02
(RING 1 CODE)	Between 6 & 12 months	03
	More than 12 months	04
	Don't know	05
	Not Applicable	06

14.4 How many times do you apply immunisations (vaccinations)?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

14.5 Season of immunisation

	Summer	01
	Autumn	02
(RING 1 CODE)	Winter	03
	Spring	04
	Don't know	05

14.6 Who is responsible for immunising your cattle?

	Individual farmer	01
(RING 1 CODE)	Local farmers' association	02
	State veterinary officials	03
	Other _____	04

15.0 WEANING PRACTICES

15.1 Weaning method used on your cattle

	Physical Separation	01
	Natural Weaning	02
(RING 1 CODE)	Nose Ring	03
	None	04
	Other _____	05

15.2 Age of calves during weaning

	Less than 6 months	01
	Between 6 & 9 months	02
(RING 1 CODE)	Between 10 & 12 months	03
	More than 12 months	04
	Don't know	05
	Not Applicable	06

15.3 How many times did you wean your calves from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05
	Not Applicable	06

16.0 LIVESTOCK SUPPLEMENTATION

16.1 Supplements you give to your cattle

	Phosphate licks (readily mixed)	01
	Phosphate licks (home mixed)	02
(RING 1 CODE)	Home made licks	03
	Salt	04
	None	05
	Other _____	06

16.2 How many times did you supplement your cattle from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

16.3 Season of lick supplementation

	Summer	01
	Autumn	02
(RING 1 CODE)	Winter	03
	Spring	04
	Don't know	05
	Other _____	06

17.0 MARKETING & MARKETING STRATEGIES

17.1 Reasons for livestock sales

	Needed money	01
(RING 1 CODE)	To de-stock/ reduce number	02
	Feast / ritual/festival	03
	Other _____	04

17.2 Which type of cattle do you sell

		Main	Other
	Dry Cows	01	01
	Lactating Cows	02	02
	Old / Culled Cows	03	03
	Bulls	04	04
(RING 1 CODE AT EACH)	Oxen (> 3 years)	05	05
	Heifers (1-3 years)	06	06
	Steers (1-3 years)	07	07
	Calves (< 1 year)	08	08
	Other _____	09	09

17.3 Strategy used to market your cattle

	Permits (of farmers ass.)	01
	Permits (private buyer)	02
(RING 1 CODE)	Auctions (of farmers ass.)	03
	MEATCO	04
	Other _____	05

17.4 How many times did you sell your cattle from January to December last year?

	4+ times yearly	01
	3 times yearly	02
(RING 1 CODE)	2 times yearly	03
	1 time yearly	04
	Not at all	05

17.5 How many cattle do you sell yearly?

	Less than 10	01
	Between 10 & 19	02
(RING 1 CODE)	Between 20 & 30	03
	More than 30	04
	Don't know	05
	Not Applicable	06

17.6 Distance to nearest market place

	Less than 10 km	01
	Between 10 & 30 km	02
(RING 1 CODE)	Between 31 & 50 km	03
	More than 50 km	04
	Don't know	05

17.7 Who set the market price for cattle in your area?

	Government marketing agency	01
	Farmers' Association	02
(RING 1 CODE)	Producers (farmers)	03
	Private Buyers	04
	Other _____	05

17.8 Overall, are you satisfied with the existing market?

	Very satisfied	01
(RING 1 CODE)	Fairly satisfied	02
	Not satisfied	03

18.0 DROUGHT PREPAREDNESS & MITIGATION

18.1 Drought mitigation strategies employed before drought to ensure cattle survival

	De-stocking	01
	Licks supplementation	02
	Building up of fodder banks	03
(RING 1 CODE)	Moving to other areas within district	04
	Leasing grazing outside district	05
	Don't know	06
	Other _____	07

18.2 Drought mitigation strategies employed during drought to ensure cattle survival

	Licks supplementation	01
	Feeding with crop residues	02
(RING 1 CODE)	Feeding with protein & energy feeds	03
	Don't know	04
	Other _____	05

18.3 Drought mitigation strategies employed after drought to ensure cattle survival

	Re-stocking	01
	Licks supplementation	02
(RING 1 CODE)	Building up of fodder banks	02
	Storing crop residues	03
	Don't know	04
	Other _____	05

19.0 VELD FIRES

19.1 What are the main causes of veld fires in your village?

	Lightning	01
(RING 1 CODE)	Hunters	02
	Other _____	03

19.2 How often do you encounter veld fires in your village?

	2+ times yearly	01
(RING 1 CODE)	1 time yearly	02
	Not at all	03
	Don't know	04

19.3 What strategies do you employ to control veld fires in your village?

	Community intervention	01
(RING 1 CODE)	Government intervention	02
	Other _____	03

20.0 AGRICULTURAL ADVICE & TRAINING

20.1 How often do you visit these local offices for advice

		Extension	Veterinary
	4+ times yearly	01	01
	3 times yearly	02	02
(RING 1 CODE AT EACH)	2 times yearly	03	03
	1 time yearly	04	04
	Not at all	05	05

20.2 Have you received any agricultural training during last 5 years?

	Yes	01
(RING 1 CODE)	No	02

21.0 AGRICULTURAL CREDIT

21.1 Sources of agricultural credit

	Agricultural Bank of Namibia	01
	Other commercial banks	02
(RING 1 CODE)	Don't know	03
	None	04
	Other _____	05

21.2 Distance covered to sources of agricultural credit facilities from you village

	Less than 50 km	01
	Between 50 & 100 km	02
(RING 1 CODE)	Between 100 & 200 km	03
	More than 200 km	04
	Don't know	05

21.3 Have you received any agricultural credit during last 5 years?

	Yes	01
(RING 1 CODE)	No	02

22.0 LIVESTOCK RECORDS

22.1 Do you keep yearly livestock (cattle) records?

	Yes	01 (specify records kept)
(RING 1 CODE)	No	02

ANNEXURE 2

All information provided will be treated as STRICTLY CONFIDENTIAL

Questionnaire: Cattle Marketing System Analysis (Communal Farmers)

A. Sustainability of Cattle Supply Chain Management

In terms of Cattle Supply Chain Management, the focus of this study will cover from farmer to processor

A.1. What transport mode are farmers using to bring their cattle to auction kraals or to processors?

Transport Mode	Market within District	Export Abattoirs
Driving cattle to market on foot		
Driving cattle to market using horses / donkeys		
Hiring vehicles to take cattle to market		
Other (Specify)		

A.2. Who is the driving force in determining the prices for various cattle classes and grades?

A.3. How are prices determined for various cattle categories and grades?

A.4. What are the buyers' quality criteria when determining prices for cattle?

A.5. As a farmer, are you in know of Buyers Quality Criteria when determining prices?

Yes _____ No _____

A.6. Which logistical arrangements should be fulfilled by farmers before marketing their cattle?

A.7. Which logistical arrangements should be fulfilled by local farmers association during the process of cattle marketing to processors from communal areas?

A.8. Which payment modalities are employed by processors or buyers, and how effective are these payment modalities?

A.9. Which constraints or problems do payment modalities mentioned in A.6 present to communal cattle farmers in communal areas?

A.10. In your own opinion, what are the main constraints faced by communal cattle farmers when marketing their cattle?

A.11. How can these main constraints of communal cattle farmers be addressed?

A.12. Are you satisfied with the marketing strengths/capabilities of communal farmers or farmers associations? Yes _____ No _____

A.13. In your own opinion, what are the main constraints faced by beef processors and cattle auctioneers?

A.14. How can these main constraints of beef processors or auctioneers be addressed?

A.15. Generally, in your own view which cattle managerial practices (i.e. dehorning, castration, calving season, weaning, type of animal sold, etc) employed by cattle farmers have negative effect or direct influence on marketing (price, sale season, age and type of animal sold) in communal area?

A.16. How can the cattle managerial practices be improved in order for communal farmers to get better prices for their cattle?

A.17. How can the current cattle marketing systems be improved to increase the supply of cattle from communal areas?

A.18. What are the main reasons for selling your cattle?

A.19. Do you set marketing plan in advance, for example where or when to sale?

Yes _____ No _____

B. Access of Market Information

B.1. By whom is cattle market information communicated to farmers in your communal area?

B.2. Which of these do farmers use mostly in accessing cattle market information?

Source of Market Information	Source Ranging (1-5)*
Radio	
Local Farmers' Association	
Print media (newspapers)	
Computer / Internet-related services	
Cell-phone service	
Other (Specify)	

*5 = most important source 1 = least important source

B.3. What do you think should be done to make farmers more aware of cattle market information in communal areas?

C. Factors Affecting the Supply of Cattle to Market

C.1. What is the size of your family?

C.2. What was the number of your cattle (asset) during 2008?

C.3. How many of your cattle have you sold during 2008 from January to December?

C.4. How much money did you spent on buying inputs (supplements, vaccines, fuel for pumping water, etc) for your cattle during 2008?

C.5. Do you have a loan from a bank or any other party that you are currently paying off?

No_____ Yes_____(state the loan amount)

C.6. Do you have any other source of income besides cattle farming?

No_____ Yes_____ (specify)

ANNEXURE 3

All information provided will be treated as STRICTLY CONFIDENTIAL

Questionnaire: Cattle Marketing System Analysis (Farmers' Associations and Co-operatives)

A. Sustainability of Cattle Supply Chain Management

In terms of Cattle Supply Chain Management, the focus of this study will cover from farmer to processor.

A.1. How many auction pens or kraals are in your communal area?

A.2. Where exactly are these auction pens / kraals located in your communal area?

A.3. Who owns the auction pens / kraals in your communal area?

A.4. What is number of sales days per month (frequency of operation) for each of auction pens / kraals mentioned in A.1?

A.5. What transport mode are farmers using to bring their cattle to auction kraals or to processors?

Transport Mode	Market within District	Export Abattoirs
Driving cattle to market on foot		
Driving cattle to market using horses / donkeys		
Hiring vehicles to take cattle to market		
Other (Specify)		

A.6. How can the current modes of transport used by farmers be improved to increase the supply of cattle to markets from communal areas?

A.7. Who is the driving force in determining the prices for various cattle classes and grades?

A.8. How are prices determined for various cattle categories and grades?

A.9. What are the buyers' quality criteria when determining prices for cattle?

A.10. Are farmers in know of Buyers' Quality Criteria when determining prices?

Yes _____ No _____

A.11. What do you think should be done to make farmers in know of Buyers Quality Criteria when determining prices?

A.12. Which logistical arrangements should be fulfilled by farmers before marketing their cattle?

A.13. Which logistical arrangements should be fulfilled by local farmers association or co-operative during the process of cattle marketing to processors from communal areas?

A.14. Which payment modalities are employed by processors or buyers, and how effective are these payment modalities?

A.15. Which constraints or problems do payment modalities mentioned in A.14 present to communal cattle farmers in communal areas?

A.16. In your own opinion, what are the main constraints faced by communal cattle farmers when marketing their cattle?

A.17. How can these main constraints of communal cattle farmers be addressed?

A.18. Are you satisfied with the marketing strengths/capabilities of communal farmers or farmers' associations? Yes _____ No _____

A.19. In your own opinion, what are the main constraints faced by beef processors and cattle auctioneers?

A.20. How can these main constraints of beef processors or auctioneers be addressed?

A.21. Generally, in your own view which cattle managerial practices (i.e. dehorning, castration, calving season, weaning, type of animal sold, etc) employed by cattle farmers have negative effect or direct influence on marketing (price, sale season, age and type of animal sold) in communal area?

A.22. How can the cattle managerial practices be improved in order for communal farmers to get better prices for their cattle?

A.23. How can the current cattle marketing systems be improved to increase the supply of cattle from communal areas?

A.24. What are the main reasons for farmers to sell their cattle in your communal area?

A.25. Do farmers set marketing plan in advance, for example where or when to sale?

Yes _____ No _____

B. Access of Market Information

B.1. By whom is cattle market information communicated to farmers in your communal area?

B.2. Which of these do farmers use mostly in accessing cattle market information and why?

Source of Market Information	Source Ranging (1-5)*
Radio	
Local Farmers' Association	
Print media (newspapers)	
Computer / Internet-related services	
Cell-phone service	
Other (Specify)	

*5 = most important source 1 = least important source

B.3. What do you think should be done to make farmers more aware of cattle market information in communal areas?

ANNEXURE 4

All information provided will be treated as STRICTLY CONFIDENTIAL

QUESTIONNAIRE: Cattle Marketing System Analysis (Cattle Auctioneers and Beef Processors)

A. Sustainability of Cattle Supply Chain Management

In terms of Cattle Supply Chain Management, the focus of this study will cover from farmer to processor

A.1. What transport mode are communal farmers using to bring their cattle to auction kraals or to processors?

Transport Mode	Market within District	Export Abattoirs
Driving cattle to market on foot		
Driving cattle to market using horses / donkeys		
Hiring vehicles to take cattle to market		
Other (Specify)		

A.2. Who is the driving force in determining the prices for various cattle classes and grades?

A.3. How are prices determined for various cattle categories and grades?

A.4. What are the buyers' quality criteria when determining prices for cattle?

A.5. According to your opinion are communal farmers in know of Buyers Quality Criteria when Determining Prices?

Yes _____ No _____

A.6. What do you think should be done to make farmers in know of Buyers Quality Criteria when Determining Prices?

A.7. Which logistics arrangements should be fulfilled by farmers before marketing their cattle?

A.8. Which logistical arrangements should be fulfilled by local farmers association during cattle marketing process?

A.9. Which payment modalities are employed by processors or auctioneers, and how effective are these payment modalities?

A.10. Which constraints or problems do payment modalities mentioned in A.6 present to communal cattle farmers in communal areas.

A.11. In your own opinion, what are the main constraints faced by communal cattle farmers when marketing their cattle?

A.12. How can these main constraints of communal cattle farmers be addressed?

A.13. In your own opinion, what are the main constraints faced by beef processors and cattle auctioneers?

A.14. How can these main constraints of beef processors or auctioneers be addressed?

A.15. Generally, what is your view about the cattle marketing system in communal areas?

A.16. What do you think could be done to further improve the cattle marketing system in communal areas and region?

B. Access of Market Information

B.1. By whom is cattle market information communicated to farmers in Omaheke communal areas where you procure cattle?

B.2. Which of these do farmers use mostly in accessing cattle market information and why?

Source of Market Information	Source Ranging (1-5)*
Radio	
Local Farmers Association	
Print media (newspapers)	
Computer / Internet-related services	
Cell-phone service	
Other (Specify)	

*5 = most important source 1 = least important source

B.3. What do you think should be done to make farmers more aware of cattle market information in communal areas?

Thanking you for your time and your contribution to sustainable livestock marketing in Namibian communal areas