INCENTIVES AND DISINCENTIVES FOR CONSERVING RENOSTERVELD REMNANTS AND THE POTENTIAL IMPACTS OF PROPERTY RATE REBATES

SUSAN RUTH PARKER

PERCY FITZPATRICK INSTITUTE
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SUPERVISORS : J K Turpie & M Botha

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ABSTRACT

Renosterveld is a critically threatened ecosystem. Eighty percent of the remaining fragments are located, mainly on privately-owned farms, in Cape Floristic Region, South Africa. Fifty-eight landowners were interviewed about their opinion towards incentives for preserving the renosterveld on their farms, from which it was concluded that a suite of conservation incentives are needed to conserve renosterveld, rather than a single incentive or group of similar incentives. All landowners suggested that they were likely to conserve the renosterveld on their farms. Although opportunity costs exist, both the perceived opportunity cost of renosterveld and the current cost of conserving renosterveld are low; renosterveld should therefore not be regarded as threatened. However, the remaining renosterveld fragments remain at risk if land-use is changed and protective legislation is not adhered to.

A property rate rebate as an incentive for the conservation of renosterveld would only marginally be of financial benefit to landowners. It would be an important incentive in the symbolic and psychological message it gives to landowners that the local government is both appreciative of their conservation efforts and serious about conservation. The cost to local municipalities of offering a property rebate is minimal, but the challenge is to convince municipalities of the need to offer such a rebate in spite of the numerous urgent social issues they face.

Motivational incentives such as support through the agricultural extension system, public acknowledgement and education would be of benefit, but the farmer's sense of heritage, family and connection to the land as well as social approval, have potentially a large role to play in motivating people actively to collaborate in the conservation of this indigenous flora. The importance of these incentives in conserving renosterveld should not be underestimated.

CONTENTS

1. CHAPTER 1: INTRODUCTION

The Cape Floristic Region (CFR) is a biodiversity hotspot (Myers *et al.*, 2000) and has a serial World Heritage Site comprising of eight natural properties. The CFR has high endemism and unexpectedly high species richness (Linder, 2003) and the importance of its conservation and the strategies and action plans to do so are well documented (Gelderblom *et al.*, 2003; Cowling *et al.*, 2003a; Pressey *et al.*, 2003).

Cape Lowlands Renosterveld, a highly threatened ecosystem within the CFR, occurs in the more fertile lowlands where the relatively more nutrient rich soils have for centuries been ploughed for agriculture (Adamson, 1938). Generally economically productive areas are less preserved (Pressey, 1994) and renosterveld has less than 4% remaining and less than 2% protected (Rebelo, 1992a; Kemper *et al.*, 2000; von Hase *et al.*, 2003). The subsidisation of cereals in the 1980s and the more recent expansion of the wine industry has meant further loss of renosterveld (Fairbanks *et al.*, 2004) which is now considered '100% irreplaceable' and a high priority area for conservation (Pressey *et al.*, 1993; Cowling *et al.*, 2003b; Rebelo, 1992a).

There is no common definition of renosterveld but it is best described as small leaved shrublands dominated by Electropappus rhinocerotis (renosterbos) (Boucher, 1980) with a prevalence of annuals and geophytes, but with lower endemism than the fynbos shrublands of the CFR (Cowling & Holmes, 1992; Moll *et al.*, 1984; Rebelo, 1992b). Renosterveld has some local traditional plant use and it is believed there is potential cosmetic and medicinal value, but its value lies mainly in biodiversity and existence value.

Habitat loss through change in land use is one of the biggest threats to biodiversity loss (Cowling *et al.*, 2003c) and in the CFR, agriculture is by far the most significant agent of habitat transformation (Latimer *et al.*, 2004). Invasive alien vegetation is also a main threat to biodiversity loss with dense stands of woody aliens having transformed 1.6% of the CFR (Richardson *et al.*, 2002). Apart from extensive transformation by agriculture

and alien vegetation infestation, renosterveld is also threatened by urbanisation and population growth, unsustainable harvesting and inappropriate land-use planning (Rebelo, 1992b; Rouget *et al.*, 2003; Kemper *et al.*, 1999; von Hase *et al.*, 2003) and potentially climate change (Bomhard *et al.*, 2005).

There are approximately 53 533 hectares of Cape lowland renosterveld in the CFR and an estimated total of 18 000 remnants with most of them smaller than a hectare (von Hase *et al.*, 2003). Irrespective of whether 2% (Low & Jones, 1994), 3% (McDowell, 1988) or 4% of the original area of renosterveld remains, it is critical to conserve all remnants of renosterveld regardless of their size (Cowling *et al.*, 2003c). Spontaneous regeneration on old fields, after 35 years, indicated lower species richness and diversity than adjacent intact habitat (Krug *et al.*, 2004b).

More than 80% of these remaining renosterveld fragments are on private lands, mainly belonging to farmers (McDowell, 1988; Wynberg, 2002). If we wish to keep what little remains, incentives must be sought to encourage these private landowners to conserve it.

The need for conservation outside nature reserves on private lands is well recognised (Hale & Lamb, 1997) but on private lands the challenge lies in accommodating both the rights of landowners to be economically productive, while at the same time protecting biodiversity (Norton, 2000). Conservation biologists need to play a critical role in private land conservation (Knight, 1999) and while it is believed that an ethical appeal should be made to private landowners to expand their duty of care as custodians of nature (Heydenrych *et al.*, 1995; Gelderblom *et al.*, 2003), Australian farmers believe that they have demonstrated a stewardship with the land for generations (National Farmers Federation Australia (NFF), 2003). Private landowners feel that they should not be expected to bear all the costs for what essentially is a benefit for public good and the broader community (Doremus, 2003).

Conservation on private lands initially failed to meet all objectives because it did not understand the views of private landowners nor appreciate the implications of regulating their private land and limiting their opportunities (Brook *et al.*, 2003; Tikka & Kauppi,

2003). More recently an attempt has been made to try and understand these views and to ascertain what motivates private landowners to retain their natural lands. Private landowners are motivated by intrinsic factors such as aesthetic appreciation, having an attachment to their land and giving the impression their farm is well managed (Erickson *et al.*, 2002, Ryan *et al.*, 2003). Farming is described as an emotional enterprise 'governed by a complex set of values, experience and perceptions, including a strong emotional component' where farmers are connected to the sense of place, 'passed on and usually deepened from generation to generation' (Koelle & Oettle, 2003).

In South Africa the advent of the new government saw the deregulation of control and the virtual elimination of subsidies (Pence *et al.*, 2003). Conservation in agriculture changed from soil conservation to broader concepts of conservation supporting ecological farming practises (Donaldson, 2002; Gelderblom *et al.*, 2003). In addition to this, a contentious issue facing private landowners is the Government Land Reform Programme. Land is an issue in South Africa as land ownership favours a racial minority and land tenure issues are not fully resolved (Wynberg, 2002; Milton *et al.*, 2003). On private lands it is "not ecological challenges which lie ahead but socio-political challenges which may be a bigger hurdle to overcome" (MacDonald, 1994).

The necessity to conserve the renosterveld is well documented but is not evident to most private landowners. Private landowners are not encouraged to leave their virgin land unploughed nor to restore their lands (Milton *et al.*, 2003). While several types of incentives are possible to induce South African farmers to conserve renosterveld, one possibility that has received much attention is that of using a property rate rebate (Botha, 2001). The *Local Government Property Rates Act [No 6 of 2004*] was introduced to standardise the way properties are valued for rating purposes and to regulate the power of a municipality to impose rates on property. This provides an opportunity for local governments to exempt or rebate property taxes as an incentive for land set aside for conservation. Any subsidies or tax exemptions to landowners for conservation would be significant, as there are few, if any, economic incentives for private land conservation.

The aim of this study was to investigate the current financial and motivational incentives and disincentives for conserving renosterveld on private farm lands. The following four key questions were addressed:

1. What proportion of farmers with renosterveld fragments plan to keep or transform these fragments?
2. What are the direct and indirect opportunity costs of maintaining these fragments?
3. What incentives would motivate farmers to conserve fragments?
4. Are property rate rebates or exemptions a viable incentive tool for conservation from the perspective of both local government and the private landholder?

Chapter 2 reviews the viability and relevance of private land incentives, as well as property tax as a viable conservation incentive (key questions 3 and 4). Chapter 3 provides the background to understanding the policies and legislation that protect renosterveld and their relevance in answering the key questions. Chapter 4 describes the methodology used. In Chapter 5 the results of the quantitative analysis are presented, with each key question addressed sequentially. The findings of the qualitative analysis are addressed within the broad context of private land owners, motivation and incentives. Chapter 6 debates the incentives issue and draws final conclusions.

2. CHAPTER 2: A REVIEW OF INCENTIVES AS A MECHANISM FOR ACHIEVING CONSERVATION ON PRIVATE LANDS

2.1 Introduction

While conservation has traditionally been approached through regulatory measures in the past, there has been a recent shift in South African policy and regulation to adopt incentive schemes to achieve conservation aims. This chapter addresses two of the key questions. Firstly the definition and role of incentives in both the global and local context are reviewed in addressing the key question: "what incentives would motivate or influence a landowners' decision to conserve?" Secondly tax and more specifically property rate tax are reviewed in addressing the key question: "is a property rate rebate or exemption a viable incentive measure for conservation?"

An incentive is something that arouses feeling, or incites to action (Shorter Oxford English Dictionary) and conservation incentives are rewards which encourage actions (Crosthwaite, 2000). A disincentive discourages good conservation behaviour, while a perverse incentive encourages undesirable behaviour (McNeely, 1988).

Economic incentives were initially proposed because institutions, research and legislation were failing to achieve conservation goals (McNeely, 1988). Economic incentives have been widely researched and are one approach to conserving biodiversity on private lands and have developed because they can achieve conservation actions on private land at a lower cost to government than traditional regulatory approaches (McNeely, 1988; Bateson, 2001; Langholz *et al.*, 2000; Doremus, 2003). Incentives should be integrated into a legislated and supportive institutional framework (Wells, 1998; OECD, 2004).

Economic disincentives such as polluter taxes discourage environmentally undesirable behaviour (Anderson *et al.*, 1977; Constanzo & Daly, 1992) although green taxes are often fiscally biased and 'too low compared to the externalities they should price' (Anderson, 2003).

Conservation has usually not been achieved through heavy-handed legislation, which often violates private property rights (Farrier, 1995; Wu & Babock, 1999; Michael, 2003). In some instances regulation has proved to be a disincentive for conservation because regulations are often ineffective, unaffordable, frustrate and anger landholders and result in less public good conservation (McDowell, 1988; Turpie *et al.,* 2003a; Doremus, 2003; Causley, 2001; Polasky & Doremus, 1998; Michael, 2003, Parkhurst *et al.,* 2002).

Incentives for agriculture such as encouraging land clearing in tropical forests are perverse incentives for conservation. Many tax incentives have been perverse, encouraging landholders to develop rather than to conserve indigenous vegetation (Binning & Young, 2003; McDowell, 1988). Perverse incentives for conservation such as taxing protected areas and forest clearing have, in recent years, in many cases been removed.

Conservation incentives are well described and include; financial incentives (subsidies, direct payments or tax relief), development incentives (tradable or transferable development rights), property right mechanisms (easements and revolving funds), motivational incentives (education, local awards, community recognition, technical support, materials, juridical protection against land invasions), framework incentives (institution building and stakeholder involvement) and a host of other supporting mechanism such as water subsidies in arid environments (Botha 2001; Michael, 2003; Shogren *et al.,* 2003; Swift *et al.,* 2003; Langholz 1999; Bateson, 2001; OECD, 2004) or relaxation of other regulations for property owners who protect biodiversity (Doremus, 2003).

However although many different conservation incentives are proposed they could all be described as either economic or motivational conservation incentives. Economic incentives are any form of direct or indirect payment such as subsidies, tax relief, labour costs or any mechanism which could be reduced to cost. Economic conservation incentives are commonly financial mechanisms to encourage private landowners to enter into property rights agreements that restrict the use of their land (easements).

Motivational conservation incentives are all non-financial measures that influence the way that people think and act towards conservation, such as public recognition, juridical protection, information, institution building or the prospect of belonging to a group or scheme.

Incentive based conservation is under-utilised and inefficiency has resulted from 'insufficient promotion and sporadic delivery of incentives by government' (Langholz *et al.*, 2000). The literature describes numerous incentive projects and it would seem that private land conservation is best achieved when a mix of incentives (Bateson, 2001) or set of mechanisms in combination with other conservation measures are used (Crosthwaite, 2000). Few discuss which incentives are most effective (Michael, 2003) or what mix of incentives are best delivered (McKee *et al.*, 2005).

2.2 Incentives in the global context

Farming in the European Union (EU) is subsidized by farm price support and compensation schemes with a well established Agri-Environmental Policy (AEP) bringing acres of land under conservation (Morris & Potter, 1995). The common agricultural policy (CAP) accounts for about 50% of the total EU budget (around EUR 40 billion), and although the EU receives a small and declining contribution to GDP from farming (European Environmental Agency, 2002), the EU contributes over $2.7 billion to European farmers (Green *et al.*, 2005).

In the United States of America over sixty percent of land is privately owned. Conservation easements, now offered in fifty states, have been adopted as the basic legal land conservation tool (Swift *et al.*, 2003; Shogren *et al.*, 2003). Voluntary conservation agreements have doubled in the past decade (Shogren *et al.*, 2003) and are becoming increasingly important in implementing the contentious Endangered Species Act, which initially failed to protect endangered species (Brook *et al.*, 2003; Langpap & Wu, 2004). These voluntary policies 'make it difficult for policymakers to target the properties with

the highest conservation value' and an attempt needs to be made to ensure 'that landowners with the lowest opportunity costs own the most ecologically valuable property' (Michael, 2003). Conservation incentives are usually in the form of some type of direct payment or tax relief, but include education and technical support (Shogren *et al.,* 2003). An extra bonus, an agglomeration bonus (Parkhurst *et al.,* 2002) has been proposed for land retired adjacent to any other retired land to encourage one 'contiguous area' (Shogren *et al.,* 2003). The *Farm Security and Rural Investment Act of 2002* and the newly created Conservation Security Program (CSP) has changed US environmental policy from providing incentives to retire agricultural land, to paying producers to adopt and maintain good conservation practice. US$ 17 billion has been budgeted for incentives for conservation on agricultural lands over five years (Parkhurst et al., 2002; Shogren *et al.,* 2003; USDA, 2003; Kurkalova *et al.,* 2003). In both America and Europe much of conservation appears to be a question of financial compensation and considering the huge subsidies given for agriculture, it is in some respects probably cheaper to compensate conservation than to subsidise agriculture.

Australia recognised the importance of private land conservation (Hale and Lamb, 1997) and has been instrumental in developing incentives for private land conservation such as the tax incentive (Binning & Young, 2003). The role that local governments can play in facilitating community involvement in conservation has been well recognised and municipalities have introduced incentive schemes providing both financial and non financial incentives (Bateson, 2001; Binning &Young, 1999). Australia has a huge body of farmers who have expressed dissatisfaction that 'farmers should be compensated if their ability to farm is compromised with legislation in the public interest' (NFF Australia, 2005). Private landholders have reservations about conservation easements (Kabii, 2003) and this contributed to initial poor participation in conservation schemes (James, 2002). Conservation schemes have become increasingly popular with landholders who enter into voluntary conservation agreements since tax incentives are in existence (Kemp, 2003). The *Environment Protection and Biodiversity Conservation Act (1999)* relies on self-regulation with heavy penalties for actions that significantly negatively impact the environment and this is meeting with success (B Talbot, *pers. comm.*).

Most countries in Latin America have more than 80% of their land in private ownership but this conservation is hampered by lack of institutional capacity and adequate legal tools (Swift *et al.*, 2003). No Latin American countries have a national law authorizing conservation easements (Swift *et al.*, 2003). A perverse conservation incentive has been that tenancy laws have required landowners to make adequate socio-economic use of their land or to face expropriation or invasion and although these laws have been repealed, perceptions about land use are tainted (Swift *et al.*, 2003). Increasing the juridical security of land to protect private owners from having their land taken has been limited to Costa Rica, but this could potentially be a major incentive offered by governments (Swift *et al.*, 2003) and particularly in countries where land invasions are prevalent. Costa Rica has promoted the best system of incentives for private land conservation offering significant economic incentives through property tax exemptions and a successful financial incentives program with payments for environmental services of approximately $50 per hectare per year (Langholz, 1999; Swift *et al.*, 2003). The only other country to offer economic incentives for private landowners is Brazil which has strong laws for private ownership but these are rarely enforced (Swift *et al.*, 2003). Property tax exemptions have been withdrawn from Ecuador, Guatemala, and Bolivia, due to the current financial crisis and given the limited budgets of most Latin American countries, 'the future of economic and tax incentives to promote private land conservation is not promising.' (Swift *et al.*, 2003). Property tax exemptions on official, conserved private land may be offered but 'rural property taxes are traditionally very low and the tax collection systems are weak, this form of incentive has not been highly attractive to private landowners.' (Swift *et al.*, 2003).

Eco-labelling is an international conservation initiative and is a voluntary method of environmental performance certification. Eco-labelling creates a market-driven approach to achieve environmental goals by providing environmental information and enabling consumers to choose those products that have less impact on the environment (Clark & Downes, 1995; Grote, 2002). In South Africa certain eco-labelling has been successful such as badger-friendly honey. There is an increased effort to use eco-labelling both locally and internationally such as the Integrated Production of Wine Conformance Certification for the marketing of wines. Consumers in the developed world are

increasingly willing to pay a premium on produce produced by environmentally sensitive initiatives (Donald, 2004) but support for such products is more difficult to initiate in developing countries where most consumers are less affluent.

2.3 Incentives in the local context

Part of this study was formulated around the need to understand the extent to which incentives, and particularly a property rate rebate, could influence private landowners to conserve the renosterveld on their farms. Although incentive policies for conservation on private land are probably the most cost-effective approach to achieve the CFR conservation targets (Gelderblom *et al.,* 2003; Pence *et al.,* 2003; Frazee *et al.,* 2003), incentives are limited and few exist. A Stewardship Program was developed by Cape Nature Conservation and the Botanical Society of South Africa to promote private sector involvement in biodiversity conservation, whereby land of conservation value is committed into one of three contract options offering differing levels of assistance and incentives. The contracts distinguish between; a conservation area such as a conservancy; a negotiated legal co-operation agreement (easement or covenant); and a contract nature reserve, which binds the land in perpetuity, but allows the owner to retain the title of the land. Contracts can offer some incentives such as limited alien clearing subsidies (Heydenrych *et al.,* 1999; Botha, 2001; Pence *et al.,* 2003) but as yet farmers making a conservation effort are not offered tax concessions, fuel rebates or other benefits (Milton *et al.,* 2003).

Delivering public policy via tax measures is complex (Chudleigh & Simpson, 2000) but the strength of a tax program is it's 'accessibility and capacity to reinforce the motivations of landholders to privately invest in public goods' (Binning & Young, 2003). Tax incentives are easier to administer and at an effectively smaller cost to government when compared to other conservation incentives (Pence *et al.,* 2003; Binning, 2000; Chudleigh & Simpson, 2000). The tax system in South Africa is under utilised as such a mechanism (Botha, 2002) but tax exemptions for donations to conservation are being considered (Manuel, 2005).

In investigating property tax as a conservation incentive in South Africa one needs to understand *The Property Rates Act* which provides the legal capacity for local governments to reduce or abolish property taxes on lands that have complied with certain regulations or been secured in perpetuity for conservation. Each municipality can stipulate their own rates policy with differential rate levies, but the legislation leaves this detail to the municipality because situations vary in different parts of the country (P van Ryneveld, rates consultant, *pers. comm.*). This potentially enables rebates or exemptions for preservation of renosterveld.

The City of Cape Town (CCT) adopted an 80% rates exemption for all agricultural properties in rural areas (CCT Draft Rates Rebate Scheme, 2002). Bitou Municipality, by way of example, offers, on written application, a 90% rebate on assessment rates to agricultural zoned land if they have complied with *National Veld and Forest Fire Act,1993* and the *Conservation of Agricultural Resources Act, Act 43 of 1983 (CARA)* (M Botha, *pers. comm.*). This provides an incentive for Bitou private landowners to control invasive aliens and prepare fire breaks and this creative rates policy differs from that in the CCT where conservation land with unrestricted land use is not yet considered for rate rebates. The CCT as yet does not give rate rebates for conservation even if the land is secured in perpetuity and virgin land that is not zoned for agriculture is subject to full property rates taxation. This is a perverse conservation incentive as it discourages conservation by exempting agricultural land that has been developed while taxing pristine conserved land that is undeveloped.

'Conservation oriented landowners are the greatest asset to protecting nature on private lands, and effective policy needs to maximize the value of this scarce resource' (Michael 2003). Internationally motivational and economic incentives are on offer for private land conservation, with an increasing number of voluntary easements. In South Africa, property tax is a viable conservation incentive and should be developed together with other conservation incentives.

3. CHAPTER 3: A REVIEW OF CURRENT POLICIES AND LEGISLATION RELEVANT TO THE CONSERVATION OF RENOSTERVELD

3.1 Introduction

Land conservation is ultimately influenced by financial and politically based decisions (Newburn et al., 2005). This chapter aims to address the key questions, specifically "whether a property rate is a viable conservation incentive?" In order to determine whether current legislation could influence renosterveld conservation, the possibilities of a rate rebate as a conservation incentive are explored. Policies relating to land use planning, invasive aliens and the *Local Government Property Rates Act [No 6 of 2004]* are discussed but with a focus on the Western Cape and more specifically the Cape Metropolitan Area (CMA).

South Africa is a signatory to a number of international agreements and conventions promoting sustainable resource use and management. The 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro, brought environmental issues into focus with adoption of Agenda 21 promoting sustainable development.

The White Paper of the Conservation and Sustainable Use of South Africa's Biological Diversity (1997) supported the introduction of conditions and incentives (e.g. tax relief) to strengthen the involvement of the private sector in the conservation and sustainable use of biodiversity. The recommendations of the *White Paper* culminated in *National Environmental Management Act (NEMA), [Act 107 of 1998],* which focuses on environmental management and promotes a national environmental interest "by laying down the institutional structures and legal mechanisms to champion the environmental cause" (Glazewski, 2005). *NEMA* (Chapter 6) stipulates South Africa's environmental obligations in the broader international context (Glazewski, 2005). The *National Environmental Management Biodiversity Act* (2003) within the framework of *NEMA,* has established a South African National Biodiversity Institute, which is responsible for the

promotion of the sustainable use, conservation and appreciation relating to the rich biodiversity of South Africa for the benefit of all people.

In South Africa, the more than 200 environmental laws and regulations enforced by numerous different government agencies, mainly at provincial level, have meant a plethora of fragmented legislation (Barnard, 2002). Difficulties with complying with Section 24 of the Constitution promoting conservation has resulted (Gelderblom *et al.*, 2003) and environmental issues have persisted due to lack of implementation of environmental laws and regulations (Glazewski, 2005). It is essential that biodiversity conservation is part of state planning policy and that 'implementing organisations and other inheritor stakeholders' must be effectively considered during planning process if effective conservation goals are to be achieved (Pierce *et al.*, 2005).

3.2 Land-use planning

As one of the major causes of biodiversity loss is habitat degradation, sound land-use planning is of vital importance as many environmental concerns arise from decisions around land use. Paterson (2005) describes land-use planning legislation being bound by three mechanisms; national and provincial laws prescribing land-use planning, laws for the establishment of protected areas and laws to ensure environmental impact assessment before development. There is legislation in place that should restrain further development of renosterveld namely; *The Environment Conservation Act 73 of 1989 (ECA)* which controls environmentally unsound land-use change and *CARA* which provides legislation for the protection of natural vegetation; the cultivation of virgin land being subject to prior approval. Although *NEMA* promotes a national biodiversity interest, the National Department of Agriculture had never turned downed an application to cultivate virgin soil in the Western Cape Province, over-ruling the Provincial agricultural decisions by provincial-level agricultural authorities (CAPE conference participant, 2004) and many lands have been ploughed without permits. In reality legislation was rarely enforced due to lack of capacity in local government and the involvement of all spheres of government in local affairs (Rural Management Framework, 2002; Cowling *et al.*, 2003c).

Many cities in South Africa have developed their own strategies for conservation. The CMA includes areas of renosterveld which are therefore influenced by policies relating to the City of Cape Town. The proposed *Rural Management Framework for the City of Cape Town, (2002),* recognised the threat of rapid urbanisation and loss of indigenous vegetation and regarded the facilitation of conservation practices by private landowners as a key environmental management issue. Land use planning ensures that land is put to optimal use, taking into account the different effects that land-uses can have in relation to social, political, economic and environmental concerns (Wise Land Use, 2001). The definition of a strong urban edge, defining the outer limit to urban development in the CMA is needed, and although the *City of Cape Town Urban Edge Structure Plan* was approved as policy in 2001, it has not to date been adopted by the CCT (S. Nicks, CNdV Africa, *pers. comm.*).

Local zoning plans are a critical tool for private land conservation (Newburn *et al.*, 2005) and the use of land is controlled by a Zoning scheme. Every property is assigned a Use Zone in accordance with the Land Use Ordinance, No 15 of 1985. *The Constitution and Municipal Structures Act, (No. 117 of 1998)*, make plan-making and land use applications the responsibility of the local municipality (Wise Land Use, 2001). Legislation around land development has changed because it used to require permission from different authorities which in some instances led to 'costly duplication, institutional conflict and a confused public' (Wise Land Use, 2001). In the CCT land use permission is now required from one single municipal structure and an Integrated Zoning Scheme is currently being compiled (S. Nicks, *pers. comm.*).

In South Africa land-use planning policy is determined by the Provincial Spatial Development Framework (PSDF) which essentially demonstrates how that province should develop. The Western Cape Department of Environmental Affairs, Economic Development and Development Planning is in the final stage of adopting the PSDF which has the protection of biodiversity and agricultural resources as one of the nine principles. Legislation now requires each municipality to adopt an Integrated Development Plan (IDP) to provide the strategies, projects and budgets for the municipality for that year *(Local Government: Municipal Systems Act, 2000)* and spatial development is defined by

the local government Spatial Development Framework (SDF). One of the aims of the PSDF is to provide the guidelines to inform and direct land use management and this occurs through the zoning schemes for which the local municipality is responsible, in both rural and urban areas (Western Cape Draft PSDF, July 2005). Provincial Spatial Development Frameworks should be aligned with the IDPs and budgets.

The implications for conservation are that municipalities, guided by the PSDFs and IDPs will ultimately have the legislative[1] ability to place biodiversity conservation strongly on their agenda with sound zonation schemes which veto development of farm land on urban fringes and other environmentally insensitive developments.

The implementation of the PSDF and the IDP budgets require a strong political support but a real potential exists for local governments to be assisted in the IDP process and thereby encouraged to incorporate good conservation planning into their IDPs. This process has been initiated in the Subtropical Thicket Biome, whereby local governments are given maps and guidelines to assist them in environmentally sustainable decisions (Pierce *et al.*, 2005).

Farms with good agricultural potential have theoretically been placed in green belt areas to ensure that they are only sold as viable agricultural units but nevertheless have a huge potential for commercial development. Evidence of corrupt interference in land-use decisions in the past, by provincial or national departments, has led some farmers on the urban fringes to believe that their agricultural land could potentially sell for commercial use, in spite of legislated agricultural zoning schemes. These factors influence the way in which private landowners around the urban fringe perceive the potential commercial land value of their renosterveld fragments. Irregularities (such as ploughing of renosterveld without permission) exist to avoid legislative complications in the process of land rezoning and although it is illegal to plough or develop virgin land, legislation has not yet proved a deterrent.

[1] PSDF legislative ability is currently under debate (S. Nicks. *pers comm.*)

3.3 Invasive aliens

CARA (amended, 2001) provides a statutory obligation for landowners to keep their land free of invasive alien plants, while *NEMA* aims to prevent, manage, control and eradicate alien and invasive species. Landowners are bound by the *National Veld and Forest Fire Act 1998, Act 101* and have a duty to prepare and maintain fire breaks, to provide equipment and have available personnel to fight fires.

The economic consequences of alien vegetation infestation are vast (Van Wilgen *et al.*, 2002) and many private landowners have little or no incentives to clear their alien vegetation. Regulatory mechanisms could bankrupt landowners who are simply unable to afford the costs of alien clearing (Pence *et al.*, 2003) and this could act as a perverse incentive to farmers to plough alien-invaded land (Turpie & Heydenrych 2000).

3.4 Property rates

The Constitution of the Republic of South Africa,1996 (s229) guarantees 'rates on property' as a source of revenue for local government. The Katz Commission of Inquiry recommended that a national land tax should not be implemented but rather a rural land tax 'in the local sphere' that finances local government (Katz, 1998). Government policy and legislation have defined municipalities as the primary point of delivery.

The CCT has 422 registered farms with a total land value of R804,355,280 and property rates levied on these farm properties are R11,367,149 (CCT Draft Rates Rebate Scheme, 2002). Property rates contributed to about 23.82% of the income of the CCT 2003/2004 operating budget but 17.2% of the 2004/2005 budget (City of Cape Town Annual Report, 2003/2004).

The *Property Rates Act [No 6 of 2004]* states that the amount due for rates is determined by the improved value of the property and the local government rates policy. No municipality may grant relief in respect of payment of a rate other than by way of an exemption, a rebate (a discount on the amount of rate payable) or a reduction (the

lowering of the amount for which the property was valued). The rates of farm properties used for 'agricultural purpose' may be rebated, reduced or exempt but this excludes the use of property for eco-tourism, game-trading and game-hunting. This delinking of ecotourism and agriculture could be problematic (R. Franzsen, *in litt.)* because renosterveld on farms that use their renosterveld for eco-tourism purposes could potentially be excluded from potential conservation incentives offered to farmers.

Private land contractually bound into a national or provincial protected area, in contradiction of the *NEMA,* initially received no exemption from municipal property rate taxes, but this has now been amended. *The Property Rates Act (2004)* 17(1) now states under other impermissible rates that a municipality may not levy a rate on *e) those parts of a special nature reserve, national park or nature reserve within the meaning of Protected Areas Act, or of a national botanical garden within the meaning of the National Environmental Management: Biodiversity Act, 2004, which are not developed or used for commercial, business, agricultural or residential purpose'.* Land placed into protected areas may not be levied and provides the opportunity for private land owners who choose to cede their conservation worthy land into protected areas, to be exempt from those rates. However, the special nature reserve status may be withdrawn if the private landowners decides to withdraw or the state decides to withdraw because of a breach of agreement by the private landowner and the owner is then liable for rates in arrears (*Property Rates Act*, 2004).

There is provision for the Minister of Finance to set a maximum rate for agriculture in relation to residential property (P van Ryneveld, *pers. comm.*) and cognizance needs to be taken of the fact that over-taxing agricultural land may disturb the viability balance of farms (I Palmer, Palmer Development, *pers. comm.*). However there is provision for this in the act which states that '*(4) When considering the criteria to be applied in respect of any exemptions, rebates and reductions on properties used for agricultural purposes, a municipality must take into account- ... (b) the contribution of agriculture to the local economy;(c) the extent to which agriculture assists in meeting the service delivery and (d) the contribution of agriculture to the social and economic welfare of farms*'. Most municipalities have considerably reduced the property rates on agricultural land which

reduces the threat of crippling property taxes, but also reduces the potential financial reward for conservation incentives. A rate rebate would be a small price to pay for conservation, but local authorities may not be able to bear the costs given other social needs which have a greater priority (Milton *et al.*, 2003; Frazee *et al.*, 2003).

In conclusion this chapter has established that current policies and legislation could influence the sound protection of renosterveld and that a property rate is a viable conservation incentive. Although an opportunity exists for local government to provide incentives to private land-owners for conservation, compliance from both legislators and private landowners is not guaranteed.

4. CHAPTER 4: METHODS

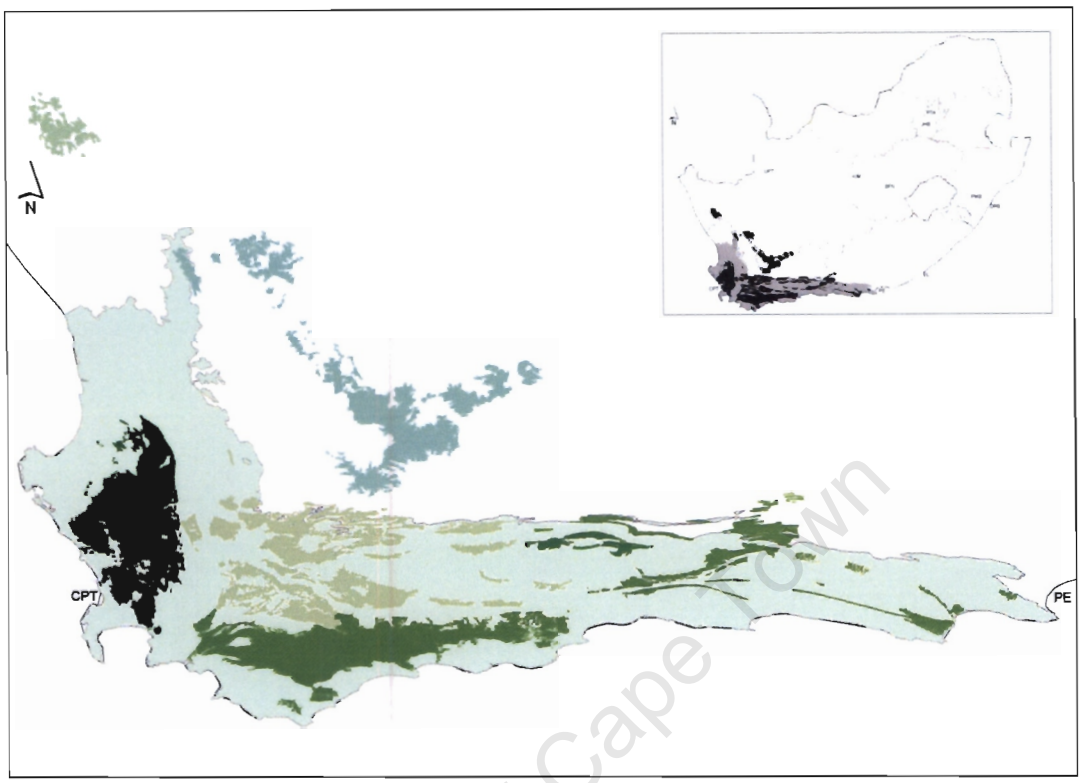
In answering the key questions, fifty eight private landowners were interviewed, the results of which provided both qualitative and quantitative data. In order to select a sample of appropriate private landowners, a study area was established, farms with renosterveld were identified and appropriate private landowners approached.

4.1 Study area

This study focuses on renosterveld on private farmlands within the Cape Metropolitan Area (CMA) and three conservancies (countryside set aside in a negotiated legal co-operation agreement between private land owners) outside the CMA. There are 6433 hectares of renosterveld in the CMA and the rationale for selecting this area is because renosterveld is highly threatened due to agricultural expansion and rapidly expanding urban development.

The restructuring of the CMA meant that the (City of Cape Town) CCT was expanded to incorporate six previous municipalities but the exact boundary of the CMA was unclear. The CCT urban edge is now defined but has not yet been adopted by the City (Urban Edge Report, 2004). Three conservancies included in the study were the Bottelary Hills, the Renosterveld and Agtergroenberg Conservancies. Bottelary Hills Conservancy was initially part of the CCT but is now excluded. This exclusion meant that there were no conservancies within the boundaries of the CMA. It was felt thought that the views of landowners in existing conservancies are important and for this reason landowners from conservancies outside the CMA were included in the study area.

a)



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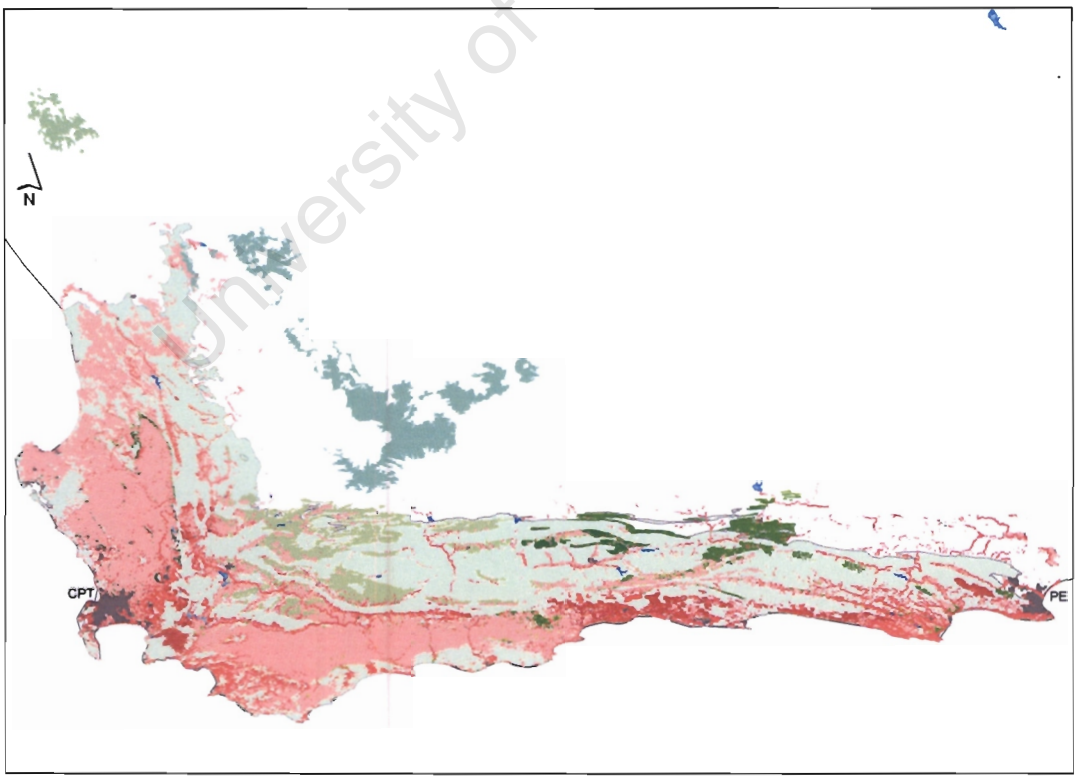

Figure 1: **Maps of South Africa showing a) the original extent of renosterveld and b) the present total remaining area (Krug, 2004a). The dark green represents Cape Lowland Renosterveld.**

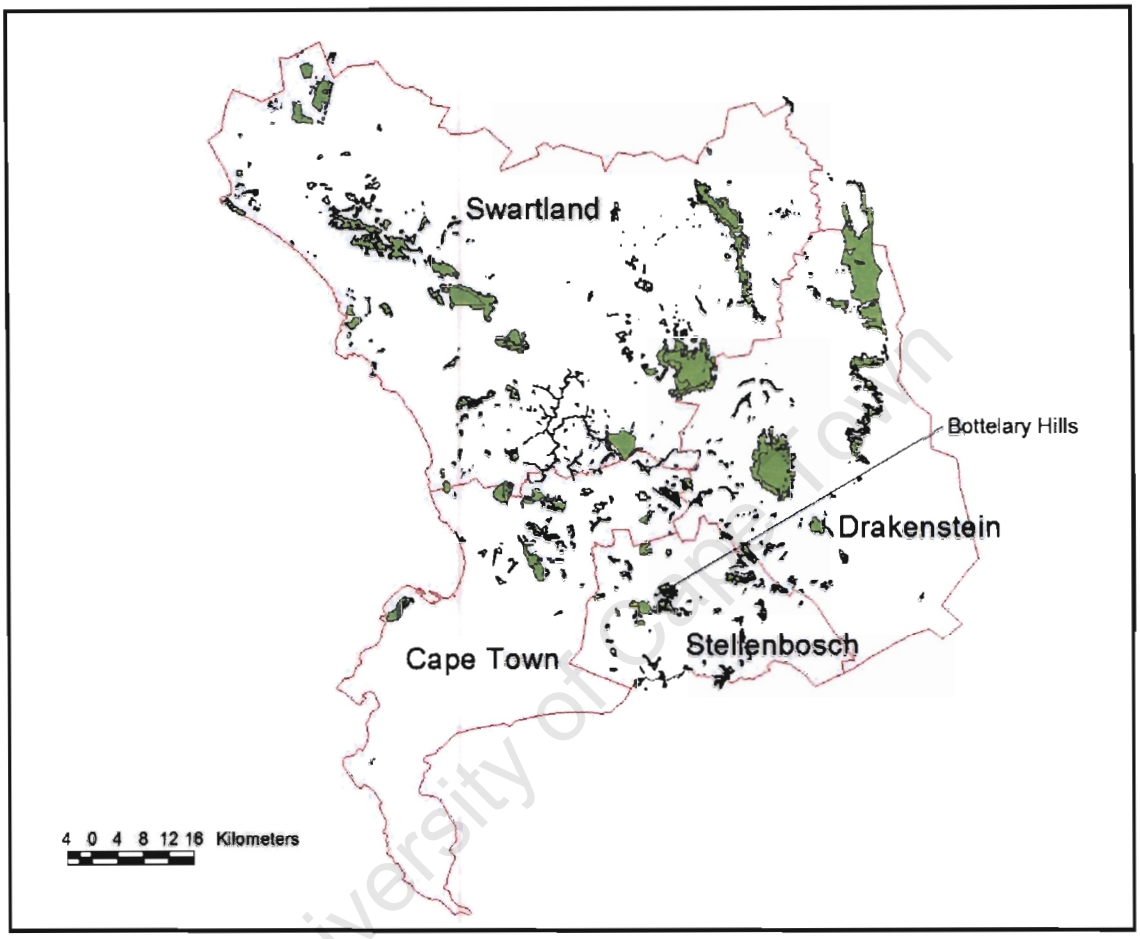

Figure 2: Map showing the existing renosterveld in the Cape Metropolitan Area and the three other municipalities included in this study namely: Stellenbosch, Drakenstein and Swartland.

4.2 Identifying farms with renosterveld

In order to ascertain which landholders to interview, properties on which renosterveld fragments occur needed to be identified, as well as the landowners and their contact details.

In order to establish which private landowners have renosterveld on their farms a complex file of registered farms as per the Land Surveyors report was obtained from the CCT. The Land Surveyors farm number (the cadastral number) and sometimes the farm name were determined from these records. The Deeds Office data base (National Register of Property Transactions in Cape Town) was accessed in the hope of obtaining the current farm name and current landowner, using the cadastral number from the Land Surveyors report. However the Deeds Office data base has no link to the cadastral number except through a 21 digit code that was not readily available. The implications were that as the cadastral number was the source of reference to farms (Land Surveyors report), the current landowners' name and current farm name were not accessible from the Deeds Office data and this data source was therefore not utilised.

Farms with renosterveld were then identified with the aid of Geographic Information System (GIS) data which provided the spatial data on the renosterveld. The following GIS data were used.

1. GIS biodiversity remnant data, where the shape file for 'CAPE remnants' was identified as renosterveld, supplied by the CCT, Dept. of Environment.

2. GIS cadastral numbers used to identify farms, supplied by the Land Surveyors General Office but obtained from the CCT, Dept. of Environment.

3. GIS 1:50 000 map of the Western Cape, compiled by The Chief Directorate: Surveys and Mapping, obtained from University of Cape Town Geomatics Dept.

4. GIS lowlands renosterveld data which provided renosterveld GIS for areas outside the CMA where 'CAPE remnants' and some 'natural vegetation' shape files were considered renosterveld, supplied by the Conservation Planning Unit, Botanical Society of South Africa.

GIS renosterveld and cadastral data were transposed onto the GIS 1:50 000 Western Cape map. GIS renosterveld data for areas outside the CMA were then added. All GIS renosterveld data within the known cadastral numbers (farm number from the Land Surveyor General) was used to compile a complete list of renosterveld sites (Appendix 8.2). This was then compared to the established list of registered farms.

An initial attempt was made to use landowners to accurately ground-truth the renosterveld data on their farms. This was not pursued because landowners found the GIS map difficult to understand. Two GIS areas were inaccurate as the data omitted the renosterveld remnant on the Durbanville Race Course but depicted a large (899.3 ha) renosterveld remnant (labelled Radio 918) which is fragmented around the expanded town of Klipheuwel. However, as neither of these remnants were on farms and therefore did not influence the selected study site, it is assumed that the GIS data used for this study were valid. This assumption is further supported by the fact that landowners' were able to accurately estimate the hectares of natural vegetation remaining on their farms and that these remnants were visible or shown to the researcher.

The average fragment size in this study area is 134 ha, but excluding a large game farm of 3000 ha, the average size is reduced to 82 ha with 57% of these fragments $\leq$ 50 ha.

4.3 Sampling Strategy

4.3.1 Sampling

All farms with renosterveld in the CMA were targeted. However, interviews ultimately depended on the ability to determine the renosterveld site and the contactability and availability of farmers. The study was then expanded to include a sample of land owners from three conservancies outside the CMA and more rural farmers.

4.3.2 Establishing contact details of private landowners

Farm owners and their contact details were established by contacting farmer associations and conservancy participants but chiefly by asking other farmers in the area. The criterion for identifying private landowners to interview was that landowners must have at least one fragment of renosterveld on their land.

In the CMA, of the eighty seven renosterveld sites identified, ten sites are municipal and nine sites are either unidentified or the owner is unknown. Of these remaining sixty eight sites, some private landowners have more than one farm and some farms have more than one remnant of renosterveld, so only fifty four private landowners with renosterveld on their farms were ultimately identified.

As there were potentially only fifty four landowners in the CMA, three conservancy areas outside the CMA were included; Agtergroenberg Conservancy, Bottelary Hills Conservancy and the Klapmuts Renosterveld Conservancy. The survey later included farmers from Malmesbury and Heidelberg in order to include some farmers perceived to be from more rural areas outside the CMA.

4.4 Survey Methods

4.4.1 Questionnaire survey

Data were collected through a structured interview. The interview was guided by a questionnaire which was developed to record both qualitative and quantitative data.

A questionnaire was developed and a pilot study initiated which involved interviewing five private land owners. The questionnaire was then redesigned and resulted in the final questionnaire (Appendix 8.3) which was then translated into Afrikaans. Interviews in the form of this questionnaire were conducted at a pre-arranged time by the primary researcher, in the language preference and home/office of the informant. The interview was recorded manually, word for word where possible and in the language of the respondent. No recording equipment was used as it was thought to be intrusive.

A total of eighty private landowners were contacted in the CMA, conservancies and more rural areas. Only fifty eight interviews were used in the final analysis, although sixty two private landowners were interviewed. Interviews with four farmers were not used; three interviews were discarded because virgin renosterveld no longer existed on those farms and one farmer interviewed became too paranoid to answer the questions. Four farmers refused interviews and sixteen private landowners were contacted or attempted to be contacted but not interviewed due to their being not available.

Ultimately of the fifty eight interviews used, forty five farmers interviewed were from the CMA and the remaining thirteen were from rural areas and conservancies outside the CMA.

4.4.2 Questionnaire structure

The revised questionnaire consisted of four sections outlined below.

1. Section A: Biographic data and nature of farming.

   i) Biographic data: farmer and farm details

   ii) Nature of farming: Q1 relates to the type of farming and Q2 asks how long the farm has been in the business or family. Although conservation practices have been known to correlate with various factors such as level of education, affluence, and language (McDowell, 1988; Winter, 2003), the researcher was not interested in exploring whether level of education, affluence or language could explain attitudes or behaviour as these factors were deemed inappropriate in an incentives program.

2. Section B: Retaining natural vegetation.

   Closed questions were used to elicit a single answer.

   i) Q3 – 6 was set to investigate the area and nature of virgin land

   ii) Q7 – 8 explored the management of alien vegetation

   iii) Q9 – 15 requested the cost involved in conserving natural vegetation

3. Section C: Incentives for saving indigenous vegetation.

   i) Q16 was structured using a five point Likert scale and assessed the farmers perceptions regarding incentive measures and conservation

   ii) Q17 asked farmers to rank fifteen potential incentives using a ranking scale (one to ten) with a score of ten being a good incentive

SPSS statistics is a software package used to gain greater insight into the actions, attributes, and attitudes of people. In order to measure the farmer' attitudes to municipal rebates, the questionnaire was originally designed using a five point

Likert Scale for SPSS software analysis. However an SPSS analysis was not used because the researcher felt that when the questions were grouped together they did not accurately portray the farmers' perceptions. The data were therefore analysed by grouping the Likert scores into 'agreed' or 'disagreed' or 'did not know' and calculated as percentages.

4. Section D: Motivation to conserve renosterveld.

Seven questions were designed using *Appreciative Inquiry* questions and analysed using Grounded Theory (Glaser & Strauss, 1967). This analysis was first conducted on the qualitative data transcribed from the interviews of nineteen farmers and was subsequently repeated and improved using the transcribed qualitative data from the fifty eight land owners.

The interview questions (Appendix 8.3) were based on *The Appreciative Inquiry Method* (Cooperrider & Srivastva, 1987) which does not focus or inquire about problems but focuses on what is appreciated. Appreciative Inquiry searches for and accentuates the positive. This method was chosen as in the absence of any current incentives, it must be positive factors that motivate farmers to conserve. These appreciative inquiry questions were designed to elicit and explore stories because it is ultimately stories that are able to inspire and from which constructive action can be taken (Liz Mellish, Liz Mellish & Associates, *pers. comm.*). Although this method was chosen to elicit positive responses the questions were sufficiently open ended to enable farmers to be critical and express dissatisfaction where appropriate.

4.5 Analysis

This study used both quantitative and qualitative techniques.

4.5.1 Analysis of quantitative data:

The quantitative data items from the questionnaire were collated and analysed. EXCEL produced charts that compared the contribution of each value to the total or to the values across categories. EXCEL was used to determine the Net Present Values (NPV) and Internal Rates of Return (IRR). STATISTICA 7 used the Kruskal-Wallis ANOVA to determine the significant differences between incentives.

All property valuations used were determined by using experienced property valuers as they provide sound estimates (Van Zyl, 2005).

4.5.2 Analysis of qualitative data:

The analysis of this research proved to be difficult, as a qualitative approach tends to be more subjective and is contrary to the more empirical approach of quantitative methods (Gibbs, 2002). The data were analysed using the *Computer Assisted Qualitative Data Analysis* software program *QSR NVivo Version1.2 142.* The merits of computer assisted qualitative data analysis have been debated (McLard *et al.,* 2003; Lee & Fielding, 1996) but can be effective if the analytic procedures are transparent (de Wet & Erasmus, 2005).

In qualitative analysis the data exists in expressions which need to be understood in context and 'seeks to take account of the views of those involved and the subjective and social constructs of their world' (Flick *et al.,* 2004). The concern is that renosterveld is a threatened eco-system which needs protection, but what would motivate private landowners to conserve it needs to be fully understood. Renosterveld grows on more fertile soils generally suitable for agriculture and although some farmers are not fully aware of its value or of the threats, renosterveld continues to decline. The legislation that protects it is ignored because the opportunity costs are too high and legislation is not enforced. The new South African government abolished subsidies, legislated labour and tenancy laws and farmers see themselves as 'scapegoats for apartheid' (Koelle & Oettle, 2003). Land reform issues place additional pressure and insecurity and cause farmers to be wary about the present government. Government extension used to be well connected

to farmers but is now non existent in parts, although farmers have good informal network systems. Farmers have not always collaborated with governmental conservation groups, although this is changing.

The qualitative data were transcribed from interviews of fifty eight landowners and were analysed using grounded theory (Glaser & Strauss, 1967). Grounded theory is usually associated with exploratory research and used extensively across social science disciplines (Gibbs, 2002). 'The grounded theory approach is a qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon.' (Strauss & Corbin, 1990). Qualitative analysis using grounded theory involves two main procedures, namely coding and adjunctive procedures. Coding procedures include *open coding, axial coding* and *selective coding* and require questions to be asked and comparisons to be made, while adjunctive procedures are memos, general comments that are made while coding (Strauss & Corbin, 1990).

The focus of inquiry in the interview revolved around two issues, namely what farmers like about the renosterveld and how they suggest it is preserved, should they wish to. Private landowners were asked what they value about renosterveld but were not directly asked what motivates them to conserve as this would preconceive the emergence of data, rather than allowing the theory to inductively arise from the data. Conservation must be understood from the private landowners' perspective as it is not in their best financial interest to set aside land for conservation.

The steps followed in the grounded theory were as follows:

1. Familiarise data by close reading.

2. Label the incidents and categorise data segments to create relevant categories (Dey, 1993).

3. Compare and link coded categories to form a core category from which the theory emerges.

4. Reflect and assess the validity of the process.

STEP 1 : Familiarise the data by close reading

Qualitative data analysis begins with in depth reading of the interview and provides the forum for issues to 'arise' out of the data.

STEP 2 : Label the incidents (data) and categorize data segments to create relevant categories

Grounded theory begins with coding and in the *open coding* process data were reread to bring together ideas about the data. Data segments were gathered, relevant information labelled, conceptualised and segments of the text were placed into 14 relevant node categories (Appendix 8.4). The data relevant to each category were scrutinized and examined for deeper connotations in a process known as the 'constant comparison method'. Categories should consider 'sociological constructs' and '*in vivo* codes' (Glaser, 1992). Many older farmers understand the word 'conservation' to be 'soil erosion' and questions about conservation are answered in terms of contour banks and preventing erosion. 'Soil erosion' is therefore an *in vivo* code for 'conservation'.

Categories are not exclusive and data segments can be attributed to several incidents or observations (Strauss & Corbin, 1990). Ideas, thoughts, reasons, motivations should continually be recorded during this process in 'memos'. For example when annotating 'neighbour relationships' one might memo that a farmer, who was part of a nature conservancy, refused to be interviewed because he did not care for conservation and claimed only to have joined the conservancy to please his neighbour. This memo may then be visited later when looking at why farmers join conservancies.

STEP 3 : Compare and link coded categories to form a core category from which the theory emerges.

The analysis continued to *axial coding* where categories are fine tuned, revisited, clarified and compared and put back together in new ways after open coding (Fielding & Lee, 1998). The relationships of categories were explored, finding connections between them and 'the idea is that each element in turn has a causal influence on the next' (Gibbs, 2002). For example 'links with the past' influences the 'emotional connection', which in turn influences constructive attributes and so on and in this way themes should start emerging and concepts develop.

The final stage of coding is *selective coding* which produces the core category around which all others are related (Strauss & Corbin, 1990). The themes from the final network of relationships between categories, determined the main claims of the resulting analysis and theory. This stage is mostly analytical and theoretical and is the process by which 'a fully grounded theory emerges' (Strauss & Corbin,1990; Gibbs, 2002).

STEP 4 : Reflexivity and assessment of validity

This final step involved a further reassessment of the whole process of analysis. 'Reflexivity' is in part 'consideration of the process of research and its possible implications for the validity of the main claims and conclusions of a study' (Hammersley & Atkinson, 1983) as there are always potential sources of error.

The interviews were recorded in the researchers own hand. Although a tape-recorded interview may have provided more data through re-listening for nuances and emphases, a manual recording method was selected to provide a less threatening atmosphere.

'Nodes are not merely a simple categorization of passages of the text' (Gibbs, 2002) and in this qualitative analysis the researcher thought the categories represented too many facts and not enough phrases that could indicate more psychological meaning. The categorization of nodes is perhaps a weakness in this analysis, although the researcher

found these more abstract categories difficult to create. Some farmers found the questions in the interviews difficult to answer and many answered '*nou vra jy my vas*' (that's difficult to answer). Questions were repeated using different synonyms and this enabled some farmers to eventually divulge their thoughts. Farmers are not usually asked why they conserve renosterveld and some answers became reiterations of what the interviewer had said earlier. Some data provided by statements such as 'get together and talk about it' were omitted because they did not fulfil a category. In grounded theory data that are not coded, are at some stage discarded and this is a recognised problem, because significant information is sometimes overlooked.

The validity and reliability of qualitative research analysis will remain in debate because 'the issue of whether the representations of the objects of qualitative research are valid cannot be escaped' (Gibbs, 2002).

4.6 Limitations of the Study

4.6.1 Sampling

The purposive sampling of farms with renosterveld fragments introduced a sampling bias. However, this was counteracted by the planned interviewing of all farmers with renosterveld in the CMA.

Although attempts were made to interview all fifty four farmers with renosterveld in the CMA, only forty four were ultimately interviewed as the remaining ten were either not contactable or refused to be interviewed. The study site was thus expanded to include further private landowners outside the CMA in conservancies and more rural areas.

No comparisons were made between farmers in the CMA, conservancies and more rural areas. A larger sample size (more farmers) would have enabled comparison. Sample size may thus be regarded as a limitation in this research.

4.6.2 Financial data

This research requires financial data and although confidentiality is offered, the financial data provided by the private landowner may not always be accurate and could impact on the results of the analysis.

4.6.3 Recording/Language

The fact that both English and Afrikaans are used may mean that data are lost in translation. An inherent bias exists when manually recording the interview because although the researcher attempts to record all that is said, some things are unwillingly excluded that may have been of importance.

4.6.4 Inter-disciplinary research

Conservationists have alluded to the necessity 'to legitimize and encourage disciplinary boundary crossings' (Orr, 1994). Interdisciplinary teaching has become more integrated over time (Niesenbaum *et al.*, 2003) and although mixing social science with natural science has been suggested, it has not often been pursued (Orr, 1994). In this research there was an attempt to investigate incentives from both science perspectives. Although qualitative data suggest subjective interpretation, this 'inductively derived' data lend richness to understanding the human perspective of motivation. The researcher struggled with amalgamating the qualitative and quantitative results into coherent theory and conclusion and this was not adequately addressed.

5. CHAPTER 5 : RESULTS

5.1 Opportunity costs of maintaining renosterveld

In addressing the key question whether farmers will keep or transform these fragments, renosterveld is considered both in terms of the direct cost of conserving renosterveld and the foregone income or opportunity costs.

5.1.1 Characteristics of renosterveld farms

One of the characteristics of the farms in the CMA is that many farms have been in the family for generations and some of these farms have been in existence for over 300 years. Of the landowners interviewed 49% had farms that had been in their family for 51 years or longer, while 23% had family farms for 21 to 50 years. Only 9% of landowners had been farming for less than 6 years.

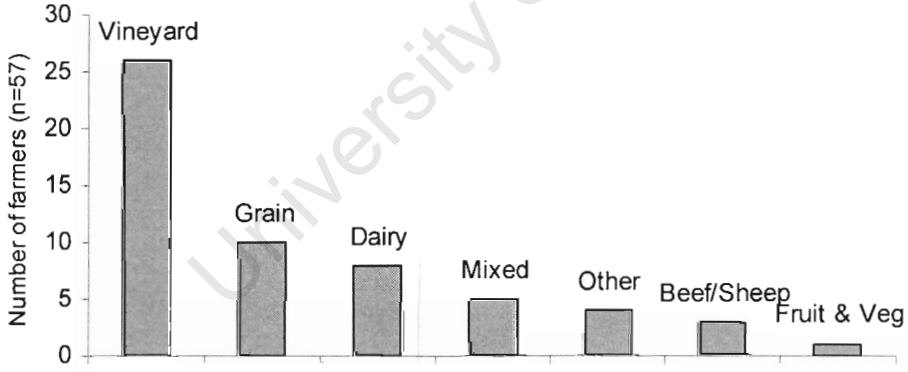

Figure 3 : Main type of farming income of landowners interviewed

Almost half the farms had vineyards as the main source of income (Figure 3); while grain and dairy were the major source of income for a third of the farmers, less than a quarter of the farmers had other main types of farming. As most farmers had vineyard as their main type of farming, a focus was given to issues surrounding wine farmers.

5.1.2 The direct costs of maintaining renosterveld

McDowell (1988) describes ecosystem conservation expenses as capital expenses and running expenses. Running expenses include fire management, alien clearing, fencing and security. The cost of maintaining renosterveld was documented in these categories and a further category added which included other expenses such as conservancy fees. These categories are presented as a percentage of the total cost (Figure 4). Alien vegetation clearing is the greatest expense, while security is the lowest expense.

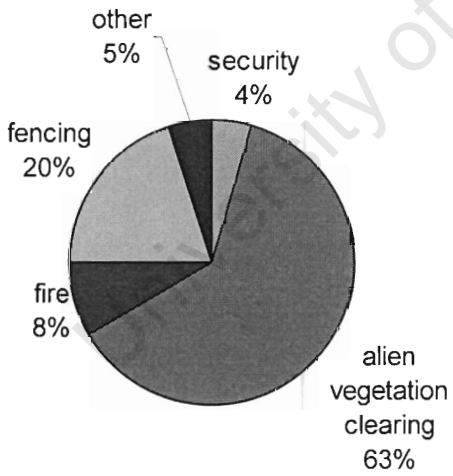

Figure 4: Categories of conservation management costs as a percentage of the total cost

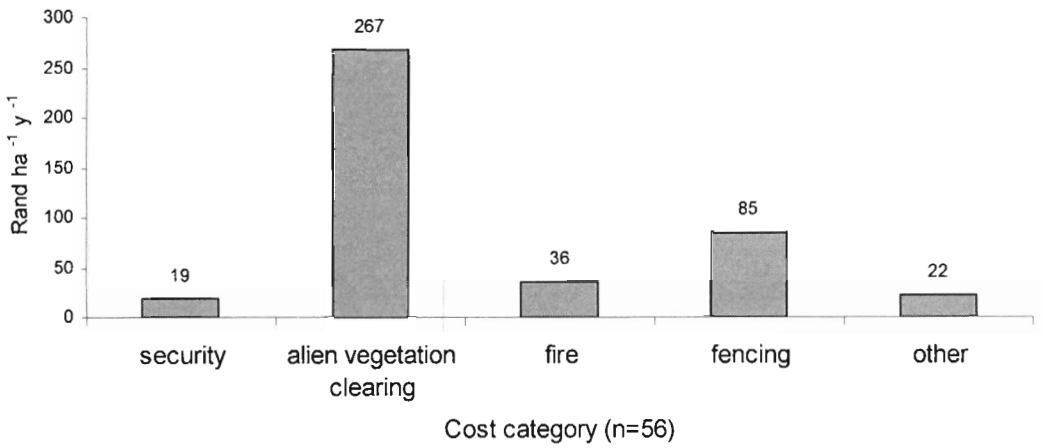

Figure 5: Landowners total cost of renosterveld (includes landowners with no costs (n=56))

The costs for renosterveld are presented again as total costs (Figure 5) and are discussed in their cost category. The results include all landowners as well those who have no costs in maintaining their renosterveld fragments, so the areas of renosterveld not incurring cost were used in estimating the rates per hectare.

Security

Security expenses were given as R19 ha^{-1} y^{-1} (Figure 5). The cost of security is incurred on only 10% of the farms. Security costs tended to be measures to protect livestock in the renosterveld from theft, such as devices attached to sheep that alert the farmer when the sheep are on the move at night. These devices could be deemed to be the cost of keeping sheep and not the cost of security, but it is presumed that sheep in renosterveld pose as a higher security risk than sheep kept on more nutritious pastures closer to the homestead.

Fire

Farmers use fire to clear or prepare land but are reluctant to control burn. Burning requires permission and even control burning poses a risk. Summer fires in high winds can cause untold damage and expense. The cost of fire management was calculated by

totalling the annual estimated cost of fire management provided by each farmer and dividing this by the number of hectares of renosterveld on their farm. The mean value of the cost of fire management on all farms was calculated as R36 ha^{-1} y^{-1} (Figure 5). Fire management costs are largely proactive cost for fire breaks.

Only 23% of the farmers provided fire management costs and severe fire costs are possibly only reflected when an infrequent fire occurs. The cost of a serious fire can be extremely high. Fire stations respond to calls (especially in urban areas) and charge a fee per incident type. An incident type increases depending on the severity of the fire (a house is incident type 1; a shop = incident type 2; a major fire = incident type 3). Costs are then doubled or tripled according to the incident type (Mr Bosch, Goodwood Central Fire Station, *pers. comm.*). A major fire appliance costs R198 per 15 minutes (or part thereof). For example a major fire lasting two hours with 2 fire engines would cost R9 504.

Fencing

Farmers wishing to conserve a remnant of renosterveld or establish a conservancy are faced with fencing costs which vary depending on the type of fencing required. Fencing costs were calculated by using the estimated annual cost of fencing provided by each farmer and dividing this by the number of hectares of renosterveld on their farm. Fencing is given as the second highest cost of maintaining renosterveld and the mean value of the cost of fencing was calculated as R85 ha^{-1} y^{-1}.

Farm fencing costs are estimated at R70 m^{-2} for low wire and R80 m^{-2} for high wire (1.8 - 2 m) (M. Willemse, WPK Malmesbury recommended fencer, *pers. comm.*). WPK Durbanville quoted R70–R100 m^{-2} depending. Cost for stock fencing (7 strands of barbed wire at 1.2m, with wooden straining, intermediate posts and steel droppers) is given at R29 m^{-2} (JJ Fencing, Blackheath, *pers. comm.*). Game fencing is generally more expensive than stock fencing and requires a minimum of 22 plain wires (R15 m^{-1} excluding labour) as opposed to the 7 strands of barbed wire for stock fencing.

Alien vegetation

It is clear that alien clearing claims the bulk of the expenditure in maintaining a renosterveld fragment (Figure 4). Landowners gave alien clearing as their highest running cost for maintaining renosterveld (Figure 5). The given cost is R267 ha^{-1}.

The benefits private landowners derive from restoring the 'productive potential of indigenous vegetation' do not outweigh the costs of clearing which range from about R320 - R6 700 ha^{-1} for lightly to densely infected areas of invasive acacias in lowland fynbos (Turpie & Heydenrych, 2000).

The cost of alien clearing presented in this analysis is lower than the cost given by Turpie & Heydenrych (2000). However, only 37% of farmers claim to have any alien vegetation costs. The bulk of landowners (63%) have properties that are less than 10% infested or not infested (Figure 6) and only 4% of landowners claim to have land that is heavily infested (more than 60%).

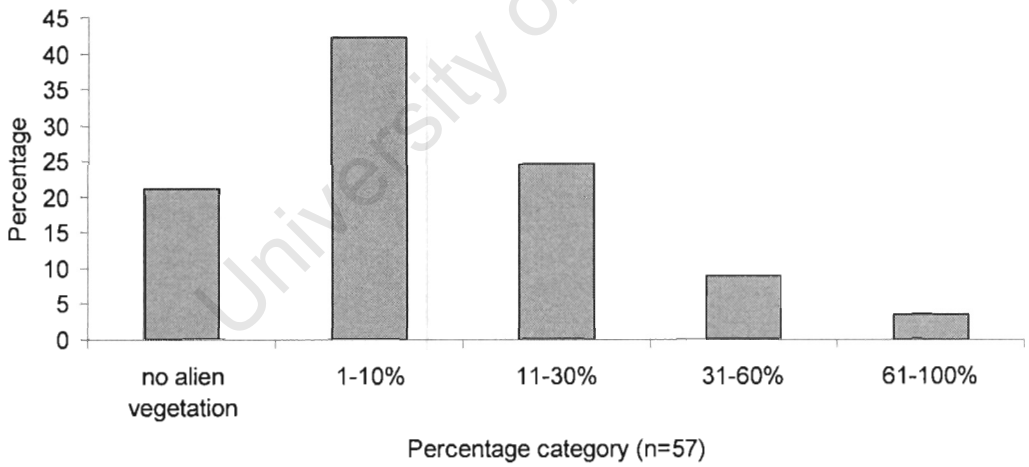

Figure 6: Landowners estimate of the extent to which their natural land is infested with alien vegetation

Other

Other expenses included the maintenance of roads.

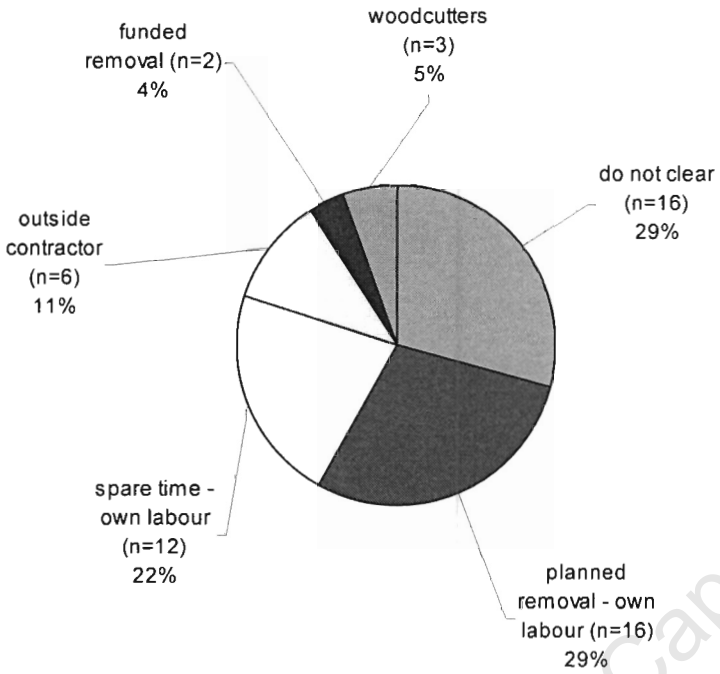

Figure 7 : Landowners indication of current removal of alien vegetation (n=55)

The majority of farmers (62%) are paying for their alien vegetation to be cleared. 29% of landowners do not clear their alien vegetation although some landowners claim not to have alien vegetation in their renosterveld (Figure 7) Landowners (4%) have funded removal and 5% have alien vegetation cleared by woodcutters. The bulk of clearing (51%) is done by the landowners either in their spare time or planned time using their own labour.

5.1.3 The economic potential of renosterveld fragments

Land prices

Land-use change is seen as one of the biggest threats to renosterveld, both in terms of agricultural expansion and urban development around the fringes of the CMA. The areas that might affect land-use change are explored.

Developed agricultural land sells for more than undeveloped land set aside for conservation and these property prices have a major impact on natural environment issues (McDowell, 1988). The price of agricultural land in the Western Cape is influenced by climate, topography, production capability and other variables such as size, untransformed land and population density (Mcosano, 2005). There is a huge discrepancy in price range and properties close to town, in a perceived desired locality, can command disproportional prices from local and overseas buyers.

The price of agricultural land in the CMA varies considerably, ranging from about R45 000 - R1 000 000 per hectare (Pam Golding, Agricultural consultants, *pers. comm.*). The estimates for agricultural potential vineyard land in the CMA are valued at R250 000 – R450 000 per hectare. Developed agricultural land tends to accommodate the cost of developing that land, which is an estimated additional R100 000 ha^{-1} for irrigated vineyard (Pam Golding Agricultural consultants, *pers. comm.*). Large tracts of low potential land for grazing occurring mainly outside the CMA, may sell for an estimated R250 - R500 per hectare (H. van Niekerk, Land Bank, *pers. comm.*). [2]

Commercial land, residential land and agricultural land command different prices. Agricultural land rezoned for commercial purposes commands prices of approximately R50 000 to R1 000 000 per ha (Pam Golding Commercial consultants, *pers. comm.*) but

[2] Six estate agents were asked the average cost of agricultural land in the CMA. Based on their estimates, agricultural land prices vary from R1000 000 ha^{-1} for vineyard to R2 500 ha^{-1} for more rural pastures. This discrepancy makes the cost of agricultural land difficult to estimate. The 'going rate' in the CMA is R45 000 ha^{-1} (the municipal market value for agricultural land) and R350 000 ha^{-1} for prime vineyard.

the best current estimate is about R1 000 000 ha^{-1} (A. Realty, *pers. comm.*). Commercial land fetches high prices in both high density and low density areas because although low density areas are more sought after, high density construction produces greater income. Generally agricultural land is estimated to be worth about half, or in some instances, one third the value of residential land. Agricultural land for vineyard around the CMA is R350 000 ha^{-1} (mean value), and the value would therefore be estimated at R700 000 – R1 050 000 ha^{-1}, which approximates the estimates for commercial land.

Existing revenue from renosterveld

Only 19% (n=11) of the farmers interviewed received any remuneration from their renosterveld and their current income, ranged from R35 ha^{-1} to R46 429 ha^{-1} with a geometric mean of R235.98 ha^{-1} . The geometric mean was used because the results would have otherwise been skewed by a profitable commercial game lodge venture. The income provided by the landowners was gross income not net income and so the commercial game lodge venture does not reflect the initial costs of establishing this lodge.

The main use of renosterveld, currently generating an income, is for grazing (n=5) but other uses include game and tourism (n=4), buchu (n=1) and wild flower harvesting (n=1). These data are presented as the mean actual income per hectare (Figure 11). This reflects the data supplied by landowners who had an income or estimated incomes and landowners who did not provide information were excluded. The game lodge and tourist ventures generated the largest income but the average income per hectare was reduced as these ventures were on larger renosterveld fragments (≥ 400 hectares of renosterveld).

Existing revenue from similar soils

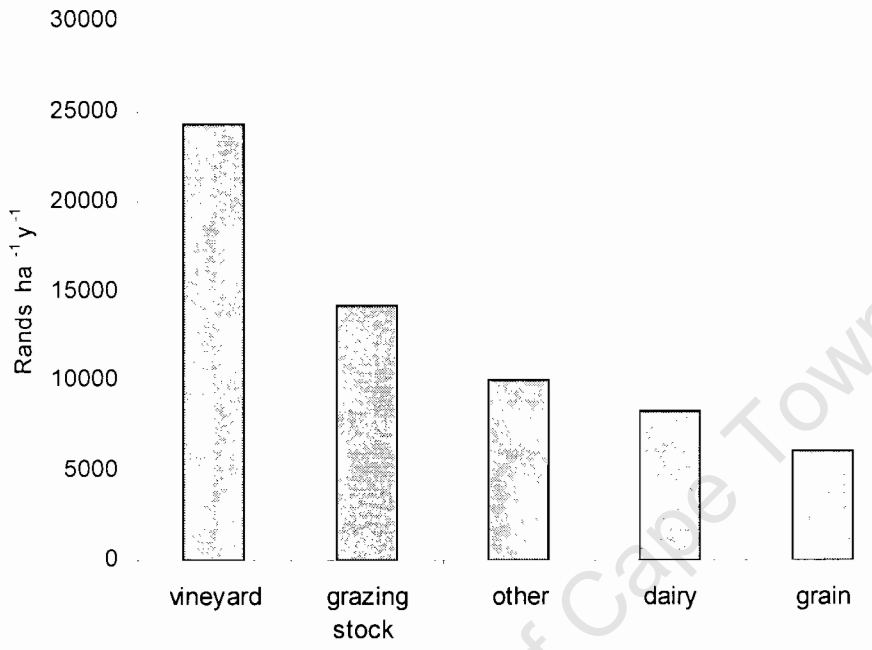

Figure 8 : Existing revenues from areas of similar soils

The income from similar soils shows that vineyard is producing the highest gross income and grain the lowest (Figure 8). One amount of R15 833 ha^{-1} y^{-1} for dairy was given as income from similar soil types. This is unrealistic revenue from renosterveld because supplementary feeding can allow numerous cows on a small area (Farmers X, dairy farmer, *pers. comm.*).

5.1.4 Landowner perceptions of potential income from renosterveld areas

Landowners were asked what they thought was the best use for the renosterveld on their farm, other than its current use. Landowners provided estimates of potential income but indicated that they had not researched alternative uses for the renosterveld on their farms.

Only 75% of landowners suggested another use and the remaining 25% thought that renosterveld had no other use or not one that they could use on their farms. The results are summarised using data supplied by the farmers who gave an alternative use (n=44).

Figure 9 : Landowners' suggested best use of the renosterveld on their farm (n=44)

Eight one percent of landowners receive no income from their renosterveld. All the landowners were asked to estimate what they thought would be the best use for their renosterveld, other than its current use. The majority of landowners (58%) thought agriculture would be the best use for their renosterveld, which included grazing, olives, vineyard and buchu (Figure 9). An equal proportion (36%) of landowners listed game/tourism and cultivation as the best use for renosterveld.

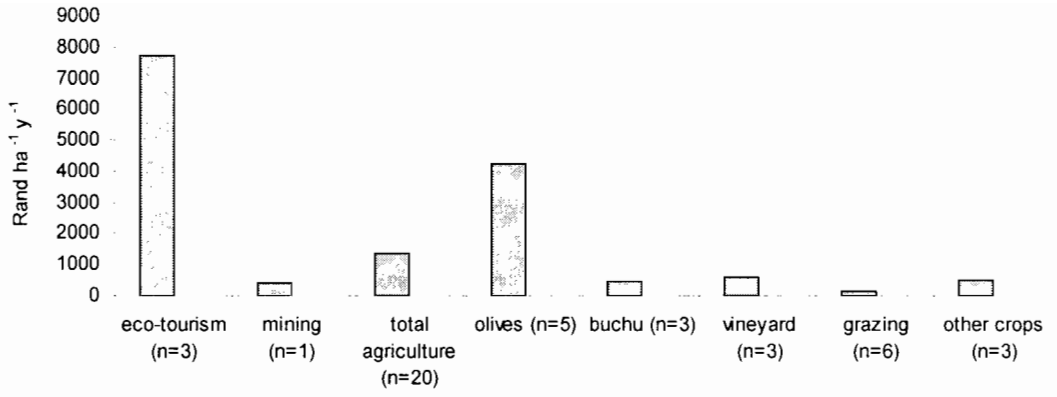

Figure 10 : Landowners' estimated gross income ha $^{-1}$ from the best use (other than the current use) of renosterveld on their farm (n=24)

Landowners were reluctant to estimate income for the best use of renosterveld but perceive eco-tourism as having the greatest opportunity cost. Landowners suggested that eco-tourism would be both the best use of renosterveld (Figure 9) and would produce the highest income (Figure 10) but only three landowners, all involved with eco-tourism, estimated an eco-tourism income. One of these landowners estimated he could multiply his current eco-tourism income by 10. The mean estimated gross income per hectare for eco-tourism was R7 749 (Figure 10) and it is clear that eco-tourism is perceived as profitable. Eco-tourism requires larger fragments of renosterveld[3] and about half the fragments of renosterveld in this study area are on steep hills.

Although grazing was suggested as the second highest best use (Figure 9), it was not perceived as generating much income (Figure 10). The income from farmers who are currently receiving income from grazing their renosterveld (n=5) is R199 ha $^{-1}$ y $^{-1}$.

After grazing, olives are perceived as the best use for renosterveld (Figure 9) but after eco-tourism, olives were estimated as generating the next largest income (Figure 10) of R4246 per hectare per annum. Buchu is not perceived as generating a good income although one

[3] Of 18 000 remaining fragments of renosterveld in the CFR more than half are less than one hectare (von Hase *et al.*, 2003).

farmer suggested an income of R20 000 per hectare per annum but it is suggested as the fifth best use for renosterveld. There are farmers who suggest vineyard as the best use (n=4) and this suggests that not all renosterveld is perceived to be on marginal ground.

5.1.5 Estimated opportunity costs of maintaining renosterveld

One of the perceptions of renosterveld is that it is only found steep hilltops or on land unsuitable for agriculture or 'uitvalgrond' (Winter, 2003), but there are opportunity costs because renosterveld does exist on some land that has the potential for further agricultural development.

The opportunity cost is the major cost of protection and is a measure of the alternative income sacrificed in the alternative use of agricultural land (Mohr & Fourie, 1995; Sinden, 2004). Michael (2003) argues that opportunity costs are frequently calculated as 'the lost revenue from restricting current land use, ignoring the fact that landowners may have non-commodity values for the land in its protected state'. Michael (2003) defines opportunity costs as 'the difference between the market values of the property in its restricted and unrestricted states'.

Opportunity cost is essentially what is being lost by investing in conservation rather than development. There are overlaps between the economic potential and opportunity costs but in financial terms they are essentially different.

The opportunity cost of renosterveld in the CMA and surrounds is explored in terms of income generated from the main types of farming namely; vineyard, wheat, olives, grazing, cattle and buchu. Eco-tourism is discussed. Three incomes from renosterveld are used to explore the viability of renosterveld. These incomes are the actual income, the perceived income generated from the suggested best use for renosterveld and the actual average opportunity costs (income from similar soils) of renosterveld.

The net present value *(NPV)* is the difference between the present value of cash inflows and the present value of cash outflows and is a standard method for evaluating whether a proposed long-term investment is profitable. A project with a positive *NPV* should be undertaken. The *NPV* (Table 1) compares the value of vineyard today to the value of that

same vineyard in the future, taking inflation and returns into account and indicates that a positive *NPV* is profitable. A higher discount rate can be used to assess the profitability of more risky projects. The Internal Rate of Return *(IRR)* is a measure used to determine the rate of return on investments (i.e. the interest rate that makes net present value of all cash flow equal zero). An investment with a higher *IRR* is therefore favoured.

TABLE 1 : The net present value and internal rate of return for vineyard and superior quality vineyard

YEAR	VINEYARD			SUPERIOR QUALITY VINEYARD		
	Running Cost	Income Expected	Net Income	Running Cost	Income Expected	Net Income
YEAR 1	67,776	0	-67,776	74,961	0	-74,961
YEAR 2	14,966	0	-14,966	14,966	0	-14,966
YEAR 3	17,030	1,312	-15,718	17,030	32,500	15,470
YEAR 4	20,643	21,139	496	20,643	52,000	31,357
YEAR 5	20,643	26,424	5,781	20,643	65,000	44,357
YEAR 6	20,643	26,424	5,781	20,643	65,000	44,357
YEAR 7	20,643	26,424	5,781	20,643	65,000	44,357
YEAR 8	20,643	26,424	5,781	20,643	65,000	44,357
YEAR 9	20,643	26,424	5,781	20,643	65,000	44,357
YEAR 10	20,643	26,424	5,781	20,643	65,000	44,357
TOTAL	**244,273**	**180,995**	**-63,278**	**251,458**	**474,500**	**223,042**
	Net Present Value at 5%		-67,153	Net Present Value at 5%		139,420
	Net Present Value at 10%		-68,257	Net Present Value at 10%		84,474
	Internal Rate of return		-15.34%	Internal Rate of return		26.77%

Vineyard

A recent surge in the wine industry in South Africa has meant the development of a large number of vineyard plantings. The total area under wine grape vineyards (excluding sultanas) has increased 16 % over the past decade (1994-2004) but by 20% in 2005. The total hectares under wine grapes in 2004 was 100 207 hectares, which increased to 124 749 hectares in 2005 (SAWIS statistics, 2005). This indicates a large increase (20%) in the recent number of plantings.

The average income per ton of grapes in 2004 was R2 126 (SAWIS statistics, 2005) and vineyards generally produce 10-13 tons of grapes per hectare (VinPro, 2006), but generally 10 tons is the estimate for superior quality grapes (M. Carmichael-Green, Winning Wines Consultancy, *pers. comm.*). This means that for each hectare of cultivatable renosterveld, the gross income is potentially an estimated R21 260 – R27 638 per hectare and production costs are high (Table 1). These statistics includes inferior quality grapes from the more marginalised areas and is not a true reflection of income in the CMA and surrounds because good quality grapes fetch on average about R45 000 per hectare.

The drivers of vineyard expansion are seen to be world consumption of wine and the US Dollar/SA Rand exchange rate (Fairbanks *et al.*, 2004). The wine market in the short term outlook indicates that the global industry is growing and WOSA's (Wines of South Africa) predict that 'South Africa's future growth is likely to be hampered by a lack of wine supply, most particularly in premium quality segments' (SAWIS, Production and Market Estimates 2004-2008).

Predictions for the smaller wine producers who do not have premium grapes are not good (VinPro, 2006). Lower income grapes are estimated to be unprofitable (*IRR = -15.34%*), while premium quality grapes estimates have a more favourable economic outlook (*IRR= 26.77%*) (Table 1).

TABLE 2 : The net present value and internal rate of return for olives and wheat

YEAR	OLIVES			WHEAT		
	Running Cost	Income Expected	Net Income	Running Cost	Income Expected	Net Income
YEAR 1	28,694	0	-28,694	2,700	1,584	-1,116
YEAR 2	3,212	0	-3,212	2,700	1,584	-1,116
YEAR 3	3,212	0	-3,212	2,700	1,584	-1,116
YEAR 4	5,662	4,000	-1,662	2,700	1,584	-1,116
YEAR 5	7,162	8,000	838	2,700	1,584	-1,116
YEAR 6	8,662	12,000	3338	2,700	1,584	-1,116
YEAR 7	11,062	16,000	4938	2,700	1,584	-1,116
YEAR 8	14,062	24,000	9938	2,700	1,584	-1,116
YEAR 9	15,562	28,000	12,438	2,700	1,584	-1,116
YEAR 10	17,062	32,000	14,938	2,700	1,584	-1,116
TOTAL	114,352	124,000	9,648	27,000	15,840	-11,160
	Net Present Value at 5%		-3,811	Net Present Value at 5%		-8,617
	Net Present Value at 10%		-11,680	Net Present Value at 10%		-6,857
	Internal Rate of return		3.29%			

Wheat

The Malmesbury district has suffered a severe drought over the past two years with the average yield ha $^{-1}$ at 2.6 tons and an average price R1 200 ton $^{-1}$ in 2002-2005 (A Fourie, Grain SA, *pers. comm.*). The price per ton in the Swartland increased to R 1035.14 ton $^{-1}$ in 2005, but the yields were lower at 1.53 tons ha $^{-1}$. These yields are not a true reflection of wheat production in the Swartland as some farmers 'saai dam'[4]. Costs for this type of wheat production are low and yields are very low but a bumper year produces good long term profitability (S. Stein, Malmesbury farmer, *pers. comm.*). Wheat is unprofitable with a Net Present Value (*NPV) at 10% = - R 6857* (Table 2) with no returns.

Olives

The gross income per hectare of olives varies according to different topography, olive tree varieties etc. Olives can be planted on slopes where vineyard cultivation could be

[4] 'Saai dam': the practice of planting wheat in marginal low lying land and involves the diverting of river water. Excellent yields or no yields are produced depending on weather quality.

more difficult and rumours abound with returns of R57 000 ha $^{-1}$ being claimed, but the estimated *IRR = 3.29%* (Table 2). The claim that there are good perceived profits from olives is probably based on income from the marketing of olives rather than the production of olives.

Grazing cattle

Dairy is not considered as an opportunity cost of renosterveld because dairy cows can be kept on small lots. The carrying capacity of beef varies considerably but an estimate for renosterveld was given as 10 cows ha $^{-1}$ at an income of @R3.80 per day per cow. Renosterveld has only 3 months of grazing available annually and gross income would amount to R2280 ha $^{-1}$ y $^{-1}$ (Farmer B, dairy and cattle farmer, *pers. comm.*).

TABLE 3 : The net present value and internal rate of return for buchu and for buchu with a fire after five years

YEAR	BUCHU			BUCHU POST FIRE		
	Running Cost	Income Expected	Net Income	Running Cost	Income Expected	Net Income
YEAR 1	47,420	0	-47,420	47,420	0	-47,420
YEAR 2	8,420	0	-8,420	8,420	0	-8,420
YEAR 3	15,020	75,000	59,980	15,020	75,000	59,980
YEAR 4	15,070	125,000	109,930	15,070	125,000	109,930
YEAR 5	14,970	200,000	185,030	14,970	200,000	185,030
YEAR 6	15,120	250,000	234,880	47,420	0	-47,420
YEAR 7	15,120	300,000	284,880	8,420	0	-8,420
YEAR 8	15,120	350,000	334,880	15,020	75,000	59,980
YEAR 9	15,120	350,000	334,880	15,070	125,000	109,930
YEAR 10	15,120	350,000	334,880	14,970	200,000	185,030
TOTAL	**176,500**	**2,000,000**	**1,823,500**	**201,800**	**800,000**	**598,200**
	Net Present Value at 5%		1,260,273	Net Present Value at 5%		418,111
	Net Present Value at 10%		891,097	Net Present Value at 10%		299,820
	Internal Rate of return		105.12%	Internal Rate of return		83.40%

Buchu

Cowling & Richardson (1995) estimated buchu income as R18 000 - 25 000 ha^{-1} and an estimate of 20 000 ha^{-1} is the figure supplied by one farmer but profits at present are large

(Table 3). The unbelievable present price ha^{-1} (*IRR= 105.12%)* is because there is a huge demand, especially in European markets, where buchu is used as a flavour enhancer. Buchu does best on well drained sandy soils, especially stony soils with alluvial deposits and low phosphate and there are pockets of such soils suitable for buchu production in renosterveld. The actual area of such soils suitable for buchu is not known. Even if the price is halved buchu is well worth planting (A Harris, buchu nurseryman and farmer, *pers. comm.*.) and even if buchu is destroyed by fire after 5 years the outcome is favourable (*IRR= 83.40%)*. These are incredibly good rates of return (Table 3).

Actual, current and perceived incomes of renosterveld

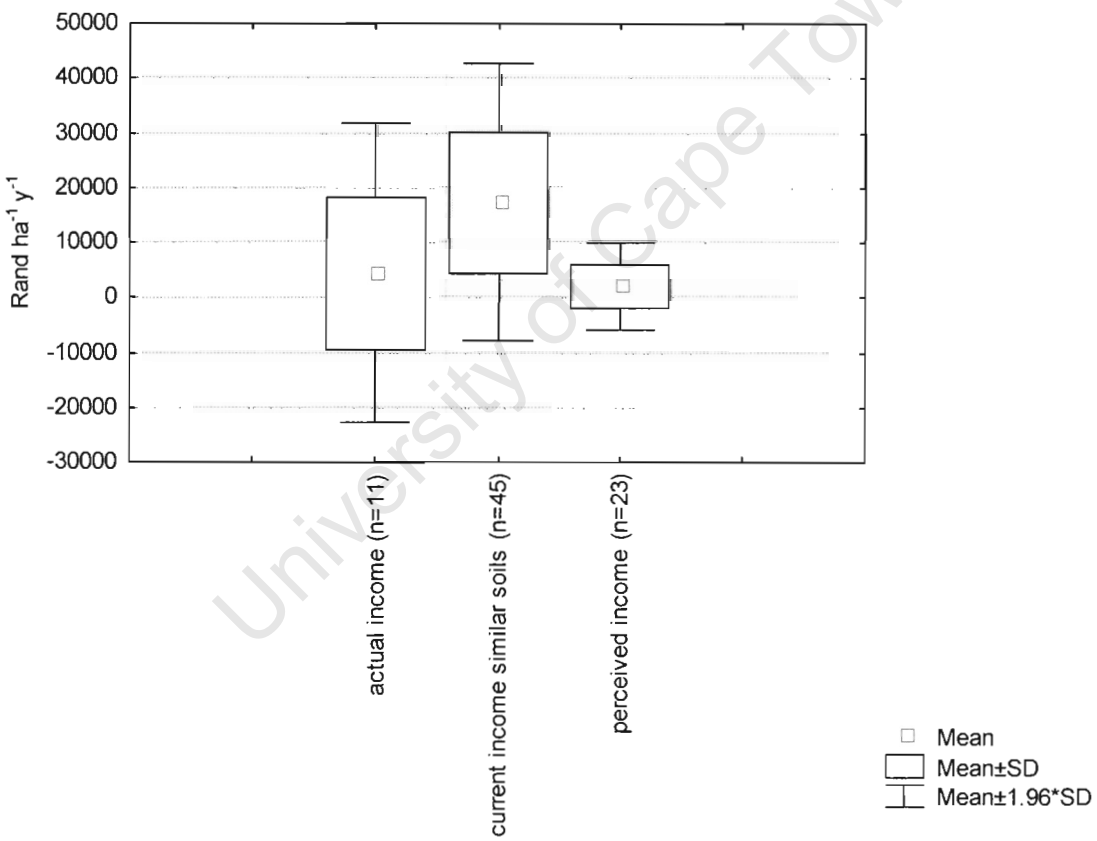

Figure 11 : Gross income from actual, current and perceived income of renosterveld

The actual income, the current income and the estimated income of landowners (Figure 11) shows that the income on similar soils is higher than both the perceived and actual

income of renosterveld. The landowners estimated (perceived) income which might intuitively be based on what is possible on similar soils is lower than the actual income. The actual income is generally much lower than the income from similar soils, except rarely, as in eco-tourism lodge for example. It is unlikely that the eco-tourism lodge would be viably replicated. The opportunity costs are not that high unless areas are rezoned for commercial use.

Eco-tourism

The opportunity cost of eco-tourism is not estimated in this analysis because firstly estimating the cost of tourism is complicated when the initial costs vary considerably according to the type of tourist venture pursued and secondly because tourism is not generally seen as a threat to renosterveld, as it conserves rather than develops renosterveld. However, tourist chalets located in a patch of renosterveld which require a 'no burn' policy may have a negative impact. Developing small game eco-tourism ventures is expensive and on average even the most successful game ranch requires at least R6 in capital outlay for every R1 generated annually, taking about 6 to 10 years for a small ranch to reach its economic carrying capacity when starting with minimum breeding herds. (WildlifeCampus ABSA report, 2005). Other tourist ventures, such a lodge, also require huge capital outlay and are dependent on factors such as if there is another lodge in the area.

5.2 Private land conservation incentives

> *"Regardless of how descriptively precise, reliable, and theoretically rigorous a measure might be, it is likely to be ignored or ineffective at influencing conservation decisions if it fails to reflect environmental qualities society understands and cares about."*
>
> Robertson & Hull, 2001

In addressing the key question whether a property rate is a viable incentive for conservation, private landowners were asked questions relating to property rates and conservation. In trying to ascertain which incentives would encourage landowners to conserve renosterveld, landowners were presented with fifteen incentives and asked to rate these incentives on a scale of one to ten. This addresses in part the key question what incentives would motivate or influence a landowner's decision to conserve.

Property rate as an incentive to landowners

90% of private landowners considered 100% municipal tax rebate to be a conservation incentive (Figure 12) and landowners think that a property rate rebate would be more of an incentive than free fire protection and alien clearing (48% agreed, 14% unsure,38% disagreed).

Private property owners who have property with special nature reserve status are not levied rates at this stage. Farmers were asked whether they are prepared to co-opt their lands into a contractual conservation agreement and 60% of farmers agreed. However it was not stated that this land would have to be conserved in perpetuity (Figure 12).

86% of landowners said that a rebate for conservation would impress them that the local government is making a conservation effort.

Landowners were previously only liable for Regional Service Levies and the *Property Rates Act* has increased the rates that farmers have to pay. 47% of the farmers said they were unhappy about the 80% agricultural exemption (19% unsure)(Figure 12). There is a belief that farmers should not pay municipal rates because they do not receive municipal services.

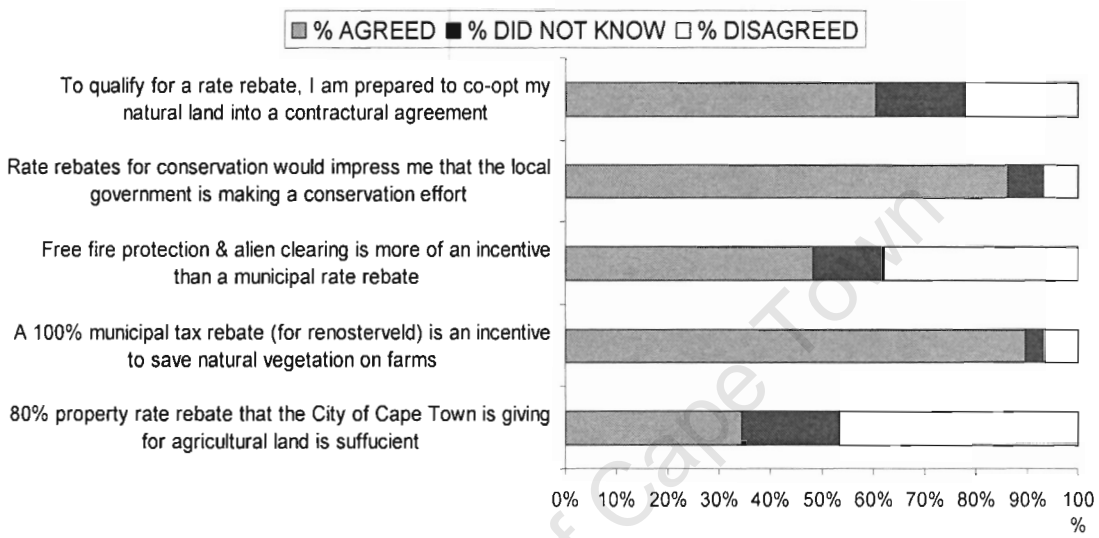

Figure 12 : The extent to which landowners agreed or disagreed with the statements (n=58)

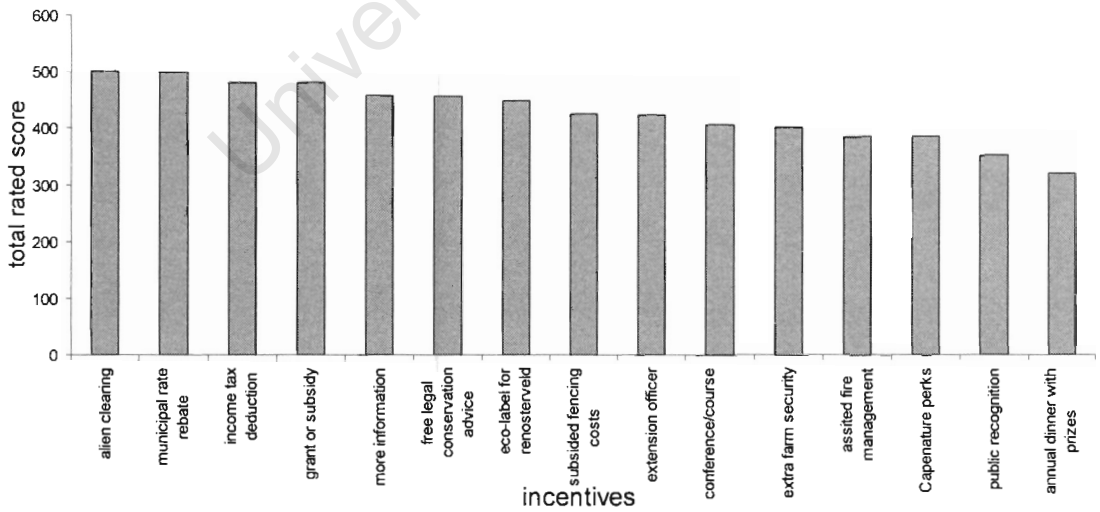

Figure 13 : Total score for each incentive (score rated by landowners on a scale of 1-10)

Incentives were rated by the landowner on a scale of 1-10. Financial incentives were expected to be more popular than other incentives, but landowners differed in their incentive preferences. There is not one prominent incentive preferred over the others. The least popular incentive was an annual dinner with prizes.

The incentive that had the highest rating score was assistance with alien clearing (Figure 13). This is surprising in that alien clearing does not appear to pose as a huge problem on these farms with 63% of landowners having no alien vegetation or properties that are less than 10% infested (Figure 4).

Landowners are not likely to get substantial financial property rebates, but they give a municipal rate rebate a high rank as a conservation incentive. A property rebate as an incentive is only marginally less than alien clearing assistance. A grant or subsidy and income tax deductions are both economic incentives and were rated as the next preferred incentive. Each incentive has some appeal to a landowner.

A Kruskal-Wallace ANOVA was used to test the null hypothesis that there was no difference in the score allocated to different incentives. There is evidence of significant differences between the incentives *($H = 81.882$, $df\ 14$, $p = <0.001$).* A significant difference exists (Table 2) between the incentives with the highest score and those with the lowest score. Assistance with alien clearing was the incentive with the most significant differences. The majority of incentives were not significantly different (88 had no differences).

TABLE 4 : The Kruskal-Wallis One Way Analysis of Variance on each individual incentive (H= 81.882 with 14 degrees of freedom (P = < 0.001) There is a statistically significant difference (P = < 0.001))*

All Pairwise Multiple Comparison Procedures (Dunn's Method):			
Comparison of VARIABLE 1	VARIABLE 2	Q'	P<0.05
alien clearing	annual dinner with prizes	5.601	significant
alien clearing	public recognition	4.605	significant
alien clearing	Capenature perks	4.088	significant
alien clearing	course eco-mangement	3.626	significant
alien clearing	assisted fire management	3.566	significant
municipal rate rebate	annual dinner with prizes	5.362	significant
municipal rate rebate	public recognition	4.367	significant
municipal rate rebate	Capenature perks	3.850	significant
income tax deductions	annual dinner with prizes	4.931	significant
income tax deductions	public recognition	3.936	significant
grant or subsidy	annual dinner with prizes	4.744	significant
grant or subsidy	public recognition	3.749	significant
more information	annual dinner with prizes	3.836	significant
free legal advice	annual dinner with prizes	3.684	significant
renosterveld eco-label	annual dinner with prizes	3.523	significant

*3 pairs were not significantly different and 87 were not tested

The incentives were grouped together in an attempt to establish whether economic factors were considered more important to landowners.

Financial incentives attained the highest score, representing 24% of the total (Table 5), while public recognition was the lowest scored group. The grouped incentives are presented as both a pie chart (Figure 14) and as means (Figure 15).

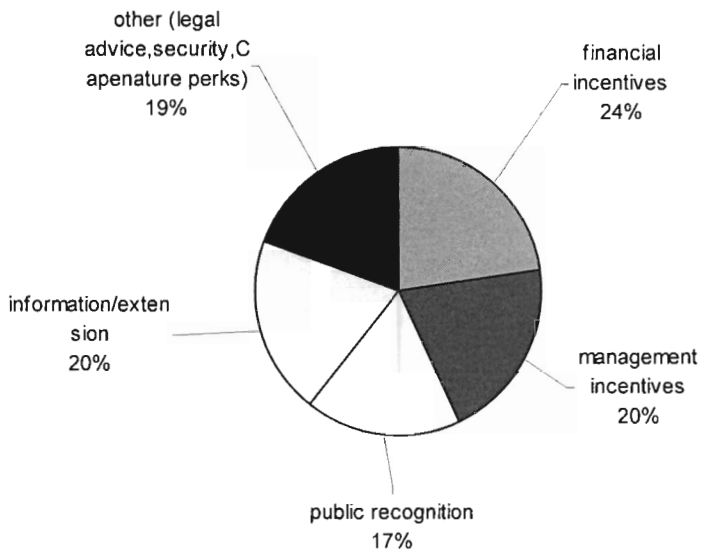

Figure 14 : Groups incentives as percentages of the total

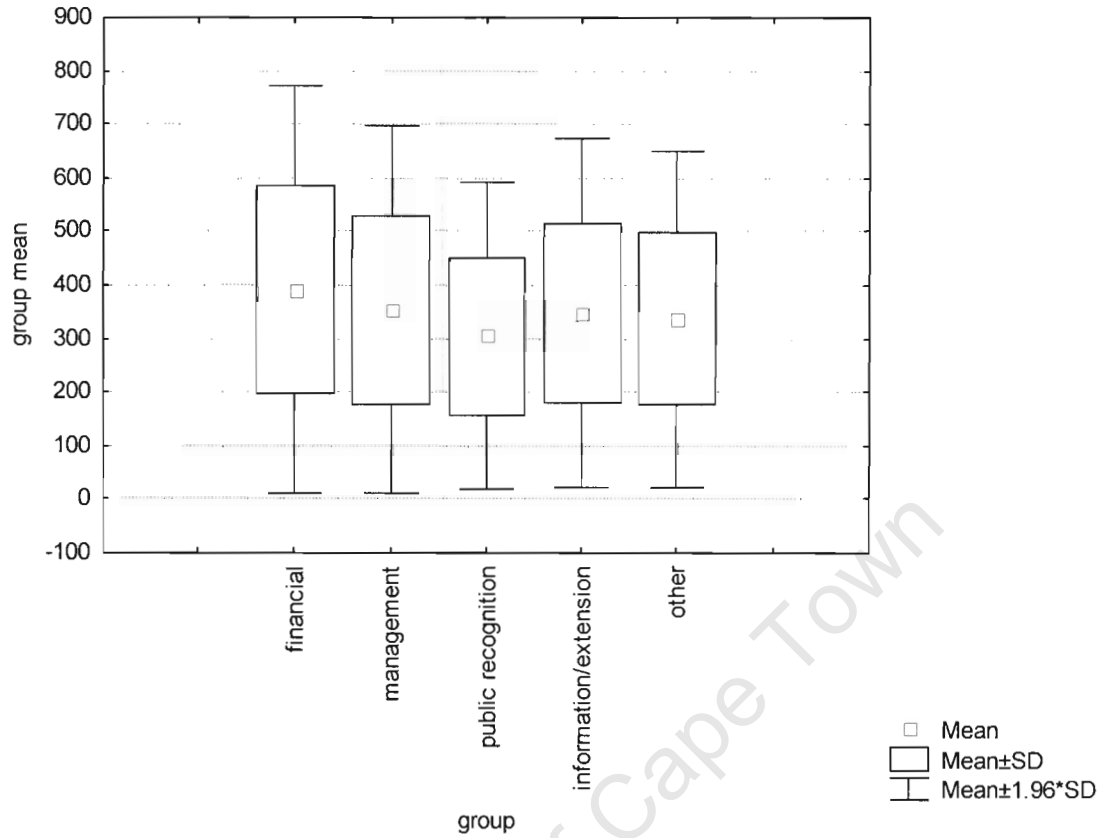

Figure 15 : Grouped Incentives

A Kruskal-Wallace ANOVA was used to compare differences between the groups *(H = 43.914, df 4, p = <0.001)*. The pairwise multiple comparisons (Table 5) show that there were significant differences.

The financial group had a higher score than the other groups and was significantly different from all groups except management. Management was significantly different from public recognition but not from any of the other groups.

TABLE 5 : The Kruskal-Wallis One Way Analysis of Variance on each group of incentives (H = 43.914 with 4 degrees of freedom (P < 0.001). There is a statistically significant difference (P = <0.001)).

All Pairwise Multiple Comparison Procedures (Dunn's Method):			
Comparison of VARIABLE 1	VARIABLE 2	Q'	P<0.05
financial	public recognition	6.073	significant
financial	other	4.265	significant
financial	extension/information	3.773	significant
financial	management	2.484	not significant
management	public recognition	3.589	significant
management	other	1.781	not significant
management	extension/information	1.289	no test
extension/information	public recognition	2.300	not significant
extension/information	other	0.492	no test
other	public recognition	1.808	no test

Stewardship programs have been initiated in certain areas in the Western Cape a nd options depend on management and land use rights. Landowners were asked their view on conserving renosterveld and whether they wished to participate in a conservation scheme.

All landowners (one unsure) believe that they are likely to save the renosterveld on their farms in any case (Figure 16). The majority (60%) would be happy for Cape Nature to manage the natural fynbos on their property but would not be prepared to sell this land to a conservation agency (76%). Most landowners believe farmers do not have extra finances needed to manage their natural vegetation (69%) but that most farmers are conservationists at heart (60%).

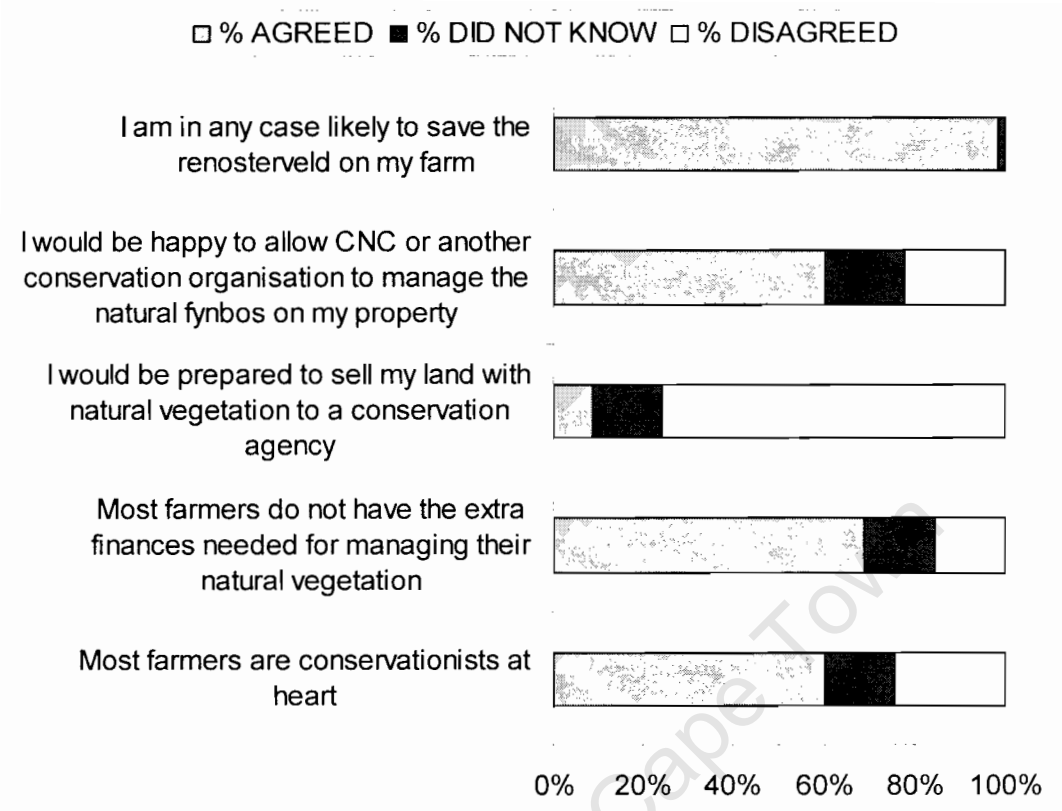

Figure 16 : What landowners think about conserving renosterveld (n=58)

The perception that renosterveld is likely to be saved in any case alludes to the fact that renosterveld conservation on private lands may be considered unnecessary. However in 70% of circumstances, the renosterveld had not been ploughed for topographical reasons (Figure 17) or because the soil was thought to be of too poor quality. Half of the private landowners selected conservation or eco-tourism as the future plan for their renosterveld (Figure 18) while only 7% saw conservation as the main reason their renosterveld was not ploughed.

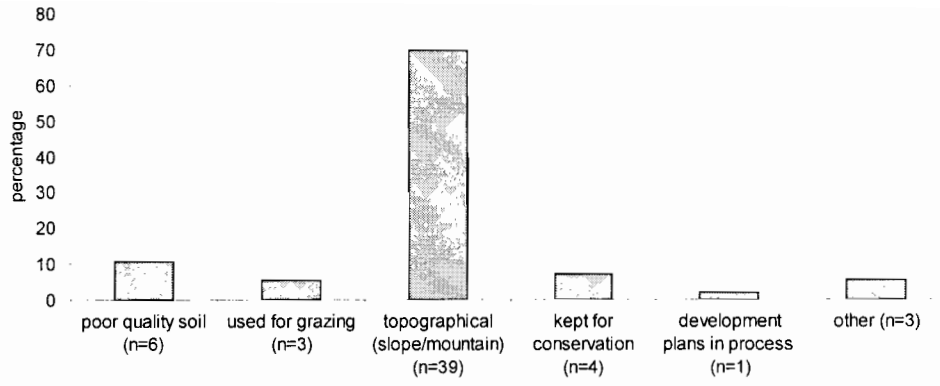

Figure 17 : Main reason natural vegetation has not been developed on landowners' farm

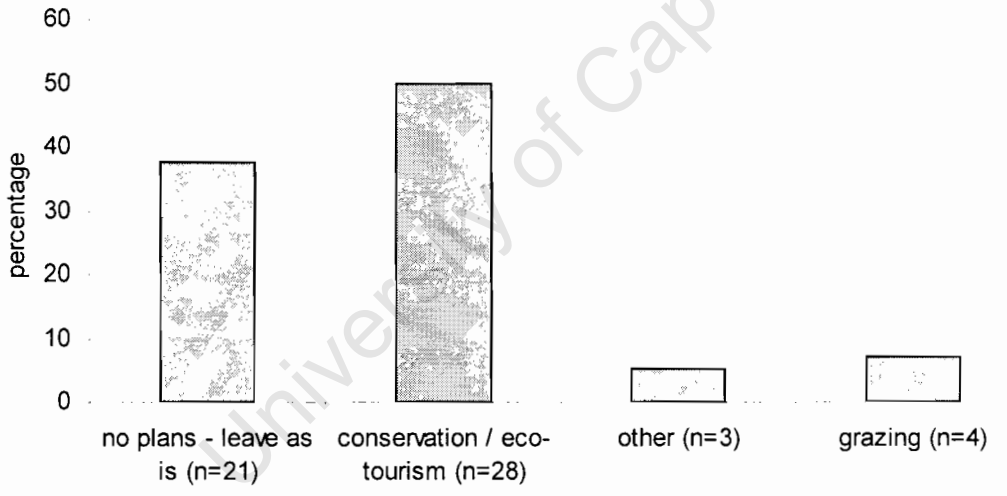

Figure 18 : Private landowners perceived future use for renosterveld on their land

5.3 Implications of a property rate rebate for local government

"We have a responsibility, a responsibility of making sure that we are accountable to our communities, a responsibility of making sure that we hear the footsteps of the people behind us."

Nomaindia Mfeketeo, Mayor of Cape Town

Local governments can have a significant impact on private land conservation by offering tax and other incentives and in some countries incentive programmes which exempt, rebate or reduce property rates have been successfully implemented.

In South Africa, the instigation of the *Property Rates Act* has meant that property tax is regulated nationally but is taxed in both the urban and rural environment, which now fall under wall to wall municipalities (Paterson, 2005). Local governments are empowered to set their own property taxes and this provides an opportunity for local governments to reduce or abolish property taxes on lands that have complied with certain regulations or been secured in perpetuity for conservation. In examining whether a property rate is a viable incentive for conservation it is necessary to understand both the economic implications for the municipality and the likelihood of municipalities instigating such a rate rebate or exemption is done with specific reference to the CCT.

5.3.1 Rates as revenue

Property taxes provide the largest source of tax revenue for local governments and the primary means through which local councils raise revenue from their local communities. The CCT levies rates on both land and improvements and has a planned regular property valuation every four years. The 2005-2006 draft budget sources of revenue totals R13,969 million with rates providing 17.1% (R2,390 million) and the RSC levies 6.6% (R928 million). Arrears for the City were 2.4 billion and this led to the formulation of new indigent policies offering poverty relief to those unable to afford rates and service charges (*City of Cape Town Annual Budget Review 2003*). Revenue from rates has varied

over the past four years from 28% in 2001/2002 to 25% in 2002/2003 and 34% in 2003/2004 but the revenue percentage from rates in fact remains at about 25%, because the capital growth includes external capital funding, such as the R2 billion for Gateway housing project (M Richardson, Director of Budgets, CCT, *pers. comm.*).

The CCT has set their rates policy, which gives a special rebate to agricultural property of 80% (CCT Rates Policy, 2005). Examples of municipal rate levies for agricultural property are set out in Table 6.

TABLE 6 : Annual property rate for agricultural property valued at one million rand

MUNICIPALITY	RATE	RATE ON R1 MILLION
Cape Town	*cent-in the-rand 0.00323*	R 3230
Stellenbosch	*cent-in the-rand 0.3448*	R 34 4800
Stellenbosch Winelands district [5]	*cent-in the-rand 0.1627*	R 16 2700
Drakenstein	*cent-in the-rand 0.00272*	R 2720
Swartland	*cent-in the-rand 0.0028*	R 2800

The annual rates on agricultural property valued at one million rand, was calculated for each of the listed municipalities (Table 6). The property rate ranges from R 2720 in the Drakenstein municipality to R 34 4800 for agricultural property in Stellenbosch. This discrepancy indicates the ability of different local governments to set their own rate policy.

The CCT has engaged in considerable debate around the issue of rebating rates on conservation property, both built and natural. The decision is that if an owner has beneficial occupation (rights of use) no rebate would be granted (M Richardson, *pers. comm.*). Land ceded to provincial protected areas, in terms of legislation, is excluded from municipal rates *(Property Rates Act),* but all other privately conserved land is subject to differential taxation rates. According to the CCT rates policy, virgin land zoned for agriculture, pays rates that are 80% exempt, but virgin land on residential properties is subject to full rates taxation as per the stipulated by-law for that area. This

rate policy is reviewed annually but unless there is considerable intervention the existing rebate policy will generally be ratified (M Richardson, *pers. comm.*)

The CCT Spatial Development Framework identifies the need to address the inequitable access to nature, but the bulk of the CCT capital expenditure (63.4%) is allocated for creating integrated human settlements (2005-2006 draft Capital Budget, IDP theme). The implications of this are that the emphasis in municipalities is on social issues and it is the inequitable access to nature that is funded rather than nature itself; no funding is allocated to private land conservation.

City of Cape Town : Calculating the potential rates loss

The CCT has 422 registered farms with a land value of R617,038,280 an improvement value of R187,317,000 and a total value of R804,355,280 (CCT Draft Rates Rebate Scheme, 2002). The total property rates levied on these farm properties are R11,367,149 and an 80% exemption for all agricultural properties, means an annual rates loss of R9,093,719 (CCT Draft Rates Rebate Scheme, 2002). This R9,093,719 reflects the rates loss from the agricultural rebate currently in effect. The financial implications of a potential further exemption for conserved land in the CMA are examined.

In the CMA there are approximately 132 remnants of renosterveld on 6433 ha of renosterveld (CCT Environmental Dept, GIS data) and this includes farms on the Bottelary Hills (now excluded from the CMA). In estimating the potential financial loss the CCT would get from a rate rebate for conserved land, renosterveld remnants known to be developed or to belong to the CCT and totalling 1580.9 hectares, were excluded.

According to the *Property Rates Act, 2004*, the rates on these properties depend on the market value of the property. In the CMA, agricultural property values vary considerably and so annual property rates of the remaining renosterveld were calculated using both a high and a low estimated property value (Table 7). These annual property rates are compared and both include and exclude Bottelary Hills.

The value of R45 000 ha^{-1} is the municipal market valuation of agricultural property and appears to be slightly lower than the going market price, unless the market value is known from a recent sale. Some farms have not been sold for generations and the true market value is unknown, the municipal market value is about ¼ of the potential market value so the property rate value of renosterveld using the lower property value is probably more realistic.

TABLE 7 : Estimated annual property rate loss from renosterveld fragments in the CCT

LAND PROPERTY VALUE	ANNUAL PROPERTY RATES		
market value = no of ha x value of ha	Bottelary Hills (351.25 hectares)	market value x 0.00323	% of total CCT rate revenue (R2,390 million)
HIGH R 350 000 per hectare	Including Bottelary (4852.1 ha)	R 5 485 299	0.230%
	Excluding botttelary (4500.85 ha)	R 5 088 211	0.213%
LOW R 45 000 per hectare	Including Bottelary	R 705 253	0.030%
	Excluding botttelary	R 654 199	0.027%

If all renosterveld fragments were exempt from property rates, regardless of whether the land is in perpetuity or not, indications are that the CCT would have a maximum financial property rate loss of 0.23% should they offer a rate exemption for renosterveld valued at R350 000 per hectare (Table 7). A more realistic minimum property rate loss on land valued at R 45 000 per hectare is only 0.027% of the total budget.

5.3.2 Property rates as an incentive for conservation

Local governments are able to use property rates as an incentive to encourage good practice by private landholders, and internationally legally binding contracts (easements or covenants) are usually required to qualify for these tax benefits.

South African municipalities are required by law to produce an IDP on which the annual council budget should be based and in 2002/2003 all municipalities were required to provide a five-year IDP. Evaluation has shown that budget processes and IDPs were not

integrated and therefore the IDPs have had little meaningful impact on budgets (Carter, 2004). These two budgets are difficult to align, as the operating budget is structured in a way that reflects what, not where, money has been spent (M Richardson, *pers. comm.*). The importance of IDPs are that they are guided by the PSDF which have, at least in the Western Cape, taken biodiversity planning into consideration and this in turn influences the local government SDF which could in turn influence the municipal rate policy.

One concern is that not all revenue due from communities is being collected by municipalities and the "causes of this are economic, structural and, in some instances, political" (Carter, 2004). Municipalities have other tax options namely a Regional Service Tax (RSC), a business tax or a local fund tax. RSC taxes are currently levied but will be abolished and replaced with possibly a more obvious business tax, but these taxes are seen as more of revenue generating tool than to be of potential benefit to conservation (M Richardson, *pers. comm.*).

5.4 What motivates private landowners to conserve

Overexploitation and habitat degradation are serious problems, but they require thoughtful solutions that run with the grain of human nature (Henderson & Sutherland, 1997)

The key question "what would motivate a landowner to conserve?" is addressed in this section. Motivational incentives, described as measures that influence the way that people think and vital as part of a package of strategies to promote conservation, are a complex challenge, especially in developing countries. In developing countries, economic incentives are less likely because finances tend to be allocated to necessary social needs, unless considerable donor funding is available for conservation.

Rural landowners as a diverse group of people with different values that are 'not bound by a single land philosophy' (James, 2002), demanded further investigation in order to understand what would motivate private landowners to conserve. This understanding could inform the development of appropriate motivational incentives.

The results of the qualitative data were difficult to present as such. Grounded theory was applied to the data. Thematic categories (nodes) were related and reassembled to construct links in an attempt to understand the social phenomena of farmers. In this analysis it emerged that a sense of heritage plays the central role in influencing farmers to conserve. This sense of heritage was a theme that continuously emerged from the data and much of what the farmers said was ultimately linked to heritage.

Heritage impacts on how farmers perceive their world and although 'people will always discount the future to some degree (Penn, 2003), farming communities are more aware of future generations because many farmers have inherited their farms and envisage their children as farmers. Some farmers are utilitarian and have a 'more economic, exploitative view and act largely to maximize profit' (James, 2002), but many farms have been in families for generations and this connects farmers to their past and to their children's

future and is reflected in the following quotes *(translated):* "*renosterveld is pretty, its history from that century to now, we must conserve our history for our children to see*"

(translated) "*every farm must keep some for the next generation, every farm must conserve some (renosterveld)* "

"it's a heritage thing, we are custodians if we don't conserve no-one will"

Heritage does not only imply something handed down by tradition, but includes the natural environment and the sentiment around the farming tradition. Farmers are linked to the past and many claim to value what's left because (translated) '*it is as it was*'. Farmers show a strong emotional connection to their land which includes an appreciation of the beauty of renosterveld.

"*I like the fine close up details of the fynbos, it looks like the Tygerberg that I know. It stops erosion and looks good and natural and is a* home *to our animals, there is not so much left so we must save it for the future before there is none left*"

"*I was shocked by the map of 1000's of years ago how vegetation has been changed by agriculture. I like the beauty of fynbos, its part of something rare and endangered... thrilled of conserving things on red data list that are unique to Western Cape. Some plants are so rare and endangered like the dodo, when it has an endangered status it triggers an emotion - don't know much but aware it is scarce*"

(translated) "*Swartland was renosterveld and (there are) few pockets left where we still see animals, small animals, all sorts of animals; geometric tortoise, buck, cats etc. They are still in their natural state and we must conserve what's left because once it is destroyed it is impossible to rehabilitate"*

Rosenzweig (2003) describes how a 'family farms offers a profoundly different world … economic balance sheets may resist quantifying their cultural wealth and values, but it tells you more about economic balance sheets than it does about the rich milieu of the

family farm'. Koelle and Oettle (2003) elaborate about the farmers' sense of place, which is often not recognized 'in the analysis of conditional values', but can influence management decisions and connect the farmer to his personal and family history.

"I want to preserve it, it provides a linkage with the past. I grew up with a woodstove .... I hanker after simpler times and links with tradition, it means something that the "heart of family" sentiment lies with renosterveld, (over and) above a practical income... we just grit our teeth because we want to save some for the family ... you need a link"

"*it's the only place on the farm that for centuries has not been ploughed and worked, it's hundreds of years of pure nature as it was, my oupa and ouma came and sat here too, there is so little natural veld left in the Western Cape we must keep it, it looks good and the landscape* (looks good) *from the air*"

Farmers made only a few references to finances such as "*needing subsidies for viable (conservation) propositions*". One farmer said "*society must pay – (conservation) cannot be borne by individual landowners*", which is a statement much reiterated by private landowners everywhere and farmers have been burdened with 'duty of care'. Transparency is also important to farmers where it was commented, "*don't make empty promises eg rates, on the whole be realistic*" Clear and concise conservation options need to be offered in a simple but flexible plan, because conservation measures have often in the past been tied in complicated bureaucratic red tape and been ineffective (Wentworth Model, 2003).

Farmers in this research often expressed a need for conservation extension. The importance of good extension is well recognized and maintaining good relationships which improve landholder public relations is hugely beneficial and indeed crucial for attaining good conservation (Winter, 2003). Meaningful interactions are often made on visits to farms and the landowners involvement 'allows the worth of research to extend beyond its intrinsic value' (Hilty & Merenlender, 2003) because personal interactions have 'a far greater potential for persuading individual subjects than has any other

medium' (McDowell *et al.*, 1998). This is reflected in the farmers' statements about extension.

"*a chap with veld should be visited by people if they have time.... a morning with coffee is a month's work and he (the farmer) is inspired to do (conservation) work*"

"*make it (conservation) worthwhile in combination with extension*"

"*someone responsible must come to farms and talk to people* staying *on the farms (about) why its necessary to conserve*"

(translated)"(someone must) go and talk to people and encourage them"

"*high turnover of (extension) personal is frustrating*"

Although landholder education regarding the scarcity of coastal renosterveld is recognized as a necessity (Winter, 2003) it is again evident that farmers want more information because they expressed the necessity of educating everyone about renosterveld.

"*people must be told what fynbos is and keep it clean like years ago*"

"*educate people staying here about the value of the veld*"

"*teach people about fynbos and the herbal uses of it so people can get an interest in it*"

The merits of education are important but 'are most effective for triggering change when it shows how the destruction of the environment harms individual interests' (Penn,2003). In other words if elimination of renosterveld can be shown to affect the individual interest of the farmer, by for example, emphasizing that if renosterveld continues to decline, their grandchildren will not have the privilege of experiencing renosterveld, then the possibility of that farmer conserving his land is more likely.

The farmers' link to the past was established through; their children and grandchildren, the appreciation that renosterveld was always there and emotional connections such as the beauty of the renosterveld spring. This led to the conclusion that a sense of heritage emerged as the most important contribution to farmers' appreciation of renosterveld and their motivation to conserve it. Heritage developed as the theme in understanding the farmers motivation.

6. CHAPTER 6: DISCUSSION AND CONCLUSION

> *"Nature conservation is a complex and diverse challenge, and successful nature conservation is ultimately not about biological and technical issues. It is about people, about community attitudes and actions, about political and economic issues, and about the actions of professionals and the organisations charged with responsibility for nature conservation.'*
>
> (Bennett *et al.*, 1995)

The diverse challenge of nature conservation implies that the answers to the key questions addres sed in this research are complex. Although the larger proportion of landowners with renosterveld fragments perceive that they will keep the renosterveld fragments on their farms this does not imply conservation complacency.

The issue of land-use change as a continuing threat to renosterveld is explored as are property rate rebates. Participation in conservation by both landowners and local government needs significant motivation. Motivational incentives as a conservation incentive are potentially powerful but further investigation and an improved understanding of these motivational incentives is required.

Private landowners' perceptions and opportunity costs of renosterveld

In this research what is of most importance is that all farmers perceive that they will keep the renosterveld on their farms and the majority had not thought of any alternative land use. Most farmers perceive that the reason their renosterveld is not used for agriculture is topographical and they predict that if they developed their renosterveld their income would be much lower than the income obtained from the other agricultural lands on their farm. These perceptions should indicate that landowners in the CMA and surrounds are unlikely to develop their renosterveld in future but no assumptions should be made unless all threats to renosterveld are removed.

There are perceived and real opportunity costs for renosterveld in the studied area. Although low, the major concern is that these potentially threaten the remaining remnants. Fairbanks *et al.,* (2004) suggest that the wine industry does not pose a threat to preserving biodiversity in the CFR, unless the local wine industry expands into the world market. Indications are that the South African wine industry in premium quality grapes is indeed expanding rapidly in international markets; by way of example, South African wine exports in 2006 are expected to double in the USA, which is the world's largest wine consumer (S. Birch, WOSA *in litt.*). Smaller producers are advised that 'if you are a small player, you will need a premium price to be profitable' (T. Rands, Vinimark, *in litt.*).

Over eighty percent of producers produce less than 500 tons of grapes (P Spies, VinPro *in litt.*). Whereas prospects for smaller wine producers currently look good for those producing premium quality grapes, the outlook for producers of lesser quality grapes is somewhat gloomier. The predicted plantings in 2008 will not exceed estimated uprootings for both red and white wines (SAWIS, Production and Market Estimates 2004-2008). Although this suggests that land for vineyards will not need to be extended, renosterveld is nevertheless threatened by these developments. This is firstly because premium varieties such as sauvignon blanc seek higher, cooler, southerly facing slopes, where much of the remaining renosterveld exists on such prime terroir and secondly because some boutique wineries can afford to run at a loss, because they are tax breaks for other businesses, and therefore may seek undeveloped or uneconomic slopes for vines.

Landowners estimated that olives would produce the second highest income per hectare, and rumours about potential olive prices abound. Although olive crops are extremely variable and good money can potentially be made from marketing olive products, olives are not expected to produce good returns within the first ten years after planting. Olives may potentially pose a greater threat to renosterveld, in that there is a perception amongst landowners that they are not only profitable but can grow on marginal stony ground. This perception may be particularly attractive for farmers who need to utilise every spare piece of land.

Neither commercial buchu nor wheat is seen as a threat to renosterveld in the area studied. Although commercial buchu predicts exceptionally good economic returns, buchu is dependent on alluvial soils which only exist in some renosterveld. The commercial buchu industry is in its infancy and is more likely to threaten renosterveld in areas further afield. The wheat industry in the Swartland has suffered in the past few years and predicted market trends indicate that wheat plantings will not currently be expanding. Wheat yields are related to rainfall and the threat of reduced or variable rainfall with climate change may discourage any further development of wheat lands in the Swartland (Turpie, 2003c).

Eco-tourism and game farming are perceived by landowners as potentially a good use for renosterveld. However, most fragments of renosterveld are small, game farms require huge capital outlays to develop and are only sustainable if there is relatively little competition from other game farms in the same area. Game farms do not qualify as agricultural land and hence are not presently entitled to any agricultural land rate rebate. Although it is unlikely that any form of such property rate rebate will be approved for renosterveld used primarily for eco-tourism, such tourism itself is not seen as a threat to the preservation of renosterveld as it self-evidently requires the renosterveld to remain intact. On the other hand, whilst many appreciate the beauty of renosterveld especially in the spring, renosterveld vegetation is rather drab for tourists. The tourism potential would appear to lie rather in the splendid view from a restaurant, potential game drives, hiking and 4X4 adventure trails, or sophisticated accommodation in the country.

The economics of farming are not always understood as landowners often pursue ventures that are clearly uneconomical and it should be recognised that assessing the relative opportunity costs to landowners may have limited worth as a means of predicting the threats to renosterveld. The paucity of renosterveld, the desire for cooler slopes to plant premium wine varieties and the continual ploughing of renosterveld without permission, suggests that each and every hectare of renosterveld is threatened.

Threats to renosterveld - land use change

Climate change, alien infestation and land use change were suggested as the three main threats to renosterveld. Climate change is not addressed. As few farmers indicated serious alien infestation in their renosterveld, possibly, because alien infestations such as alien grasses are not recognised, only land-use change as a threat is discussed.

Agriculture is the biggest cause of land use change in the CFR (Latimer et al., 2004). With renosterveld mainly situated on agricultural land, land-use change is therefore the biggest threat to renosterveld and any further land-use change needs to be prevented. Biodiversity strategies are beginning to be incorporated into planning policy such as the Western Cape PDSF. Albeit land prices for commercial land are attractive, a defined urban edge and the new PDSF, once both are adopted and implemented, should halt further rezoning of any agricultural land with renosterveld and development of these areas should then be prevented. There is also a perception by both developers and farmers that Provincial Government is strictly enforcing EIA recommendations for biodiversity conservation (A. Beukes, Firstplan Town Planners, *pers. comm.*), from which it may be inferred that developers and farmers are more likely in future to respect the laws that protect renosterveld.

Conservation incentives for private landowners

Fehr and Falk (2002) argue that the 'narrow view of human motivation may severely limit understanding the determinants and effects of incentives'. Indeed, previous assumptions about what landowners want have meant that private biodiversity protection was 'uncoordinated with the interest of the landowners' (Tikka & Kauppi, 2003). If conservation incentives are to be used to promote private conservation, clearly we need to know which incentives private landowners want. Private landowners conserving renosterveld are positively affecting biodiversity and any motivational or economic incentive that encourages conservation of renosterveld would be worth pursuing.

This research suggests that financial incentives as a group are clearly more attractive than the other groups and although there are significant differences between incentives there is

no single incentive that is more desirable than any others. This lends support to the conclusions of others that a suite of incentives is more likely to be effective (Bateson, 2001; Crosthwaite, 2000).

Economic incentives

In South Africa, apart from Working for Water, which operates mainly on state land, and other projects which incorporate a strong focus on the provision of jobs or poverty alleviation, economic incentives for private land conservation are limited or non existent.

South Africa has suffered with racial discriminations in the past as a result of which the development of redressive socio-economic infrastructure places the greatest claim on public finances. Finances for conservation, which for many appear an unnecessary luxury, compete with glaring social issues. There is simply not enough money for substantial compensation for conservation of renosterveld, but small compensations, like that of a property rate rebate, could have a symbolic psychological significance.

"No matter how sophisticated, conservation planning cannot afford to ignore economic forces at play and should also serve the goal of maximising benefits to society" (Turpie *et al.*, 2003a). In wealthier and more developed countries, financial incentives are often supplied by affluent philanthropists, but in less developed countries social issues are often prioritized above conservation issues and financial incentives need to be supported with foreign funds (Scherr & McNeely, 2002). Nevertheless financial mechanisms are powerful drivers for changing the way that people farm (Halweil, 2002) and financial rewards that meet or surpass the opportunity costs of developing renosterveld would no doubt encourage private landowners to conserve.

Alien clearing as an incentive

Although very few farms bore obvious signs of infestation by alien vegetation, almost all the farmers interviewed felt that assistance with dealing with alien vegetation clearing would be a significant incentive. This can be attributed to the fact that many farmers

deploy significant labour and time resources towards maintaining their lands free of alien vegetation. Indeed, landowners not only identified alien clearing costs as the most expensive maintenance cost in conserving renosterveld, but ranked assistance with alien vegetation clearing as the most popular incentive. Most landowners moreover believe they do not have the extra finances needed to manage their natural vegetation. Assistance, whether financial or by way of other support (labour, poison or equipment) with alien vegetation clearing therefore has the potential to be a good conservation incentive and indeed is currently offered under some circumstances. Money for alien vegetation clearing is available under certain circumstances, from the Department of Agriculture, Working for Water and World Wildlife Fund for Nature. Money is available for clearing water catchments, but the process of obtaining funding for alien clearing is not transparent to farmers. Conservancies that motivate for funding may receive alien clearing assistance usually in the form of herbicide and this in itself is an incentive to join a conservancy.

It is unclear to what extent a more vigorous enforcement of alien clearing legislation would be effective in practice. Apart from the unaffordable expense (Pence *et al.*, 2003), landowners perceive that local government does not itself comply with legislation, but rather adopts a position of '*do as I say but not as I do*'. The perceived inequity of enforcement in these circumstances is evidently a factor in discouraging compliance by landowners with the existing formal legal system. Local government would do well to clear Schedule 1-3 declared weeds off municipal properties within their jurisdiction as a clear indication of its own commitment to the law and the importance it places generally on conservation.

Other municipal services as an incentive

The use of other municipal services to support conservation initiatives, for example making available to landowners existing municipal resources to assist with fire management, fencing and security, would promote a collaborative public-private culture of conservation. Municipal assistance with fire management and alien clearing are currently been offered by at least one local government. The cost to the private landowner

of utilising a public good service such as fire-fighting and prevention are very high. Making available such services to private landowners for conservation purposes would face the same difficulties as the introduction of a property tax rebate system, namely lack of funding, the need to convince local government that conservation incentives are necessary and the capacity within the local government to instigate them.

A property rate rebate as an incentive

A property rate rebate or exemption is highly recommended as a conservation incentive because any economic gain could help reduce the costs of conservation and deliver a good conservation message. Three issues are reviewed in trying to determine the extent to which a rate rebate would be an incentive for private landowners, namely: (i) the identification of what would persuade farmers to participate, (ii) the need to convince municipalities of the benefit and (iii) the question of land value.

i) *Identification of what would persuade landowners to participate in conservation*

Landowners rated a municipal property rate rebate highly as a conservation incentive, confirming that a tax rebate for conserved land would convey the message that local government is committed to conservation, even though the financial gain from any such municipal rebate would only provide a marginal financial benefit to the farmer.

Since most renosterveld is remnant vegetation and in any event levied as agricultural land, the rates of which have already been significantly reduced and after taking into account the tax deductions already permitted for capital expenditure incurred in agricultural development, the overall potential financial gain for the farmers, using such a property rebate system, would be low. However the symbolic significance for landowners of a rebate system should not be overlooked.

It may be concluded that, however financially minimal, such a property rate rebate system would have an important symbolic significance in demonstrating the local government's appreciation for the conservation efforts of landowners and public commitment to addressing conservation. In addition, it would go some way towards

addressing the perception of many farmers that the new government is not committed to supporting the agricultural industry, an impression gained since the removal of agricultural subsidies and what are often seen as restrictive labour law and tenancy regulations.

Combining fragments into conservancies would be more beneficial than individual efforts but conservancies do not bind land in perpetuity. Placing conserved land into co-operation agreements is a complex issue because such agreements are binding on future landowners (Merenlender et al., 2004). The majority of landowners in this research were prepared to co-opt their natural land into a contractual conservation agreement and were happy for Cape Nature to manage the natural fynbos on their property, but expressed a strong unwillingness to sell this land to a conservation agency. Most were unaware that such land would have to be conserved in perpetuity. It was also clear that most landowners are reluctant to place their land under any legally-binding agreement because they feel insecure about present land reform policies.

The majority of farms in South Africa are owned by the white minority population group. The government is committed to redistributing thirty percent of farming land to other race groups by 2014 (Didiza, 2004). Some private landowners expressed concern that setting aside land for conservation might indicate to government that these lands are unused and under-utilised and accordingly available for expropriation and redistribution purposes (O. Parker, farmer, *pers. comm.*). Landowners need to be reassured that all levels of government have a constitutitional mandate to protect the environment and that those areas of conservation importance are now identified in the provincial and local SDF's. 'If conservation land is rezoned as a protected area through the correct procedures, any resettlement without consideration of the biodiversity provisions would be in contravention of multiple regulations administered through various government departments or agencies and hence more difficult to redistribute for socio-political reasons' (C Martens, *pers. comm.*).

ii) *Convincing municipalities of the benefits*

Local governments often "tend to rely on vague and generalised statements of aspirations" (Barton & Bruder, 1997) and the difficulties in persuading local governments to conserve natural vegetation include the belief that this is the responsibility of national government. Success depends on the inspiration of key individuals, financial resources, capacity and institutional support but "ultimately, political will is driven by community attitudes and perceptions" (Binning *et al.*, 1999; Swift *et al.*, 2003).

Property rates in South Africa are a contentious issue because local revenue is understood to be needed for vital social reforms. Municipalities are setting their own rate policies and clearly have the capacity to set a rate policy that exempts virgin land from property rates. If all renosterveld fragments in the CMA were exempt from property rates the loss is estimated at a small percentage of the total budget (0.027%). This is a small price to pay for conserving biodiversity that is irreplaceable. A rate rebate needs to be negotiated with all stakeholders and justified in the annual municipal rates policy and "from a policy point of view it is always problematic to open the door to any special arrangement for one - albeit small - group or category of ratepayers" (Franzsen, 2005 *in litt*). The problem is that although the impact on the revenue may be negligible, "on other taxpayers, pressure groups, councillors and even the cost of administration, (the rate rebate impact) may be significant" (Franzsen, 2005, *in litt.*).

The double challenge lies in convincing local government of the importance of the role they can play in private land conservation and on the need to do this as a priority, in spite of their commitment to address the economic discrepancies within the community. One can appreciate that local governments will be hesitant to spend money in supporting something of national interest in the same way that farmers resent being expected to bear the cost of something that is essentially a public good.

iii) Clarifying the question of conservation land value

The issue of defining value is important because one of the big concerns about the rebate route is how to determine the extent of the rebate (R Franzsen, 2005 *in litt.*). This raises the question of conservation value, which is essential both in determining what land is worthy of conservation and how this conservation value is defined.

Biodiversity is valued in terms of its natural capital (Constanza & Daly, 1992) and the potential global benefits compared to cost of nature conservation are vast (Balmford et al., 2002). Natural capital uses special methods to estimate value, such as contingent valuation WTP (willingness to pay) and relatively high existence values were found for biodiversity in South Africa with WTP in the fynbos biome approximately R21.50 ha^{-1} $year^{-1}$ (Turpie *et. al.,* 2003a). Value is described in different ways and Sinden (2004) describes the indirect gains of conserving biodiversity having existence values, bequest value and option values. Zhang & Li (2005) refer to value as "use-value or exchange-value. "Exchange-value can be exchanged for a good to an individual, the WTP, or it can be the exchange-value of a good to society, the price, and these two economic values are often confused".

Defining value is important as there is a need to determine a simple and robust value scale. Biodiversity Habitat Units (Cowling and Heijnis 2001) with a defined rating scale could provide the conservation value to natural vegetation. Determining a rate rebate on agricultural land with differences in potential profitability and therefore a different market value becomes complicated when both lands have a high conservation value. The definition of conservation value in robust economic terms then becomes problematic. Logically land of high conservation value should qualify for the lowest rural tax. If, by way of example, the property rate for renosterveld were to be rebated on two fragments of renosterveld of equally high conservation value, should land with a higher market value receive greater financial compensation for a hectare of alien-infested renosterveld than a hectare of land of a lower market value where the farmer has paid to keep the fragment clean. The prevention of overcompensation or misuse of exemptions has been addressed in the literature (Michael, 2003).

A rate rebate scheme could be guided by the municipal plan which accounts for every hectare of land. The positive impact of a rate rebate for conservation far outweigh the difficulties in setting up such a scheme. It is recognised that local governments have a responsibility to the community and the environment (Bateson, 2001). The challenge in South Africa will be to persuade both local government and private landowners that all biodiversity has a conservation value that will ultimately benefit society.

Motivational incentives

Motivational incentives that promote conservation have not yet been fully explored. Non-financial motives shape human behaviour such as the desire to reciprocate, the desire to gain social approval (Fehr & Falk, 2002), and 'intrinsic satisfaction' (De Young, 2000). These motives can "interact with pecuniary incentives and can provide a deeper understanding of the effects of pecuniary incentives and an understanding of how psychological forces constitute incentives" (Fehr & Falk, 2002). Three aspects are reviewed, namely: (i) promoting existing motivational incentives, (ii) linking biodiversity to land reform and (iii) understanding motivational conservation behaviour.

I. Promoting existing motivational incentives

Social research has recognized the importance of good extension officers on the ground (NRF, Australia, 2004) and 'nothing can surpass personal co-operation with private landowners through direct extension in order to overcome misunderstandings, communicate relevant information and to determine ways of satisfying varied individual needs' (McDowell, 1988).

Local research on the attitudes of farmers towards conservation has suggested that landholders need more information and extension (McDowell, 1988; Winter, 2003). This has been advocated for many years, but apart from pilot projects little or no regular conservation extension presently exists. "One extension officer on the ground does more than ten people in an office" (W Bester, farmer, *pers. comm.*) and although on the ground conservation is time consuming an outgoing extension service has "unfulfilled potential

for winning the hearts and minds of even the most "difficult" of landowners" (Mc Dowell, 1988).

A 'duty of care' is expected from landowners. There is, however, a conservation ethic among landowners who generally perceive themselves as conservationists at heart and 'stewards' of the land (Shogren, 2003). The Conservation Stewardship Project in conjunction with the Department of Agriculture Area-Wide Planning initiative is endeavouring to tie limited incentives to this stewardship ethic on private lands (The Conservation Stewardship Project, 2003). The Biodiversity and Wine Initiative (BWI) and Wines of South Africa (WOSA) have suggested to all grape farmers that the promotion of biodiversity and sustainable wine production would be a good international marketing tool and is in their best interest. The concept is an excellent one, but "BWI has been slow in roll-out because we're trying to do it credibly" (T Hansen, *in litt.,* 2005). Although this strategy encourages farmers to protect and promote their renosterveld, there are many private landowners with renosterveld who do not export wine and would need the encouragement of other farmers to participate. The most efficient way to influence landowners is to get other landowners to influence them and this has been recognized by conservation groups who try to 'identify the champion'. Admired landowners who could claim conservation rebates and expound the merits of conserving renosterveld to neighbours, would have a far greater influence than other conservation efforts.

A 'renosterveld friendly' eco type label or a branded flagship species could be initiated for all products produced by landowners participating in a renosterveld conservation scheme and has been suggested but not persued. A coordinated effort is needed to make an eco-label effective in biodiversity marketing and the "growing and novel sources of support; private philanthropy, premium pricing for biodiversity related goods via certification schemes, need to tackle thorny issues of accountablility" (Balmford & Whitten, 2003).

I. Linking biodiversity conservation to land reform

"Land has emotive overtones everywhere in Africa" (Sibanda, 2001). AgriBEE is the agricultural framework for the *Broad-Based Black Economic Empowerment Act (2003).* The proposed "non-negotiability of a market-related dispensation" (Bosman, 2005) is of great concern to farmers who feel threatened by the practice of land invasion in neighbouring countries.

The AgriBEE draft proposes seven indicators of empowerment (Codes of Good Practice) which include guidelines for broad-based BEE and a BEE Scorecard for large-scale enterprises. Corporate Social Investment '*programs in conservation projects; community clean-up programs and preservation of the natural environment.'* (Draft Transformation Charter for Agriculture, 2005) provides an opportunity for land of high conservation status to be accredited to an AgriBEE scorecard. Land of high conservation value could potentially be regarded as reformed land. If conserved land could be linked to the redistribution and reformation process, conservation of renosterveld and indeed many threatened eco-systems, could be resolved, making conservation an attractive land use option. The preservation of the natural environment can be seen as a public good that benefits all, especially those working farms. Special concessions could be allocated for priviledges such as collection of wild plants.

This is an ambitious proposition. Land reform has many issues that still need to be resolved. In addressing the inequities of the past, little support can be anticipated for any perceived gain offered to perceived wealthy farmers, but the complicated non delivery of the promised high land reform rates could find solutions in conservation. More realistically, conservation in Africa is and will continue to be more about resource use economics than anything else.

II. Understanding motivational conservation behaviour

There is a need to find the best measures to save biodiversity but it is 'remarkable how unconcerned we are in finding out what these measures are' (Sutherland et al., 2005). In

trying to understand what incentives would motivate or influence a private landowners' decision to conserve, social psychological research tries to understand human behaviour and the way in which it influences individuals. The challenge in conservation is to try and positively change the way that people behave, in a way that benefits conservation. This is critical in a world where there is 'a dwindling awareness of biodiversity among the citizenry of most countries' (Cowling, 2004).

Interdisciplinary research is slowly emerging and fields such as ecological economics and environmental psychology are addressing environmental issues (Penn, 2003). Conservation psychology is trying to understand why people act in an environmentally unsustainable way (Clayton & Brook, 2005) and until recently this has not been a focus of conservationists. Clayton & Brook (2005) propose that 'behaviour impacting the natural environment is a product of a person's situational context, past experiences, and motivations' and if actions are clearly understood, more environmentally friendly behaviour can be promoted.

There is an individualistic side to human behaviour, but 'people are generally influenced by the larger spheres within which they are embedded, such as ethnic groups, professions, communities and states' (Hanna et al., 1996). This research emphasises the importance of heritage to farmers and suggests that farmers have a strong emotional connection and attachment to their land and that future generations are important. Penn (2003) states that 'humans place greater emphasis on their family than the common good' and this is important when promoting conservation, because appeals should be made to landowners to conserve for their children and future generations, rather than to save biodiversity for the population at large.

The success of a conservation project depends not only on ecological data but social mechanisms (Mathevet & Mauchamp, 2005). Alcoa World Aluminium in Australia relinquished some of their bauxite reserves for biodiversity, not only because of changing community attitudes and expectations but because people within the workforce did not want to work for a company that does not care for the environment (Gardner & Stoneman, 2003; C Grant, Alcoa World Aluminium, *pers. comm.*). More communication

should be channelled through social or informal networks (Brook *et al.,* 2003) and in this research it was interesting how many farmers were motivated by the prospect of joining a conservancy, not only because of the funding benefits, but because it pleased their neighbours and brought them together.

Farmers are very influenced by their networks, by traditions and by other farmers. These undefined networks drive social pressure. People's 'attitudes and behaviour towards the natural world will remain intimately influenced by their social structures' (Hamilton, 2001) and 'being better than the Jones'' is an important motivation in human nature. If motivational incentives could be constructed in a way that influences landowners and those in their social network to believe that because they conserve renosterveld they are 'better than the Jones,'' conservationists would be a great deal closer to achieving conservation goals. Penn (2003) states that "humans are highly social animals that care about their reputation, and social pressure appears to provide a strong incentive to change behaviour". The powerful impact that social pressure can have on conservation is not yet fully appreciated or explored (Penn, 2003 ; Fehr & Falk, 2002) and understanding the way that farmers think about conservation, or what motivates them to conserve and then changing their behaviour so that they want to conserve, opens a new ambit of research.

Social marketing provides another strategy to change the way that people think about conservation (Kotler *et al*., 2002). "Perhaps the biodiversity sector needs to take a leaf out of the advertising manual and start investing in using the media more effectively to change human behaviour"(Cowling, 2004). As Penn (2003) suggests "advertisers are fuelling runaway consumption by exploiting our instinctive desires to maintain status in society and attract mates". Conservationist need to urgently communicate the problem of biodiversity loss to a world that is influenced by television and advertising and does not appreciate that there is a problem and indeed many landowners are unaware that renosterveld is in need of conservation. Advertising needs to exert social pressure to the benefit of conservation.

In Summary

If we want to manage the natural world successfully for the long-term benefit of all people, we need to understand why humans behave in the way that they do (Siegfried, 2002). This ultimately depends on "a good appreciation of the reality of the human condition" (Hamilton, 2001). If private landowners are to keep the renosterveld on their farms, they must *want* to save renosterveld.

Whilst opportunity costs for preserving renosterveld do exist, landowners' actual and perceived income benefit from utilising existing renosterveld for other purposes is lower than their current income. For this reason, unless renosterveld is rezoned for other land use or current legislative protections in place continue to be ignored, it is at present not highly threatened.

Long-term reliance cannot be placed on the present situation continuing and given the paucity of renosterveld, every effort should be made to preserve the remaining fragments. Whilst landowners generally indicate that they will keep the existing renosterveld on their land, they need to be motivated with incentives to do so. No single incentive was identified as decisive in motivating landowners to conserve but rather, a raft of incentives, both financial and motivational.

On the financial side, a municipal property rebate system is clearly attractive to farmers; however, while local government has the power to initiate this, its capacity to do so at present is uncertain. Any financial incentive would therefore also need to be supported by social and psychological motivators: public acknowledgement of prior stewardship, clear communication channels and an uncomplicated national commitment to conservation are all factors which this research suggests could provide the necessary support to conserve renosterveld.

7. REFERENCES

Adamson, R.S. (1938) The Vegetation of South Africa. Monographs of British Empire Vegetation. London.

Anderson, F.R., A.V. Kneese, P.D. Reed, S. Taylor and R.B. Stevenson. (1977) Environmental Improvement through Economic Incentives. John Hopkins University Press. USA.

Anderson, M.S. (2003) The Use of Economic Instruments for Environmental Policy - a Half Hearted Affair. Accessed on 15/11/06 at: http:/www.iisd.ca/linkages/consume/skou.html

Balmford, A., A. Bruner, P. Cooper, R. Costanza, S. Farber, R.E. Green, M. Jenkins, P. Jefferiss, V. Jessamy, J. Madden, K. Munro, N. Myers, S. Naeem, J. Paavola, M. Rayment, S. Rosendo, J. Roughgarden, K. Trumper and R. Kerry Turner. (2002) Economic Reasons for Conserving Wild Nature. Science 297 (5583) 950-953.

Balmford, A. and T. Whitten. (2003) Who should pay for tropical conservation, and how should the costs be met. Oryx 37 (2) 238-250.

Barton, H., and N. Bruder. (1997) A guide to local environmental auditing. Earthscan Publication Ltd, London.

Barnard, D. (2002) Environmental Law. Accessed on 18/08/2003 at : http://www.envirolaw.co.za/Envirolaw/Background

Bateson, P. (2001) Incentives for Sustainable Land Management: Community cost sharing to conserve biodiversity on private lands. A guide for local government. Revised edition. Environment Australia, Canberra and Environs Australia, Melbourne.

Bennett, A., G. Blackhouse and T. Clark. (1995) People and Nature Conservation Perspectives on Private Land Use and Endangered Species Recovery. Transactions of the Royal Zoological Society of New South Wales, Australia.

Binning, C. and M. Young. (1999) Conservation Hindered: The impact of local government rates and State land taxes on the conservation of native vegetation. CSIRO Wildlife & Ecology, Research & Development Corporation, Canberra.

Binning, C. (2000) Thinking Bush : Science for managing native vegetation in Australian landscapes.

Binning, C. and M. Young. (2003) Talking to the taxman about Nature Conservation. Proposals for the introduction of tax incentives for the protection of high conservation value native vegetation. CSIRO Wildlife & Ecology, Research & Development Corporation, Canberra.

Bomhard, B., D.M. Richardson, J.S. Donaldson, G.O. Hughes, G.F. Midgley, D.C. Raimondo, A.G. Rebelo, M. Rouget, and W. Thuiller. (2005) Potential impacts of future land use and climate change on the Red List status of the Proteaceae in the Cape Floristic Region, South Africa. Global Change Biology 11 (9) 1452.

Bosman, L. (2005) Agri SA will look soberly at Land Summit demands. Accessed on 20/01/06 at http://www.agriinfo.co.za/

Botha, M. (2001) Incentives for conservation on private lands: options and opportunities. Cape Conservation Unit, Botanical Society of South Africa, Claremont, Cape Town.

Botha, M. (2002) Tax Amendment Proposals to facilitate conservation. Cape Conservation Unit, Botanical Society of South Africa, Claremont, Cape Town.

Boucher, C. (1980) Notes on the use of the term "Renosterveld". Bothalia 13 (1&2) 237.

Brook, A., M. Zint and R. de Young. (2003) Some psychological aspects of an endangered species act listing: Private landowners' conservation behaviour. Conservation Biology 17: 1638-1649.

Carter, J. (2004) Integrating planning and budgeting at the local level. IDASA budget watch. Accessed on 20/01/06 at: www.idasa.org.za/gbOutputFiles.asp?WriteContent=Y&RID=690

Causley, I. (2001) Public Good Conservation: Our Challenge for the 21st Century. House of Representatives, Standing Committee on Environment and Heritage. Parliament of the Commonwealth of Australia. Canberra, Australia.

Chudleigh, P. and S. Simpson. (2000) Review of the Landcare Taxation Rebate. Agtrans Research, Brisbane, Australia.

Clark, D. and D. Downes. (1995) What Price Biodiversity? Economics and Biodiversity Conservation in the United States. (republished in 11 Journal of Environmental

Law & Litigation 9: 1996) [BW96-8]. Accessed on 15/10/04 at http://www.ciel.org/Publications/summary.html

Clayton, S. and A. Brook. (2005) Can Psychology Help Save the World? A Model for Conservation Psychology. Analysis of Social Issues and Public Policy 5 (1) 87-102.

Constanza, R. and H.E. Daly. (1992) Natural Capital and Sustainable development. Conservation Biology 6: 37-46.

Cooperrider, D.L. and S. Srivastva. (1987) Appreciative Inquiry into Organizational Life. In W. Pasmore and R. Woodman (Eds.) Research in Organization Change and Development. Greenwich, CT: JAI Press. 1: 129-169.

Cowling, R.M. and P.M. Holmes, (1992) Flora & Vegetation, in: Cowling, R.M. (Ed.) The Ecology of Fynbos. Nutrients, Fire & Diversity. Oxford University Press, Cape Town. 23-61.

Cowling, R.M., and D.M. Richardson. (1995) Fynbos: South Africa's Unique floral Kingdom. Fernwood Press.

Cowling. R.M. and C.E. Heijnis. (2001) The identification of broad habitat units as biodiversity entities for a systematic conservation planning in the Cape Florisitc Region. South African Journal of Botany 67: 15-38.

Cowling, R.M. (2003a) Introduction to systematic conservation planning in the Cape Floristic Region. Biological Conservation 112: 1-13.

Cowling, R.M. and R.L. Pressey. (2003b) The expert or the algorithm? – comparison of priority conservation areas in the Cape Floristic Region identified by park managers and reserve selection software. Biological Conservation 112: 147-167.

Cowling, R.M., R.L. Pressey, M. Rouget, and A.T. Lombard. (2003c) A conservation plan for a global diversity hotspot- the Cape Floristic Region, South Africa. Biological Conservation 112: 191-216.

Cowling, R.M. (2004) The process of mainstreaming: conditions, constraints and prospects. Innovating Conservation. Cape Partners conference, Kirstenbosch, Newlands, South Africa.

Crosthwaite, J. (2000) Farmer Land Stewardship : A Pillar to Reinforce Natural Resource Management? Australian Conservation Foundation. Inquiry into Public Good Conservation – Impact of Environmental Measures Imposed on Landholders,

House of Representatives Standing Committee on Environment and Heritage, Australia.

Dey, I. (1993) Managing data, Creating categories, and assigning categories. In Qualitative Data Analysis: A User-friendly Guide for Social Scientists 75-82.

De Wet, J. and Erasmus, Z. (2005) Towards Rigour in Qualitative Analysis. Qualitative Research Journal 15 (1).

De Young, R. (2000) New ways to promote environmental Behavior: Expanding and Evaluating Motives for Environmentally Responsible Behavior. Journal of Social Science 56 (3) 509-526.

Didiza, A.T. (2004) AgriBEE: Broad-Based Black Economic Empowerment Framework for Agriculture. Department of Agriculture. Accessed on 16/08/05 at: http://www.nda.agric.za/

Donald, P.F. (2004) Biodiversity Impacts of Some Agricultural Commodity Production Systems. Conservation Biology 18: 17-37.

Donaldson, J.S. (2002) Biodiversity and Conservation Farming in the Agricultural Sector in: Mainstreaming Biodiversity in Development: Case Studies from South Africa. Pierce, S. M., R. M. Cowling, T. Sandwith, and K. MacKinnon. (Eds.) The World Bank Environment Dept. 818 H Street, Washington, USA.

Doremus, H. (2003) A Policy Portfolio approach to biodiversity protection on private lands. Environmental Science and Policy 6 (3) 217-232.

Draft Transformation Charter for Agriculture. (2005) Broad-Based Black Economic Empowerment. AgriBEE. AgriBEE Steering Committee. Accessed on 20/01/06 at: http://www.nda.agric.za/docs/agribee/AgriBEECharter.pdf

Erickson, D.L., R.L. Ryan, and R. De Young. (2002) Woodlots in the rural landscape: landowner management attitudes in a Michigan (USA) case study. Landscape and Urban Planning 58: 101-112.

European Environmental Agency. (2002) Environmental Signals 2002, Benchmarking the Millenium. Environmental Assessment Report No 9. (Office for the Publications of the European Communities, Copenhagen, Demnark, 2002) Accessed on 16/08/05 at: http://reports.eea.eu.int/environmental_assessment_report_2002_9/en/signals2002-chap06.pdf

Fairbanks, D.H.K., C.J. Hughes and J.K. Turpie. (2004) Potential impact of viticulture expansion on habitat types in the Cape Floristic Region, South Africa. Biodiversity and Conservation 13: 1075-1100.

Farrier, D. (1995) Conserving biodiversity on private land: incentives for management or compensation for lost expectations? Accessed on 16/03/05 at: http://www.lib.ttu.edu/playa/rights/r995-04.htm

Fehr, E. and A. Falk. (2002) Psychological foundations of incentives. European Economic Review 46: 687-724.

Fielding, N. and R. Lee. (1998) Approaches to Qualitative Analysis: In Computer Analysis and Qualitative Research, Sage, London. pp. 21-55.

Fielding, N. and R. Lee. (1998) Managing Data in CAQDAS. Computer Analysis and Qualitative Research, Sage, London. pp. 86-118.

Flick, U., E. von Kardoof and I. Steinke. (2004) A Companion to Qualitative Research. Sage Publications. London.

Frazee, S.R., R.M. Cowling, R.L. Pressey, J.K. Turpie and N. Lindenberg. (2003) Estimating the costs of conserving a biodiversity hotspot: a case-study of the Cape Floristic Region, South Africa. Biological Conservation 112: 275-290.

Gardner, J.H., and G. Stoneman. (2003) Rehabilitating mines to meet land use objectives: Bauxite Mining and Conservation of the Jarrah Forest in South-West Australia. Unasylva, 207: 3-8. Accesed on 20/01/06 at : http://www.iucn.org/themes/business/mining/paperjgardner.pdf

Gelderblom, C.M., B.W. van Wilgen, J.L. Nel, T. Sandwith, M. Botha and M. Hauck. (2003) Turning strategy into action: implementing a conservation action plan in the Cape Floristic Region. Biological Conservation 112: 291-297.

Gibbs, G.R. (2002) Qualitative Data Analysis – Exploration with *NVivo*. Open University Press. Buckingham. UK.

Glaser, B. (1992) Basics of Grounded Theory Analysis. Mill Valley: Sociology Press.

Glaser, B. G., and A. L. Strauss. (1967) The Discovery of Grounded Theory. Strategies for Qualitative Research. Aldine Publishing Co, Chicago, Il, USA.

Glazewski, J. (2005) Environmental Law in South Africa. 2nd Ed. Lexis Nexis Butterworth, Durban, South Africa.

Green, R.E., S.J. Cornell, J.P.W. Scharlemann and A. Balmford. (2005) Farming and the Fate of Wild Nature. Science 307 (5709) 550-555.

Grote, U. (2002) Eco-labelling in the agricultural sector: an international perspective. High-level Pan-European Conference on Agriculture and Biodiversity: towards integrating biological and landscape diversity for sustainable agriculture in Europe. Maison de l'Unesco, Paris, France. Accessible on 11/10/03 at: www.nature.coe.int/conf_agri_2002/agri08e.01.doc

Hale, P. and D. Lamb. (1997) Conservation Outside Nature Reserves. Centre for Conservation Biology, University of Queensland, Australia.

Halweil, B. (2002) State of the World 2002. Worldwatch Institute. WW Norton & Co., 500 5th Ave, New York.

Hamilton, A. (2001) Human Nature and the Natural World. Watkiss Studios Ltd, Biggleswade, Beds, New Millennium, United Kingdom.

Hammersley, M. and P. Atkinson. (1983) Ethnography. Principles in Practise, London, Tavistock.

Hanna, S., C. Folke and K-G. Maler. (1996) Rights to Nature Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment. Island Press, Washington DC, USA.

Heydenrych, B.J., C. Burger and C. Oberholtzer. (1995) The sustainable use of the western cape lowlands. Can this be achieved? Proceedings of a symposium. Flora Conservation Committee. Botancial Society of South Africa.

Heydenrych, B.J., R.M. Cowling and T.H. Trinder-Smith. (1999) Strategic conservation interventions in a region of high biodiversity and high vulnerability: a case study from the Agulhas Plain at the southern tip of Africa. Oryx 33: 256-269.

Hilty, J. and A.M. Merenlender. (2003) Studying Biodiversity Private Lands. Conservation Biology 17 (1) 132-137.

James, S.M. (2002) Bridging the Gap between Private Landowners and Conservationists. Conservation Biology 16: 269-271.

Kabii, T. (2003) Forum presentation Notes to the National Trust Forum Nature Conservation on Private Lands, Australia. Accessed on 11/03/06 at: http://www.ntwa.com.au/forum/paperTKabii.pdf

Katz Commission (1998) The Implications of Introducing a Land Tax in South Africa. 8th Interim Report of the Commission of Inquiry into certain aspects of the Tax Structure of South Africa.

Kemp, D. (2003) Tax incentives for conservation extended. Joint media release, Commonwealth Minister for Environment and Heritage (D Kemp), Commonwealth Minister for Revenue. Accessed on 15/08/04 at: http://assistant.treasurer.gov.au/atr/content/pressreleases/2003/008.asp

Kemper, J., R.M. Cowling and D.M. Richardson. (1999) Fragmentation of South African renosterveld shrublands: effects on plant community structure and conservation implication. Biological Conservation 90: 103-111.

Kemper, J., R.M. Cowling, D.M. Richardson, D.D. Forsyth and D.H. McKelly. (2000) Landscape fragmentation in South Coast Renosterveld, South Africa, in relation to rainfall and topography. Austral Ecology 25: 179-186.

Knight, R.L. (1999) Private Lands, The Neglected Geography. Conservation Biology 13 (2) 223-224.

Koelle, B.R.I., and N.M. Oettle. (2003) Myths, Legends and Nature … Farming as an emotional enterprise. Accessed on 10/01/06 at: http://www.nbi.ac.za/consfarm/cfdownloads/Koelle,%20Oettle%20Myths,%20Legends%20and%20Nature.pdf

Kotler, P., E.L. Roberto, N. Roberto and N. Lee. (2002) Social Marketing: Improving the Quality of Life. Sage Publications Inc.

Krug, C.B. (2004a) Practical Guidelines for the Restoration of Renosterveld. University of Stellenbosch, South Africa.

Krug, C. B., R.M. Krug, D.M. Iponga, B.A. Walton and S.J. Milton. (2004b) Restoration of West Coast Renosterveld: facilitating the return of a highly threatened vegetation type. Proceedings 10th Medecos Conference, Rodes, Greece. Arianoutsou & Papanastasis (Eds.) Millpress, Rotterdam.

Kurkalova, L., C. Kling and J. Zhao. (2003) Green Subsidies in Agriculture: Estimating the Adoption Costs of Conservation Tillage from Observed Behavior. Working paper 01-WP 286. Center for Agricultural and Rural Development. Iowa State University, USA.

Langholz, J. (1999) Conservation Cowboys: Privately-Owned Parks and the Protection of Tropical Biodiversity. PhD Thesis. Cornell University, USA.

Langholz, J., J. Lassolie and J. Schelas. (2000) Incentives for Biological Conservation: Costa Rica's Private Wildlife Refuge Program. Conservation Biology 1735-1743.

Langpap, C. and J. Wu. (2004) Voluntary conservation of endangered species: when does no regulatory assurance mean no conservation? Journal of Environmental Economics and Management 47: 435–45.

Latimer, A.M., J.A. Silander, A.E. Gelfand, A.G. Rebelo and D.M. Richardson. (2004) Quantifying threats to biodiversity from invasive alien plants and other factors: a case study from the Cape Floristic Region. South African Journal of Science 100: 81.

LAW, 2003. Arrangements to Enhance the Effective Use of Incentive Mechanisms in Natural Resource Management. Land and Water Australia Research Project AGT13.

Lee, R. M & Fielding, N. (1996) 'Qualitative Data Analysis: Representations of a Technology:A Comment on Coffey,Holbrook and Atkinson'. Sociological Research Online 1 (4). Accessed on 15/11/05 at: http://www.socresonline.org.uk/socresonline/1/4/1.f.html

Linder, H.P. (2003) The radiation of the Cape Flora, southern Africa. Biological Reviews. Cambridge University Press. 78: 597-638.

Low, A.B. and F.E. Jones. (Eds.) (1994) The sustainable Use and Management of Renosterveld Remnants in the Cape Floristic Region. Proceedings of a Symposium. FCC report 1995/4. Botanical Society of South Africa, Kirstenbosch, Cape Town.

MacDonald, I. (1994) In: An Overview of The Importance of Conserving Natural Remnant Vegetation. Low & Jones (Eds.) Proceedings of a Symposium. FCC report 1995/4. Botanical Society of South Africa, Kirstenbosch, Cape Town.

Manuel, T. (2005) Mid-term budget speech, Cape Times 27 Oct 2005.

Mathevet, R. and A. Mauchamp. (2005) Evidence-based conservation: dealing with social issues. Trends in Ecology 20 (8) 422-423.

McDowell, C.F. (1988) Legal strategies to optimize conservation of natural ecosystems by private landowners – Economic incentives. PhD Thesis. Fitzpatrick Institute Library, UCT.

McDowell, C.F., R. Sparks, J. Grindley and E. Moll. (1998) Persuading the landowner to conserve natural ecosystems through effective communication. Journal of Environmental Management 28: 211-225.

McClard, A.,D. & S. Pettit-Brown. (2003) Making sense of qualitative results: a systematic approach. Doxus LLC. Atlanta, Georgia. Accessed at: ttp://www.doxus.com/attachments/Making_sense.pdf

McKee, J., D. Kristy, W. Moss and L. Pullen. (2005) "From developed grants … to babysitting. Broadening the horizon of incentives." Accessed on 10/02/06 at: http://www.agric.uwa.edu.au/ARE/AARES/Conf2005/PapersPDF/DaltonAARES2005.pdf

McNeely, J.A. (1988) Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources. IUCN, Switzerland.

Mcosano, O.P.M. (2005) Estimating the Opportunity Costs of Biodiversity Conservation in Western Cape, South Africa. MSc Thesis, Percy FitzPatrick Institute, University of Cape Town, South Africa.

Merenlender, A.M., G.G. Huntsinger, G. Guthey and S. K. Fairfax. (2004) Land Trusts and Conservation Easements: Who Is Conserving What for Whom? Conservation Biology 18: 65-75.

Michael, J.A. (2003) Efficient habitat protection with diverse landowners and fragmented landscapes. Environmental Science and Policy 6: 243-251.

Milton, S.J., W.R.J. Dean and D. M. Richardson. (2003) Economic Incentives for restoring natural capital in southern African rangelands. Frontiers in Ecological Environment 1 (5) 247-254.

Mohr, P.J. and L.J. Fourie, (1995) Economics for South African Students. UNISA, Pretoria, South Africa.

Moll, E.J., B.M. Campbell, R.M. Cowling, L. Bossi, M. L. Jarman and C. Boucher. (1984) A description of major vegetation categories in and adjacent to the Fynbos biome. South African National Scientific Programmes Report No 83.

Morris, C. and C. Potter. (1995) Recruiting the New Conservationists: Farmers' Adoption of Agri-Environmental Schemes in the U.K. Journal of Rural Studies (1) 51-63.

Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. da Fonseca and J. Kent. (2000) Biodiversity hotspots for conservation priorities. Nature 403: 853-858.

National Farmers Federation, Australia (NFF). (2002) Accessed on 11/04/04 at : http://www.nff.org.au/pages/policies.html#en

Newburn, D., S. Reed, P. Berck and A. Merenlender. (2005) Economics and Land-Use Change in Prioritizing Private Land Conservation. Conservation Biology 19: 1411-1420.

Niesenbaum, R.A. and T. Lewis. (2003) Ghettoization in Conservation Biology: How Interdisciplinary Is Our Teaching? Conservation Biology 17 (1) 6-10.

Norton, D.A. (2000) Conservation Biology and Private Land: Shifting the Focus. Conservation Biology 14 (5) 1221-1223.

OECD (2004) Recommendations of the Council on the Use of Economic Instruments in Promoting the Conservation and Sustainable Use of Biodiversity.

Orr, D.W. (1994). Professionalism and the Human Prospect. Conservation Biology 8 (1) 9-11.

Parkhurst, G.M., J.F. Shogren, C. Bastian, P. Kivi, J. Donner, and R.B.W. Smith. (2002) Agglomeration Bonus: an incentive mechanism to reunite fragmented habitat for biodiversity conservation. Ecological Economics (41) 305-328.

Paterson, S. (2005) "Property Tax: A friend or Foe to Landscape Protection in South Africa'. Paper presented at 9th International Environmental Law Conference, Sau Paulo,Brazil and published in Landscape Nature and Law (Conference Proceedings), Law for a Green Planet Institute pp. 31-52.

Pence, G.Q.K., M.A. Botha, and J.K. Turpie. (2003) Evaluating combinations of on-and off-reserve conservation strategies for the Agulhas Plain, South Africa: a financial perspective. Biological Conservation 112: 253-273.

Penn, D.J. (2003) The Evolutionary Roots of our Environmental Problems: Towards a Darwinian Ecology. The Quarterly Review of Biology 78 (3) 275-301.

Pierce, S.M., R.M. Cowling, A.T. Knight, A.T. Lombard, M. Rouget and T.Wolf. (2005) Systematic conservation planning products for land-use planning: Interpretation for implementation. Biological Conservation 125 (4) 441-458.

Polasky, S. and H. Doremus. (1998) When the Truth Hurts: Endangered Species Policy on Private Land with Imperfect Information. Journal of Environmental Economics and Management 25: 22-47.

Pressey, R.L., C.J. Humphries, C.R, Margules, R.I. Vane-Wright, and P.H. Williams (1993) Beyond Opportunism: Key Principles for Systematic Reserve Selection. Tree 8 (4) 124-128.

Pressey, R.C. (1994) Ad Hoc Reservation:Forward or Backward Steps in Developing Representative Reserve Systems? Conservation Biology 8 (3) 662-668.

Pressey, R.L., R.M. Cowling and R. Rouget. (2003) Formulating conservation targets for biodiversity pattern and process in the Cape Floristic Region, South Africa. Biological Conservation 112: 99-127.

Rebelo, A.G. (1992a) Red Data Book Species in the Cape Floristic Region: Threats, priorities and target species. Transactions of Royal Society, South Africa. 48: Part 1.

Rebelo, A.G. (1992b) Preservation of biotic diversity in: Cowling, R.M. (Ed.) The Ecology of Fynbos. Nutrients, Fire & Diversity. Oxford University Press, Cape Town. pp. 309-344.

Richardson, D., M. Rouget, R.M. Cowling and J.W. Lloyd. (2002) Current Patterns of Habitat Transformation and Future Threats to Biodiversity in Terrestrial Ecosystems of The Cape Floristic Region, South Africa. Accessed on 29/11/04 at: http://www.conbio.org/scb/Activities/Meetings/2002/abstracts/symposia/sympseven.cfm

Robertson, D.P., and R.B. Hull. (2001) Beyond Biology: toward a More Public Ecology for Conservation. Conservation Biology 15: 970-979.

Rosenzweig, M.L. (2003) Win-Win Ecology. How the Earth's Species Can Survive in the Midst of Human Enterprise. Oxford University Press, Oxford.

Rouget, M., D.M. Richardson, R.M. Cowling, J.W. Lloyd, and A.T. Lombard. (2003) Current patterns of habitat transformation and future threats to biodiversity in terrestrial ecosystems of the Cape Floristic Region. Biological Conservation 112: 63-85.

Rural Management Framework for the City of Cape. (2002) Accessed at: Townhttp//www.capetown.gov.za/planning/rural/pdf/rural.pdf

Ryan, R., D. Erikson, R. De Young. (2003) Farmers' motivations for adopting conservation practices along riparian zones in a Midwestern agricultural watershed. Journal of Environmental Planning and Management 46 (1) 19-37.

Savy, C. (2003) Conserving Wattled Crane (Grus carunculatus) on private land in KwaZulu-Natal, South Africa: Attitudes, economics and potential incentives. MSc. Thesis. University of Cape Town.

SAWIS (2003) South Africa Wine Industry Information and Market estimates. Production and Market Estimates 2004-2008. A publication of SAWIS. Paarl, South Africa.

SAWIS (2005) South Africa Wine Industry Information and Market estimates. A Publication of SAWIS. Paarl, South Africa.

Scherr, S.J., and J.A. Mc Neely (2002) Reconciling Agriculture and Biodiversity:Policy and Research Challenges of "Ecoagriculture". The Equator Initiative. IIED. Accessed on 15/08/04 at: www.undp.org/equatorinitiative/docs/egoagriculture.doc

Seely, M.K., J. Zeidler, J.R. Henschel and P. Barnard. (2003) Creative problem solving in support of biodiversity conservation. Journal of Arid Environments 54: 155-164.

Shogren, J.F., G.M. Parkhurst and C. Settle (2003) Integrating economics and ecology to protect nature on private lands: models, methods, and mindsets. Environmental Science and Policy 6: 233-242.

Sibanda, S. (2001) Land Reform and Poverty Alleviation in South Africa. Paper presented at the SARPN conference on Land Reform and Poverty Alleviation in Southern Africa, HSRC, Pretoria. Accessed on 20/01/06 at: www.sarpn.org.za/Eventpapers/Land/20010604Sibanda.pdf

Siegfried, R. (2002) Keeping the Rainbow. The Environmental Challenge for Africa and the World. Africa Geographic. Cape Town, South Africa.

Sinclair, A.R.E., D. Ludwig and C. W. Clark. (2000) Conservation in the Real World. Science 289 (5486) 1875.

Sinden, J.A. (2003) Estimating the opportunity costs of biodiversity protection in the Brigalow Belt, New South Wales. Journal of Environmental Management 70: 351-362.

Strauss, A. and J. Corbin. (1990) Basics of Qualitative Research: Grounded Theory Procedures and Techniques, Sage, Newbury Park, CA, USA.

Sunderland, W.J., A.S. Pullin, P.M. Dolman and T. M. Knight. (2005) Response to Mathevet and Mauchamp: Evidence-based conservation: dealing with social issues. Trends in Ecology 20 (8) 424-425.

Swift, B., S. Bass, L. Castelli, A. Akella, E. Corcuera, F. Fahsen, X. d. l. Macorra, D. Janzen, M. Orellana, K. Mott, P. Boland, J.J. Dada, J. Langholz, L. Paulson, S. Yeatman and C. Chacón. (2003) Legal Tools and Incentives for Private Land Conservation in Latin America: Building Models for Success. Environmental Law Institute. Washington, DC, USA.

Tikka, P. M. and R. Kauppi. (2003) Introduction to special issue: Protecting Nature on Private Land-from Conflicts to Agreements. Environmental Science and Policy 6 (3) 193-194.

Turpie, J.K. and Heydenrych, B. (2000) Economic consequences of alien infestation of the CFK fynbos' vegetation. In The Economics of Agricultural Invasions. Perrings, Williamson, M. Dalmazzone, (Eds.) Edward Elgar, Cheltenham, England.

Turpie, J.K., B.L. Heydenrych and S. J. Lamberth. (2003a) Economic value of terrestrial and marine biodiversity in the Cape Floristic Region: implication for defining effective and socially optimal conservation strategies. Biological Conservation 112: 233-251.

Turpie, J.K. (2003b) The existence value of biodiversity in South Africa: how interest, experience, knowledge, income and perceived level of threat influence local willingness to pay. Ecological Economics 46: 199-216.

Turpie, J.K. (2003c) An Ecological-economic appraisal of conservation on commercial farm land in four areas of South Africa. Final Report of the Ecological-Economic Research Component of the Conservation Farming Project. National Botanical Institute, South Africa.

Urban Edge Report. (2004) Accessed on 13/11/05 at: http://www.capetown.gov.za/edgeguidelinesmanual/UrbanEdgeGuidelinesManualmay2004.pdf.

USDA :United States Department of Agriculture (2003) accessed on 11/08/05 at: http://www.nrcs.usda.gov/programs/farmbill/2002/funding.html

Van Wilgen, B.W., C. Marais, D. Magadlela, N. Jelie and D. Stevens. (2002) Win-win-win: South Africa's Working for Water Programme in: 2002 Mainstreaming Biodiversity in Development. Case Studies from South Africa. World Bank, 1818 High St. Washington, D.C., U.S.A.

von Hase, A., M. Rouget, K. Maze and N. Helme. (2003) Fine-Scale Conservation Plan for Cape Lowlands Renosterveld:Technical Report. Cape Conservation Unit, Botanical Society of South Africa.

Van Zyl, H. (2005) The use of property value approaches to value urban freshwater environments: case studies and their management implications for Cape Town. Draft Ph.D Thesis, School of Economics, University of Cape Town, South Africa.

VinPro. (2006) South African wine farmers' service organisation. Accessed on 10/01/06 at: http://vinpro.co.za/

Wells, P. (1998) Institutions and incentives for biodiversity conservation. Biodiversity and Conservation 7: 815-835.

Wentworth Group of Concerned Scientists. (2003) A New Model for Landscape Conservation in New South Wales, WWF, Australia.

WildlifeCampus. (2005). The trend towards game ranching in South Africa. Game Ranch Economics with ABSA. Accessed on 03/02/06 at : http://www.wildlifecampus.com/Courses/GameRanchEconomics/GameRanchEconomics/UpfrontCostofGameRanches/892.pdf

Wilson, G.A. (1996) Farmer environmental attitudes and ESA participation. Geoforum 27: 115-131.

Winter, S.J. (2003) Attitudes and behaviour of landholders towards the conservation of Overberg Coastal Renosterveld, a threatened vegetation type in the Cape Floral Kingdom. MSc. University of Stellenbosch.

Wise Land Use, 2001. White paper on spatial planning and land use management, Ministry of agriculture and Land affairs. Accessed on 08/08/04 at: http://www.gov.za/whitepaper/2001/spatialplanning.htm

Wu, J., and B.A. Babock. (1999) The Relative Efficiency of Voluntary vs Mandatory Environmental Regulation. Journal of Environmental Economics and Management 38: 258-175.

Wynberg, R. (2002) A decade of biodiversity conservation and use in South Africa: tracking progress from the Rio Earth Summit to the Johannesburg World Summit on Sustainable Development. South African Journal of Science 98: 233-242.

Zhang, Y. and Y. Li. (2005) Valuing or pricing natural and environmental resources? Environmental Science and Policy 8: 179-186.

8. APPENDIX

8.1 Abbreviations

CARA	Conservation of Agricultural Resources Act
CCT	City of Cape Town
CMA	Cape Metropolitan Area
EU	European Union
GIS	Geographic Information System
IDP	Integrated Development Plan
NEMA	*National Environmental Act*
NFF	National Farmers Federation
PSDF	Provincial Spatial Development Framework

8.2 Identified renosterveld sites

CAPE TOWN MUNICIPALITY

SITE NAME	CONTACT
Klipvlei	C Starke
Springfontein	A Beukes
Zondagsfontein	A Louw
Uitkyk	AJ Herold
Vrymansfontein	B Naude
Uitkamp	Boetie Louw
Tierhoogte	C Starke
Corona 480	County Fair
Karnemelksvlei	County Fair - R Briers
Meerendal	D Adriaanse
De Goede Ontmoeting 180	D Herholdt
Rondeberg 1373	D Loubser
Welgelegen / Koelenhof	F Bonthuys
Goedgewag	F Brink
Remhoogte	H de Kok
Ongegund 158	H de Villiers
Leeuwendans 937	H Slabbert
Oliphantskop	H Stofberg
La farge Quarry Tygerberg	H van Zyl
Berg-en-dal	Haman
Joostenberg Kloof	I Warner
Bloemendal	J Coetzee
Draaihoek	J Herold
Fredericks kraal 71	J Herold
Langerug	J Herold
Matjeskuil	J Lategan
Mariedal 63	J van der Spuy
Clara Annafontein	Justin Basson
Klipheuwel	K Blackenberg
Morgenster	K de Villiers
Altona	K Loubser
Bottelfontein	Karstars
Ouskip	Koeberg coast

SITE NAME	CONTACT
Contermanskloof	L & C Stark
Kuiperskraal	Loubser Broers
Kuyperskraal 180	Loubser broers
Mosselbank 906	Loubser broers
Swellengift	Loubser broers
Welgegund	Loubser Broers
Koeberg	M de Kok
Koebergplaas 110	M de Kok
Oortmanspost 49	M de Kok
Welvergenoegd	M de Kok/Loubser
Diemersdal	M Louw
Groenekloof	Mamre Nature reserve
Durbanville Golf Course	Municipality
Durbanville Race Course	Municipality
North Pine	Municipality
Sonstraal	Municipality
Stikland	Municipality
Tygerberg Nature Reserve	Municipality
Van Riebeecksplaas	Municipality
Melkbosstrand open space	Municipality
Altydgedacht	O & J Parker
Hillcrest farm	P Inglis
Blaauwblommekloof	P Kitshopf
Matjeskuil	P Louw
Oliphantskop	P van der Spuy
Groot Phesantekraal	R Brink
Hercules Pillar	S de Wit
Goedgedacht	S Hamman
Rondeboschjes Berg	S Hugo
Spes Bona	S Hugo
Matjeskuil	S Olding
Hoogekraal 1413	S Scher
De Grendel	Sir D Graaf
Radio 918	Small holdings
Spieka	T Enting
Dassenvaley	T Mostert
Dasvlei	T Mostert
Mosselbank	V Loubscher
Hubertskuil	W Bester
Leeuwenkuil 937	W Dryer

SITE NAME	CONTACT
Oatlands	W Louw
Platrug	W Melk
Rondeberg Farm	WS Pretorious
Dassenburg	not known
Klein Zoute Rivier	not known
Kliprug	not known
Langerug	not known
Magrug	not known
Nooitgedacht	not known
Slagtersdam 470	not known
Spuitfontein	not known
The Farm 1419	not known
Van Schoorsdrif	not known

STELLENBOSCH MUNICIPALITY - Bottelary Hills and Renosterveld Conservancies

Sterhuis	A Kruger
Overgaauw	B van Velden
Jordan Winery	C & G Jordan
Bellevue	D Morkel
Amperbo	D Smit
Kaapzicht	D Steytler
La Provence	F Joubert
Langverwacht	F le Roux
Biebleblom	F v d Merve
Neetlingshof	H van Zyl - manager
Muldersbosch	Hydro Holdings - M Dobrovic
Fransmanskraal	J Carinus
Zevenwacht	J Johnson
Skoonheid	J Van der Westhuizen
Bonfoi	J Van der Westhuizen
Morgenson	L'Émigré
Kastaiinberg	M Neetling
Warwick	M Ratcliffe
Wolfkloof	M Scholtz
North Pine	Municipality
Saxenbeurg	N van der Merwe
By Den Weg	P Andrag
Tabanana	P Bacon
Goede Hoop	P Bestbier

SITE NAME	CONTACT
Wolwedans	P Fasen
Hazendal	R de Lange
Fort Simon	R Uys
Avalon	S Esterhuizen
Le Bonheur	S Kotze
Koopmanskloof	S Smit
Delheim/Delvera	S Sperling
Mooiplaas	T & L Roos
De Goede Sukses	not known

DRAKENSTEIN MUNICIPALITY - Groenagterberg Conservancy

Sonder Twyfel	B & S Smuts
Lupinvale	C Dickinson
Lemietrivier	F Turner
Palmiet Vallet	I Harris
Somchem Krantzkop Factory	J du Toit
Rooshoek	M Bester
Elandsberg Farms	M Gregor
Foxenberg Estate	M Hemmes
Kruishof Restante	S Japp
Boplaas	S Power

MALMESBURY MUNICIPALITY

Rotzenburg	B Doman
Kanonberg	D Koch
Swavelberg	G Damp
Malansdam	J Koch
Boschmanskloof	Malmesbury
Brakfontein	Malmesbury
Goudmyn se Berg	Malmesbury
Hartebeeesfontein	Malmesbury
Henninsberg	Malmesbury
Hoogeleggen	Malmesbury
Kasteeelberg	Malmesbury
Klipfontein	Malmesbury
Leewenkop	Malmesbury
Nooitgedacht	Malmesbury
Swartberg	Malmesbury
Wolfkop	Malmesbury

8.3 Questionnaire survey

WHAT MOTIVATES PRIVATE LANDOWNERS IN THE CAPE METROPOLITAN AREA TO SAVE RENOSTERVELD

This questionnaire is being conducted as part of a Masters thesis looking at what incentives would encourage private landowners to save renosterveld on their land.
Renosterveld is a type of fynbos that grows on more fertile soils - most renosterveld is therefore found on farms. It is now known that Renosterveld is an incredibly unique type of vegetation with many plants (mainly bulbs) that could potentially be very valuable.

Section A : FARM DETAILS

Date :

Name		
Farm Name & Address		
Business Name		
Telephone	(h)	(w)
	(cell)	(fax)
Email		
Farm size (ha)		
Erf numbers **Surveyor Generals Code**		

Please note : ***Any information you may wish to keep as confidential will be done so at your request.***

1. **What is your main type of farming ?**
   1. Vineyard
   2. Dairy
   3. Beef cattle/sheep
   4. Orchards
   5. Vegetables & fruit
   6. Grain
   7. Flowers
   8. Other (please specify) .....

2. **How long have your family or company owned this land ?**
   1. 1 – 5 years
   2. 6 – 20 years
   3. 21 – 50 years
   4. 51 years or longer

Section B: Retaining natural vegetation

3. **Approximately how much of your land is currently natural vegetation?** *(natural vegetation being both indigenous and non indigenous vegetation)*

   (hectares) .....

4. **How much of the natural vegetation on your farm is virgin land?** *(virgin meaning pristine, indigenous vegetation that has never been ploughed before)*

   (hectares) .....

5. **What is the main reason that your natural vegetation has not been ploughed ?**
   1. Poor quality soil
   2. Used for grazing
   3. Geographical (slope, mountain)
   4. Kept for conservation
   5. Development plans in process
   6. Communications/electrical installation
   7. No plans - never developed
   8. Other .....

6. **Which of the following best describe your future plans for the major part of your natural fynbos vegetation on your farm ?**
   1. No plans - leave as is
   2. Eco-tourism / conservation plan
   3. Other (please specify) .....
   4. Grazing
   5. Plough for agriculture

7. *If one could imagine all alien vegetation in your natural fynbos land being put to one side to form a dense stand* - **What percentage of the natural land would be alien vegetation?**
   1. No alien vegetation
   2. 1% - 10%
   3. 11% – 30%
   4. 31% - 60 %
   5. 61 % - 100 %
   6. Don't know

8. **How do you presently manage the removal of alien vegetation?**
   1. Do not clear alien vegetation
   2. Planned alien vegetation removal using own labour
   3. Remove alien vegetation in spare time using own labour
   4. Pay outside contractor to remove alien vegetation
   5. Obtain funds under a contractual agreement to clear alien vegetation
   6. Other (please specify) ……

The cost of natural vegetation

Please be honest this information will be kept strictly confidential

9. What are your **total costs per annum** for managing your natural vegetation? Please mark the appropriate box with an **X** or √ or if **no cost leave blank**

Cost per annum	Security	Alien veg Clearing	Fire	Fencing	Other
R1 - R 1000					
R 1001 - R 3000					
R 3001 - R 6000					
R 6001 - R 10 000					
> R 10 000					

10. What **gross income per annum** do you currently obtain from your indigenous fynbos vegetation, if any ?

R …….. (please specify) ……

11. What **gross income per annum** do you currently obtain per hectare on your productive land of similar soil types as your indigenous fynbos vegetation ?

   1. R 0 - R 5000
   2. R 5001 - R 10 000
   3. R 10 001 - R 15 000
   4. R15 001 - R 20 000
   5. > R 20 001

12. Could you potentially expect to obtain the same income from your indigenous fynbos vegetation if it was used for agriculture ?

YES NO DON'T KNOW

13. What do think would be the next best use for this fynbos land other than its current use ? ……

14. What gross income could one expect to generate from this use ? R ……

15. What **other income per annum** could you **potentially** expect to get from the indigenous vegetation on your farm (eg grazing, tourism etc)

(Approx) R ..... Please specify what for .....

(Approx) R ..... Please specify what for .....

Section C : Incentives for saving indigenous renosterveld

*The new **Property Rates Bill** taxes all properties on their market value.*
Each municipality now has the authority to reduce or increase municipal taxes.
The City of Cape Town municipality has implemented a rural rates rebate of 80%.

EXAMPLE : a monthly rates bill on a property valued at say **one million rand** is calculated as follows: -

Value of property	R 1000 000
Less R 50 000 **rebate**	R 50 000
Net value	= R 950 000

To calculate **RATES** = NET VALUE X 1,0782336 CENTS (950 000 x 1.0782336 cents)
Annual rates = R 10 243.22
Monthly rate (divide by 12) = R 853.60

*With an **80% rebate**, your rates bill on **R 1000 000** would be **R170.72 per month**.*

15. To what extent do you agree with the following statements?

	strongly agree	agree	unsure	disagree	strongly disagree
1. I am in any case likely to save the fynbos (renosterveld) on my farm					
2. The 80% municipal tax rate rebate that the City of Cape Town is giving for agricultural land is sufficient					
3. A 100% municipal tax rebate for (renosterveld) fynbos would be an incentive to save the natural indigenous vegetation on my farm					
4. Free fire protection and alien clearing would be more of an incentive to save natural fynbos than a municipal rates rebate					
5. A rate rebate for saving natural vegetation, would impress me that the local government is making a conservation effort					

	strongly agree	agree	unsure	disagree	strongly disagree
6.To qualify for a rate rebate or any conservation assistance, I am prepared to co-opt my natural land into a contractual conservation agreement					
7. I be would be prepared to sell my land with natural vegetation to a conservation agency					
8. I would be happy to allow Cape Nature Conservation or another conservation organisation to manage the natural fynbos on my property					
9. Most farmers do not have the extra finances needed for managing their natural vegetation					
10. Most farmers are conservationists at heart					

16. Incentives for conserving indigenous vegetation

Please rank these incentives on a scale from 1 -10

1 = no incentive 10 = a good incentive

1. Assistance with fire management - burning	
2. Subsided fencing costs	
3. Alien clearing at no cost to the farmer	
4. Income tax deductions for money spent on saving renosterveld	
5. Municipal rates rebates for saving renosterveld pro rata	
6. A grant or subsidy for saving renosterveld	
7. Free access or accommodation discounts to all Western Cape Nature Conservation Board (WCNCB) parks	
8. Public / community recognition for saving renosterveld (e.g. a certificate, article in magazine, etc.)	
9. An annual dinner with generous awards and prizes for farmers who have made a contribution to saving renosterveld	
10. More information on how & why we need to save renosterveld	
11. A renosterveld eco-label for all farm products grown on 'renosterveld-friendly' farms	
12. A conference/course for farmers on ecosystem management	
13. Regular visits from a conservation extension officer	
14. Free legal advice with regards to conservation matters	
15. Extra farm security	

Any other suggestions on possible incentives ?

……

Section D : Motivation to conserve renosterveld

17.1. *When you/your family think about RENOSTERVELD at its BEST - what do you see?* What are your best IMAGES or EXPERIENCES of Cape renosterveld fynbos?

……

……

……

17.2. What do you value most about renosterveld fynbos

a) on your land

……

……

b) in the Western Cape

……

……

17.3. What are the BEST reasons/ideas you can think of for **keeping** renosterveld fynbos?

……

……

17.4. What are the BEST reasons/ideas you can think of for **protecting** renosterveld fynbos?

……

……

17.5. What would be the **benefit** of saving renosterveld fynbos?

……

……

17.6. What would you like to see happen to renosterveld in the FUTURE so that your family can experience natural, indigenous Cape fynbos at its best?

……

……

……

……

17.7. What do you suggest/feel could be done to see that this happens i.e. renosterveld is appreciated by current and future generations in the Cape and South Africa?

……

……

……

……

This research is being conducted as part of a Masters thesis at the University of Cape Town.

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Thank you very much for your time and participation!

8.4 *NVivo* Categories

NVivo revision 1.2.142 **Licensee: Ruth Parker**

Project: My Project **User:** Administrator **Date:** 2006/02/13 - 09:03:07 AM

NODE LISTING

Nodes in Set: All Free Nodes

Created: 2005/11/07 - 08:24:22 AM
Modified: 2005/11/07 - 08:24:22 AM
Number of Nodes: 14

1 appreciate the beauty
Description:
I wanted to get a sense of whether farmers appreciate what they have

2 connection to farm
Description:
I wanted to see how often farmers refer back their farms

3 consequences biodiversity loss
Description:
to try and establish how often farmers refer to biodiversity loss and or the consequences. Is this important to them?

4 conservation or preservation
Description:
wonder how often farmers refer to conserve or preserve or if it is a loaded word they avoid

5 could tell a story
Description:
a code added since my last analysis and I wanted to include things that could be elaborated into a story - its the stories we need to know to inspire people

6 educate & public awareness
Description:
I wanted to get a sense of whether there is a perceived need that everyone should not only be educated, but made aware - does this relate to wanting more info

7 emotional connection
Description:
this code gives me a sense of whether the farmer is connected to renosterveld or not - of course it is entirely subjective and is based on the sense I got when I interviewed the farmers

8 fauna and flora
Description:
an indication of whether it is flowers and animals that are mentioned or more fynbos in general

9 future generations
Description:
trying to get a sense of heritage - do farmers want to preserve their land for future generations - developed because many farmers talk about 'die nageslag'

10 links with past

Description:

what links farmers to the past - apart from previous generations

11 soil erosion

Description:

conservation is preventing soil erosion to some farmers - I wanted to get a sense of whether farmers that conservation is much broader or whether it still is merely seen as soil erosion

12 specific activity to save renosterveld

Description:

speaks for itself - are farmers doing or want to do anything to try and save renosterveld

13 specific plants

Description:

want to know how many farmer are interested in the botanical side of their renosterveld. Stunning flowers in the spring is often the first thing in renosterveld to be presented to farmers - is it of interest to them?

14 financial details

Description:

any mention of money - people always believe that is all farmers want and I needed to get an idea of how money minded they are