

WILDLIFE UTILIZATION ON PRIVATE LAND: UNDERSTANDING THE ECONOMICS
OF GAME RANCHING IN SOUTH AFRICA

By

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To my mother

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Wildlife based land use has been spreading rapidly on private land of South Africa, as individuals harness the benefits of wildlife in semi-arid areas where traditional agricultural activities of livestock rearing and crop cultivation are challenged by the harsh agro-climatic conditions. Private game ranches represent an important avenue for contributing to economic growth and conservation of natural habitat.

The purpose of this study is to better understand the financial and economic profitability of commercial wildlife enterprises on private reserves; and to assess the effects of the wildlife policy environment on rancher behavior. In-depth interviews with reserve managers and financial records from thirteen private game ranches in eastern Limpopo province were collected. The study applies Policy Analysis Matrix methodology and institutional analysis. Results indicate that games ranches are financially profitable and economically efficient. Game ranches also face challenges from an uncertain policy environment. Understanding the characteristics of private game reserves provides valuable information on the private and public incentives for wildlife utilization, and the contribution made by game reserves in the economy.

CHAPTER 1 INTRODUCTION

The rapid pace of habitat and species loss requires a change in approaches to conservation (Millennium Ecosystem Assessment 2005). Public parks have long been relied on to meet the conservation needs of society, but it is increasingly apparent that alone they cannot meet the mounting challenges and much of the world's land area remains under-protected. Increasing land use conflicts and insufficient funds for conservation are increasing the pressure on natural lands, particularly in developing countries (Krug 2001; Langholz *et al.* 2000). There has been a growing trend towards wildlife utilization outside protected areas in privately owned natural areas (Sims-Castley *et al.* 2005; Figgis, Humann, and Looker 2005; Rambaldi, Fernandes, and Schmidt 2005). The private land owner's ability to capture the benefits from natural areas lies at the heart of this trend and provides an opportunity to augment existing conservation initiatives.

1.1. Wildlife Utilization on Private land

Privately owned natural areas have long existed as part of private landholdings. There is no single model for privately owned natural areas, and wide range of types exist worldwide that represent different management objectives and ownership structures. Nine different categories of private protected areas have been identified that are based on the International Union for Conservation of Nature (IUCN) guidelines (Lanholz and Lassoie 2001). The categories vary in ownership, purposes and intensity of production systems, with each fitting a particular niche within the land use landscape (Barnes 1998). Private protected areas have the appeal of the potential for profitability from wildlife stocks and the potential to augment existing protected area systems.

Intensive wildlife farming such as deer farming is prevalent in New Zealand and Australia. New Zealand has a large intensive deer farming industry generating over NZ \$200 million yearly. Extensive wildlife uses such as trophy and recreational hunting are popular in western Europe, and in the European Union it is estimated that hunting generates about 9.88 billion Euros and approximately 100,000 jobs (Lindsey, Roulet, and Romañach 2007).

Private land is becoming home to large numbers of wildlife populations, for example in North America 66% of land is privately owned (Fulbright and Ortega-Santos 2006), landholders control a significant proportion of wildlife habitat (Butler *et al.* 2005), but the actual wildlife remains a public resource effectively owned by the state. Non-consumptive uses based on wildlife viewing are more significant than consumptive uses in North America. Between 2000 and 2007, five of the fastest growing nature based activities in the United States included viewing, photography or some form of observing nature, i.e. scenery, birds, wildlife and wilderness (Cordell 2008).

Maintaining land for nature based activities is largely voluntary act by individuals based on the costs and benefits to the landholder of doing so. Langholz *et al.* present a model of how landowners decide how much land to conserve (Langholz *et al.* 2000). The model assumes that landowners will produce the natural good to the point where the marginal cost of provision of one additional unit is equal to the marginal benefit derived from one extra unit. The marginal benefits to the landowner come from both market activities and from non-market values of the natural land. Thus the landowner benefit from the revenues generated from commercial activities such as hunting, game viewing, and sales of animal products, and the positive externality from his non-

monetary benefits from having the nature reserve that can include cultural and inheritance values of the land. The size of the externality depends on the importance the owner places on non-market benefits which are typically related to management objectives and the owners own value system. For example, an owner who places great value on the conservation contribution of his land to society and regards conservation of habitat and species as his primary objective derives a larger non-monetary benefit from the landholding than an owner whose primary objective is maximizing profit through market activities. In addition land owner decisions can also be affected by the larger trends occurring in society, especially in the economic and policy environment.

The total marginal benefit to the landholder is therefore dependent on his ability to create and capture values from the attributes of the land. Wildlife itself has set attributes that can be considered as subset of attributes inherent in a tract of land (Lueck 1989). Creating and capturing the benefits of any of these attributes requires assigning property rights to the valued attributes. Different bundles of property rights, affect the incentives individuals face, the types of actions they take, and the outcomes they achieve (Schlager and Ostrom 1992).

1.2. Wildlife Utilization in Southern Africa

The dry woodland biomes of southern Africa are home to large numbers of large charismatic wild animals. The lack of sustainability and developmental potential of cattle and agricultural systems in semi-arid areas has been a stimulus for many southern African countries' move towards a focus on wildlife utilization as a development and conservation tool (Brown, Tompkins, and Adger 2001; Child 1989). The natural system typified by the diverse mix of browsers and grazers at varying levels of food selectivity is believed to have ecological and economic comparative advantage in marginal areas

(Du Toit and Cumming 1999; Jansen, Bond, and Child 1992) where there are few alternatives to cattle and rain-fed agriculture.

Southern Africa has highly developed commercial wildlife sectors. This is largely a result of legislation that allowed individuals to use rights of wildlife outside protected areas. Wildlife is used commercially on communal and private land in rural areas of Africa.

Communal use takes place in the form of community based resource management initiatives, while private use takes the form of individual farms and ranches. The dominant management arrangement in a given country setting is mostly a result of the property rights structure in that country. For example in Namibia wildlife ownership is privatized on private land and in Zimbabwe private farmers have the right to utilize and derive full benefits from their wildlife resources. This has resulted in more than 200 commercial game ranches covering an area of 27,000 km² in Zimbabwe and 148 private nature reserves in Namibia covering 7,600 km² (Krug 2001). In contrast, in Kenya, all rights over wildlife are held by the state with rights to trade in wildlife and hunting having being revoked in 1977 (Kameri-Mbole 2005). The limited incentives for wildlife use resulted in decreases of up to a third in wildlife populations and reduced land values where wildlife viewing remains the only legal option for wildlife use, and wildlife ranches held by private individuals only cover 1,992 km² (Kameri-Mbole 2005; Carter, Adams, and Hutton 2008).

Bond *et al* identified four wildlife production systems on private land that are based on intensity of production (Bond *et al.* 2004). The first is intensive single species, a capital and management intensive system where animals are reared for their skin and meat, for

example crocodile and ostrich farms. Overall this is not considered to contribute much to direct conservation of wild habitat. The second system is semi-intensive multispecies production that generally refers to small enclosed game farms that are approximately 5000 ha in size. Commercial activities supported on this land are diverse ranging from lodge accommodations, to hunting, live animal and meat sales. The third system, extensive multispecies production, is similar to the semi-intensive system but refers to larger properties that maintain free ranging wildlife populations. The landholdings may or may not be fenced depending on size, country, location and production objectives. The fourth production system is the conservancy system, in which a group of contiguous landholders come together to collectively manage wildlife. Management arrangements take different forms. Cooperation and coordination can be induced by incentive mechanisms or by government regulation. The most common form of conservancy is characterized by binding agreement to remove internal property fences, reduce or eliminate domestic stock, provide water and law enforcement, and to follow similar management and off take regimes (Krug 2001; Child 2004; Lindsey, Romañach, and Davies-Mostert 2009).

For this study the focus is on semi-intensive and extensive wildlife production systems commonly referred to as 'game ranching'. These systems are better suited to more remote semi-arid areas than intensive systems that require a stable water supply to support large number of animals on a small area (Barnes 1998). For the purposes of this study, game ranching is defined as "the management of game in a system with minimal human intervention in the form of: provision of water, supplemental food except

in times of drought, provision of health, control of parasites, or supplementation of wild predator populations” (NAMC 2006).

1.3. South African Approach to Wildlife Utilization

Approximately 73% of the land in South Africa is privately held (Bond *et al.* 2004). There are an estimated 17 million hectares of land used for wildlife and the sector continues to grow with an estimated conversion rate from livestock to wildlife of 2-2.5 % per year (Patterson and Khosa 2005). The primary driver of this growth is the private game ranching sector. It is estimated that there are approximately 5,000 game ranches and more than 4,000 mixed game and livestock ranches in South Africa, covering 14% of the country’s total land area. In contrast, official national and provincial conservation areas only amount to 6.3% of land area (Palmer *et al.* 2006). Three drivers of development in wildlife have been identified: i) well defined property rights over land and wildlife resources, ii) farmers have the right to use wildlife and are allowed to trade live game and wildlife products, and iii) economically viable wildlife markets due to the strong international demand for wildlife tourism and local demand for venison (Krug 2001). With the majority of natural areas lying outside officially protected areas, it is increasingly evident that protected areas alone cannot meet all conservation needs as they cannot be extended to encompass all habitats or all species at the expense of the taxpayers. Ranches present an increasingly important avenue for conserving biodiversity and natural habitat outside these protected areas and contributing to the national economy. Economic returns from commercial use provide incentive to manage land for the welfare of habitat and wildlife populations while making a positive contribution to the economy.

Growth in wildlife use has also been facilitated by a number of policy and legislative changes that reduced barriers to entry and eliminated or reduced perverse incentives that undermined private investment in wildlife. First the independence of South Africa in 1994 saw a move to a more representative political system to empower groups that had previously been disadvantaged by the apartheid regime. The adoption of a representative government system reduced the influence of the powerful farm lobby sector, thereby reducing the flow of government resources to traditional agriculture. At the same time, deregulation of the agricultural sector saw a drastic reduction in agricultural subsidies. The effective agricultural subsidy was reduced to 4% compared to agricultural subsidy levels of 45% in Europe (ABSA 2003). This made livestock less lucrative, paving the way for wildlife production. Biosphere, protected area and more recently protected area legislation enshrined concepts of environmental sustainability and sustainable development in South African industry, giving legitimacy to wildlife production as a system that embraced these objectives. At the farm level, owners were also frustrated with high level of stock theft from cattle farms, and wildlife being less domesticated has an advantage in that it that is not as easy to capture and move. More recently the “share blocking” legislation allows large amounts of capital to be raised in a short amount of time by allowing shares of a property to be sold to different individuals (Bothma, Suich, and Spencely 2009). This has helped to overcome the high capital costs of establishing a game ranch, facilitating the transition of landholdings from livestock farming to game ranching. In addition ‘adequate enclosure’ certification which is granted to land owners who fence their properties, leaves wildlife utilization at the discretion of the land owner. Adequate enclosure certification exempts the land owner

from provincial regulations and grants the owner the ability hunt year round as well as the right to buy, sell and convey animals (Carruthers 2008). These changes have created an environment where farmers are free to be innovative on their properties, resulting in highly diverse wildlife utilization activities and a distinctly different wildlife industry.

1.3.1. Importance of Wildlife in South Africa

As poverty is high in South Africa government policy strives to reduce the levels of poverty and inequality in the country. South Africa is naturally endowed with a rich wildlife stock. Tourism is the fourth largest industry in the country in terms of GDP. Tourist arrivals have been increasing steadily over the years from 5.7 million in 1998 to 9.9 million in 2009 (Figure 1-1). A large proportion of international visitors participate in nature-based tourism. A 1999 survey found that 61% of all foreign visitors experienced game or nature reserves as part of their visit (Spencely 2003). With tourism as one of the fastest growing economic sectors the potential to increase employment and generate revenue in the economy is large. And government departments increasingly look to it a strategy to foster economic growth and employment in remote areas where there are few employment alternatives.

1.3.2. Issues and Challenges

The South African game ranching sector is faced with a number of challenges from the economic environment in the form of environmental regulation and market regulations, and from operational challenges in terms of ability to achieve quality conservation. Many of the difficulties stem from a lack of clear understanding of the economic contribution of the industry. The political will in South African does not support the game ranching sector. Government officials largely regard land under

extensive wildlife as underutilized. Game ranching is viewed as the preserve an of elite of rich white South Africans. This runs contrary to the national goal of equity, and there is a trade-off between developing the game ranching sector and the political and social need to remedy historical racial land imbalances and combat unemployment.

Land reform policy includes a set target of redistributing 30% of agricultural land to previously disadvantaged individuals by 2014 (Moerane 2008). Many agricultural and game landholdings are faced with land claims that will require to hand land over to previously disenfranchised black citizens. The presence of land claims introduces a level of uncertainty for landholders as they wait to find out whether their land will be redistributed. Faced with these questions there is no incentive to continue investing in a resource when it is unclear whether you will be able to reap the returns. In addition once a claim is made the landholder cannot use land as collateral to finance continued development of the business (Moerane 2008). While redistribution is necessary, if the value and potential of wildlife as a land use is not recognized wildlife risks being sidelined as a viable land use post-redistribution.

The existing regulatory environment and resulting practices have raised some concerns. Wildlife utilization is considered to be forms of conservation that can extend conservation beyond protected areas and at the same time grow the economy provide jobs. However the ability of wildlife utilization to conserve habitat as well as species is dependent on management. A poorly managed game ranch can nullify any potential conservation benefits. Good management is a function the owner's skills, motivation and ability to implement management strategies that minimize damage to the ecosystem/rangeland.

Regulations that require perimeter fencing to attain the right to consumptive wildlife utilization have led to division of large areas into small fenced areas. Small areas have a number of negative implications, including limitation on the movement of animals, inbreeding, disruption of natural ecological processes, predator persecution and susceptibility to overstocking that causes ecological degradation (Lindsey, Romañach, and Davies-Mostert 2009). It is believed that most wildlife production units are too small to meet biodiversity objectives even though trophy hunting (which is considered a “biodiversity- friendly” activity) is often the main economic activity (Patterson and Khosa 2005). Besides the conservation concerns that have been raised, there is also concern that resulting small properties may not be economically viable in the long term since they are not able to stock larger species that draw tourists and hunters.

1.4. Research Objectives

The purpose of this study is to investigate the economics (financial and economic profitability) of wildlife use in the semi arid rangelands of South Africa. It is believed that wildlife has comparative economic and ecological advantages in semi arid rangelands of South Africa. By harnessing the benefits of wildlife, land holders can capture the superior benefits of wildlife and consequently advancing the goals of conservation and development. While this is thought to be the case in all situations in southern Africa, studies have shown that returns to wildlife are dependent on ownership and rights to use and geographic location (Reilly, Sutherland, and Harley 2003). The aim of this study is to describe the unique conditions that exist for wildlife utilization on private land in South Africa. This study asks the following questions: What are the specific conditions that exist in South Africa that have encouraged widespread uptake of wildlife use? And

do these conditions translate into profitable wildlife enterprises that contribute to economic development and conservation goals?

Objectives

1. To describe the current state of wildlife based land use on private land. This entails identifying and characterizing enterprise activities taking place on game ranches and, describing the participants and their motivations for entering into game ranching.
2. To determine profitability of game ranching land uses on private land and the sources of enterprise profitability, relative to cattle production in the area.
3. To describe the game ranching policy environment and its impact on wildlife utilization on private land.

Hypotheses

1. Game ranchers are not only profit maximizers, but display diversity, in farm size, enterprise activities and they pursue multiple objectives in their wildlife enterprises that include but are not limited to financial profitability.
2. Diversified game ranch enterprises, i.e. those that combine activities of hunting, ecotourism animal sales, processed products and have diversity in species, generate more revenue. They are more profitable than undiversified enterprises.
3. The regulatory and policy environment influences profitability of wildlife enterprises through limitations and opportunities for wildlife producers.

The anticipated outcome of this research project is to enhance understanding of the fundamental economic imperative behind widespread uptake of game ranching on privately held land in South Africa. This study examines farm level operations and the institutional environment in which they take place to enhance understanding of the role of wildlife utilization in the development process.

1.5. Study Area

Limpopo province was selected for the study. Limpopo Province is located on the northern border of South Africa (Figure 1-1). Ecological conditions in the province are of the savanna biome, a biome well suited to extensive wildlife production. About two

thirds of the province receives less than 400mm of rain while only 6% receives more than 800mm (Limpopo Department of Agriculture). Limpopo accounts for a large proportion of the national private wildlife industry. 80% of the South Africa's hunting industry is attributed to the province and it has the largest number of private game farms in South Africa with 2,482 farms (van der Merwe & Saayman, 2003).

Limpopo Province covers an area of 12.46 million hectares with a population of 5.56 million people (Pauw 2005). Agricultural production systems are divided between commercial farming and smallholder communal farming which cover 70% and 10% of land area, respectively. Agriculture is the largest employer, employing 42.5% of the provincial population and Limpopo is also the country's primary livestock producing region. Other agricultural activities include production of tropical fruit, vegetables, cereals and tea. Sustainability of livelihoods in this region is a matter of great concern. Limpopo has a high poverty rate with 67.3% of its population below the national poverty line of R 5057 per year (Pauw 2005). Intensification of agriculture alone in semi-arid rural areas is unlikely to produce a significant increase in potential livelihoods (Kirsten 1996). The main constraint to production is the agro-ecological conditions, particularly lack of rainfall. Agro-ecological constraints highlight the importance of identifying livelihood alternatives that are decoupled from primary production; in other words activities that add value to the primary resources rather than relying on intensification of primary production (Child 1989).

1.6. Summary

Wildlife utilization on private land remains a poorly documented sector. However the development of this industry presents an opportunity to economic growth in remote marginal rainfall areas and to preserve biodiversity. A detailed analysis of game

ranches provides insight into how these enterprises can contribute to these goals given the existing institutional environment and the limitations that are faced by private ranchers. Chapter 2 presents the details of the institutional analysis and profitability analysis methodology used in this study to explore the research questions. Chapter 3 presents the results of analysis of the game ranching policy environment, the institutional structures and the resulting outcomes for wildlife producers. Chapter 4 presents a detailed case study analysis of wildlife producers. It examines game ranching activities, and presents result of farm profitability and opinions and perspectives of land owners and managers. Chapter 5 synthesizes the findings from institutional and farm analysis to highlight the impacts on wildlife producers and the implications for wildlife utilization as a land use option.

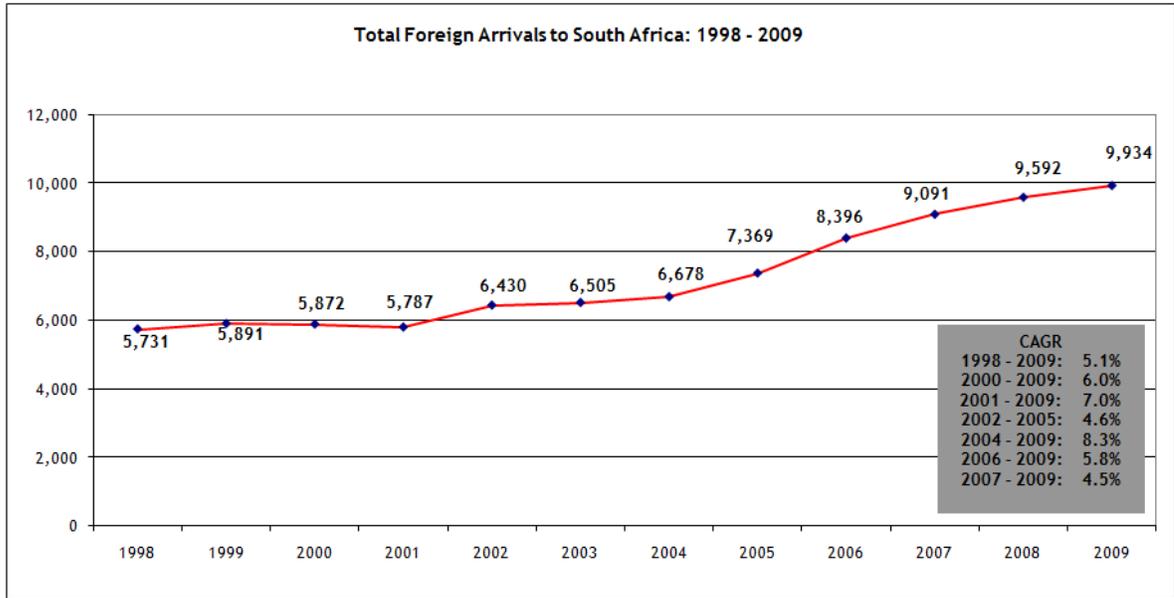


Figure 1-1. Total foreign arrivals to South Africa 1998-2009. Source: South African Tourism, 2009 Annual tourism report.



Figure 1-2. Provincial map of South Africa. Source: Geology.com 2007

CHAPTER 2 METHODOLOGY

South Africa has applied a set of legislation and policy that together have created an institutional frame work that provides rights to the land user over the wildlife resource. This framework governs farmer behavior and results in different farm outcomes on the ground. To analyze wildlife production, first we must understand the incentives structure that exists for wildlife utilization. This is done in two ways: examining the policy environment and net returns to wildlife production. A case study approach is used that combining policy analysis, a producer survey, profitability analysis and literature review. The combination of methods captures the detailed view of game ranching. The case study approach allows us to consider the observed outcome of game ranching and begin to explain why this has occurred (Yin 2008).

Private game reserves in South Africa are market driven entities where inputs and outputs are identifiable and priced in the market. This presents a favorable situation for valuing ranching activities. Game ranches are business entities that keep financial records for management and tax purposes. The vertical integration of wildlife activities means that the bulk of wildlife activities take place on a single farm unit e.g. producing and marketing of animal products and services. Valuing wildlife utilization requires that as many of costs and benefits associated with the resource are identified and captured. Private game ranches capture many direct and indirect wildlife values. Total economic value (TEV) is frequently used as a more complete measure of costs and benefits generated by nature based systems (Table 2-1). TEV encompasses direct commercial market values, non-market values, ecological functions and non-use benefits associated with production systems. As well as presenting a more complete picture of the

economic importance of nature based production systems, it clearly demonstrates the wide-ranging economic costs associated with their degradation, which extend beyond the loss of direct use values (they include opportunity costs and losses to other economic activities incurred by the presence of a given land use) (ICEM 2003).

Rangeland enterprises provide a number of different benefits and costs to landowners and society as a whole. The two key rangeland activities of game ranching and cattle ranching generate revenues by capitalizing on direct use and non use values. For cattle enterprises the direct use values are those derived from the sale of cattle and meat products. While on game systems benefits are derived from sale of non-consumptive and consumptive tourism, and animal products. There are added non use values that can be generated from the preservation of endangered species and maintaining natural scenic habitat. In some cases landholders can find means to capitalize on these benefits and generate market values from them. For example, the consideration of the sale of painted hunting dog viewing packages which capitalize on visitors' willingness to pay to see an endangered species in its natural habitat (Lindsey *et al.* 2005). Cultural values associated with wildlife resources and natural landscapes are also considered significant. It is thought that wildlife ranching in South Africa arose largely out of lifestyle preferences and culture of hunting in European settler societies (Carruthers 2008), and those preferences persist today. Not all values associated with rangeland uses can be measured. The best approach is to assess the economic value of game and cattle ranching openly while keeping in mind that, in addition to monetary value, these enterprises provide other benefits that are not valued in the market. Direct

use values will be given priority, followed by indirect use values, and non- use values will discussed in the context of their importance in game ranching.

In comparing alternative land use systems there are three criteria with which to measure the desirability of an activity: financial sustainability, economic sustainability and also environmental sustainability (ICEM 2003; Bann 1998). For any alternative to be desirable, it should be financially profitable from the perspective of the private individual in the sense that it provides a continuous stream of benefits over time that can cover costs of operation. Economics sustainability ensures that the activities undertaken by individuals meet the needs of society and do not divert resources from more efficient activities; they do not rely on government subsidies or taxation of competing industries that cannot be maintained over time. The last but equally important aspect is environmental sustainability. The natural environment serves as input into the production process of land based activities. If the resource base is degraded productivity is compromised and can decline over time, reducing output and thus undermining both financial and social profitability. In analyzing and comparing alternative forms of wildlife utilization and livestock production, the methodology incorporates the three aspects to different degrees in the analytical framework. Each of the three aspects will be covered to the degree made possible by the available data.

2.1. Financial and Economic Analysis

Financial analysis is the first step in assessing the monetary costs and benefits of an enterprise. It is taken from the perspective of the private investor who is interested in the actual money costs and returns on his enterprise. It measures private profits accruing to households or firms based on market prices. While financial analysis can be invaluable in illustrating the motivations of the private sector, no account is made of

market or policy failures that may distort market prices (Bann 1998). In much of southern Africa, direct or indirect agricultural and resource use policies aimed at the livestock and agricultural sectors mask the true comparative social efficiency between the livestock and wildlife sectors (Barnes 1998; Jansen, Bond, and Child 1992). The change in benefits from policy effects can lead to inefficient allocation of scarce resources to non-competitive economic activities. Economic analysis goes beyond a financial analysis to assess the economic costs and benefits of an enterprise on the welfare of society as a whole. Economic analysis requires adjustments to market prices to correct for any market and policy failures so that they more closely reflect the opportunity costs of resource use to society and any distributional objectives. The adjusted market price is often referred to as the efficiency or shadow price and is an indication of the economic value of the good or service.

2.1.1. Financial Analysis

Two approaches are used to measure financial profitability. The first is gross margin analysis, and the second is the policy analysis matrix. Financial profitability is estimated using gross margin and net margin analysis. The gross profit margin is used to analyze how efficiently a firm is using its raw materials, labor and fixed assets to generate profits. Net margin incorporates fixed costs to give the bottom line profitability of an enterprise.

2.1.2. Gross Margin Analysis

For any business to survive in the medium to long term, it has to make and retain profits annually. Profitability analysis gauges the performance of the whole farm business. Profitability ratios show how well a firm is managing its expenses by expressing income as a portion of each dollar in revenue. Two important profitability

ratios are gross margin and net margin. Gross margin shows how much money is added to gross profit for each dollar of revenue. It uses gross profit, a measure of income that is the direct result of production management.

$$\text{Gross Margin} = (\text{Revenue} - \text{Variable cost}) / \text{Revenue} \quad (\text{Eq. 2-1})$$

To evaluate operating performance, operating expenses (e.g. selling and general administrative expenses) are subtracted from gross profit to get operating profit.

$$\text{Operating Profit Margin} = (\text{Revenue} - \text{Variable cost} - \text{Fixed cost} \\ \text{expenses}) / \text{Revenue} \quad (\text{Eq. 2-2})$$

Operating profit margin is affected by the same factors as gross margin plus operating expenses such as office rent, lease expenses, and income from investments, advertising expenditures and bad debt expenses. Gross margin is affected by: (i) changes in sales volume, which affect cost of goods sold and sales; (ii) Changes in sales price, which affect sales; and (iii) changes in the cost of production, which affect cost of goods sold (Fabozzi and Peterson 2003). Any change in gross profit margin from one period to the next is caused by one or more of those three factors. Similarly, differences in gross margin ratios among firms are the result of differences in those factors.

2.1.3. The Policy Analysis Matrix

The policy analysis matrix (PAM) developed by Monke and Pearson is an approach that allows both financial and economic profitability to be assessed within a single framework (Monke and Pearson 1989). It is a system of double entry bookkeeping which requires construction of accounting matrices of revenues, costs and profits (Table 3-1). The PAM incorporates government intervention into sectoral analysis to evaluate private profits and social efficiency. The private profitability portion of the

PAM aids in the establishment of competitiveness between sectors or firms given the current prices, technology and policy. Economic profitability indicates the costs and benefits to society (in terms of government taxes or subsidies) of committing scarce resources to a given activity. The ability of PAM to assess economic efficiency makes it a suitable tool in the evaluation of the trade-offs between land-use enterprises.

2.1.3.1. Financial profitability

The first row of the matrix (Table 2-2) contains elements that calculate financial profitability. The first row is a budget that shows revenues from production output and costs of production at market prices; with costs divided into tradable and non-tradable costs. Financial profitability is defined as is the difference between revenues at market prices less all costs at market prices ($D = A - B - C$). Tradable inputs are defined as anything that can be internationally traded even if it is not currently traded, and domestic resources are the immovable domestic factors of production such as land, labor and capital.

The normal costs of capital, defined as minimum after tax return that owners of capital require to maintain their investment, is included in domestic factor costs (C), so that the profits (D) are above average returns to the activity. If financial profitability is negative ($D < 0$), then operators are earning a sub-normal rate of return and can be expected to quit the activity unless there is a change that increases profits to at least to a normal level ($D = 0$), where the breakeven level. Alternatively, if financial profits are positive ($D > 0$), returns are above normal and should lead to future investment in the activity.

To calculate financial profitability, revenues and costs must be valued at actual market prices, normally for the most recent year for which ranches or firms have this

data available in their accounts. Financial costs for wildlife production are taken from producer 2008 budgets.

2.1.3.2. Economic profitability

The second row in the matrix shows cost elements expressed in economic prices i.e. opportunity cost. It measures the comparative advantage or efficiency. Efficiency is attained when the economy's resources are used in activities that create the highest level of output and income. The PAM approach measures the distorting effects of policies and market failures that interfere with efficient outcomes. Economic profitability is defined as the difference between revenues and costs measured in economic prices ($H=E-F-G$). Economic prices are prices that reflect the underlying scarcity values or opportunity costs. Theoretically, if these prices were used, they would result in the optimal allocation of resources, thereby maximizing efficiency and generating the highest possible level of national income. To calculate economic profitability the main task is to find reasonably accurate approximations of economic prices for outputs and inputs. Once the revenues and costs in economic prices are entered in the matrix, economic profitability can be calculated as the difference between revenues and costs in economic prices ($H=E-F-G$). If economic profits are positive ($H>0$), the activity is competitive at world prices and is an efficient user of scarce resources contributing positively to national income. Alternatively if economic profits are negative ($H<0$), the activity is inefficient and draws valuable resources away from more efficient activities in the economy.

2.1.3.3. Impact of market failure and government policy

The third row of the PAM is simply the first row minus the second row. It shows the net effect of policy and market failure and whether these effects amount to implicit tax or

subsidy on the activity being studied. If revenue in financial prices (A) exceeds revenue in economic prices (E), then domestic consumers are forced to pay above world prices for goods and services or the government is directly subsidizing production causing an output policy effect of (I). For column two, if the cost of tradable inputs in financial prices (B) is less than their cost in economic prices (F), tradable inputs are subsidized, resulting in input policy effect of (J). For domestic factors, the policy effect (K) is given by the difference between cost of domestic factors in economic prices (G) and their cost in financial prices (C).

Entries in the PAM allow comparison between systems producing the same output. To compare systems producing different outputs, (e.g. wildlife-based tourism to livestock) ratios are used where both the numerator and the denominator are PAM entries defined in domestic currency units per physical unit of the commodity. Therefore, the ratio is number free of any commodity or monetary designation. A number of analytical ratios can be calculated from PAM entries. The two ratios of primary concern in this study are the private cost ratio and the domestic cost ratio.

2.1.3.4. PAM analytical ratios

The private cost ratio (PCR) is the ratio of domestic factor costs to value added in private prices ($PCR = C / (A-B)$). It shows how much a system can afford to pay domestic factors and still remain competitive i.e. break even after earning normal profits. Producers prefer to earn excess profits and they can do this by ensuring their factor costs are less than their value added in private prices. They try to minimize the private cost ratio by holding down factor and tradable input costs in order to maximize excess profits.

The domestic resource cost ratio (DRC) is the ratio of domestic factor costs in economic prices to value added in economic prices ($DRC = G / (E - F)$). The DRC measurement allows economic profitability to be compared across different commodities /outputs. A DRC less than one indicates that a particular activity is economically profitable; in the absence of government policy this activity would produce more than enough value added to remunerate labor and reimburse capital owners. Alternatively a DRC greater than one indicates that a particular activity is not economically profitable; in the absence of government policy this activity would not produce enough value added to remunerate labor and reimburse capital owners. In this case the firm does not have comparative advantage in producing this good or service.

To examine the effects of policy two additional ratios are included: the effective protection coefficient and the profitability coefficient. These ratios show the incentive or disincentive firms face in relation to output production and input usage.

The effective protection coefficient (EPC) take into account effects of policy on revenue as well its effect on inputs used in production. EPC is calculated as the ratio of value added (revenue from sales of tradable outputs minus the costs of tradable inputs) in financial prices to value added in economic prices. Divergences in between economic and financial prices occur when government policies such as taxes, customs duties, price control or a requirement to purchase a good locally, affect the price of an input to the producer. When EPC is greater than one this shows that the firm is receiving a net positive incentive on the combination of policies that are influencing its sales revenue and tradable input costs. An EPC less than one indicate that the producer is receiving a

net disincentive. The EPC does not account for the effect of policy on the costs of domestic factors (i.e. land, labor and capital) making it a limited indicator of incentives. The profitability coefficient (PC) is an extension to the EPC that includes domestic factor transfers. PC is the ratio of enterprises revenue in financial prices to its revenue in economic prices (A/E) and it measures the effects of all policy and can be considered a measure of net policy transfers.

2.1.3.5. Limitations of PAM

The PAM addresses three issues: competitiveness, efficiency and policy transfers (Pearson, Gotsch, and Bahri 2004). Government ministries are concerned with competitiveness of a country's principal land use systems. Economic planners are concerned with the growth and distribution of national. Decision makers also want to be informed on the effects of policy and market failure and PAM provides a straightforward analysis of policy-induced effects. One of the main strengths of this approach is that it allows varying degrees of disaggregation. Analysis can be disaggregated by production system (e.g. dry land vs. irrigated cropping), by geographic location, etc.

A limitation of the PAM methodology is its static nature; the data used represent a single year. The frequent use of fixed input-output coefficients makes it difficult to determine the dynamic effects attributable to policy shifts (Monke and Pearson 1989; Drew, Alavalapati, and Nair 2004). One way to address this is to determine price elasticities of supply and demand, as well as cross price elasticities of demand allowing for estimates of how farmers may respond to various policy interventions. However, in developing country contexts, reliable elasticities are often difficult to obtain. An acceptable practice is to make informed assumptions on magnitude of elasticities and test the robustness of the results through sensitivity analysis. Another weakness

associated with PAM is the subjectivity involved in shadow pricing costs and benefits. The calculation of economic prices requires the researcher to exercise some subjective judgments in assigning economic values (ICEM 2003).

Another difficulty with PAM is in accounting for externalities. Actually this problem arises not from the PAM approach but from the difficulty of determining accurate values for externalities to input into the PAM matrix. Kydd, Pearce and Stockbridge provide a framework for extending PAM to account for environmental costs and benefits by incorporating additional rows to the matrix for social and private environmental costs and benefits (Kydd, Pearce, and Stockbridge 1997). In this way, effects of externalities are disaggregated from policy distortions and labor, land, and credit market failures. The difficulties for pricing costs and benefits associated with externalities generated by production systems requires identifying reasonable estimates of externalities that are transferable to the study area. There are few estimates of externalities available in the literature and they are not included in this study due to the objective difficulty of assessing them, but it is important to remember that they do exist. They include values that arise in rangeland systems such as conservation benefits, degradation costs as well as other non-use values such as recreation and cultural benefits and payments for environmental services such as water, carbon and biodiversity.

2.2. Shadow Prices for South Africa

This section outlines the specific approach used to adjust market prices from to economic values. Tradable inputs and outputs we values at world prices while domestic factors were valued at opportunity cost. The methodology of Pearson, Gotsch and Bahri , and Gittinger was used to determine appropriate shadow values to use(Pearson, Gotsch, and Bahri 2004; Gittinger 1982). Country and location specific adjustment

factors were obtained from the *South African Manual for Cost Benefits Analysis* by (Mullins *et al.* 2007) .

2.2.1. Pricing Tradable Goods

For commodities that are traded internationally, the economic price is taken to be the world price. For imports, the c.i.f. (cost, freight, insurance) import prices are used and for exports the f.o.b. (free on board) price is used. The reasoning behind this choice of prices is that the government always has the option of setting policy that will permit more imports or exports at world price levels, even though they presently may restrict imports and exports and thus choose not to exercise this option World prices provide a relevant standard of comparison and establish economic valuations for tradable outputs and inputs. The c.i.f. and f.o.b. prices are obtained from *International Financial Statistics*. Taxes and tariffs were obtained from *Cargo Info Africa*, domestic and excise tax information was obtained from the schedule to the Customs and Excise Act as recommended by Mullins *et al* 2007.

2.2.2. Pricing Non-tradable Goods

A non-tradable product is a good or service that is not traded internationally, such as security services, water, electricity and buildings. Most non-tradable goods are not traded internationally because they are perishable or they are high bulk and low value. If the good is not internationally traded then it cannot be valued at world prices since world prices for the commodity do not exist. A way to overcome this is to separate the non-tradable good into its, tradable and factor cost components. Allocation of non-tradable into the two components is done using a national social accounting matrix to determine how it is divided across industry sectors.

Exchange rate. The shadow exchange rate used is taken from calculations in (Mullins *et al.* 2007). The shadow exchange rate is based on the long term trends in the real effective exchange rate from 1990 to 2006. Their long term trend captures the major impacts on the rand such as import and export volumes, foreign exchange market perceptions, foreign financial flows etc. The projected index of real exchange rate of the rand provided in Mullins et al 2007 is used to adjust the 2008 exchange rate to its economic value. The base year of 2005 and a 2008 index of 84.71; the exchange rate adjustment factor of 0.8471 is used to determine that shadow real effective exchange rate.

Fuel. The economic value of fuel used is the pump price of fuel less any taxes and levies that do not directly benefit the fuel consumer (Mullins *et al.* 2007). This price is further adjusted for transport costs according to district. 2008 Pump prices and taxes and levies were obtained from the Reserve bank and transport adjustment factors were taken from Mullins et al 2007.

2.2.3. Domestic Factors of Production

Domestic factors of production such as land, labor and capital, are valued at their opportunity cost; that is their value in the next best alternative use.

Labor. Labor is valued according to whether it is skilled or unskilled labor. Skilled labor such as managers, mechanics, foremen etc, is considered to be in short supply. Even where unemployment exists, skilled labor is likely to be fully employed therefore the wages paid to workers at their market values are used as economic prices. For unskilled labor, e.g. agricultural laborers, the economic value is given by the wage rate paid at peak season. In South Africa, there is persistent involuntary unemployment of unskilled workers, implying that the employment of this labor will entail fewer or no

opportunity costs. However, this is not a reasonable assumption since individuals will only work if there is some form of reward attached to the work, such as money, food, etc (Jooste and van Zyl 1999). The shadow price of unskilled labor is taken to be equal to per capita income of urban and non-urban areas in the province such that the per capita income of laborers is used as the economic value of labor. Per capita income was determined from the Reserve Bank Bulletin June 2008. District specific adjustment factors for unskilled labor were taken from those calculated by (Mullins *et al.* 2007) .

Land. Land is a primary input to the ranching system. The market price of land is not an adequate measure of its economic value because the value of land also depends on its physical characteristics, the climate and the production technologies that are applied to it. The shadow price of land in this study is taken to be its opportunity cost. The best alternative use for wildlife ranch is extensive cattle production which in many cases was a previous land use.

The opportunity cost of land is the net value of production forgone if land were changed to the next best alternative use (Gittinger 1982; Mullins *et al.* 2007; Mullins *et al.* 2007). For this study wildlife is considered the next best alternative to cattle production.

Capital. The economic value of capital is calculated by first determining the current market value (or replacement cost) of the capital asset. Then opportunity cost is applied to the market value. Opportunity cost used is the interest rate that the owner would get if he sold the asset and put the money in the bank. Thus the economic value of capital is given by interest that would be earned on the market value of the asset over

a year. Prevailing real interest rate of 12% for 2008 was used (South African Reserve Bank).

Electricity. For purposes of this study, electricity is considered to be a non-tradable good. This follows the practice in (Jooste and van Zyl 1999). Although electricity is supplied to neighboring countries, the scale of distribution is such that not even all areas in South Africa have access to electricity. Therefore, electricity can be regarded as a non-tradable for at least the short to medium term. The economic value of electricity is the tariff rate plus an adjustment factor. The adjustment factor calculated by (Jooste and van Zyl 1999) was used.

Water. South Africa, like many other southern African countries, has scarce water resources. The annual rainfall in Limpopo province is 400mm lower than the national average of 500 millimeter (Pauw 2005). Rainfall also varies to a great extent from year to year. In addition, dry land farming and conservation rely entirely on rainfall. The limited supply of water is not reflected in water tariffs that have been paid by farmers. It implies that water will have a positive opportunity cost; with a unit of water used in one sector reducing the water available to be used in other sectors. Hassan et al (1996) calculated the scarcity value of water for dry land production to be R0.35 per m³. This value was used to reflect the opportunity cost of water in South Africa. Thus, the economic value of water is the tariff plus the scarcity value. Local water tariffs from the Limpopo department of industry were used.

Opportunity costs of domestic resources are a function of the current prevailing policy conditions, therefore if policy was to change opportunity costs would change as well. Government policy can also affect financial prices through policy such as taxes

and subsidies that directly affect the market prices of goods. This means that opportunity costs are only relevant under a given set of policy conditions. For this reason PAM is considered to be a partial equilibrium analysis.

2.3. Policy Analysis

Policy analysis is used to describe the game ranching environment by investigating the current institutional systems in place and their impacts on observed rancher behavior. The policy analysis matrix provides information on the effects of policy and market failure and gives insight into the incentives faced by ranchers. Further analysis on how policies and regulation are perceived by ranchers and government officials will add to the understanding of the policy environment by identifying specific impacts faced by ranchers and their implications for wildlife use on the ranch.

This portion of the study uses qualitative research methods. Patton 2002 observed that qualitative data collection consists of three approaches: interview data, direct observation, and review of written documents. The policy analysis uses interview data and review of written and web-based documents. Qualitative analysis techniques allow creation of an intergrated view of the policies and resulting farmer behavior (Patton 2002) . This section uses an institutional economics approach applying the tools of stakeholder analysis and organizational analysis.

2.3.1. Institutional Analysis

Institutions govern social behavior and include organizations or sets of conventions, policies or legislation (Matsaert 2002). Institutional analysis in this study is used to understand the policy environment and its influence on wildlife producers. Stakeholder analysis and organizational analysis framework are used to examine the interrelationships between stakeholders, the regulatory and policy framework in place.

The consequent outcomes of the institutional structures in place are then examined to determine the manner in which these structures influence rancher behavior.

2.3.2. Stakeholder Analysis

Stakeholder analysis (SA) identifies stakeholders as those with a vested interest in a issue or system with the goal of developing a strategic view of the human and institutional landscape, and the relationships between the different stakeholders and the issues they care about. Grimble 1997 defined it as “a holistic approach or procedure for gaining an understanding of a system, and assessing the impact of changes to that system, by means of identifying the key actors or stakeholders and assessing their respective interests in the system” (Grimble and Wellard 1997). SA is well suited to natural resource management context where there are complex situations characterized by multiple interests and tradeoffs between interacting sets of local people, government departments, national and international planners, and professional advisors(Grimble 1998). Applications of stakeholder analysis generally address answer the following set of questions:

1. Who are the stakeholders?
2. What are the stakeholders’ interests and beliefs?
3. Who controls critical resources?
4. With whom do stakeholders form coalitions?
5. What strategies and venues do stakeholders use to achieve their objectives?
(Weible 2007).

Stakeholders are categorized by the nature of their engagement in the system as passive or active stakeholders and their relative influence and importance in the system (Weible 2007). SA provides a guide to investigate stakeholders’ perceptions regarding the severity, causes, of a problem, the distribution of resources among coalitions, and the accessible political venues for influencing policy. In addition to stakeholders, the

legislative and policy environment can impact critically on many aspects of resource management. It is important that producers are aware of the opportunities and limitations of this environment.

Key informants were selected for interview from government departments involved in the management and regulation of the wildlife sector and wildlife producer associations. Three government departments were identified for the study: the Limpopo Department of Agriculture which oversees the agricultural policy and management for livestock production; the Limpopo department of Economic Development Environment and Tourism responsible to wildlife trade and regulation, and environmental compliance and enforcement; and the Limpopo local departments of conservation for the eastern Limpopo service area. These are the departments that have day to day interaction with game ranchers implementing and enforcing provincial legislation. Interviews were carried out through telephone and email survey.

Written documents include provincial regulations and guidelines, government and industry reports. National and provincial wildlife legislation and department directives are available from the provincial department websites. Additional reports were sources from industry associations including Wildlife Ranchers Association and National Agricultural Marketing Association.

2.4. Data Collection

The study area focused on wildlife based land uses taking place on private farms in the Lowveld region of Limpopo province. Data for the study were collected through three approaches: semi structured interviews of game ranch owners and managers, key industry informant interviews and provincial game ranch statistics. Additional information

on the game industry, operating and policy, environment was collected through key informant interviews and locally available documents.

2.4.1. Producer Survey

The survey targeted game ranch and commercial cattle ranch owners/managers. The questionnaire is designed to capture information to assess the profitability and management of game ranches. Survey questions were compiled by reviewing survey instruments used in analysis of game farms and livestock farms. The survey is designed to capture information to assess the profitability and management of game ranches (see Appendix A). Three questionnaires were reviewed; first a survey designed to assess profitability of nature tourism in Zululand in 2000 for a study by (Porter, Ferrer, and Aylward 2003); second a survey from comparative analysis of profitability of cattle and wildlife in Midlands of Zimbabwe in a study by Child 1988. Third, Kydd *et al* 1997 provides a question guide specific to policy analysis matrix. Reviews of these sources provided a guideline in constructing the survey. Current issues in game ranching sectors were also reviewed to ensure that the questions were appropriate to current conditions. The questionnaire included sections on the following topics:

- Demographic information,
- General land unit and land use information,
- Livestock enterprise costs and revenues,
- Wildlife enterprise costs and revenues,
- Conservation and management activities, and
- Business threats and opportunities.

The questionnaire was pretested on two game ranches in Mopani district. The review provided perspective on the concerns of ranchers, and issues that are foremost in their concerns. Issues raised include costs of land reclamation from previous overgrazing and misuse, the effect of land redistribution claims on farms, and lack of

recognition by government officials of the contribution and potential of wildlife-based land uses. The questionnaire was revised accordingly to improve question comprehension and allow for ease of self completion.

2.4.2. Sampling and Participant Selection

Referral sampling was used to select ranchers for the survey. Referral sampling lends itself to collection of sensitive information. Referral from a trusted peer helped to foster trust with the respondent and encouraged willingness to divulge financial information. This would have been less likely had a random selection of ranches been chosen from a list and sent a questionnaire or visited. In addition the absence of a comprehensive list of game ranches in the province prevented use of a predetermined sampling frame. A referral approach was used to identify key informants in the game ranching sector who in turn provided contact information for game farmers in eastern Limpopo province. A combination of self completion and face to face interviews were used to collect the data. Questionnaires were distributed via email for self completion through the Agricultural Research Center rangeland management unit to encourage responses. The unit has longstanding relationship with game ranches in Lowveld area and performs annual vegetation monitoring for many game reserves. Questionnaires were emailed to 20 private game reserve owners and managers. Non- responses were followed up with telephone reminders and face to face interviews to complete the questionnaire. The in person interview of game farmers consisted of in depth discussion of their game farm operation and completion of the 11 page questionnaire. Four farms were visited for direct observation of wildlife enterprises visits including extensive tour of property facilities, observation of farm activities (tourism, breeding, and rangeland management) and extended interview. A total of fourteen responses were

received, these included ten responses at farm level and three at the conservancy level and one state owned provincial reserve for comparison purposes. Farms ranged in size from 1,700ha to 14,500ha and conservancies ranged in size from 11,500ha to 60,000ha (Table 2-3). Due to the sensitive nature of information of requested in some sections farms are identified by code in the analysis. Many of the private farms in eastern areas of Mpumalanga and Limpopo province have been converted from cattle farms to game farms. The shift created some difficulty in locating commercial cattle farmers, as those that were previously identified as cattle farms have since been converted to wildlife. To overcome this, 2008 cattle production enterprise budgets were sourced from the Limpopo Department of Agriculture.

2.4.3. District Game Farm Statistics

Establishing the number of game farms present in the districts proved difficult due to the lack of a comprehensive provincial register of game farms. Statistics were collected for Mopani district which houses key game ranching areas of the province. Statistics on the number of game ranches are recorded through exemption permits that allow landowners to hunt, buy sell and convey wildlife in accordance with the provisions of the permit. Exemption data for Mopani district was compiled from three service center databases, Klaserie, Phalaborwa and Tzaneen. Exemption data base provides information on; farm name, farm size, municipality, presence of accommodation, and game species present. A total of 166 farms were identified as exempted. Previous studies (Van der Waal and Dekker 2000; Sutherland, Harley, and Reilly 2003) have raised concerns that exemption permits issued may not be an accurate reflection of the number of game farms in existence. The fear is that use of exemption permits alone for may bias the results towards fenced farms operations that engage in hunting while

farms that engage in non-consumptive uses or unfenced farms may be excluded from the sample. It remains that exemption records are still the best available measure of the number of game farms.

Table 2-1. Rangeland economic values. [Adapted from Bann, C. 1998. The economic valuation of tropical forest land use options: A manual for researchers (Page 24, Table B6.1). *Singapore.*]

Total benefits of rangeland areas		Total cost of rangeland areas	
Use	Non- use	Use	Non- use
<i>Direct values</i>	<i>Existence values</i>	<i>Direct management costs</i>	<i>Opportunity costs</i>
Outputs consumed directly, such as trophies, food, recreation, etc.	The intrinsic value of rangeland resources and ecosystems, irrespective of their use, such as cultural, aesthetic, bequest significance. etc	Costs of equipment, capital, wages, buildings, policing, etc.	Alternative land and resource uses foregone, loss of profits and alternative investments, etc.
<i>Indirect values</i>		<i>Costs to other activities</i>	
Ecological services, i.e. flood control, storm protection, carbon sequestration, climate control etc.		Human disease and injury, livestock losses, crop destruction, competition for resources, etc.	
<i>Option values</i>			
The value of maintaining rangelands for future possible direct and indirect uses			

Table 2-2. Policy analysis matrix. Source: Monke and Pearson 1989

	Revenues	Tradable Inputs	Costs Domestic Factors	Profits
Private prices (market prices)	A	B	C	D
Social prices (opportunity cost)	E	F	G	H
Effects of divergences and efficient policy	I	J	K	L

Note:

Private profits	$D = A - B - C$
Social profits	$H = E - F - G$
Output transfers	$I = A - E$
Input transfers	$J = B - F$
Factor transfers	$K = C - G$
Net transfers	$L = D - H$

Table 2-3. Farm survey sample. Compiled from survey of game ranches.

Type	Size (ha)	Start year	Rainfall (mm)	Activities	
Ranch					
	1	2500	2003	450	Tourism
	2	5207	1933	550	Tourism
	3	2017	1986	460	Tourism
	4	2039	2006	480	Non commercial- recreation
	5	3700	1980	500	Tourism, breeding, hunting, animal sanctuary
	6	2800	1989	300	Tourism, breeding
	7	3000	1994	380	Tourism, breeding
	8	1700	1998	550	Tourism, breeding, hunting
	9	3200	2003	550	Breeding, hunting
	10	14400	1965	521	Breeding, feedlot cattle
Conservancy					
	11	30000	1993	550	Breeding, conservation
	12	60000	1969	460	Tourism, conservation
	13	11500	1980	550	Tourism, conservation
Provincial					
	14	23200	1967	600	Tourism, conservation

CHAPTER 3 THE POLICY ENVIRONMENT

South Africa's history of strong private property rights facilitated by the policy environment has led to diversity and innovation in the wildlife sector. On private land owners have legal jurisdiction over the wildlife resource, provided the land is fenced and they have received exemption certification. Private ownership does not exclude oversight of wildlife resources by the relevant government departments. Wildlife is a sector that falls under the multiple government sectors - agriculture, environment, and tourism - resulting in a complex policy and regulatory environment. The implementation and enforcement of policy has varying impacts on farmer behavior. This chapter describes the existing policy and institutional structure for wildlife production and management; and how it is applied to wildlife producers.

3.1. Conceptual Framework

Institutional constraints dictate the margins at which organizations operate and define the rules of the game affecting the behaviors of the actors. Institutions affect the performance of the economy by their effect on the costs of exchange and production. Together with technology, they determine the transaction and transformation costs that make up the total costs (North 1990; Nelson and Sampat 2001). The situation-structure-performance framework (Schmid 2001, Schmid 1987) is used to analyze the game ranching institutional environment and its impact on rancher behavior. Schmid identifies three main variables of the institutional theory; situation, structure and performance. Within this frame work institutions are defined as "sets of ordered relationships among people that define their rights (opportunities), exposure to the rights of others, privileges, and responsibilities" (Schmid 1987). The institution – influence relationship is an

analysis in three parts: (i) the situation, which defines the inherent characteristics of the good that lead to human interdependencies. These inherent characteristics include the degree of incompatibility, exclusion cost, cost to provide the good for another user, cost to produce another physical unit, and transaction costs. (ii) Structure, which identifies the institutions that facilitate the interests of stakeholders, (iii) Performance, which considers the consequences and outcomes of alternative institutional arrangements.

Structure describes the relationships between people that define their relative opportunity sets. Structural variables include the type of right and which party holds it. Kiser and Ostrom suggest the following typology of structural variables: (1) Boundary -- the entry and exit conditions for participation, (2) Scope -- allowable actions and allowable outcomes from interaction, (3) the distribution of authority among positions, (4) the aggregation of joint decisions, (5) procedural rules linking decisions together, (6) information rules and (7) sanctions and payoff rules (Kiser and Ostrom 1982). Together the rules and positions govern interdependencies that arise from the good determining opportunity sets of individuals.

Performance can be divided into who gets and does not get what goods, and gives an indication of whose interests count. A performance criterion used to evaluate the outcomes of the institutional arrangements (the regulatory and policy environment) is efficiency, which is frequently used to evaluate performance in an economics context. Ostrom, Schroeder and Wynne identify additional criteria including equity and adaptability. Equity can be assessed in terms of fiscal equivalence, a concept of equity in which those who benefit from a good should bear the cost of providing the good, and those who derive more benefits more should pay more. Perceptions of fiscal

equivalence affect individuals willing to contribute to the development and maintenance of the resource. A alternate and often conflicting view of equity is that of distributional equity. Redistribution of resources to targeted needy groups is often a policy objective particularly in South Africa where distribution of wealth is highly skewed. A trade-off arises where resources are directed to poorer individuals whereas efficiency requires that scarce resources are directed to a use in which they generate the greatest net benefit.

Adaptability refers to the ability of institutional arrangements to respond to changing environment. Inflexible institutions can comprise investment in the good. In the fast changing game ranching sector where producers are innovating and discovering new means through which to generate value from the wildlife and other rangeland resources responsive institutions are necessary for continued growth and development. Together conjunction with efficiency, these criteria give an integrated evaluation of rancher performance (Ostrom, Schroeder, and Wynne 1993). The situation-structure-performance framework was used to identify the institutional structures and their impact in the game ranching sector. The following section presents a situation-structure-performance analysis of game ranching in Limpopo province. Data for the analysis was obtained from key informant interviews of industry stakeholders conducted in 2009 and 2010, government reports, industry publications and web data.

3.2. Situation

Game ranching is a multidimensional good that produces multiple goods i.e. wildlife, recreation, improved vegetation, water, and soil conservation. Private ownership over land on which wildlife is found and subsequent ownership of wildlife resource itself make game ranching an incompatible use good. Private ownership of a

tract of land for game ranching precludes its use by another individual for alternative land use such as cropping or urban development. The physical exclusion of others by electrified fencing makes land inaccessible to others. Privately owned goods are often incompatible use goods in that ownership by one party precludes use by another. The ownership of an incompatible-use good influences who can create costs for whom, and thus the distribution of benefits. For example, if user A hunts and kills an animal, then that animal is no longer available for viewing or consumption by user B. Ownership of factors influences whose interests are realized and whose are forgone and controls the interdependencies that arise from incompatible use.

3.3. Structure

Structure describes the relationships between people that define their relative opportunity set. Structural variables and their influences in the game ranching sector are examined using stakeholder analysis and a review of the regulatory environment. The stakeholder matrix is used to reveal the positions and opportunity sets of groups in the game ranching sector, and to identify the interdependencies between groups and how costs and benefits are distributed.

3.3.1. Stakeholder Analysis

Many natural resource use situations are characterized by a complex web of interests and tradeoffs between interacting sets of local people, government departments, national and international planners, and professional advisers (Grimble and Wellard 1997). Wildlife utilization is no exception. In this context stakeholder analysis is a useful analytical tool to better understand complex situations and predict future situations and scenarios, and addresses both conflicts of interest between stakeholders and trade-offs between objectives (Grimble and Wellard 1997; Weible

2007). By unraveling the different interests and objectives of stakeholders, stakeholder analysis assists in getting to the heart of problems, identifying incompatibilities and prioritizing objectives. There are potentially crucial differences in perspective regarding use of the resource, for example, between economic, social and environmental viewpoints and between the competing interests of different stakeholders. The ecological and socio economic objectives of wildlife use are in varying importance by the various stakeholders and in some cases oppose each other. Stakeholder analysis helps to conceptualize the dynamics of the policy subsystem and provides a guide to investigate stakeholders' perceptions regarding the severity and causes of a problem, and the distribution of resources among groups (Weible 2007).

3.3.1.1. Wildlife production stakeholders

The policy subsystem is defined by the spatial boundary province of Limpopo and by the topical boundary of private wildlife ranches. Stakeholders involved in the wildlife production policy subsystem include local, provincial and national government officials, interest groups, nongovernmental organizations, community groups, researchers, scientists, wildlife producers and tourists. A stakeholder matrix is used to map out the relative importance and influence of key stakeholders (Table 3-2). The matrix provides a framework which is used to analyze and map key strengths, weaknesses, linkages and areas of potential conflict (Matsaert 2002). The stakeholders identified in the wildlife ranching policy sub system are incorporated into the matrix along with their interests, positions and power differentials. Underlying interests show the stakeholder core objectives, while their position shows what stakeholder are saying about their concerns and objectives. Different groups may have opposing positions but have common underlying interests. Power is used as an indicator of influence and shows the ability of

one stakeholder to alter the decisions made and /or welfare experienced by another stakeholder relative to the choices that would have been made and/or welfare that would have been experienced had the first actor not existed or acted (Schmid 2001).

A number of organizations have direct and indirect impacts on wildlife producers. These organizations include government departments and industry associations. National government departments provide legislative framework and enforce regulations through local field and conservation officers. Producer associations represent ranchers at the national level and provide extension and training at the local level.

Wildlife producers. Wildlife producers are the direct stewards of wildlife resources. Ranchers have legal claim over the wildlife resource, and they depend on wildlife for livelihood and lifestyle needs. Ranchers are directly dependent on the wildlife resource for tourism, hunting, breeding, and personal enjoyment. These are activities that are possibly replaceable by alternative agricultural activities, but the wildlife resource itself cannot be substituted. Conservation considerations include the preservation of endangered species and biodiversity in the natural landscape that would otherwise be transformed to agricultural or urban landscape not suitable for sustaining wildlife. Indeed, preservation of habitat is a high priority. This dual commercial and conservation value of wildlife makes it a difficult sector to manage. Ranchers derive monetary benefits from market activities they engage in that include consumptive and non-consumptive tourism, rare species breeding and sale of animal products. Factors that reduce the value of market transactions are considered detrimental to business by ranchers. Ranchers are interested in maintaining their livelihood and lifestyle and they

consider the regulatory environment a key factor that is reducing the value of the market values that can be captured from wildlife.

National and Local Government: Game ranching falls under two main government departments, the Department of Environmental Affairs and Tourism (DEAT) and The Department of Agriculture (DOA). These agencies have specific responsibilities but there is some overlap (NAMC 2006) (Table 3-1). This leads to ambiguity as to who is responsible for what, and subsequently some responsibilities are not adequately fulfilled. It is in these gaps that national and local farmers associations step in. Although game ranching was officially declared an agricultural activity in 1987, this has never been formalized. Both DEAT and DoA contain game ranching units. The presence of two separate units in two separate government departments confounds the enforcement of legislation. For the farmers, this means that they have to discover on their own how to navigate this complex regulatory environment to obtain necessary operating requirements.

The Department of Agriculture has a large stake in the game ranching sector. At the national level the DoA is responsible for legislation regarding animal health and management. The agricultural department also provides producers with livestock services including range and veld monitoring, animal health and care guidelines, and animal nutrition guidelines. The department has developed a wildlife ranching policy that covers veld and forage and animal improvement. Legislatively they have claim on the oversight of wildlife production since wildlife was officially considered an agricultural activity, although it is only recently that this responsibility has been actively pursued. At the local level the DoA interacts with farmers through veterinary regulation enforcement.

The Department of Environmental Affairs and Tourism has a large direct impact on wildlife producers; this agency are responsible for the implementation of the National Environmental Management Act and the Biodiversity Act, both of which are the core legislation under which wildlife is managed nationally and provincially. They are also involved in the formulation of new policy and regulations. They have legal and administrative responsibilities and mandate local conservation offices to ensure compliance to biodiversity regulations and agreements at national, provincial and local levels. DEAT wields and exercises the most direct authority. Through monitoring and permitting systems. They have direct influence over wildlife use by granting permissions for ranching, hunting, taxidermy, trade etc influencing the use and commercialization of wildlife. DEAT has direct contact with ranchers through the local conservation offices that are responsible for the enforcement and monitoring of the wildlife ranching activities. They provide ecotourism, hunting and regulation services directly to farmers. Many of these services entail permitting and enforcement. The Department of Agriculture appears to be responsible for the welfare of animals while the DEAT is responsible for issuing permits for hunting and game ranching. There is no comprehensive enabling legislation for wildlife, rather there exists a complexity of rules that are not always coordinated or evaluated, such that interpretation and implantation of rules is left to the discretion of provincial conservation offices.

Government departments have acknowledged complexity as a key factor that must be addressed, in order to ensure growth and development of the sector (Patterson and Khosa 2005; Burgener, Greyling, and Rumsey 2005). However, the process of addressing the problem has been slow. This confusing legislative structure has made it

extremely difficult for conservation authorities already facing budgetary and capacity constraints, to carry out their work effectively and efficiently. There are currently, for example, a number of inconsistencies in permitting procedures, sanction provisions, legal definitions, and the conservation status of many indigenous species (Damm 2005). It has had an equally damaging effect on the commercial hunting industry as the sector generates significant income through foreign hunters, a number of whom have, in recent years, sought alternative hunting destinations due to the inefficient and inconsistent regulation of hunting in the country (Burgener, Greyling, and Rumsey 2005).

Producer Associations. Producer associations represent the needs of producers and lobby for producer interests at the national level. At the local level, they provide support to producers through extension and training generating and disseminating knowledge among producers. Wildlife Ranching South Africa (WRSA) is sole representative of game ranchers at the national level. Despite being the main representative of ranchers WRSA has only 1500 members while there are in excess of 9000 registered game farms in the country. All the same WRSA has access to national decision making for and is committed to advancing wildlife producer interests in national policy and legislation. Hunting associations such as the Professional Hunters Association of South Africa (PHASA) and the confederation of hunters associations of South Africa (CHASA) promote sustainable use, development and conservation through ethical hunting. They have large membership and their objectives are to promote the standards of ethical hunting and safeguard the reputation of South Africa as a premier hunting destination. Producer associations believe that the wildlife sector is overregulated and it compromises the producer's ability to develop their wildlife

businesses and, reduces the competitiveness of South Africa as a hunting destination in the region. The lobbying capacity of these associations is hampered by the lack of quality and persuasive data with which to lobby. There is no comprehensive record of the number of ranches and where they are located, and of the economic value of their activities. Professional hunters and safari operators are required to complete detailed reporting sheets to provide provincial level data on hunting, but reporting is unreliable and it is expected that this is due to loopholes in the reporting process and inadequacies in collection and interpretation of data (Patterson and Khosa 2005; Damm 2005).

3.3.1.2. Provincial regulatory environment

The wildlife industry performs a large number of value added activities at the farm level (Child 2004) and ranchers are faced with having to comply with a great number of regulations (table 3-3). In addition to livestock regulation the wildlife sector is governed primarily by the National Environmental Management: Biodiversity Act that distinguishes between wildlife ranching, and farming with domestic livestock. It regulates wildlife related activities setting out guidelines and management standards for hunting, threatened and protected species, alien species, translocation, bio-prospecting and environmental impact analysis. A permit system is used to regulate all wildlife activities both on public and private land. In general, permits are required for hunting, possessing, capturing, importing, exporting, transporting, processing, selling, collecting, and harvesting (Burgener, Greyling, and Rumsey 2005). An exemption permit gives the landowner a certificate of adequate enclosure that provides the owner with various rights not usually afforded other farm owners. These rights include hunting of protected species of animals as specified on a certificate, the use of some prohibited hunting methods, the right to keep animals in captivity, and the right to sell or donate any animal

or carcass without permit (Limpopo conservation officer). However the wildlife producer is still faced with permitting requirements that the average domestic livestock produce do not have to contend with, for example a cattle producer does not require permits to harvest or capture. The regulatory playing field is uneven and it places wildlife at disadvantage relative to other land uses.

The regulatory environment imposes additional costs to producers. Examples of these include fencing act which is institutionalized through exemption certification. The average costs of game fencing are high. Cloete, Taljaard, and Grove, showed that fencing presented substantial capital costs in conversion from cattle to wildlife with costs in the range of R 12 million(Cloete, Taljaard, and Grove 2007). In addition fencing imposes negative externalities on society; fragmenting habitat and negatively impacting biodiversity (Hayward and Kerley 2009). The experience of other nations demonstrates that fencing need not be a necessary requirement. Zimbabwe has differed in that private landholders also have ownership over wildlife resources on their land, however, fenced enclosure is not a necessary requirement for ownership, rather full rights are provided for through a single piece of legislation; the Parks and Wildlife Act of 1975 which removed bureaucratic constraints of central authorities associated with wildlife management (Child 2000). This piece of legislation moved the landowners away from a permitting system, deliberately reducing the transaction costs and thereby increasing the profitability of wildlife enterprises. The working of government when it changes the rules of the game by issuing new regulations or makes administrative transactions, directly affects stakeholders and the value of their goods. Transaction costs create additional varieties of externalities that nominal factor ownership and competition do not

address. For example, the cost of administrative transactions that arises due to bureaucratic red tape, and are borne by the landholder. Administrative cost greatly affects to what extent he will actually make use of wildlife, if the cost is high enough trade will not take place. This type of cost cannot be resolved by increased competition in wildlife markets rather it is a matter of public choice.

3.4. Performance

Performance refers to the consequences and outcomes of alternative institutional arrangements. Performance gives some indication of whose interests count (Schmid 2001). Performance criteria used to evaluate the outcomes of the institutional arrangements (the regulatory and policy environment) include efficiency. Efficiency is the often used standard measure of economic performance, and is closely related to sustainability. A firm is sustainable if the benefits of operating and maintaining the enterprise exceed direct and indirect costs. Efficiency in production and direct costs for a game ranch operation are examined in detail in Chapter 4. Ostrom *et al*, identify additional criteria that include equity and adaptability (Ostrom, Schroeder, and Wynne 1993). Together with efficiency, these criteria give an integrated evaluation of rancher performance.

3.4.1. Impact of Policy and Regulation

The overwhelming impression presented by the ranchers interviewed is one of poor relations with government authorities both at the local level and at the national level. Farmers also perceive that government policy prejudices wildlife. For example, farmers across Limpopo received assistance and compensation for losses suffered from a recent drought. but this assistance did not extend to game farmers. Cattle and other domestic livestock farmers received compensation for lost animals and were given feed

support for the remaining animals, while game farmers had to fend for themselves even though they too had suffered the effects of drought and lost animal stock (farmer comment). The value of wildlife is largely unrecognized by the authorities, and ranchers sense the need to demonstrate to the government the positive impacts of game ranching and its legitimacy as a land use option.

Legislation doesn't fit with new way of thinking in game ranching industry. We have already lost a lot of opportunities (Ranch manger 2009)

South Africa is the most biologically diverse country on the continent, and it offers the greatest variety of habitat, huntable species and hunting experiences, yet our laws tend to nullify all of these advantages (CEO Professional Hunters' Association, quoted in *Farmers Weekly* 2010)

The concerns of farmers are echoed by Wildlife Ranching South Africa (WRSA) a national organization representing game ranchers across the country. WSRSA found that these are problems faced by their members country wide.

The biggest problems facing the ranches are high number of regulations, the perception of industry by government as an elite white activity and poaching (WRSA 2009).

The focus of WRSA is to work with the government on new and existing regulations and negotiating for a move for ranching from conservation to agriculture classification. A move to agriculture is viewed a solution to overcome policy restrictions facing ranchers.

A move to agriculture would give ranchers access to subsidies that are widely available in agriculture but not in wildlife, avoid the many regulations in wildlife, and give ranchers tax benefits afforded to other agricultural activities (WRSA 2009).

These sentiments are reflected to some extent in the recently revised wildlife ranching policy of the department of agriculture, which strives to develop policy that addresses the existing shortfalls that are stalling the development of the game ranching sector.

The "animal improvement policy" drafted by the DoA recognizes the lack of coordination

and the interdependencies between government departments and wildlife producers and recommends formalized collaboration.

An inter- Departmental working group (DEAT and National Department of Agriculture) should be established to facilitate the development of the game farming industry within an acceptable legal framework that takes cognizance of all relevant legislation- but recognizes the fact that game farming is a legitimate agricultural activity. As a recognized agricultural activity, game farming should have a policy to facilitate the development of the industry at all levels (Department of Agriculture 2009).

Ranchers generally perceive that there are too many regulations. The difficulty with regulations manifests itself as a lengthy permit processing and a large number of permits required for wildlife related activities, such as hunting, breeding, selling and translocation.

3.4.2. Impact of Veterinary Regulations

The Veterinary and Para-veterinary Professions Act, No.19 of 1982 was introduced to safeguard animal health. The act applies to all livestock and as such applies equally to wildlife. The growth of the wildlife industry presents new veterinary challenges in preventing disease spread, and protecting animal health. Veterinary authorities must keep up with the changing and evolving producer practices. Veterinary surveillance areas attract particular attention from regulators due to the high disease risks. The eastern Limpopo region is nestled against Kruger Park to the east which is considered endemic for foot and mouth disease, and as a result many farms in the area fall within veterinary control or surveillance areas. These areas entail additional veterinary oversight and regulation compared to areas in 'free zones'.

3.4.3. Market Restrictions

In semi arid areas where wildlife is present, the marketing of cattle produced in this region is limited by national and international disease regulations. Most of the semi-arid

lands particularly those in the east close to Kruger National Park lie within foot and mouth disease (FMD) 'red zones'. This means that the production and marketing of livestock is restricted by control measures. Within FMD zones animals must be slaughtered at specific processing plants identified by veterinary authorities, meat must be marketed locally, animals cannot be moved freely without a permit and animal products have to be treated in a specific way before they can be moved between zones (Moerane 2008). These restrictions on farmers lead to high input costs and loss of potential markets in FMD free zones (Moerane 2008).

Although farmers understand the necessity and support the idea of preventing disease outbreaks, they also feel that veterinary regulations have serious negative impacts on their operations. On further discussion it appears it is not so much the regulations themselves but the process of obtaining permits that is the problem. Farmers cited slow processing of permits and the large number of permits required which when combined make compliance a long drawn out and unpleasant experience.

Vet control is very important, but there is also immense profit in game meat industry. The issue is more with permits and the hassles surrounding them. Same applies to the skins of animals, as export is a huge industry. (Ranch owner/manager 2009)

The difficulties are partly due to the lack of manpower at local service centers to process permits (personal comment conservancy manager). This was the case in the eastern Limpopo study area, where the conservation officers confirmed that they were understaffed and overwhelmed by the monitoring and inspection demands and were not always able to keep up with the paperwork. Limpopo province processed an average of 15000 permits annually in 2004 (DoA 2009) and with the increase in game ranches the number can be expected to go much higher. Whereas in other provinces nature

conservation authorities only deal with nature conservation issues, in Limpopo nature conservation offices are also manage general environmental issues that include monitoring of environmental impacts assessments, regulation of pollution control and waste management that add to their administrative responsibilities. Farmers encounter backlogs at service centers which mean that their requests take longer, which is not ideal for time sensitive operations such as movement of game. The 2005 panel of experts report to the Minister of Environment and Tourism found that there were significant constraints to implementation and enforcement of regulations from budgetary limitations and staff training.

Inadequate budgets impacts staff numbers, staff training, and the ability of field officers to ensure compliance with hunting laws and to issues permits efficiently.

Where staff numbers are not the problem, there is a problem with staff training and lack of experience and this is often affects officials' ability to conduct the analysis that is requires to assess whether a permit application meets the scientific and administrative criteria for issuance.(Panel of experts on professional and recreational hunting in South Africa, DEAT 2005).

The large number of permits also increases the costs of operations, capture teams spend an estimated R75 000 per annum on permit applications (NAMC 2006). The financial and legislative burden involved in legally translocation animals is great and in many instances regarded as impractical, and as a result it is estimated that up to 50% of capture teams move wildlife illegally (NAMC 2006).

The Meat Safety Act 2000 is another piece of legislation intended for the production of domesticated livestock, but when applied to wildlife producers presents considerable challenges and introduces substantial additional costs to producers. The Act itself is designed to maintain standards of food safety and protect human health

(DoA Meat Safety Act 2000). Its goals are: To provide for measures to promote meat safety and the safety of animal products; To establish and maintain essential national standards in respect of abattoirs; To regulate the importation and exportation of meat; To establish meat safety schemes; and To provide for matters connected therewith. When this legislation is in place the additional financial and transition costs introduced result in a disincentive for ranchers to engage in meat production.

The main government criticism is that they don't produce meat, but ranchers don't want to give real red meat quantities for fear of increased regulation (WRSA 2009).

It is estimated that less than 1% of game meat reaches commercial marketing channels (Oberem 2009).

The latest is the Meat Safety Act 40 of 2000 states no dead animal can be brought to an abattoir. Therefore it's very difficult to produce meat if you need to herd animals to the abattoir. It's very expensive since there are very few designated abattoirs... to build a 3rd class rural abattoir is very expensive R60, 000 to R80 000. A farmer does not kill that many animals and it's hard to recoup that level of cost. (WRSA 2009)

Harvesting of wildlife is much more difficult compared to domesticated livestock due to the extensive nature of production. Game ranchers cannot make use of more readily available red meat abattoirs. Regulations do not permit the slaughter of wildlife at the same facilities as domesticated livestock. With only five wildlife meat abattoirs in the country game ranchers would need to provide their own facilities to find less costly alternatives. However, the costs of establishing an on farm abattoir and to comply with regulations are high. To own and operate an abattoir the farmer would be subject to not only the meat safety act, but also to the Agricultural Product Standards Act, Act No. 119 of 1990 which requires the maintenance of certain standards regarding the quality of products and packing, marking and labeling of meat for sale and export. Meat

classification and marking is a voluntary system in terms of the Agricultural Product Standards Act and an abattoir can only be approved to if it has the services of an experienced person to render such service. Also the Abattoir Hygiene Act, 1992 - Act No. 121 of 1992 provides for the maintenance of proper standards of hygiene in the slaughtering of animals and in the handling of meat and animal products, and the Animal Diseases Act, 1984 - Act No. 35 of 1984 provides for control measures for the prevention of diseases and parasites and for schemes to promote animal health enforced by the veterinary services department (DoA 2009, Red Meat Abattoir Association 2009). Ultimately no animals can be slaughtered for meat or animal products except at an abattoir. Abattoirs on a wildlife farm must be approved and registered with veterinary services, and the wildlife producer must be a qualified meat inspector or employ a qualified meat inspector in addition to physical construction costs. This had a detrimental effect on recreational hunting in KwaZulu- Natal and Northwest Province where following the implementation of the Meat Safety Act the meat of an animal killed during a hunt cannot be used (Burgener, Greyling, and Rumsey 2005). Adhering to all these regulations can be an onerous and costly task, and for this reason domestic livestock red meat abattoirs often use the services of professional companies to assist them with compliance (*The Butcher* 2009).

When combined with veterinary regulations the Meat Safety Act creates an environment of negative incentives that discourage diversification into production of meat and animal products. Clearly the intention of the DoA is to develop the game ranching sector to its full economic potential however it appears that the lack of understanding of the differences and nuances of extensive wildlife production is the

basis of much of the disincentive to the distribution of wildlife meat and meat products that arises from well meaning policy. In the 2005 panel of experts review of the hunting industry the report to the Minister of Environmental Affairs and Tourism suggested that the problems mostly arise from the interpretation of the act when applied to wildlife producers rather than the specific provisions of the act. The 2006 report on the problems in the wildlife ranching suggested more mobile abattoirs, passive capturing techniques and meat processing facilities as solutions to the problems arising from the Meat Safety Act. These solutions show an appreciation for the unique nature of extensive wildlife production and it is clear that for them to be implemented successfully effective communication and collaboration with wildlife producers to develop relevant technologies that are agreeable to producers will be necessary.

3.5. Conclusions

Institutional arrangements that enable private ownership of land and the wildlife resource have produced a competitive market environment where game ranchers strive to produce their products at lowest possible cost. Private land owners have strong fundamental property rights for the use of wildlife that are conferred by certificate of adequate enclosure. On the positive side, certification gives land owners the right to manage and use wildlife as well as the rights to buy and sell wildlife. This is the fundamental force behind rapid expansion of the wildlife sector. On the negative side, adequate enclosure requires game fencing which is both capital intensive and ecologically damaging, it compartmentalizes landscapes that are characterized by variability in rainfall and vegetation, and mobility of species.

Considerable transaction costs are placed on game farmers who are expected to deal with two categorizations of legislation, livestock and wildlife legislation. On the one

hand game ranching is an agricultural activity, but is not formally recognized as such and does not get many of the benefits accorded to agricultural land uses. On the other hand, it is governed by 'conservation' criteria, which tends to be costly and restrictive rather than facilitative. Additionally, the game ranching sector is expected to follow a host of other regulations, for example, rules applying to meat production, but these are not specifically aligned with the needs and realities of the sector.

The current regulatory environment imposes additional transaction costs on wildlife ranchers and a large administrative burden on conservation officers. The regulatory approach is almost entirely focused on command and control methods to ensure compliance and fails to reflect more contemporary approaches of incentives and co-management (Burgener, Greyling, and Rumsey 2005). Frequent changes in regulations, as well as new regulations have left ranchers with a sense of uncertainty for the future. This can result in shortsighted behavior as ranchers try to maximize profits before policy changes. Ranchers overstock their land in an effort increase revenues and are willing to compromise future vegetation health for high present returns. The large volume and inefficient processing of permits is a large factor in increasing the costs of those involved in the ranching sector. Improvements in staffing and streamlining of permits -- by reducing the number of permits and applying them only when they are absolutely necessary, and when they can be enforced and processed -- could reduce administrative burden on conservation offices and financial burden on producers and subsequently improve compliance and revenues to conservation departments. In general, the game ranching sector is over-regulated, yet under-served by regulations. A more facilitating approach to wildlife production by regulators would provide wildlife

producers with the support needed to reduce uncertainty, maximize profitability and foster an environment of understanding where conservation and economic goals could be achieved.

Table 3-1. Activities and services, and the responsible government departments.
 Source: Limpopo Department of Economic Development Environment and
 Tourism 2009, Limpopo Department of Agriculture 2009, National Agricultural
 Marketing Council 2006.

DEAT	DoA
Tourism planning and development	Labor
Protected areas development	Land and land tax issues
Wildlife:	Wildlife:
Permit processing	Meat
Game translocation	Diseases
Damage causing animals	Animal health services
Cites management	Extension:
Wildlife centers and institutions regulation	Animal care and production guidelines
Hunting regulation	Animal nutrition
Game farm regulation	Animal identification, evaluation and improvement
Capacity building	Veld evaluation and improvement
Taxidermy regulation	Enforcement
Enforcement of legislation / compliance	
Conservation	

Table 3-2. Wildlife ranching stakeholder matrix.

Stakeholder	Position	Interest	Power
Game ranchers	-They are contributing to economic development and conserving endangered species and habitat. -Want less regulation for wildlife activities and support for their ranches in the same way other livestock producers are supported by government	- Generate and maintain profitability of ranch. -Maintain outdoor lifestyle -Conserve biodiversity -Recognition for their economic contribution. -Survive the land reform transition.	-Ranchers are the legal owners of the wildlife resource. -They are responsible for direct care and management of wildlife and vegetation. They can strengthen their position by joining producer associations that voice their concern at a national level.
Tourists: 1a)Local ^a 1b)International ^a 2)Hunters ^b	Come to ranches to experience wild nature. 1a)View birds and rare species, scenery 1b)View large mammals and predators “Big five” 2)Simpler processing of firearms permits	Enjoyment, Value for money 1a)Quiet retreat, good service 1b)- 2) Source meat, leisure, enjoyment of nature.	- Tourist preferences drive the industry ^c . Tourists have expectation of seeing certain animals and ranchers are eager to provide this to remain competitive.
National government ^d 3)Dept. of Agriculture 4)Dept of Environmental Affairs and Tourism	3&4) Want ranching to contribute to food security and employment. Conserve biodiversity	3&4)Conserve biodiversity -Tourism development -Animal health	They enforce existing regulation and create new legislation.- They have regulatory power. 3) Set veterinary regulations, Monitoring veldt management and wildlife management. Influence market opportunities for ranchers. 4) Determine standards for game ranching; define the property rights for wildlife through permits. Enforcement of international and domestic wildlife regulations

Table 3-2. Continued

Stakeholder	Position	Interest	Power
Local government Conservation offices	- Additional budget support - Additional trained staff	-Conservation and species preservation -Tourism development, employment creation. Animal health	-Regulatory enforcement
Non-governmental organizations IUCN, WWF, SCI, CIC, Wildlife Trust	-Sustainable use of resources and conservation of biodiversity	-Biodiversity preservation -Ethical resource use	-Lobby for changes in environmental policy locally and internationally. -Support national government develop scientific resource management guidelines
Producer associations 1)Game ranching –WRSA 2) Hunting- PHASA, CHASA	1)-Develop game ranching, -Assist game ranchers contribute to economic development -Moving ranching to Agriculture -Less regulations 2) Sustainable, ethical hunting - Less regulations	1)-Representing rancher interests -Ensuring industry survives land reform and other challenges -Show economic contribution of ranching 2)- Simplified access to quality hunting for members -Marketing South African hunting	1)-The only one representative of game ranchers at the national level but they have access to key decision making forums. 2) Large membership, hunters that are large segment of the tourism industry.

Notes: ^a (Lindsey *et al.* 2007),(Kepe 2001), ^b(Van der Merwe and Saayman 2008),(Lindsey *et al.* 2007), (Kepe 2001),^c(NAMC 2006; Patterson and Khosa 2005; Burgener, Greyling, and Rumsey 2005) Department of Agriculture 2009, ^d(Cousins, Sadler, and Evans 2008), ^e PHASA 2009, CHASA 2009.

Table 3-3. Legislation affecting wildlife. Source: Department of Agriculture 2009, Department of Environmental Affairs and Tourism 2009.

Regulation	Department Responsible
Agricultural Products Standards Act, No. 119 of 1990	DoA
Animal Health Act, No.7 of 2002	DoA
Animal Improvement Act, No.62 of 1998	DoA
Animal Identification Act, No.6 of 2002	DoA
Animals Protection Act, No. 71 of 1962	DoA
Conservation of Agricultural Resources Act, No.43 of 1983	DEAT
Environmental Conservation Act, No. 73 of 1989	DEAT
Fencing Act, No. 31 of 1963	DoA
Firearms Control Act, No. 60 of 2000	Dept. of Police
Marketing of Agricultural Products Act, No. 47 of 1996	DoA
Meat Safety Act, No. 40 of 2000	DoA
National Environmental Management Act, No. 9 of 1998	DEAT
National Environmental Management: Biodiversity Act, No. 10 of 2000	DEAT
National Environmental Management: Protected Areas Act, No. 57 of 2003	DEAT
Perishable Products Export Control Act, No. 9 of 1983	DoA
South African Abattoir Corporation Act, No.120 of 1992	DoA
Veterinary and Para-veterinary Professions Act, No.19 of 1982	DoA
Tourism Act, No. 72 of 1993	DEAT

CHAPTER 4 GAME RANCHING IN LIMPOPO PROVINCE

Privatization of the wildlife resource has resulted in an extensive network of game ranches. Property rights through exemption certification gives farmers full control over the wildlife resources on their land, and ownership in turn creates the incentive for innovation in use leading to diversity in the practices of game ranching. This diversity is displayed in the immense range of goods and services provided at the farm level and the multiple enterprises that have arisen over time. The proliferation of game ranches suggests that they are economically viable and financially sustainable. This chapter considers what has emerged in the landscape of South Africa as a result of the economic and policy environment surrounding wildlife. A case study of Mopani district in eastern Limpopo province is used to identify and quantify operational costs and revenues to determine ranch profitability; and describe rancher behavior at the farm level.

4.1. Economic Benefits from Wildlife Utilization on Private Land

Utilization of wildlife on game ranches is associated with a range of economic benefits. Some of these benefits are captured by market values, while other do not have associated market values. The values from the wildlife resource are derived from direct and indirect use, and non-use values. This section provides an overview of the nature of these market and non-market values.

4.1.1. Market Values

Market value derived from the utilization of wildlife on game ranches is captured through four key activities: ecotourism, hunting, breeding of species and processed game products (ABSA 2003; Van der Merwe and Saayman 2007; Luxmoore 1985).

Ecotourism refers to the use of wildlife and nature by experiencing it. There are many definitions of ecotourism, but for the purposes of this study the definition of ecotourism is the provision of accommodation (hotel, lodge, chalet and tented camps) and related recreational products (game viewing, cultural tours and sightseeing) to international and local visitors (ABSA 2003; Luxmoore 1985).

Hunting is divided into two categories trophy hunting and biltong hunting. Trophy hunting refers to activities where “wildlife is hunted by means of a rifle, bow or similar weapon primarily for its horns and skin in order to be displayed as trophies” .Biltong hunting is “a cultural activity where wildlife is hunted by rifle, bow, or similar weapon for the usage of a variety of venison products such as biltong and salami” (Van der Merwe and Saayman 2007).

Breeding focuses on the production of rare species. Game breeders specialize in rearing rarer species like Roan, Sable, Lichtenstein’s Hartebeest, Livingstone’s Eland, Tsessebee, etc for public auction or private sale (Damm 2005; Van der Merwe and Saayman 2007).The animals are often sold to other farmers for trophy animals or to become founder populations or to be used to diversify the genetic pool of existing populations. The rising prices of most game species have made this method of utilization popular. In 2003 the gross income from all live animal auctions was just over R84 million with 87% the animals being sold by private owners (ABSA 2003).

Approximately 450 tons of wildlife meat are exported annually at a value of R15 million rand and approximately 1350 tons of wildlife meat are consumed locally with a value of R27 million per annum (NAMC 2006). Domestic wildlife meat market is not well developed and processed meat products are largely a potential market which is not

currently widely exploited, it is estimated that only 1% of venison from game ranches reaches conventional meat marketing channels such as supermarkets and other retail outlets (Oberem 2009). The contribution of extensive wildlife ranching to wildlife meat production is limited due to the difficulty of sustained production and processing that arises from the extensive rather than intensive nature of the wildlife production, and from the complex and restrictive game meat handling regulations. These four activities can be found in any number of combinations on game ranches.

At a national level trophy hunting is the biggest revenue earner (R568 million) followed by live animal sales (R180 million), eco tourism (R106 million) and processed game products (\$ 26 million) (van der Merwe and Saayman 2003). However, at a regional level this varies. For example in the Gauteng area, eco-tourism rather than hunting was found to be the biggest earner due to proximity to urban areas and tourism circuits (Reilly, Sutherland, and Harley 2003). Literature shows that income derived from ranching activities depends on the region where the ranch is located, proximity to a large city and availability of draw species such as elephant, rhinoceros, buffalo, lion and leopard - the so-called 'Big Five' (Barnes 1998; Reilly, Sutherland, and Harley 2003). Empirical studies of private game ranches in South Africa indicate that farmers have been able to capitalize on advantages of wildlife. Van der Waal and Dekker estimated consumptive use values and economic impacts of game ranching in Limpopo Province of South Africa using mail survey data (Van der Waal and Dekker 2000). They estimated that the game ranching in the province produced annual turnover of R221 million from which local hunting was the largest contributor with annual turnover of R82 million, followed by live sales with R56 million, R48 million from foreign hunting and R7

million from venison production. Overall they estimated a gross income of R61per hectare for game ranches. Economic impacts were estimated at 13700 full-time jobs on game ranches.

Sims–Castley *et al*, examined the income generated by game farming, ecotourism and livestock farming in thicket vegetation biome of Cape Province of South Africa (Sims-Castley 2002). The study calculated gross incomes for different enterprises. Ecotourism produced the highest gross income per hectare of R1,944.44 , while Mohair farming provided R155.18 and Boer goat farming generated R495. In addition, they estimated the change in land use from livestock to ecotourism increased per hectare gross income from R99.73 to R413.86.

Given the absence of cost data in the studies above (Van der Waal and Dekker 2000; Sims-Castley 2002; Langholz and Kerley 2006), the resulting figures can be thought to represent upper bound estimates of values of wildlife enterprises. These figures do not account for operating costs of game ranches which are believed to be significantly higher. Capital costs such as fencing are substantial, and animal handling and transport costs are can take up a large portion of revenues (Cloete et al, 2007; Higgin Bottom and King 2006 cited in Bothma et al 2009). Establishing a reserve was estimated to require an average initial outlay of USD \$4.6 million for game reserves in the Eastern Cape (Langholz and Kerley 2006). It has been noted that in many instances land holders struggle to generate operating profits, and the variability in size and sophistication of operations can mask comparative advantage (Bothma, Suich, and Spencely 2009). Therefore, incorporating costs to determine profitability of each enterprise allows accurate comparison across enterprises and assessment of the

efficiency with which productive resources are allocated (Langholz and Kerley 2006). Jansen, Bond and Child suggested that economic efficiency and performance of game ranches depends not only on what ranchers do (what enterprises they engage in and the production systems used), but also depends on who ranchers are (their management ability and level of experience) and how ranchers are affected by government policies (Jansen, Bond, and Child 1992). This study takes a detailed look at farm level operations determine profitability and the factors that influence ranch performance.

4.1.2. Non-market Values

Rangelands typically hold a high value as a recreational resource or destination. While private land owners generally charge for some recreational services they do not charge for all, in many cases there is no direct charge to view or enjoy natural ecosystems and species. Even where goods and services have no market price, and no close replacements or substitutes, they frequently have a high value to people in the form of option and existence values. A study by Mmopelwa and Blignaut (2006) estimated the existence value of the Okavango Delta using willingness-to-pay (WTP) for its conservation was estimated at US\$2,1 million and US\$3,2 million in total and US\$214.08 per person (Mmopelwa and Blignaut 2006).

Another WTP study by Holland surveyed visitors to four protected areas (recreation areas and game reserves) in KwaZulu-Natal Province, South Africa (Holland 1994). For one of these sites (Royal Natal National Park) results indicated that visitors were willing to pay N\$ (Namibian dollars) 15, N\$12, and N\$12 per month to a fund for the option to use, bequest and existence value (respectively) of this park. The total

annual non-use value perceived by visitors was calculated to be N\$389,000, and this amounted to N\$43 per hectare of park, or N\$4 300 per square kilometer.

Turpie reported on a contingent valuation study in which WTP for preservation of the De Hoop Nature reserve in Western Cape, South Africa was solicited from local and provincial capital residents. The annual non-use value for the reserve was estimated to be N\$724 000 in the local population near the reserve, and N\$13 389 000 for the city of Cape Town. The study showed patterns of variation in respondents' willingness to pay, according to their locality, ethnicity and levels of information/experience about the reserve (Turpie 1996 cited in (Barnes, Schier, and Van Rooy 1997)).

The value of conserving rangelands can also be estimated in terms of expenditures avoided. Mitigative or avertive expenditures represent the costs reduce the negative effects of the loss of rangeland goods and services. Costs incurred in damage to, or reduction of economic activities due to the reduction or loss of rangeland goods and services, represent the economic losses foregone by conserving rangelands. Turpie et al 2003 estimated productive losses caused by alien vegetation associated with invasive species for the Cape Floristic Region of South Africa (Turpie, Heydenrych, and Lamberth 2003). Alien species increased costs in the form of lost water runoff from fynbos catchments. Water losses were valued at the average cost of water production through future supply schemes which amounted to a value of R0.75 m⁻³.

Costs of over stocking in game ranching have been documented in studies valuing land uses in southern Africa (Child 1988; Taylor and Child 1991, Jansen et al 1992, Dekker 1997.). Taylor and Child calculated the loss in productivity due to overstocking as an average annual productivity loss of 0.32 kg livemass ha⁻¹ yr⁻¹ amounting to a cost

of Z\$0.113 per kg of overstocked livemass per hectare per annum (Taylor and Child 1991). Overstocking is often used by short sighted managers to fulfill current obligations e.g. mortgage payments. It is also used if improvement practices or treatments are relatively cheap. Then the overstocking rate will be higher and treatments will be more frequent. If economically viable and ecologically sound treatments are available, a range management strategy that systematically overstocks and periodically applies treatments would be more profitable (Pope and McBride 1987, Costa and Rehman 2005). However such strategies are risky in an unpredictable savanna ecosystem. There is high variability in rainfall, and one cannot be guaranteed that veld conditions will improve by applying a treatment such as rotational grazing or land reclamation. Managing stocking rate is therefore a very important aspect of creating a successful ranching operation.

Land owners provide environmental goods and services to society for which they are compensated. Even in the absence of markets often alternatives or substitutes can still be bought and sold. These replacement costs can serve as proxies for rangeland resource and ecosystem values. The economic values to analyze were selected based the importance of the values to the overall assessment, and the feasibility of collecting data given time and resource constraints. Direct use values were given priority followed by indirect use values that relate to environmental effects on productivity of rangeland enterprises. Not all values associated with rangeland uses can be measured, however. The best approach is to assess the economic values of game ranching openly while keeping in mind that, in addition to monetary value, these enterprises provide the non-monetary benefits of importance.

4.2. Case Study Area: Mopani District

This work focuses on Mopani District which is located in eastern Limpopo province, and borders the Kruger National Park. The district spans a total area of 2,242,183 ha (22,421.83km²) with a population of 1 223,747 people (Figure 4-1). A total of 166 game ranches (exempted farms) were recorded in Mopani province in June 2009. The ranches are dispersed through four municipalities: Maruleng (75), Ba-Phalaborwa (49), Greater Tzaneen (30) and Greater Letaba (12). Notably, there are no exempted farms in Giyani, the fifth municipality of the province that consists largely of rural settlements. Mopani district has experienced a strong shift from cattle production to wildlife on commercial farms over the past 20 years. Exempted wildlife ranches cover approximately 35% of the municipal land area in the district.

There is a wide range of farm sizes in the district. Farms range from a minimum of 300 ha to a maximum of 38,000 ha with a median size of 3,293 ha (Figure 4-2 and 4-3). Very large farms, e.g. 38,000 ha, represent conservancies, which are collective arrangements where a number of farms have removed fences and joined together to manage resources collectively (Bond *et al.* 2004; Lindsey, Romañach, and Davies-Mostert 2009). The landscape is characterized by variations in size and changing organizational structure. While there are older established reserves that now form part of greater the Kruger National Park (KNP) network, the organizational landscape is not static, and new collective arrangements continue to be created. A total of 86% of exempted farms in Mopani district have visitor accommodation on the property (Figure 4-4). This suggests a trend towards tourism either viewing or hunting tourism in the district. However this overview of the district oversimplifies the complexity that exists at the farm level.

4.3. Farm Case Studies

While it is known that wildlife farms can generate revenues, it is less certain whether they can be profitable. By examining a cross section of ranches at different stages in their development, the following section highlights aspects influencing profitability and how ranchers diversify their enterprises and how this affects their profitability and development. Data collected through surveys was used to construct a policy analysis matrix for each operation, and resulting coefficients indicate level of profitability. A subset of interviews was used for policy analysis matrix due to data limitation in financial information provided. Two farms were excluded due to incomplete financial information and one farm was excluded because it was used for recreational purposes and did not generate any revenue. A total of eight of the thirteen farms are presented with a policy analysis matrix. Farmer interview data is used to describe farmer perspectives and motivations.

4.3.1. Farm A: Ecotourism – Small Unfenced Property

Farm description. This property has a long history primarily for wildlife use. It has a large ecotourism operation as the primary activity. It is a member of a well established conservancy and engages only in non-consumptive wildlife use with ‘Big five’ viewing as an attraction. Activities offered include game drives, walking trails and skeet shooting.

This farm is a prime example of an ecotourism focused operation. There is a large 68 lodge catering to the luxury segment of the market. The business has been performing well, receiving over 15,000 overnight visitors in 2008 at an average price of R 2800 per night. The owner intends to continue operating the business in the same manner in the next five years, with no plans for expansion. From a management perspective, the owner considers the business well run, and rated his own skills in

marketing and finance very high. While there are many objectives the owner ranked species protection and conservation above profit in importance although profit was still considered of high importance. This perspective appears to be paying dividends as borne out by the financial analysis. This farm has the high gross margin of over R8000 per hectare (Table 4-13).

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR=C/(A-B)$) of 0.380, a domestic resource cost ratio ($DRC= G/(E-F)$) of 0.196, an effective protection coefficient ($EPC= (A-B)/(E-F)$) of 0.942 and a profitability coefficient ($PC = D/H$) of 0.726 (Table 4-2). The PCR indicates that farm is profitable; the value added is more than able to cover the domestic factor costs in market prices. For each one rand of value added the farm can afford to pay domestic factors 38 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 6%. The PC is less than one indicating a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 27%.

From the private perspective, this ecotourism driven ranch is financially profitable and economically efficient. Although this ranch can be considered as good example of a well run high end tourism operation. It still faces a net disincentive that is coming from

the domestic factor markets of capital and labor. In the absence of disincentives the ranches could increase economic profitability.

4.3.2. Farm B: Ecotourism - Small Fenced Property

Farm description. Formerly an extensive cattle ranch and converted to wildlife in the mid 1990's this ranch is also primarily an ecotourism operation. The ranch offers a range of four star, three star and two star accommodation, from luxury lodge to more affordable self-catering facilities for local clientele. Lacking only elephant to complete the 'big five' due to the small size of the ranch (1,700 ha) game viewing is still a large part of the attraction. The owner has negotiated agreements with other operators to allow game drives on his ranch for additional income. Activities offered also include trophy hunting which is conducted over a single month in the winter. The accommodation portion of the business is not performing well in the past few years; particularly the self catering portion of the business where the target market is local South African clientele. The reason given for this lack of profitability is that sectoral determination from the department of labor, which sets the conditions for employment and rates of payment for the ecotourism sector, has made it very difficult to turn a profit. Sectoral determination levels for the sector are set in line with the standards of large luxury ecotourism operations that cater to foreign visitors, for example farm A in this sample. Charging average prices of R250 rand per night for locals, the business has been struggling and the manager plans to close down the accommodation section and keep only the four star lodge in operation. Disease free buffalo breeding was introduced as a secondary activity occupying a 50 hectares section of the ranch and this enterprise is 8 years old. However at the time of the interview the buffalo enterprise was the mainstay of the farm, supporting the less profitable accommodation enterprise. This

points to some of the sensitivities of game ranching: although ecotourism may be the stated primary activity, financially it may not be the most profitable activity. It also points to a recurring theme, the difficulty of catering to the local clientele and remaining profitable. This may reflect the high level of competition in this segment of the market, including competition from accommodation in state protected areas that may represent subsidized competition (though prices are going up and are much higher than on small game ranches).

As the smallest farm in the sample, the stress on the vegetation was apparent. Vegetation monitoring indicated that there was significant bush encroachment and overstocking that had resulted in compacted topsoil. There was definitely a tradeoff between the rangeland management and financial profitability. The small size of the farm required intensive management to find a balance, which it appeared is difficult to achieve. The manager is not oblivious to this but must tradeoff between profitability and conservation. He has had to generate sufficient income to undertake large rangeland management projects and this year now that major infrastructure developments are complete he is able to focus on rehabilitating the land; hiring heavy machinery to clear bush and casual labors to clear invasive species. The intensive management and limited resources means that he can only pick one or two projects to undertake per year, last year it was roads and a building and this year it is dams and vegetation. Continuous maintenance is limited, instead maintenance is performed as periodic once off capital intensive projects that focus on repairing damage that has occurred rather than perform preventative measures.

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.439, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.220, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.884 and a profitability coefficient ($PC = D/H$) of 0.635 (Table 4-3). The PCR indicates that farm is profitable; the value added is able to cover the domestic factor costs in market prices. For each one rand in value added, the farm can afford to pay domestic factors 44 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 12%. The PC is less than one indicting a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 37%.

The analysis showed despite the strain in sections of the ranch business, it was both financially profitable and economically efficient. While the business is profitable, the heavy reliance on the disease free buffalo enterprise to cover operating costs of all enterprises and large capital expenditures on rangeland rehabilitation indicates the difficulty of managing a diversified enterprise on a small landholding. The proposition that game ranches should engage in all four pillars to maximize profitability comes into question here. Clearly there are preconditions for successfully achieving this, and these

conditions may include size of the property, experience, management ability and availability of labor or financial resources to maintain the natural resource base.

4.3.3. Farm C: Ecotourism- Small Fenced Property

This property was previously a cattle farm and was converted to wildlife in the early eighties. It is a 3,700 ha farm with annual rainfall of 450mm. The primary enterprise is ecotourism offering lodge and self catering accommodation with 'big five' as an attraction. Activities offered include game drives, walking trails, and educational tours, limited trophy hunting and lion breeding as a secondary enterprises. The farm is owned as a family business; the family has a long history in tourism and brought with them a wealth of experience when the farm was acquired. This has allowed them to establish a strong base of loyal clientele reducing the need for extensive marketing. This is a highly diversified operation engaging in all 'four pillars' of wildlife use. The owners have plans to expand the operation and add infrastructure, but the main drawback to doing this is the uncertain policy environment.

The land reform policy has impacted directly on owners with the farm being under a land claim. The uncertainty as to the outcome of this claim means that they have slowed and stopped large infrastructural investment and are holding off on new buildings. In addition the restrictions on lion breeding have made this aspect of the business is less profitable. There are plans for expansion however this all depends on the regulatory environment; the recent spate of new regulations (Threatened or Protected Species (TOPS) regulations) and proposed regulation has created an air of uncertainty. The owner explained that they want to continue to grow but it all depends on the regulations and right now you never know when something new is going to occur.

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.94, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.588, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.915 and a profitability coefficient ($PC = D/H$) of 0.134 (Table 4-4). The PCR indicates that farm is profitable; the value added is more than able to cover the domestic factor costs in market prices. For each one rand in value added, the farm can afford to pay 94 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 9%. The PC is less than one indicting a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 87%.

This ecotourism driven ranch is financially profitable and economically efficient. The PCR is close to one showing that while the ranch is financially profitable it is earning little in the way of excess profits due to costs of inputs.

4.3.4. Farm D: Ecotourism – Small Fenced Property

Farm description. This property was converted from cattle production to wildlife in the mid 1980's, and since then wildlife has been main land use. The property is just over 2,000 ha in size with low annual rainfall of 460mm. The ranch is owned as a partnership and at the time of the interview was in the process of negotiating membership in a conservancy. The owners entered into wildlife use primarily for

personal enjoyment motivated by conservation and love of nature. They later established a tourism enterprise which has been in operation for the past 8 years. In terms of business goals, profit is of very little importance while protection of species ranked highly importance. An additional goal of moderate importance was expansion of the wildlife enterprise in the near future. The primary commercial activity is ecotourism with a small 12 bed lodge facility. The activities offered include trophy hunting, game drives and walking trails. The small size of accommodations means that fewer overnight visitors can be accommodated; in 2008 it received 144 overnight visitors at an average price of R 285 per night.

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of -1.511, a domestic resource cost ratio ($DRC = G / (E-F)$) of -1.001, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.944 and a profitability coefficient ($PC = D/H$) of 1.184 (Table 4-5). The PCR is negative indicating that farm is not financially profitable; the value added cannot cover the domestic factor costs in market prices. The DRC is negative indicating that the ranch is not economically profitable and is not making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would not produce enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. Because both financial and economic profits are negative the PC in this case does not have a meaningful interpretation, so the net disincentive faced by ranch may be due to market, policy or management factors.

The farm is not generating profits having had a loss in the 2008 financial year. This farm has also not been long in the tourism business and is still growing, with plans to expand operations within the next five years. This points to the difficulties that are faced by ranchers as they establish their enterprises, as they are faced with high costs and low income. Lack of profitability may also be attributable to management and the goals of the business. Owners ranked profits as low in importance. The gross margin of the business indicates a return of 4 rand per hectare (Table 4-14). The gross margin does not include overhead costs which suggests poor management of overhead in addition to not generating sufficient revenue may be behind the lack of profits.

4.3.5. Farm E: Breeding – Small Fenced Property

Farm description. Prior to 1989 when the current owner acquired the farm, the ranch was in transition with mixed cattle and wildlife land use. After acquisition, land use became fully wildlife-based. The farm is 2,800 ha in size, with low annual rainfall of 300mm. The stated primary activity is ecotourism with a small 12 bed lodge facility. In 2008 they received 80 overnight visitors at price of R 350 per night. Despite tourism being the stated activity, it provided only 10% of farm revenues in 2008 from activities that include game drives, walking trails, quad biking, and horse trails, with the remaining 90% coming from disease free buffalo sales. The buffalo enterprise occupies 300ha of the farm has been in operation for three years. This farm highlights an aspect of the appeal of disease free buffalo farming: it is able to produce returns in a short period of time. Within three years 90% of income is from buffalo breeding. The owner has plans for expansion of the rare species breeding enterprise. The ranch is in the process of transition from ecotourism to breeding of disease free buffalo with the vision of the phasing out of ecotourism completely. In the process the business goals of profit,

protection of species, minimizing financial risk were ranked in high importance consistent with the transition phase which the business is undergoing. In terms of management skills the owner ranked his abilities in marketing, conservation and management as very good. Clearly showing that he believes he has the abilities to successfully make the transition

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.335, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.256, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.962 and a profitability coefficient ($PC = D/H$) of 0.859 (Table 4-6). The PCR indicates that farm is profitable; the value added is more than able to cover the domestic factor costs in market prices. For each one rand of value added, the farm can afford to pay domestic factors 34cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 4%. The PC is less than one indicting a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 14%.

4.3.6. Farm F: Ecotourism- Small Fenced Property

Farm description. This property was previously an extensive production cattle farm which converted to wildlife in early 2000's. Given the small size of the property, 3,200 ha, and lack of 'big five', the owner felt that competing in the ecotourism industry

would be difficult given the large number of ecotourism operations in the area. Thus he decided to go for game farming. The primary activity is species breeding (sable and disease free buffalo). Complementary activities of trophy hunting and biltong hunting are offered to international and local clientele. The farm has 10 beds to cater to hunters and received 25 day visitors and 720 overnight visitors for the 2008 year at the average accommodation price of R250, with most revenues coming from hunting packages and live animal sales. The business has been in operation for six years and has a strong biltong hunting component. Making a profit and protecting species are ranked as very important management goals and the owner/manager ranked himself as having excellent overall management abilities.

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.693, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.430, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 1.026 and a profitability coefficient ($PC = D/H$) of 0.553 (Table 4-7). The PCR indicates that farm is profitable; the value added is able to cover the domestic factor costs in market prices. For each one rand of value added, the firm can afford to pay domestic factors 69 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is equal to one indicating that the ranch receives neither a tax nor subsidy from the combination of policies that are influencing its sale revenue and tradable input costs. At most the ranch receives a subsidy of 2%. The PC is less than one indicating a net

disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 47%

The business is both financially profitable and economically efficient. However, profits were a modest R105,331 with the bulk of costs attributable to tradable inputs that are associated with animal management costs of the breeding enterprise. The PC is an improved measure of incentive over the EPC in that it includes domestic factors while EPC does not. The inclusion on domestic factors lowers the PC suggesting that a substantial portion of disincentive is derived from the influence of policy on the domestic factor prices.

4.3.7. Farm G: Mixed Use- Large Fenced Property

Farm description. This well established farm that was solely a cattle operation until early 1990's when formal commercial wildlife use began. The farm conducts both cattle production and wildlife breeding (sable). No visitor accommodation facilities are available on the property and trophy and biltong hunting are contracted out to an external party while the focus remains on the breeding. The owner-operator entered the wildlife business for profit. Having always had a sable population on the farm, he sold a few animals here and there but was not planning and managing the operation and as a result there was inbreeding and animals died, but since cattle was the main concern he did not take much notice. In the early 1990's he began to realize that there was substantial money to be made from sable. He approached the business as he had cattle production focusing on his strengths and began carefully selecting and breeding the animals; and now he has a profitable sable breeding business. The animals are sold at public auction. At the same time he continues to maintain his cattle business using a feedlot production system rather than extensive production. He moved into this system

due to high levels of stock theft, and to improve the security and increase profitability. The cattle are fed with feed purchased from the area (citrus residues, lucerne, etc.) to minimize costs. The farm is within the red line veterinary surveillance area which prevents the movement of live cattle outside the area limiting the market options. He maintains profitability by running a vertically integrated business owning an abattoir, and butcheries behind the red line. This highlights some of the difficulties with cattle production in these areas. Particularly in veterinary restriction areas, restriction of movement limits marketing options and the extensive production methods may be less lucrative (Moerane 2008). This is part of the strong shift from cattle to wildlife. In fact from the Pahlaborwa to Hoedspruit region only two cattle producers remain of which he is one. The reason he is able to remain in the cattle business is that he has a ready market for his product behind the redline, and he is able to produce large quantity of cattle to feed the abattoir system. He further diversified adding a lion breeding enterprise. That served a dual purpose generating revenue from live sales to hunters and neighboring ranches and disposing of meat residues from the abattoir. However due to the controversy surrounding lion breeding and a subsequent ban lion breeding he sold of all his lion and discontinued the lion enterprise. Without this kind of vertical integration or intensive production cattle producers within veterinary restriction areas face lower prices and limited product markets compared to their counterparts in the 'free' zones. This also highlights the difficulty of transitioning from cattle to wildlife or entering the industry. Indeed, there is a substantial learning curve and without the necessary skills transition can be difficult and not all wildlife enterprise options may be feasible. In this case the farmer clearly recognized that he did not have the

interpersonal skills required to provide competitive customer service in an ecotourism operation and focused on transferring his expertise from cattle to sable breeding.

Policy analysis matrix results. The policy analysis matrix was calculated for this farm and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.160, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.112, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.911 and a profitability coefficient ($PC = D/H$) of 0.862 (Table 4-8). The PCR indicates that farm is profitable; the value added is more than able to cover the domestic factor costs in market prices. For each one rand of value added, the farm can afford to pay domestic factors 16 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch is receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 9%. The PC is less than one indicting a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 14%.

4.3.8. Conservancy Profiles

All conservancies are motivated and established with conservation in mind. With all viewing themselves as equally business and way of life - except for one that views itself as a way of life which is expected main use for conservancy members is recreation. The organization and management of the conservancies differ considerably and are the results of the negotiations processes to establish them and can be thought of a

representing the individual owners' needs. The following section presents information on conservancies in the case study sample.

Conservancy A. Conservancy A is made up of a voluntary association of 5 members and owned in partnership. The conservancy initiative began in 2003 with conservation as the primary goal. The conservancy manager stated that their objective was: "To create a conservation model that would benefit the wildlife as well as the local rural populations. We believe you have to involve local communities if you want the initiative to be sustainable long term. If not, you risk being viewed as a rich man's playground and expose yourself to poaching, land claims, crime, etc". The conservancy has 36 beds in chalet and tent accommodations. Catering only to overnight visitors they received 5500 overnight visitors in 2008. Tourism is the primary wildlife enterprise generating 40% of revenues and remaining revenues coming from member levies (50%) and wildlife sales (10%) (Table 4-13). However, the conservancy has felt increasing pressure to increase income. The manager remarked that, "Pressures of the cost of living and the high running costs of a reserve such as this place more pressure on the owners to find a way to make the reserve financially self sustaining". Future plans include expansion not only through adding more members but through diversification of the business enterprises and expanding the disease free buffalo breeding project.

Conservancy B. Conservancy B is a young conservancy established in 2009 and made up of 8 members and covering 11,500 hectares. The conservancy is structured such that individual members retain a measure of autonomy; individual farms run their own tourism operations with their own lodges and hunting. The conservancy derives

the income to manage collective aspects from member levies and live animal sales and hunts. The conservancy continues to plan to expand by acquiring more members: “It is also very important for us to continue trying to expand the size of the reserve in order to secure as much land as possible for wildlife and bio-diversity conservation”

(conservancy manager).

Conservancy C. Conservancy C was formed in the early nineties from former cattle farms that have removed internal fences and is governed by a constitution. The conservancy consists of 11 farms. One of the conditions of the collective arrangement is that there are no commercial tourism activities that take place on individual farms, meaning no lodges or commercial hunting. The properties are maintained for leisure as a weekend getaway for owners, with only one member residing on their farm full time. Range and wildlife management takes place at the collective level. Wildlife breeding (sable) and trophy hunting is used to generate revenue to cover management costs. The conservancy itself is composed of two businesses, a game company that handles all commercial aspects and a trust that deals with rangeland management and represents owners in negotiations with outside parties. The conservancy runs on a cost recovery basis, with the conservancy manager responsible for maintaining rangeland and selling live animals to cover the conservancy management costs. This is done since members are not required to pay levies into the company for management and they do not receive any dividends unless there is excess income remaining after covering costs. In which case, members receive dividends according to their land contribution. If the company is in a deficit and cannot cover costs that year then members pay into the conservancy to cover the costs.

Policy analysis matrix results. The policy analysis matrix was calculated for this conservancy and resulted in a private cost ratio ($PCR = C / (A-B)$) of 0.155, a domestic resource cost ratio ($DRC = G / (E-F)$) of 0.081, an effective protection coefficient ($EPC = (A-B) / (E-F)$) of 0.904 and a profitability coefficient ($PC = D/H$) of 0.832 (Table 4-10). The PCR indicates that farm is profitable; the value added is more than able to cover the domestic factor costs in market prices. For each rand of value added, the conservancy can afford to pay domestic factors 16 cents. The DRC is less than one indicating that the ranch is economically profitable and making efficient use of resources. This means that in the absence of government policy, the activities carried out on the ranch would produce more than enough value added to remunerate labor and reimburse capital. The EPC is less than one indicating that the ranch receives a net tax resulting from the combination of policies that are influencing its sale revenue and tradable input costs. The tax has reduced value added by 10%. The PC is less than one indicating a net disincentive to the ranch resulting from the effect of all policies on output, tradable inputs and domestic factors. Private profits are reduced by 17%.

Even with the self-sustainability goal, the conservancy business is economically efficient and financially profitable. This performance is highly dependent on the ability of the sable produced to fetch high prices.

Conservancy D. Conservancy D is an old and well established conservancy and is part of the greater Kruger network, covering 60,000 hectares it is very large and has a large number of members in excess of 30. Structurally members maintain autonomy in their tourism operations in compliance with the conservancy constitution. All conservancy income for management is derived from live wildlife (live animal sales,

hunts, meat sales). With this the conservancy provides the conservation measures that include, anti-poaching, game fencing, invasive plant species removal, soil erosion control, water sources for game and, vegetation and game monitoring.

Conservancies are complex arrangements with a variety of structures, it is reasonable to expect that there are as many variation in structures as there are conservancies given that each conservancy is the outcome of negotiations and the resulting constitution that represents members' needs. There are three standard types of conservancy, land company, game company and trust (personal comment conservation manager & Beyond). Conservancies increase habitat conserved, but differ in the way they achieve this. It is also important examine the quality of the conservation given the differences in objectives of the members and the size. Conservancies are not static and may continue to attract additional members and grow in size. This all depends on individual's needs and the ability of the conservancy to meet those needs.

4.3.9. Comparative Policy Analysis Matrix Results

All ranches except for one were financially profitable and economically efficient. For the one inefficient ranch, (farm D) where DRC and PRC were negative, the tourism enterprise was recently established and profit was not a high importance business goal (Table 4-11). In the remaining ranches the DRC is less than one which indicated that the game ranches are economically efficient and have a comparative advantage. The effective protection coefficient (EPC) shows the degree of transfers to the output market excluding factor markets. The EPC is less than one indicating that the majority of farms are facing a net tax from government policy and market imperfections. The profitability coefficient (PC) is a more inclusive measure of net transfers that incorporates transfers to the domestic factor markets. The PC is lower than the EPC showing that when factor

markets are taken into account overall transfers are increased. This suggests that there are significant divergences in factor markets of labor and capital.

Divergences are the result of negative net transfers indicating that although the farm is efficient it is still experiencing a net tax on operations. The profitability coefficient is less than one confirming that net transfers to output and domestic factor markets are resulting in a net disincentive for ranchers. Part of the divergence is due to distortions in factor markets, for example, ecotourism operation requires high levels of labor. Farm A employed 194 people in 2008 (table 4-15) all of whom are subject to stringent labor policy that makes labor considerably more expensive in private prices than in economic prices.

4.4. Financial Analysis

This section examines the farm budgets in details to understand the costs associated with the wildlife enterprises studies and the magnitude of the costs. The following section gives a case study of 8 ranches from the survey sample. The case study highlights the on-the- ground complexities that are obscured by district level statistics and examines financial aspects of the ranch: costs, revenues and profitability. The eight farms displayed diversity in ownership and management objectives. Ownership arrangements include sole proprietorship, family business, partnership, corporation and shareblock.

4.4.1. Operating Costs

In most cases capital costs were difficult to obtain because capital developments such as roads, dams, and fencing were made over a number of years and it was difficult to recount all the developments that had been made and their associated costs. Four farms provided information on capital costs excluding land and these ranged from 2,222

rand /ha to 4,845 rand/ha. Capital costs included buildings, fencing, dams, wildlife introductions, vehicles and machinery etc. Operating costs ranged from 407 rand/ha to 3608 rand/ha. Costs of ecotourism-centered farms were incurred from the provision of the safari experience, that is, lodge accommodation, game drives and the service staff to cater to tourist's needs. The operations that stated ecotourism as the primary purpose show that the wage bill formed the largest category of expenditure from 20% to 73% of total operating expenses (Table 4-12).

Maintenance, administration, and utilities accounted for less than 24 % of operating costs. Maintenance include activities such as repairing roads fences and buildings which in most cases are performed by regular staff as part of their daily activities if they are able thereby saving on repair costs. Animal care and movement costs are minimal less than 1%. This partly explained by membership to a conservancy, in which case animal care and movement costs are borne at the collective level. Enterprises with a consumptive game use component incur expenditures associated with the care and management of wild animals. Animal care comprised the largest expenditure accounting for 40 % percent to 65 % of farm running costs; the percentage is higher for ranches with larger breeding component. Labor is also an significant cost but to a much smaller extent than in farms with a large ecotourism component.

4.4.2. Revenue Sources and Profitability

Wildlife-based enterprises generate revenue from visitor accommodations, entry fees, retail sales, trophy hunting, biltong hunting, live animal sales and game meat sales. Visitor accommodation dominates revenue earnings for tourism enterprises. Strict tourism enterprises generate revenue from non-consumptive uses

(accommodation, entry fees and retail sales). Farms with a wildlife breeding component derive revenue from, live animal sales, biltong hunting, trophy hunting and to limited extent meat sales (Table 4-13). The sources of revenue show the different proportions by which a particular activity contributed to farm income. It also reflects the flexibility in wildlife use. The different revenue streams allow farmers to diversify and cope with changes in the market and in the farms' development by shifting focus from one enterprise to another.

Budgets showed variation in profitability (Table 4-14). These differences can be explained by a number of reasons: level of development of the farm, size of the tourism enterprise (number of beds), management etc. Gross margin values allow comparison across farms and the gross margin levels vary from as low as 4 rand per hectare to over 8 000 rand per hectare. The gross margin shows how much money is added to gross profit for each dollar of sales. The range in gross margins showed that farms vary in profitability from being barely profitable with 4 rand per hectare in profit to highly profitable at over 2000 rand per hectare profit.

Differences in gross margin are caused by differences in the volume of sales, the costs of production and differences in sales prices. For example, in the sample Farms A, B, C all state tourism as the main activity however the structure of the tourism business differs from farm to farm. Farm A has a large number of accommodations in excess of 80 beds while farm B and C maintain a small number of accommodations 30 beds and 12 beds respectively. The price ranges for these accommodations also differ with an average price of R 500 for Farm A and R250 to R350 for B and C. Farms B and C cater to perhaps the same segment of the market at a lower volume. In addition

prices may vary by the type of accommodation, luxury compared to self catering. Sale prices are also important with live animal sales. Mode of sale and quality of the product (trophy size, species breed etc. affect the price of the animal. A farmer may sell buffalo for R350,000 rand while smaller less valuable game will sell for much less.

Costs of production affect profitability. These differ among farms depending on their stage of development -- new startup or well established ranch. They also differ by the type of enterprise and its size, ecotourism requires built accommodations, whereas, species breeding requires relatively cheap enclosure pens. In addition to these physical differences, management styles of individuals differ. Those with greater experience or who exercise careful planning outcomes may perform better. These unobservable play an important role performance of the farm and business.

4.4.3. Employment

A total of nine farms and three conservancies provided information on labor. Labor costs appear to vary with type of enterprise, and ranches with a tourism component tended to hire more employees. This is expected since service is a key component of the product offered, requiring rangers, cooks, housekeepers, managers etc. Ranches with a game breeding or hunting focus use less labor (Table 4-15). At the conservancy level jobs are created for rangeland management and wildlife management. Jobs are created in addition to the labor hired by the members of the conservancy for individual tourism operations. Eight farms provided information on labor costs: the wage bill ranged from 87 rand/ha to 2 788 rand/ha with an average wage bill of 672 rand /ha. In all cases employees also received non-monetary benefits such as, food rations, accommodation, uniforms and game meat. The game ranches create employment and have the advantage that jobs created at a higher skill level than the typical elementary

level farm worker on crop and extensive cattle farms. They create employment in a niche which traditionally would not be found in remote areas (Van der Merwe and Saayman 2007). In Mopani and neighboring districts alternative agricultural employment I found on citrus and horticultural farms that require elementary skill levels largely for harvesting fruit and maintaining groves. The service industry demands a skilled laborer and in many cases the enterprises invest in the development of worker skills through training programs for staff. In this analysis skilled workers refers to managers and the unskilled workers refers to all other staff and this includes rangers, housekeeping staff, animal care staff, etc. The size of the accommodation operation also affects the amount of labor employed: a larger operation with more beds require more workers than a relatively smaller operation with few beds.

The differences noted above suggest differing economic impacts for wildlife utilization that vary with type of enterprise. On the one hand, ranch operations generate multiplier effects through purchases of inputs from other sectors of the local economy and have a larger impact on households through salaries paid to staff, which can in turn be spent on purchasing household needs inside and outside the local community. The presence of relatively developed markets in surrounding small towns and tourist centers means that a greater proportion of tourism impacts can be felt through local multiplier effects. Game breeding operations, on the other hand, hire less labor and so less impact is expected for local households. Economic impacts are transmitted through services and goods purchased for the farm such as animal translocation, feed, veterinary services, etc.

4.5. Farmers' Perspectives

Interviews were conducted with game ranch owners/managers and key informants. During the interview the managers were asked to describe their farm operation, the wildlife activities, and their thoughts on government authorities and regulations. The following section presents the perspectives of the ranchers and the common themes that emerged. Themes covered include, land values, future plans, motivation for game ranching, collective managing, and business challenges and opportunities.

4.5.1. Financial Values of Wildlife Based Land Use

The increase in the number of exempted farms suggests that there are economic incentives which are attracting new entrants into the sector. Land owners are attracted by rents that can be extracted from the game ranching sector. Landowners indicate a financial benefit from wildlife after conversion from domestic livestock ranching. It is these financial benefits that attract farmers. Many have found it to be a more financially rewarding option than extensive a cattle production. Improved values under wildlife are reflected in farm revenues, employment level and land values. This result was found across different wildlife enterprises including ecotourism, wildlife breeding and on less intensive leisure operations. For example, following conversion from cattle to wildlife enterprises land values increased. Three key informants specifically stated that they had observed changes in land values with conversion from cattle to wildlife. Two of these examples are given here. A large private game reserve concentrating in ecotourism found that prior to conversion it consisted of 9 cattle farms with a gross turnover from cattle of R150 per hectare and employed a total of 61 people at average salary of R150 per month. After conversion to ecotourism the reserve experienced a

gross turnover of R1500 per hectare and increased employment of 350 people with minimum starting salary of R300 per month (pers. records conservation manager & Beyond 2009).

In situations where commercial use of wildlife is not the focus and conservation of nature is the main objective, landowners often use land as a peaceful getaway from city life. While there is little in the way of intensive commercial activity on these types of properties, a similar increase in land values has been observed. A large private game reserve formed in 1993 with the primary focus of conserving nature observed a similar increase in value of land after switching from cattle production to wildlife conservation. Under a cattle regime the price was R 800 per hectare in 1993; now under wildlife use, land is worth R 8,000 per hectare a with R 2,500 per hectare of that value generated by game (personal comment reserve manager). The values of R 8,000 per hectare apply to land with plains game and it is expected that this value increases up to R 20,000 per hectare if 'big five' game are present on the property (personal comment reserve manager, personal comment wildlife specialist Pam Golding). While there are other factors that go into increased value of land such as infrastructure developments (roads, lodges, dams, etc.) the presence of game remains a large factor and the developments themselves are driven by the desire to exploit the wildlife present on the land.

These examples illustrate some of the benefits that are generated from wildlife. They suggest that wildlife can generate benefit even when there is no extensive commercial exploitation of the resource. This demonstrates how exemption regulations have effectively allowed land owners to capitalize the value of wildlife into land and reap the benefits. Increased returns to wildlife in both these cases suggest at the potential

for wildlife to generate significant benefits across different enterprises if at the one extreme ecotourism produces increased revenues and at the other, seemingly idle wildlife land at the very least results in increased land values over ordinary range land.

4.5.2. Explaining Rancher Behavior: Motivations for Game Ranching

Along with economic values, other goals of landholders are important in determining the activities that take place and the type and levels of costs and benefits that are generated. The reasons for engaging in game ranching vary ranging from the traditional economic rationale of profit maximization to pure resource conservation concerns (Van der Merwe and Saayman 2007; Sims-Castley 2002; Langholz 1999). Even in the case of traditional livestock ranching research has long shown that profit may not and in many cases is not the primary motivating factor for engaging in ranching. Torell *et al.* showed that family, tradition and way of life is frequently the most important reason for entering ranching (Torell *et al.* 2001). They conclude that rangeland farmers desire something 'they can feel, touch and enjoy' and they are willing to accept lower returns from livestock production to achieve this.

Ranchers can range from pure profit seekers to hobbyists who are not dependent on the ranch for income but meet their financial needs with other non-farm occupations. Van der Waal and Dekker found that in the Northern Province of South Africa profit was a secondary motive for entering into game ranching for the majority of respondents (Van der Waal and Dekker 2000). The primary reason was their own pleasure followed by the desire to make a personal contribution to conservation. These sentiments are mirrored in survey of game ranchers in the Northern Cape Province (Langholtz and Kerley 2006). There too ranchers cite game ranching as an activity that provided financial gain while pursuing their passion for wildlife development.

Objectives of wildlife management are also influenced by the ownership of the ranchland. If it is corporately owned with a group individuals holding shares in the property it is likely that profit is a driving factor, whereas family owned farms are more likely to be concerned with maintaining the outdoor lifestyle and passing on the property to future generations (Torell *et al.* 2001; McNally 2001). The less dependent the owner is on farm for income the more they are able to pursue other objectives. Survey results from Limpopo province showed that a quarter of respondents were not financially dependent on full-time farm activities for income and in most cases owners relied on income from another non-farm business (Van der Waal and Dekker 2000). Similarly, a national study of the South African game ranching industry showed that third of respondents earned their income from non-agricultural occupations (ABSA 2003).

What is most important from these findings is that ranchers are faced with multiple objectives: they are not solely profit maximizers, but may also want to optimize other factors such as species diversity, range quality, and cultural needs at the same time. Owners are driven by both intrinsic motivators and extrinsic incentives (Mitchell 2005).

4.5.3. Motivation Behind Wildlife Enterprise Types

Motivation can rarely be narrowed down to a single objective and often ranchers are concerned about both profit and conservation objectives. From ten ranches that responded all but one cited conservation and lifestyle as motivation for entering game ranching. Three of these also explicitly cited financial benefits as a motivator in conjunction with conservation and lifestyle. The love of nature and the need to sustain a lifestyle that allows close contact with nature means that often owners have to balance these two objectives.

Reasons for the type of wildlife enterprise chosen are complex; driven by market forces, environmental factors and regulatory environment. One rancher interviewed indicated that return on investment was the main consideration for choice of enterprise. Analysis performed by the game rancher prior to selecting the type of wildlife enterprise to undertake in the early 1990's revealed extensive cattle production had the lowest return on investment at 5 percent, eco tourism had a return on investment of about 12 percent (without big five) and game farming surpassed both of these generating the highest return in excess of 25% (personal records game ranch manager). He chose game farming due to the high expected returns. Farmers respond to price signals and adjust their enterprises according to market prices. For example, increasing buffalo and sable prices is encouraging farmers to diversify into species specific breeding.

There are also non-market factors that influence the decision to engage in wildlife enterprises. Size of the property and game present influence the enterprise type. For example, if the farm is small and cannot support large animals such as elephants or predators such as lion comfortably, then this is taken into consideration when selecting the enterprise type. Lack of big five may make ecotourism less attractive and favor other activities such as game breeding and hunting. Veterinary restrictions for the prevention of disease spread (foot and mouth, brucellosis, bovine tuberculosis etc.) restrict the movement of animals in surveillance areas, and these regulations together with market forces and the rancher's lifestyle preferences influence the type of wildlife activities that take place on the farm.

4.5.4. Changing Views and Future Plans

Originally framers entered game ranching primarily for lifestyle reasons, i.e., love of nature and the outdoors. Over time the operating costs of the ranch have increased

leading to greater pressure to generate higher incomes. “Increasing operating cost may force a change in view...”; “Pressures of the cost of living and the high running costs of a reserve such as this place more pressure on the owners to find a way to make the reserve financially self sustaining”. From the ten ranchers interviewed, five currently view the ranches as equally a business, three considered them more of a business and two considered them as primarily a way of life. Focusing on increasing revenues to meet rising costs has meant farmers have taken a more business like view of game ranching. Concerns of managing costs and generating income have become more important.

This perspective is also reflected in future plans for the wildlife businesses. Seven farmers planned to expand their operations and three planned to continue in the same way, without any plans to reduce the operations or exit the industry. Farmers planned to expand their enterprises by acquiring more land, taking up breeding of rare species (disease free buffalo and sable) or introducing more species. All of these are actions geared towards increasing revenues or reducing costs. As ranchers manage their businesses they considered the market and changes they anticipated in the future in game prices. Ranchers did not seem to be concerned about a potential fall in prices for sable in the future. Many had a positive outlook on future of sable prices and stated that sable prices had already exceeded their expectations. They expected sable prices to remain high for the foreseeable future. There was less certainty regarding the future of disease free buffalo market. While many indicated a desire to expand this area of enterprise they also indicated that there was some uncertainty in its future. Buffalo prices continue to increase but some believe the actions of unscrupulous farmers who

do not take adequate care with their animals and push through 'unclean animals' were a threat to this market. Their activities may cause regulators to take notice and rethink the feasibility of producing disease free animals and restrict their ability to do so. Ranchers were pessimistic about the white rhino market.

4.5.5. Business Opportunities and Challenges

All of the respondents had positive visions of their businesses and felt that there were opportunities still to pursue. Diversification and moving into breeding of buffalo and sable was considered one of the key opportunities available to ranchers. Five ranches indicated a desire to increase the breeding component; one ranch was in the process of converting from tourism to breeding of high profile species and eliminating the tourism component of the business altogether. Three tourism-focused ranchers expressed the desire to expand their tourism enterprises by breaking into new markets and acquiring more land. They felt that existing tourism industry is very competitive, and that one way to get ahead was to break into markets such as Asia and South America which were not the traditional clientele for the industry. Other opportunities cited were; employment creation and development of a wildlife estate.

The challenges cited by farmers related largely to the policy and economic environment. The biggest challenge cited was land claims and the policy environment both in terms of legislation as well as the negative perception of white farmers. Seven farms interviewed were under land claim. Land claims impacted negatively on businesses by stalling long term plans and reducing capital investment. Farmers hold back on major infrastructure developments such as new buildings and roads in the face of uncertainty. It has also slowed down the expansion of wildlife enterprises as purchase of additional land is complicated by the presence of a claim. Two respondents

stated that claims process also places substantial financial burden on land owners in terms of legal fees paid while claims are processed.

The economic climate is also of concern. Appreciation in value of the South African rand has made South Africa a relatively more expensive destination for international hunters and tourists. Farmers feel they are losing clientele to other countries where prices are cheaper. Farmers are also concerned with over development of natural areas reducing the “bush feel” which detracts from the safari experience, and increases in roads and urban construction poses a considerable threat. In addition one farmer cited sectoral determination as a major problem particularly for tourism enterprises with lower price range targeted at local visitors. The sectoral determination levels set were much better suited to large high end operations, such that this type of enterprise struggled to maintain profitability.

4.5.6. Collective Management

Farmers were asked if they would be willing to remove fences and manage resources collectively. The views on conservancy membership are sharply divided. The reasons cited for establishing a conservancy was to strengthen the negotiating powers of farmers with government and other wildlife entities by forming a group and as well as taking advantage of economies of scale (personal comment conservancy manager); traversing rights for game drives, and joint rangeland management reduce the cost borne by individuals. Ten responded; five would not like to join a conservancy, two were already part of a conservancy and three were in the process of negotiating membership to a conservancy. Those against the idea however did not find the loss of autonomy that comes with joining a conservancy appealing: “we would lose our identity” (farmer comment). Being part of a conservancy means adhering to constitution with set

objectives. One of the difficulties is that ability to adjust operations and explore other activities is often limited in the conservancy arrangement. As one farmer put it, he was willing to join a conservancy but there are many considerations to be taken into account.

Only under very strict management and sound principles with the other land owners contributing equally in game value. Traversing will have to be highly negotiated and not forced. All parties concerned must believe in a single goal and have the exact same management styles and principles for this to work. Opposites do not attract in this field. This is also a very delicate sector and requires intense thought and planning (Ranch owner/manager 2009).

As with any collective organization, there are difficulties associated with identifying goals that all members can agree on. This is even more so with wildlife management due to the diversity of enterprise activities and motivations.

4.5.7. Ecological Management

The conservation contribution of private ranches has been hotly debated, with concerns for the conservation goals of owners, and the limitations of ranches to achieve conservation goals due to their tourist demand-driven focus, and their impermanence in the long run (Cousins, Sadler, and Evans 2008). All ten game ranches stated they had a formal ecological management plan. All monitored wildlife populations and vegetation regularly with annual game counts and vegetation surveys. Six ranches stated that they took measures to control soil erosion and remove alien invasive species such as guava, prickly pear, sisal trees and lantana.

A firm criticism of game ranchers is that they are profit driven rather than conservation driven (Patterson and Khosa 2005; Cousins, Sadler, and Evans 2008; Gallo *et al.* 2009), to the detriment of conservation quality. However ranchers are not only motivated by profit, they are motivated by a combination of goals and conservation is among these. Among the farms interviewed, conservation of species ranked high in

importance among goals of the farm higher of business related goals such as profit and managing risk. This shows to some extent that these farms do consider their conservation aspects and they also considered monitoring an important aspect of the business planning. Monitoring provided information on animal stocks and species available and the condition of the vegetation and the owners often used this as basis for planning off take, introductions, and veld rehabilitation.

As with all actions, the decisions have to be balanced out with the cost of carrying out ecological management activities which can carry a substantial price tag. Preventative practices reduce damage through continuous improvements rather than using expensive capital investments to control or remedy degradation once it has occurred. Although a ranch may undertake ecological monitoring and have an ecological management plan, its ability to undertake all the necessary preventative strategies indicated in the plan can be limited because of the labor intensive nature of continuous improvements. It requires many people to be involved in the continuous maintenance and prevention activities (Hart 1995).

If the preventative measures are not taken, it can result in costly capital and labor expenditures to mitigate the damage. This can include hiring heavy machinery to remove overgrown brush, clear invasive species, excavate silted dams, or culls of overabundant species such as impala that have proliferated due to range degradation. For smaller ranches without the labor to undertake continuous preventative action, management strategy may veer towards periodic once-off mitigation activities when damage has reached a level where it can no longer be ignored or there is sufficient income to hire labor to perform these services. In a conservancy arrangement there is

a dedicated labor force for continuous environmental management and they may employ an ecologist to assist in planning and management, improving the ease with which preventative measures can be carried out. In comparison, smaller individual ranches often relegate range management activities to when and wherever the regular labor has spare time to undertake the activities. For example, when there is lull in visitors, rangers and other staff may assist in repair in fence and roads and reinforcing soil erosion barriers.

4.6. Conclusion

Rights over wildlife enjoyed by game ranchers have resulted in and diversified game ranches where ranchers are able to select an enterprise mix that meets their intrinsic and extrinsic needs. Diversification is a strategy that farmers can employ to increase income and survive in a changing agricultural climate (Barbieri and Mahoney 2009). The integration of recreation tourism and consumptive wildlife use on farms and ranches increases revenues, add value to natural resources by reducing direct price competition with other ranchers (Barbieri and Mahoney 2009). Ranchers are motivated by intrinsic lifestyle factors and desire to contribute to the conservation of the landscape in which they live; and financial gain.

Wildlife can be both financially profitable and economically efficient. This analysis shows that wildlife based ranches can produce positive returns and exceed returns to extensive cattle production. Private costs ratios of less than one showed that ranches were privately profitable. Domestic resource cost ratios (DRC) less than one for all of the ranches showed that in a policy and market environment without distortions: these ranches were operating in an economically efficient manner. Differences in efficiency are partially attributable to market failure and government policy and to differences in

management goals, size of the enterprise, stage of development and experience in the field.

Farm size constraints can be overcome by substituting land or labor for capital. Small farms can improve revenues by increasing connectivity to other farms through negotiating traversing agreements with neighbors or allowing neighbors to traverse their land for game drives. In addition, small farms can become members of a conservancy and save on operation costs in time, labor and capital required to maintain vegetation and animals. Collective have arrangements have the added benefits in that they create more jobs for collective management activities. They also provide a protective umbrella to members negotiating on their behalf with external parties and conferring the benefits of a good reputation on its member lessening the individual marketing burden.

Despite the benefits not all are keen to join such arrangements, particularly those individual ranches that have a well established individual good reputation and steady clientele. The reputational benefits of conservancy may not match up to what they have already achieved on their own. In addition the binding constitution of conservancy limits flexibility to shift and change enterprises, management and activities must be compliant with conservancy agreements and for some whose management style is not compatible, the prospect of curtailing activities and losing autonomy is not appealing particularly those with highly diversified enterprises.

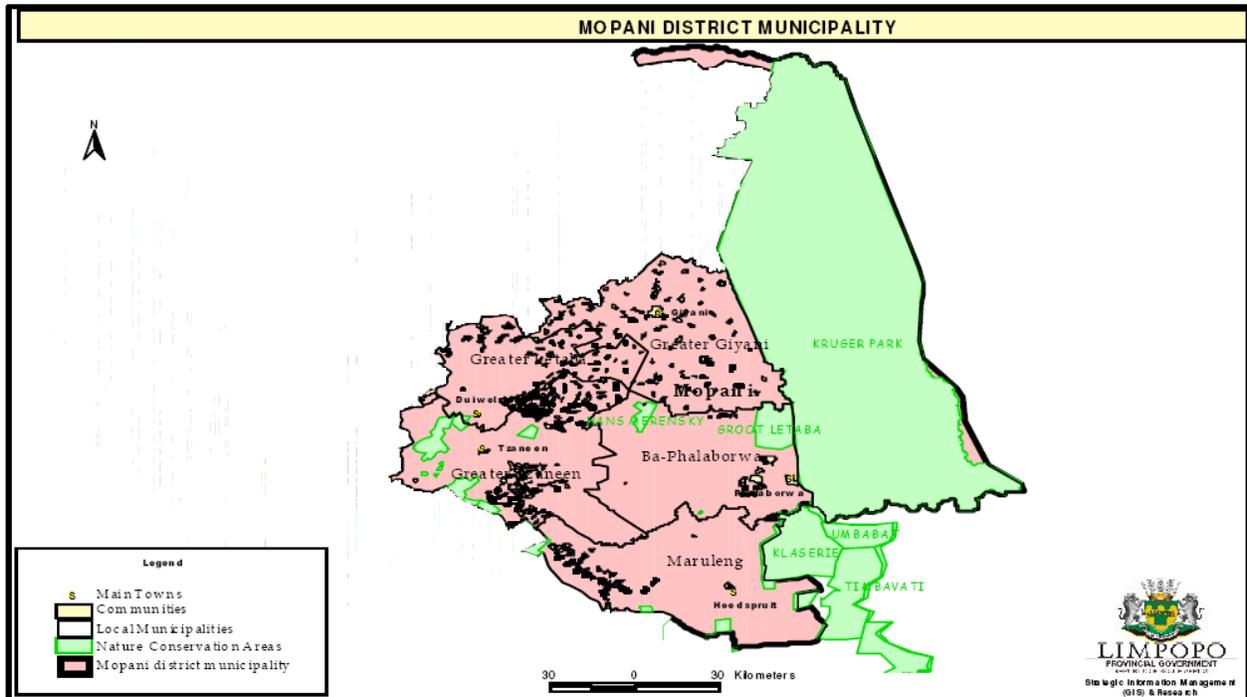


Figure 4-1. Mopani district: local municipalities and district management area. Source: Limpopo Provincial Government 2008.

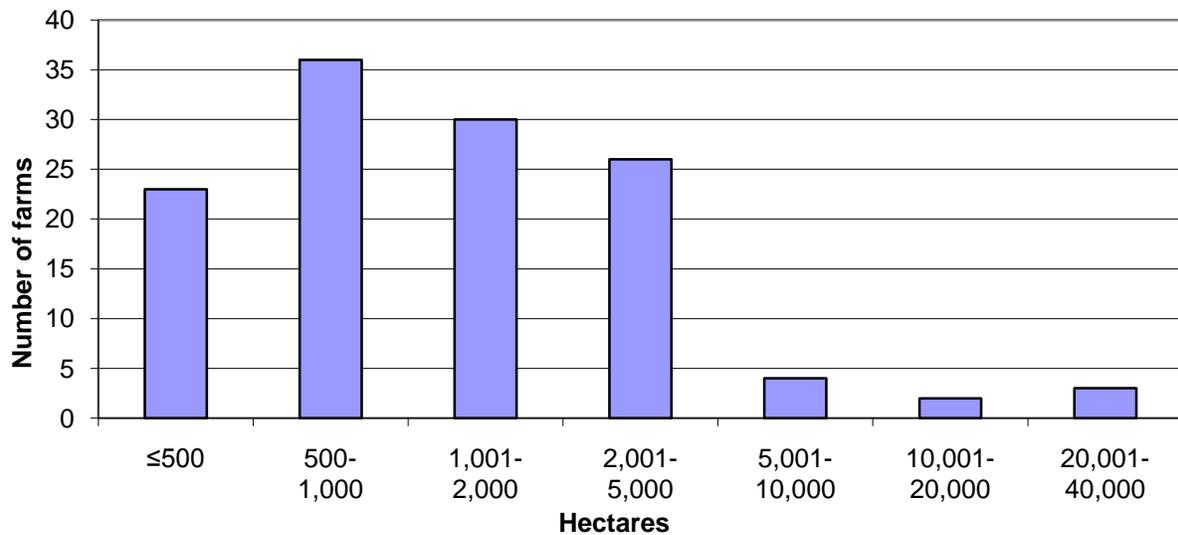


Figure 4-2. Size distribution of exempted farms in Mopani District (n=124). Compiled from game ranching statistics, from Limpopo Department of Economic development, Environment and Tourism 2009.

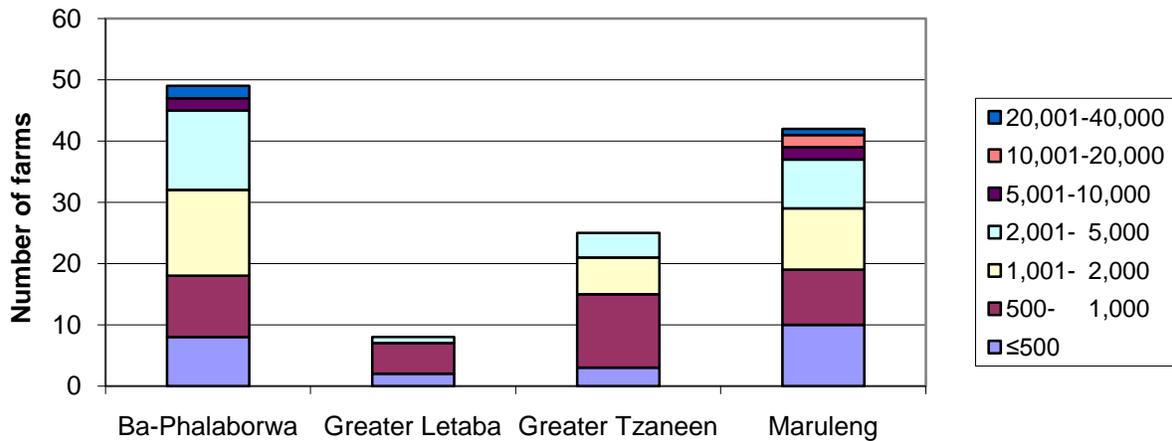


Figure 4-3. Size distribution by municipality of exempted farms in Mopani district (n=124). Compiled from game ranching statistics, from Limpopo Department of Economic development, Environment and Tourism 2009.

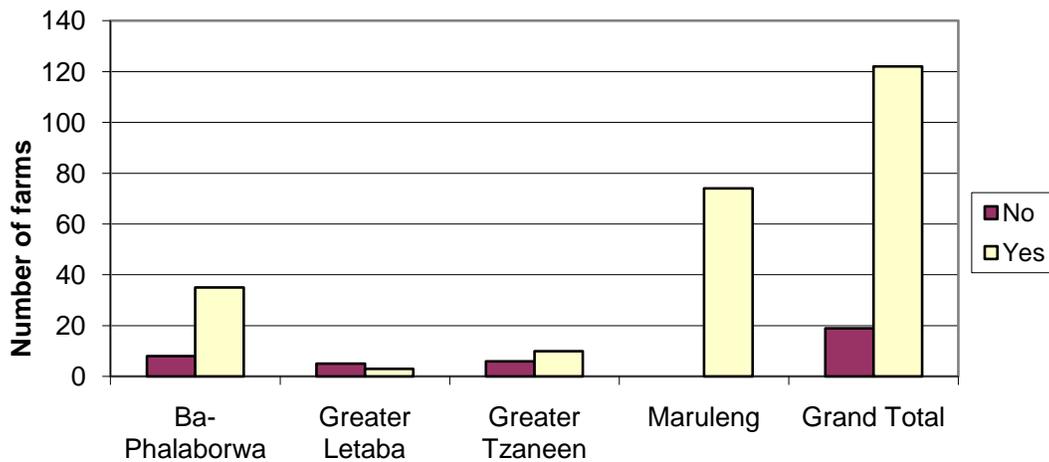


Figure 4-4. Accommodation on exempted farms by municipality (n=141). Compiled from game ranching statistics, from Limpopo Department of Economic development, Environment and Tourism 2009.

Table 4-1. Ranch characteristics. Compiled from game ranch survey.

Farm	Start Year	Conservancy member	Big five	Accommodation (Beds)	Activities
A	1933	Yes	Yes	80	Game viewing
B	1998	No	No	36	Game viewing, trophy hunting, buffalo breeding.
C	1980	No	Yes	60	Game viewing, trophy hunting, lion breeding, education, rehabilitation.
D	1986	No	No	12	Game viewing, trophy hunting.
E	1989	No	No	12	Game viewing, buffalo breeding.
F	2004	No	No	10	Trophy hunting, biltong hunting, sable breeding, buffalo breeding.
G	1990	No	No	n/a	Trophy hunting, biltong hunting, sable breeding.
H	2007	Yes	Yes	12	Recreation

Table 4-2. Farm A policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Profits	
		Tradable inputs	Domestic factors	
Private prices	45,332,972	8,130,905	14,141,462	23,060,605
Economic prices	48,143,616	8,653,105	7,726,623	31,763,888
Divergences	-2,810,644	-522,200	6,414,839	-8,703,283
<i>Ratios</i>				
PRC = C/(A-B)		0.380		
DRC = G/(E-F)		0.196		
EPC = (A-B)/(E-F)		0.942		
PC = D/H		0.726		

Table 4-3. Farm B policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Profits	
		Tradable inputs	Domestic factors	
Private prices	8,392,000	4,528,149	1,697,250	2,166,601
Economic Prices	8,912,304	4,541,530	959,721	3,411,053
Divergences	-520,304	-13,381	737,529	-1,244,452
<i>Ratios</i>				
PRC = C/(A-B)		0.439		
DRC = G/(E-F)		0.220		
EPC = (A-B)/(E-F)		0.884		
PC = D/H		0.635		

Table 4-4. Farm C policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Domestic factors	Profits
		Tradable inputs		
Private prices	8,253,941	5,351,381	2,727,788	174,772
Economic prices	8,765,685	5,592,545	1,864,883	1,308,258
Divergences	-511,744	-241,164	862,905	-1,133,486
<i>Ratios</i>				
PRC = C/(A-B)	0.940			
DRC = G/(E-F)	0.588			
EPC = (A-B)/(E-F)	0.915			
PC = D/H	0.134			

Table 4-5. Farm D policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Domestic factors	Profits
		Tradable inputs		
Private prices	212,286	801,789	890,588	-1,480,091
Economic prices	225,448	850,114	624,985	-1,249,651
Divergences	-13,162	-48,325	265,603	-230,440
<i>Ratios</i>				
PRC = C/(A-B)	-1.511			
DRC = G/(E-F)	-1.001			
EPC = (A-B)/(E-F)	0.944			
PC = D/H	1.184			

Table 4-6. Farm E policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Domestic factors	Profits
		Tradable inputs		
Private prices	4,600,000	2,293,279	773,330	1,533,391
Economic Prices	4,885,200	2,486,794	613,713	1,784,693
Divergences	-285,200	-193,515	159,617	-251,301
<i>Ratios</i>				
PRC = C/(A-B)	0.335			
DRC = G/(E-F)	0.256			
EPC = (A-B)/(E-F)	0.962			
PC = D/H	0.859			

Table 4-7. Farm F policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs		Profits
		Tradable inputs	Domestic factors	
Private prices	3,516,000	3,173,019	237,650	105,331
Economic Prices	3,733,992	3,399,672	143,860	190,460
Divergences	-217,992	-226,653	93,790	-85,129
<i>Ratios</i>				
PCR = C/(A-B)	0.693			
DRC = G/(E-F)	0.430			
EPC = (A-B)/(E-F)	1.026			
PC = D/H	0.553			

Table 4-8. Farm G policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs		Profits
		Tradable inputs	Domestic factors	
Private prices	41,840,000	18,848,281	3,671,000	19,320,719
Economic Prices	44,434,080	19,194,929	2,825,437	22,413,714
Divergences	-2,594,080	-346,649	845,563	-3,092,995
<i>Ratios</i>				
PCR = C/(A-B)	0.160			
DRC = G/(E-F)	0.112			
EPC = (A-B)/(E-F)	0.911			
PC = D/H	0.862			

Table 4-9. Conservancy characteristics

Conservancy	Start year	Area (hectares)	Number of members	Revenue Sources at conservancy level		
				Wildlife	Tourism	Levies
A	2003	25,000	5	10	40	50
B	2009	11,500	8	50	0	50
C	1993	30,000	11	100	0	0
D	1969	60,000	30+	100	0	0

Table 4-10. Conservancy C policy analysis matrix. Compiled from game ranch survey.

	Revenues	Costs	Domestic factors	Profits
		Tradable inputs		
Private prices	4,500,000	1,480,750	466,500	2,552,750
Economic Prices	4,779,000	1,440,694	271,743	3,066,563
Divergences	-279,000	40,056	194,757	-513,813
<i>Ratios</i>				
PCR = C/(A-B)	0.155			
DRC = G/(E-F)	0.081			
EPC = (A-B)/(E-F)	0.904			
PC = D/H	0.832			

Table 4-11. Policy analysis matrix summary results. Compiled from game ranch survey.

	Private cost ratio (PCR)	Domestic resource cost ratio (DRC)	Effective protection coefficient (EPC)	Profitability coefficient (PC)	Financial profitability	Economic profitability
Ranch						
A	0.380	0.196	0.942	0.726	Yes	Yes
B	0.439	0.220	0.884	0.635	Yes	Yes
C	0.134	0.588	0.915	0.135	Yes	Yes
D	-1.511	-1.001	0.944	1.184	No	No
E	0.335	0.256	0.962	0.859	Yes	Yes
F	0.693	0.430	1.026	0.553	Yes	Yes
G	0.160	0.112	0.911	0.862	Yes	Yes
Conservancy						
C	0.155	0.081	0.904	0.832	Yes	Yes

Table 4-12. Operating costs 2008 (percentage of variable costs). Compiled from game ranch survey.

	Primary Activity	Employees	Animal care	Administration	Fuel & Transport	Safari costs	Maintenance	Utilities
Farm								
A	Tourism (Large)	77.3	0	7.7	1.7	3.3	6.7	3.2
B	Tourism (Mid size)	20.5	51.3	3.5	10.8	0.8	7.0	6.0
C	Tourism (Mid size)	42.7	4.9	24.1	5.6	9.8	11.0	1.8
D	Tourism (Small)	63.3	0.2	11.6	0.2	0	13.2	11.5
E	Tourism (Small)	51.2	12.7	0.5	8.6	0	23.6	3.2
F	Breeding	18.2	47.0	9.5	9.8	1.0	11.5	3.1
G	Mixed	19.3	58.8	0.9	13.7	0	6.8	0.6
Conservancy								
C	Breeding	17.9	40.1	1.5	19.4	0	18.3	2.9

Note: Animal care includes: supplemental feed, veterinary services, medicines, and animal movement and transportation and medicines. Maintenance includes: roads, fencing, buildings, vehicles, machinery and water provision equipment.

Table 4-13. Revenue sources 2008 (percentage of total revenue). Compiled from game ranch survey.

	Primary Activity	Accommodation	Live animal sales	Trophy hunting	Biltong hunting	Game meat	Retail	Cattle
Farm								
A	Tourism (Large)	94.5	0	0	0	0	5.5	0
B	Tourism (Mid size)	2.1	91.8	6.0	0	0.1	0	0
C	Tourism (Mid size)	78.7	2.4	15.8	0	0	3.0	0
D	Tourism (Small)	94.9	0	0	0	0	2.2	0
E	Tourism (Small)	0	100	0	0	0	0	0
F	Breeding	5.1	71.1	6.1	17.1	0.6	0	0
G	Mixed	0	14.3	1.5	0.5	0	0	83.7
Conservancy								
C	Breeding	0	100	0	0	0	0	0

Table 4-14. Gross income and gross margin 2008. Compiled from game ranch survey.

	Primary Activity	Gross Income Rand /ha	Gross Margin Rand/ha
<i>Farm</i>			
A	Tourism (Large)	8,706	8,282
B	Tourism (Mid size)	4,936	2,886
C	Tourism (Mid size)	2,231	856
D	Tourism (Small)	105	4
E	Tourism (Small)	1,643	1,434
F	Breeding	1,099	768
G	Mixed	2,906	1,947
<i>Conservancy</i>			
C	Breeding	150	90
	Cattle*		717

* Source: Limpopo Dept. of Agriculture enterprise budget 2008

Table 4-15. Labor use on game ranches. Compiled from game ranch survey.

	Primary Activity	Labor			Hectares employed per person
		Skilled	Unskilled	Total	
<i>Farms</i>					
	Tourism (Large)	32	162	194	27
	Tourism (Mid size)	4	80	84	20
	Tourism (Mid size)	2	17	19	106
	Tourism (Small)	1	5	6	340
	Tourism (Small)	3	6	9	311
	Tourism (small)	1	16	17	176
	Breeding	1	9	10	320
Average				48	186
	Mixed (cattle & breeding)	3	72	75	192
<i>Conservancy*</i>					
	Leisure	1	9	10	3000
	Ecotourism	12	27	39	1538
	Eco tourism	4	80	84	137
Average				44	1558

*Refers to labor used at the collective level for range and wildlife management. It excludes labor employed by individual farms within the conservancy.

CHAPTER 5 CONCLUSIONS

The policy environment in South Africa shows that many of the market distortions experienced in other countries have largely been eliminated in South Africa, making wildlife an attractive option in this country. Private landholders are choosing to undertake wildlife production in large numbers. However, producers are faced with large negative net policy transfers that are reducing the economic profitability of their ranches, as well as significant transaction costs. High levels of bureaucracy and poor understanding of wildlife producers are key sources of inefficiency. The purpose of this study was to investigate the economics (financial and economic viability) of game ranching and describe the unique conditions that exist for wildlife utilization on private land in South Africa. Three objectives were outlined: (i) to describe the current state of wildlife based land use on private land. This entails identifying and characterizing enterprise activities taking place on game ranches and describing the participants and their motivations for entering into game ranching; (ii) to determine financial and economic profitability of game ranching land uses on private land and the sources of enterprise profitability; and (iii) to describe the game ranching policy environment and its impact on policy on wildlife utilization on private land. This chapter summarizes the results of the policy and profitability analysis and discusses the implications for the wildlife producers and the role of game ranching.

5.1. Game Ranch Performance

The fundamental property rights necessary for wildlife ownership and use are in place in South Africa, and have resulted in the emergence of a heterogeneous group of game ranchers. Even within the relatively small area of Mopani district, game farms

differ in size, activities mixes and management arrangements. The financial analysis of case study farms showed that wildlife is both financially profitable and economically efficient. Gross margin analysis of case study ranches showed that wildlife based ranches produce positive returns that exceed returns to extensive cattle production by up to R7,565 per hectare. Private costs ratios of less than one showed that ranches were privately profitable, meaning they were able to generate above normal profits at market prices and compensate domestic factors of production. Domestic resource cost ratios (DRC) less than one for all of the ranches showed that in a policy and market environment without distortions, these ranches were operating in an economically efficient manner. However, the ranches demonstrated large negative net transfers from inefficient policy and market failure affecting prices in input and output markets. The effective protection coefficient (EPC) of less than one indicated that the ranches were experiencing a reduction in value added between 4% and 22% due to policy transfers affecting prices in the product and tradable input markets. Overall, the ranchers faced a net disincentive that reduced private profits by 14% to 88%. Differences in efficiency are attributable to market failure and government policy primarily affecting the prices of domestic factor inputs of land, labor and capital. Differences in relative efficiency of individual ranches are also due to differences in ranch characteristics, including management goals, size of the enterprise, stage of development and experience of the manager.

The ranchers in the case study were motivated primarily by conservation and lifestyle preferences. This suggests that there are significant non-monetary values associated with game ranches that accrue to land owners. They are also actively

engaged in ecological management activities to meet conservation objectives. Even with ecological management plans in place, these served only as guidelines and were often weighed against profitability needs influencing the timing, type and quality of ecological interventions. Some landholders have also chosen to become members of conservancies, and in doing so, save on operation costs in time, labor and capital required to maintain vegetation and animals. Collective arrangements have additional benefits in that they create additional jobs for collective management activities. They provide a protective umbrella to members negotiating on their behalf with external actors, and thereby confer the benefits of a good reputation on members, lessening the individual marketing burden. However, individual ranches with well established good reputations, steady clientele and diversified wildlife enterprises are reluctant to join conservancies. The benefits of conservancy membership are insufficient to compensate some landholders for the loss of an established identity and operational autonomy. Conservancies are complex arrangements with a variety of structures. Each conservancy is the outcome of negotiations, and the resulting constitution represents members' specific needs. Growth in conservancy membership depends on those individuals' needs and the ability of the conservancy to meet those needs.

5.2. Policy and Institutions

Institutional arrangements that enable private ownership of land and the wildlife resource have produced a competitive market environment where game ranchers strive to produce their products at lowest possible cost. However, there are considerable transaction costs facing ranchers from monitoring, regulating and policing rules used to govern transactions of game ranchers.

The regulatory approach applied by government departments is almost entirely focused on command and control methods to ensure compliance and fails to reflect more contemporary approaches of incentives and co-management. Time spent and complexity associated with securing permits for ranch activities and other producer-to-government interactions proved to be a large cost to producers, and these costs are not reflected in financial costs of farm budgets. It is conceivable that the situation can be improved by simplifying permitting processes and restricting them to when they are absolutely necessary, as well as improving communication of information and ability of conservation office staff to handle these demands without incurring exorbitant costs. Self regulation could prove to be an alternative to permitting for some wildlife related functions that can reduce the level of transaction costs.

Well-meaning regulations when applied to wildlife are resulting in production challenges and are reducing the competitive advantage of the bio-experience economy. Frequent changes in rules and regulations leave ranchers with a sense of uncertainty towards the future. This can result in shortsighted behavior as ranchers try to maximize profits before policy changes. A facilitated, participatory approach to wildlife production by regulators could provide wildlife producers with the support needed to reduce uncertainty, maximize profitability and foster an environment of understanding where conservation and social goals could be achieved. This could enhance a land use option that has not only an economic and financial comparative advantage, meaning it a good use of South Africa's resources, but provide more job and economic growth, with a land use that conserves the environment to a greater extent than the alternatives.

5.3. Policy Implications

A purely competitive approach may prove inadequate to issues of social legitimacy, therefore, competitive advantage must be created within a broader scope of social legitimacy. Ranches have continued to expand and diversify, and they are now experiencing limits to their development from the external social environment. Land reform, veterinary and wildlife policy and the lack of public support for game ranching due to its overwhelming perception as an elite white activity are some of the key challenges facing the ranchers. In conservation circles, questions have begun to arise as to whether ranchers are legitimate conservation stewards, and whether they meet the standards of conservation. One way to overcome crisis in social legitimacy is for competitive strategy to give way to cooperative action. Cooperation can complement a competitive strategy and can reinforce and differentiate the ranchers' positions through the positive effects of a good reputation. A weakness of the producers is that they have largely been ineffective in communicating their positive economic and environmental contributions to external stakeholders. This is partly due to a lack of sufficient data with which to demonstrate their positive impacts. Research on the economic performance of game ranches is lacking. Ranchers are also not well organized into an effective association. Membership in the Wildlife Ranchers Association, which is considered the mouthpiece for producers at the national level, is not representative of the large number of producers in the country. Concerted efforts are needed to organize producers into cohesive groups, and to generate a solid base of empirical data on game ranching contributions that can be communicated to external stakeholders to improve understanding of the industry. This would improve the producer's ability to effectively engage government and environmental groups in policy discussions.

Stakeholder relationships and the perceptions they have of each other discourage collaboration. Conservation organizations consider ranchers to be profit-driven to the detriment of conservation goals. At the same time, ranchers perceive themselves as actively driving conservation. In addition to mobilization of producers, collaboration between stakeholders is needed to allow ranchers to internalize stakeholder concerns and recommendations in their operations and also increase transparency of all involved in the game ranching sector. Although conservation organizations and ranchers may not agree on standards of conservation quality, they have similar underlying interests in biodiversity conservation, and participatory processes could bring these to the surface assists improving understanding between groups and allow increased recognition of the contributions each makes towards conservation.

5.4. Study Limitations

There are two main limitations in this study. First, non-use values of game ranching are not included in the policy analysis matrix assessment. The exclusion of values for ecosystem services provided by game ranching underestimated economic profitability. These positive externalities can be considered to be significant, given that land owners who converted farms from cattle production undertook land reclamation to improve the previously degraded land, improving vegetation and reducing soil erosion from previous overgrazing. As part of routine ecological management, ranchers take measures to prevent soil erosion and routinely remove invasive plant species. These activities contribute significantly to financial operation costs but are not all compensated for through market benefits, yet society enjoys the benefits of these investments. High values for land under wildlife, even in the absence of commercial activities, suggests that there are some non-use values that are capitalized into the value of land.

Second, this study largely represents the perspective of wildlife producers and subsequently their opportunities and limitations. However, it is important to note that perspectives of by key government officials at provincial and national levels have significant impact on the goals that are pursued by game ranching related policy. Further information on this stakeholder group is required to complete the understanding of the wildlife production and the potential for policy responsiveness to changes in game ranching operations.

5.5. Further Work

This study has shown economic profitability of game ranching, which supports the hypothesis that wildlife had comparative advantage in semi-arid areas. Further extensions of the research can take the next step and to determine the economic multipliers that are associated with upstream and downstream value chain of game ranching, and how they compare to other uses on the same land. It is hypothesized that wildlife has the potential to generate greater value added through diversification relative to livestock because it is less dependent intensification of primary production. It also provides an evaluation of the extent of the tradeoff between wildlife and alternative land uses such as domestic livestock production. With equity concerns that exist in South Africa, labor-intensive land use alternatives are typically favored by the government. An evaluation of the magnitude of economic impacts provides a more accurate reflection of not only the contribution of game ranching to other sectors of the economy, but also of the opportunity cost of choosing an alternative land use over wildlife.

APPENDIX
PRODUCER SURVEY QUESTIONNAIRE

**ECONOMIC EVALUATION OF LAND USE ALTERNATIVES IN THE GLTFCA,
SOUTH AFRICA**

2009 Game Reserve Questionnaire

Interviewer:	Date:	Interview number:
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INSTRUCTIONS: Please fill in responses in spaces provided and underline the most applicable answer where required.

Background Information

1. Name of farm: _____
2. Province : _____
3. Postal address: _____

4. Tel: _____

Respondent Information

5. Respondents position on farm
a) Owner/ shareholder b) Manager c) Spouse d) Other
(specify): _____
6. Age
a) 20 -29 b)30 -39 c)40-49 d)50 -59 e)60 and over
7. What is the highest level of education you have attained?
a) None b) Primary School c) Secondary school d) University degree e) Professional qualification

Land Unit Information

8. What is the total size of the farm? _____ hectares
9. In what year did you acquire this farm? _____
10. How is this farming business owned?
a) Corporation
b) Family
c) Partnership
d) Sole proprietor
e) Other (specify): _____

11. What is your mean annual rainfall? _____mm

12. What are the different enterprises on the farm?

Land use	Area of farm used (Hectares)	Percentage contribution to total farm revenue (%)	How many years has this particular land use been practiced on the farm?
Irrigated crops			
Dry land crops			
Wildlife			
Cattle			
Other (specify):			

13. Do you belong to any farmer organizations

a) Yes (specify organizations)

b) No

14. Apart from the farming business do you have any other off -farm formal employment?

a) Yes-Part time

b) Yes-Full time

c) None

15. How do you view your farm?

a) More a business than a way of life

b) Equally a business and a way of life

c) More a way of life than a business

16. How has this view changed over time?

Wildlife/ Nature Based Enterprise

17. In what year did you begin using wildlife on you farm? _____

18. What was the existing land use system on the farm before you began wildlife use?

19. What was your reason for entering the game ranching business?

- a) For financial revenues
- b) For conservation
- c) Love of nature and outdoor lifestyle
- d) Didn't want to get left behind
- e) Other (specify): _____

20. How important are the following business goals for your wildlife enterprise? Circle the appropriate number

Goal	Importance				
	1= Not at all important 5= very important				
Maximize profits	1	2	3	4	5
Protect threatened species	1	2	3	4	5
Expand operation	1	2	3	4	5
Reduce business risk i.e. social risks and labor problems	1	2	3	4	5
Reduce financial risk i.e. variability in cash flow due to debt financing	1	2	3	4	5

21. How would you rank your ability in the following business and management skills? Circle the appropriate number

Ability	Your ability				
	1= Very low 5= Very high				
Interpersonal dealings with clients	1	2	3	4	5
Conservation	1	2	3	4	5
Marketing	1	2	3	4	5
Farm finance	1	2	3	4	5
Human resource management	1	2	3	4	5
Overall management	1	2	3	4	5

22. What activities are from offered on your farm?

Activity	Yes	No
Trophy hunting		
Biltong hunting		
Game drives		
Walking trails		
Quad biking		
Canoeing		
Other (Specify):		

23. Do you provide visitor/ tourist accommodation?

- a) Yes
- b) No

If yes please list the type(s) of visitor accommodation you provide?

--

24. What is the total number of beds you have available for visitors?

_____beds

25. How many visitors did you receive in 2008 year?

	Local visitors (from South Africa)	International visitors	Total visitors
Day visitors			
Overnight visitors			

26. Complete the following details regarding visitor accommodation for the last year

Ave Price charged per person per night (Rand)	High season price per person per night (Rand)	Low season price per person per night (Rand)

27. What was the total number of bed nights sold in 2008?_____bed nights

28. What are your plans for the wildlife enterprise in the next 5 yrs?

- a) I want to expand the size of my operations
- b) I want to continue in the same way
- c) I want to reduce the size of my operations
- d) I am considering retirement and transfer of the farm to the next generation
- e) I am considering selling the farm and moving into a different career

Comment:

--

Economic Analysis

Please refer to your financial records if necessary to accurately complete this section.

Capital costs

29. Please answer following questions (a-g) regarding capital expenditures incurred in setting up the wildlife based business:

- a) Did you perform any water development for game on your farm?
 - 1. Yes
 - 2. No

	Number	Year	Cost
Dams			
Boreholes			
Pumps			

b) Did you install fencing for game?

1. Yes
2. No

	Km	Year	Cost
Electrified Fencing			

c) Did you construct any buildings for visitor accommodation?

1. Yes
2. No

Accommodation Type	Year	Cost

d) Did you construct any buildings for Storage

1. Yes
2. No

	Number	Year	Cost
Storage Shed			

e) Did you construct any buildings for refrigeration

1. Yes
2. No

	Number	Year	Cost
Cold room			

f) Did you introduce additional wildlife onto the property?

1. Yes
2. No

Species	Number	Year	Cost

g) Did you purchase any vehicles?

1. Yes
2. No

Vehicle	Number	Year	Cost

Variable Costs:

30.

a) Please list all employees(full time and part time) costs for 2008

Type of employee	Number of employees		Cost (Rand)
	Part time	Full time	
Managers			
Rangers			
General			
Unpaid family labor			
Other (specify)			
Total			

b) Please list all non-salary employee benefits you provided and their value to staff for 2008

Item	Quantity	Value
Game meat		
Rations		
Other (Specify):		
Total		

c) Please list all costs for utilities used for 2008

Item	Cost
Electricity	
Water	
Total	

d) Please list all cost for animal, capture and transport used in 2008

Item	Quantity	Cost
Animal transport		
Wildlife capture aids and equipment		
Permits		
Culling costs		
Other (specify):		
Total		

e) Please list all costs for wild animal care for 2008

Item	Quantity	Cost
Supplemental feeding e.g. mineral licks		
Medicines/ vermicides/ dipping fluid		
Veterinary and information services		
Total		

f) Please list all administrative and marketing costs for 2008

Item	Cost
Telephone/fax/email/postage and stationary	
Marketing e.g. advertisements and brochures	
Other (Specify) :	
Total	

g) Please list all vehicle costs 2008

Item	Quantity	Cost
Fuel.		
Vehicle licenses		
Vehicle insurance		
Total		

h) Please list all Safari costs for 2008

Item	Quantity	Cost
Food		
Beverages		
Purchases of trophy animals		
Total		

i) Please list all maintenance costs for 2008

Item	Quantity	Cost
Roads		
Game fencing		
Water provision equipment		
Buildings and visitor facilities		
Vehicles and machinery		
Other (Specify):		
Total		

Benefits

31. Please complete the following table on sales made in the last financial year , please include all items that generated revenue for the farm

Sales	Quantity	Revenue (rands)
Trophy fees		
Daily rate		
Visitor accommodation		
Live animal sales		
Biltong hunts		
Game meat		
Hides		
Other (specify) :		

32. Where are live animals sold?

- a) Public auction
- b) Private sale
- c) Other (specify) _____
- d) Not applicable

33. Where do you sell your game meat?

- a) On farm
- b) Local
- c) Urban
- d) I do not sell game meat

Opportunity Costs

34. Please list losses incurred in the last year

	Yes	No	Quantity	Value (Rand)
Crop losses				
Disease losses				

35. If you could avoid the costs of fencing would you be willing to manage wildlife and vegetation collectively with other land owners?

- a) Yes
- b) No

Comment:

36. Do veterinary regulations limit markets for wildlife products?

- a) Seriously
- b) Moderately
- c) Slightly
- d) Not at all
- e) Don't know

Comment:

Conservation and wildlife management

37. Do you have a formal ecological management plan?

- a) Yes
- b) No

38. What wildlife conservation and range management measures do you use on your property?

Conservation measure	Yes	No	Cost (Rand)	Comment
Anti poaching units				
Game fences				
Remove invasive alien plant species				
Soil erosion control measures				
Monitor vegetation				
Monitor wildlife population				
Provide water sources for game				
Provide supplementary feed for game				
Provide mineral licks				
Control dog populations				
Predator control				
Other (Specify):				

39. What animal species do you have on your farm?

Species name	Number of animals	Primary use (1)Hunting, (2)Meat (3)Game viewing, (4)Live sale If other specify
Blesbok		
Buffalo		
Bushbuck		
Bushpig		
Cheetah		
Duiker: common		
Eland: common		
Eland: Livingstone		
Elephant		
Gemsbok		
Giraffe		
Grey rhebok		
Hartebeest: Lichtenstein's		
Hartebeest: red		
Hippopotamus		
Hyena		
Impala		
Klipspringer		
Kudu		
Lechwe		
Leopard		
Lion		
Mountain reedbuck		
Nyala		
Oribi		
Ostrich		
Reedbuck		
Roan antelope		
Rhino: black		
Rhino: white		
Sable antelope		
Springbok		
Steenbok		
Tsessebe		
Warthog		
Waterbuck		
Wildebeest: black		
Wildebeest: blue		
Wild dog		
Zebra: Burschell's		
Zebra: mountain		
Other: (SPECIFY)		

General

40. Is your farm currently under a land claim?

- a) Yes
- b) No
- c) Don't know

41. If there is a claim on your land how has this affected your farm business management and operations?

- a) Positively
- b) Negatively
- c) No effect

Comment:

42. What do you consider to be the biggest opportunities for your farm business?

43. What do you consider to be the threats or challenges for your farm business?

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BIOGRAPHICAL SKETCH

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