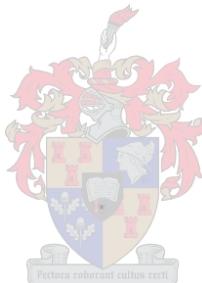


Attitudes and behaviour of landholders towards the conservation of Overberg Coastal Renosterveld, a threatened vegetation type in the Cape Floral Kingdom

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University of Stellenbosch

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Declaration

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

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Abstract

This thesis describes the findings of a survey to investigate the attitudes and behaviour of private landholders towards the conservation of Overberg Coastal Renosterveld, a highly endangered grassy-shrubland of the Cape Floral Region (CFR) lowlands, now 94% transformed. Personal interviews were conducted with 36 farmers in the Overberg region of the Western Cape, by administering a questionnaire. The following aspects were quantitatively described using the Statistical Package for Social Scientists (SPSS): renosterveld management and utilisation behaviour, perceived value of Overberg Coastal Renosterveld; landholder knowledge of its conservation importance and willingness to conserve it. Attitudes towards incentives for conservation; conservancies; and the provincial conservation authorities were also investigated. Willingness to conserve was explored further using SPSS cross-tabulation analyses. It was found that farmers who were more willing to conserve were younger, did not necessarily have a better education, and owned larger farms (> 500 ha) with a greater amount of remnant renosterveld (> 300 ha) than farmers less willing to conserve. Attitudes towards Overberg Coastal Renosterveld were largely negative, due to certain associated plants and animals which are problems for farmers, and because it is not economically advantageous to retain it. However, provision of incentives (of which assistance with fencing and land management was most attractive) and increased extension support will provide practical positive inducements for conservation. There is also a need for more landholder education regarding the scarcity of coastal renosterveld to prevent transformation of remaining fragments.

The second component of the study aimed to construct a user-friendly index to measure the conservation attitudes of landholders towards conserving Overberg Coastal Renosterveld. An iterative item analysis was executed on the data, using Spearman Rank Order correlations and Cronbach's Alpha. Results yielded an index with two dimensions and a Cronbach Alpha co-efficient of 0.67. The dimensions or components of conservation attitude towards renosterveld included: (i) a landholders' perception of the perceived benefit of Overberg Coastal Renosterveld; and (ii) their willingness to conserve it. The mean conservation attitude score was 0.6 (± 0.03), indicating that landholder attitudes were generally sympathetic towards renosterveld conservation. This suggests that while many landholders do not place a high value on Overberg Coastal Renosterveld due to its low agricultural value, their willingness to conserve it is in some cases higher than expected, which possibly explains the above-average mean conservation attitude score. An analysis of variance showed that the following variables were significantly, positively correlated with conservation attitude: (i) area of Overberg Coastal Renosterveld; (ii) landholder environmental group membership status; (iii) presence of ecotourism activities on the property; and (iv) how long the property had been in the owner's family. The intended application of the index is that index scores (amenable for use in a Geographical Information System database) can assist conservation practitioners in deciding where resources

should be allocated, on the assumption that high-scoring individuals are more likely to want to take part in conservation initiatives.

Abstrak

Hierdie proefskrif beskryf die bevindings van ‘n opname waarin die houdings en gedrag van private grondeienaars ten opsigte van Overberg Kustelike Renosterveld ondersoek word. Altesaam 94% van die oorspronklike renosterveld, ‘n hoogs bedreigde, grasagtige struikveld in die laaglande van die Kaapse Planteryk (KPR), is reeds getransformeer en verander. Persoonlike onderhoude is met 36 boere in die Overbergstreek van die Wes-Kaap gevoer en ‘n vraelys is aan hulle gestel. Die “Statistical Package for Social Scientists” (SPSS) is gebruik om die volgende aspekte kwantitatief te beskryf: die bestuur en benutting van Overberg Kustelike Renosterveld; die waarde wat toegeskryf word aan hierdie renosterveld; asook grondeienaars se kennis oor die bewaringsbelang van Overberg Kustelike Renosterveld en hul bereidwilligheid om dit te bewaar. Houdings jeens aansporingsmiddelle om bewaring te bevorder, bewareas en die provinsiale bewaringsowerhede is ook ondersoek. Private grondeienaars se bereidwilligheid om betrokke te raak by bewaringswerk is verder ondersoek deur gebruik te maak van die SPSS-kruistabelleringanalise. In vergelyking met boere wat nie bewaring ondersteun nie, is gevind dat die meer bewaringsgesinde boere jonger is, nie noodwendig ‘n beter opvoeding het nie, en groter plase (>500 ha) besit waarop meer brokkies oorblywende Overberg Kustelike Renosterveld (>300 ha) gevind word. Grondeienaars se houding jeens Overberg Kustelike Renosterveld was grootliks negatief. Dit is as gevolg van sekere verwante plante en diere wat deur boere as probleme ervaar word, en omdat dit nie ekonomies lewensvatbaar is om renosterveld te behou nie. Die beskikbaarheidstelling van aansporingsmiddelle (waarvan hulpverlening met omheinings en grondbestuur die aantreklikste was), en ‘n toename in landbou-voortligting is egter praktiese en positiewe dryfvere wat bewaring kan bevorder. Daar is ook ‘n behoefte vir meer opvoeding van grondeienaars oor aspekte soos die skaarsheid van Overberg Kustelike Renosterveld, sodat die verdere transformasie van oorblywende fragmente voorkom kan word.

Die tweede gedeelte van die studie was daarop gemik om ‘n gebruikersvriendelike indeks te ontwikkel waarmee die bewaringsgesindheid van grondeienaars teenoor die bewaring van renosterveld gemeet kan word. Deur gebruik te maak van Spearman se rangorde-korrelasies en Cronbach se Alpha is die data aan ‘n herhalende item-analise onderwerp. Die resultate het ‘n indeks met twee dimensies en ‘n Cronbach Alpha-koeffisiënt van 0.67 gelewer. Die dimensies of komponente van bewaringsgesindheid jeens renosterveld het onder meer ingesluit: i) ‘n grondeenaar se opvatting oor die moontlike voordeel van Overberg Kustelike Renosterveld en ii) sy/haar bereidwilligheid om dit bewaar. Die gemiddelde telling vir bewaringsgesindheid was 0.6 (± 0.03), wat in die algemeen ‘n simpatieke houding jeens die bewaring van Overberg Kustelike

Renosterveld onder grondeienaars aandui. Hiervolgens blyk dit dat alhoewel heelwat grondeienaars weens die lae landbouwaarde van renosterveld nie 'n hoë waarde op hierdie plantegroeitipe plaas nie, hulle bereidwilligheid om dit te bewaar soms verwagtinge oortref. Dit is dalk 'n moontlike verklaring vir die bo-gemiddelde gemiddelde bewaringsgesindheidstelling. 'n Variansie-analise het 'n noemenswaardige, positiewe korrelasie met bewaringsgesindheid ten opsigte van die volgende veranderlikes getoon: i) area van Overberg Kustelike Renosterveld; ii) die grondeienaar se moontlike lidmaatskap van 'n bewaringsgroep; iii) die teenwoordigheid van ekotoerisme-bedrywighede op die eiendom; en iv) die tydperk wat die eiendom al in besit van die grondeienaar se familie is. Die voorgestelde gebruik van die indeks is toepaslik omdat die indeks-tellings (wat vir gebruik in 'n Geografiese Inligtingstelsel databasis aangepas kan word) bewaringslui kan help met besluite rondom die toekenning van hulpbronne. Die aanname is dat individuele grondeienaars wie hoë tellings aangeteken het, met alle waarskynlikheid meer geredelik aan bewaringsinisiatiewe sal wil deelneem.

Dedication

This thesis is dedicated to family and friends who supported me throughout the long writing process,
especially my Mom.

May God receive all honour and glory for enabling me to complete this thesis,
for He alone is the source of all wisdom and strength.

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CHAPTER 1

General Introduction

1.1 Introductory remarks

This thesis represents a multidisciplinary investigation of the status quo with regards to the attitudes and behaviour of private landholders towards coastal renosterveld in the Overberg within the Western Cape Province. The findings of a survey conducted amongst 36 landholders (representing 40 farms) using personal interviews is presented in Chapter 2. Chapter 3 explores a method for measuring landholder conservation attitudes and presents the resulting index scores for the landholders interviewed in the study sample. Chapter 4 contains concluding remarks on the validity of the findings, recommendations for a new approach to conservation extension, and recommendations for future research. The thesis has been written in paper format, so that Chapters 2 and 3 (once further abridged) can be submitted to *Biological Conservation*, which accounts for any repetition between chapters. For this reason, all formatting and layout is in accordance with the instructions to authors of *Biological Conservation*. The thesis is also written for an intended audience of conservation biologists, conservation planners, managers within conservation agencies, nature conservation extension officers and environmental policy makers.

There are two main emphases that run throughout the four chapters of the thesis, which are defined as follows:

- 1.) **Private landholders (i.e. landowners and managers).** Commercial farmers were chosen for investigation because they own and/or manage the largest proportion of rural land in South Africa (McDowell, 1988). Furthermore, approximately 80% of the country's most scarce and threatened natural habitats is privately owned by the agricultural community (Botha, 2001b). There is therefore a growing national realization that the future conservation or destruction of threatened ecosystems, such as coastal renosterveld, lies predominantly in the hands of private landholders.
- 2.) **Overberg Coastal Renosterveld.** This is a vegetation type described by Cowling and Heijns (2001) that is part of the Fynbos biome, and which has been largely replaced by cultivated lands in the south west and south east lowlands of the Western Cape Province. It is one of the most threatened and poorly protected vegetation types in the Cape Floral Region (CFR), with 94% of its original extent being transformed (Von Hase et al., 2003). Coastal Renosterveld has been identified as 100% irreplaceable by the Cape Action Plan for People and the Environment (C.A.P.E.) (Cowling et al., 1999), which means that all remaining areas are

required to meet the target of 25% of the original extent of lowland renosterveld. Coast¹ Renosterveld broadly includes Overberg, Swartland and Boland Coastal Renosterveld, which have the same critical conservation status. The same is not true for all the renosterveld types, especially inland renosterveld associated with mountainous terrain (Rouget et al., 2003).

Renosterveld has been used for natural grazing for centuries by livestock belonging to Khoi-Khoi pastoralists, and later to Dutch settlers (Kemper et al., 1999). Mechanisation after World War I facilitated large-scale, intensive agriculture, and an estimated 160 000 ha of lowland natural vegetation was transformed to cereals and artificial pastures between 1918 and 1990 (Hoffman, 1997). Renosterveld is a fire-prone, small-leaved, grassy shrubland 0.5 to 2m tall (Low and Rebelo, 1986). Renosterveld is renowned for its spectacularly rich geophyte flora (Cowling, 1990) and is largely associated with shale-derived, fertile soils, making this vegetation type highly suitable for agricultural production. *Elytropappus rhinocerotis* (renosterbos) frequently dominates renosterveld, although this is usually due to past disturbance. Proteaceae, Ericaceae and Restionaceae, which are three typical fynbos families, tend to be absent in renosterveld, or are present at very low abundances (Low and Rebelo, 1996). Overberg Coastal Renosterveld is mostly confined to the semi-arid to sub-humid (350-600 mm/year) coastal forelands of the Cape Floristic Region (Kemper et al., 2000).

The remaining areas of coastal renosterveld are small fragments scattered throughout agricultural lands, which exist in varied levels of degradation and are under constant threat of being cleared for new agricultural lands or other development. Disturbances which have degraded many remnants include grazing, trampling, edge effects such as alien grass invasion, crop spraying and frequent fires (Kemper et al., 1999).

Remarkably, plant species composition in small remnants of Overberg Coastal Renosterveld appears unaffected, relative to that on extensive tracts of habitat, suggesting that these remnants still have a role to play in species-level conservation (Kemper et al., 1999). However, it is not cost-effective to establish statutory reserves seeing as most of the lowland remnants are very small (Frazee et al., 2002). In addition many landholders may be unwilling to subdivide their properties by selling off sections. Conserving renosterveld is unattractive to landholders for two reasons: because they occur on very productive soils, renosterveld areas have a high utility for conventional agriculture. Secondly, there is an absence nowadays, of the traditionally more popular indigenous large mammal component from renosterveld areas, and therefore returns from ecotourism and wild animal products are low. For these reasons, conservation of fragments is only likely to be achieved by a combination of measures outside of formal, statutory reserves supported by a rigorous information campaign (Gelderblom et al., 2002).

¹ Coastal Renosterveld is referred to as Lowland Renosterveld by Von Hase et al. (2003) in the Cape Lowlands Project. At the time of writing, authors of the new National Botanical Institute vegetation map had not decided which nomenclature would be used (i.e. Coast Renosterveld or Lowland Renosterveld).

1.1.1 Aims and objectives

The **general aim** of this thesis was twofold:

- (i) To deepen an understanding of landholder attitudes and behaviours towards Overberg Coastal Renosterveld, and other conservation-related aspects
- (ii) To measure the attitudes of landholders towards Overberg Coastal Renosterveld by the construction of a conservation attitude index.

The **aim of chapter 2**, was to investigate the attitudes of landholders towards:

- i.) Overberg Coastal Renosterveld (in terms of a landholder's knowledge, perceived benefit and willingness to conserve this habitat); and
- ii.) Conservation tools (such as incentives, conservancies² and provincial conservation authorities)

Landholder behaviours were also investigated regarding the retention, use and management of Overberg Coastal Renosterveld by investigating how much renosterveld is left on their properties, why it was retained, what it is currently used for and how it is managed. These attitudes and behaviours were investigated by means of a questionnaire that was administered during personal interviews.

The **aim of chapter 3** was to develop a quantitative method for measuring the attitude of landholders towards Overberg Coastal Renosterveld conservation by compiling one, all-encompassing index, amenable for use in a Geographical Information System (GIS) system. The data collected by means of the questionnaire in Chapter 2, was used to compile the index. A determination of the underlying components of conservation attitude, as well as a determination of how other demographic variables of landholders are empirically related to conservation attitude accompanied the process of constructing an index. The second aim of the study was to consider the applications of a Conservation Attitude Index for informing the extension strategy of conservation authorities for privately owned land.

Originally the intention of Chapter 3 was to compile an index to reflect the vulnerability of Overberg Coastal Renosterveld to future transformation, which was thought to be determined by the characteristics of the landholder and his/her intentions and future plans for transforming or developing the land. The rationale for this original intention was borne out of a review of conservation planning literature. In conservation planning two characteristics are commonly used to prioritize an area of land in terms of the necessity for formal protection or improving its conservation status, namely irreplaceability and vulnerability (Pressey and Taffs, 2001). Irreplaceability of that land unit refers to the likelihood that an area will be needed to contribute to a set of conservation targets nominated for the region's biodiversity features. Vulnerability of land refers to the

² Conservancies are areas of land that are managed through the voluntary, co-operative agreement of the landholders, community and users themselves, in respect of which registration has been granted by the relevant provincial nature conservation authority (KZNCCS, 1999).

likelihood or imminence of destruction or alteration of native vegetation, based on known threats (Pressey and Taffs, 2001). Currently no conservation planning exercise has attempted to express vulnerability of land based on the attitudes or development intentions of the holders of that land, and therefore a single quantitative expression of renosterveld vulnerability would provide a valuable contribution. However, the results of the item analysis discussed in section 3 of Chapter 3, showed that this was not statistically possible using the questionnaire that was developed. For this reason, the purpose of the index became to measure of the conservation attitude of landholders and not the vulnerability of the land to future transformation.

1.1.2 Broad Rationale

Within the Western Cape, coastal renosterveld occurs naturally in two regions, namely the West Coast and the Overberg. The renosterveld that occurs on the West Coast has been the subject of more research compared to the Overberg. Furthermore, Overberg Coastal Renosterveld has been identified as one of the seven most threatened broad habitat units in the Cape Floral Region (CFR) by the C.A.P.E. programme (Cowling and Heijnis, 2001). For these two reasons, the Overberg was selected as the broad study area for this investigation. From here on, Overberg Coastal Renosterveld will be referred to as Ov. Coastal Renosterveld. Furthermore, use of the term ‘renosterveld’ with regards to the two study areas generally implies Overberg Coastal Renosterveld, if not specifically stated as such.

Conservation priorities have been identified at a fine-scale within the Overberg and the West Coast by the Cape Lowlands Project, initiated by the Cape Conservation Unit (CCU) of the Botanical Society of South Africa (Von Hase et al., 2003). Conservation planning expertise has been used to prioritise which of the Coastal Renosterveld remnants are the highest priority for conservation, based on criteria of biodiversity patterns and ecological processes. However, up to now no consideration has been given to the attitudes of Overberg farmers (who own the majority of the remnants) towards Coastal Renosterveld and their willingness to conserve it. Farmer attitudes and conservation behaviour have been investigated in parts of the West Coast by McDowell (1988). It is critical that landholder attitudes are adequately understood because their attitudes can either provide important opportunities or constraints for implementing conservation plans and strategies in the area.

While understanding landholder attitudes represents a very important first step for conservation efforts on private land, the end goal for nature conservation is to ultimately change landholder behaviour, in order for biodiversity to be conserved and managed sustainably. The question therefore arises: do attitudes predict behaviour? Attitudes do provide valuable clues about behaviour that can be expected, but there has been much controversy over the ability of attitudes to predict behaviours (Steel, 2000; Shipworth, 2000). However, in the case of highly endangered ecosystems whose future existence depends on the decisions and actions taken by landholders, time is of paramount importance. Therefore, it may be justified to use

landholder attitudes to help predict their conservation behaviour, so that action can be taken in the areas that are most critical. The action referred to in this context could include entering into agreements with landholders for managing remnants, restricting land use, and as a last resort buying development rights.

1.1.3 Key concepts

Attitudes refer to very general evaluations that people hold of themselves, other people, objects and issues. People's attitudes can be based on i.) feelings; ii) cognition or beliefs and knowledge; iii.) behaviours or actions; or iv.) some combination of these elements (Petty, 1995). Concerning the conceptualisation of the term *attitude*, two schools of thought can be distinguished. According to Brehm and Kassin (1990), one approach referred to as the tricomponent view, is to view an attitude as a combination of affective, cognitive and behavioural reactions to an object. However, sometimes what people feel is not necessarily related to what they think, nor do feelings necessarily determine actions. Because of this lack of consistency, many social psychologists prefer to define attitudes in strictly affective terms. According to this single-component definition, an attitude is simply a positive or negative evaluation, at some level of intensity, toward an object (Deaux et al., 1993). Thus an attitude is purely a matter of the heart.

A distinction must be made with opinions and values, which are often used interchangeably with attitude. Oskamp (1977) notes that opinions are generally narrower in content or scope than the broad evaluative orientation, which we call an attitude, and they are primarily cognitive rather than emotion-laden. Opinions therefore, have more to do with judgments about the likelihood of events and relationships than a person's wishes and desires about events and relationships. An opinion or perception, therefore, reflects what an individual thinks about an event or situation (Kotze and Masutha, 2002). A value on the other hand, is a broad, abstract goal that lacks a specific object or reference point, such as the values of freedom or bravery (Deaux, et al., 1993). Attitudes, beliefs, values, personality traits, predispositions and the like, are collectively referred to as orientations (Babbie and Mouton, 2001). While individual people may be the unit of analysis in a study, orientations are normally the point of focus.

Applying Petty's (1995) broad definition of attitude to the context of conservation, conservation attitude could be regarded as the general evaluations that people hold of themselves either as careful custodians or rightful owners of their natural resources; other people or officials involved in conservation; and issues such as resource use, conservation projects and environmental problems. McDowell (1988) defines conservation attitude as "the expressed positive attitude towards the principle of conservation of natural ecosystems". The guidelines he provides for assessing conservation attitude include two aspects: the extent of a persons' understanding of general nature conservation principles; and the receptiveness of these people towards ideas and suggestions regarding their natural lands. However, because attitudes can be multi-faceted, an adapted version of Petty's (1995) definition and McDowell (1988) definition, were both considered to be insufficient

in describing the components of conservation attitude. For this reason, a number of attitude components were investigated in Chapter 3 of this thesis, (i.e. knowledge, perceived benefit and willingness to conserve) in order to improve the understanding of what comprises peoples attitudes towards conservation.

In contrast to an attitude, a behaviour is an observable action (Gray, 2002). However, the definition for conservation behaviour is less clear-cut. McDowell (1988) in his study of the factors affecting the conservation of renosterveld on the West Coast, produced a definition for conservation behaviour. According to McDowell (1988), conservation behaviour is the positive action taken by the landholders towards the conservation of natural ecosystems, particularly those on their own properties. Such positive actions include a collection of the following four criteria:

- (i) The extent of natural habitat retained at least for the part for ecosystem conservation
- (ii) The sacrifice of alternate commercial ventures which may have resulted from the retention of natural habitats
- (iii) The degree to which the ecosystems are scientifically managed to ensure continued survival of the natural elements
- (iv) The willingness to continue the actions in i), ii) and iii) into the indefinite future.

McDowell (1988) states that the definition he provides could be extrapolated to other threatened and highly diminished ecosystems under private ownership. However, this thesis has not adopted McDowell's definition as a working definition, and has not specifically set out to investigate conservation behaviour according to the four criteria described above.

Willock et al., (1999) measured environmentally-orientated behaviour amongst farmers in Edinburgh, and provided the following observations of what constituted environmentally-orientated behaviour. High scoring individuals were likely to be active in conservation, to be members of conservation organisations, to welcome members of the public on to their land, and to have undertaken some management on their farm in the last five years which would enhance its conservation status, e.g. replaced hedges, and/or habitat creation.

Ferrar (1983) refer to conservation behaviour as a discipline of its own, which includes more than just positive action taken by landholders, as referred to by McDowell (1988). Conservation behaviour can include the study of human motivation and conservation ethics and the formation and understanding of human attitudes and values. In short, conservation behaviour is the study of the human behaviour/natural environment relationship (Ferrar, 1983), to which this thesis is making a contribution.

1.2 Literature Review

1.2.1 The link between attitudes and behaviour

Within social psychology, people's attitudes and behaviours are modelled by the Theory of Reasoned Action (TRA) (Fishbein and Azjen, 1975) (Fig. 1.1). According to this theory, the immediate cause of behaviour is behavioural intention, a conscious decision to engage in a certain action. The expressed willingness of a person to act in a certain way can also be regarded as part of behavioural intention. This theory argues that behaviour is best predicted by a person's intentions, which are in turn affected by his/her attitudes and the influences of significant others on their intention to act, referred to as subjective norms (Bohner and Wanke, 2002). Fishbein and Azjen (1975) define attitudes as the product of (i) beliefs individuals hold about the outcomes of behaving in a certain way; and (ii) how they evaluate those outcomes. Beliefs can also be based on information, hearsay, experience and implied knowledge (Bohner and Wanke, 2002). Although the TRA is still widely used, its critics suggest that the theory is inadequate in some areas. These criticisms are directed at the exclusion of other external variables like personality traits, habits, demographic variables or environmental variables which are known to influence behaviour directly, and not through their influence on the proximal determinants of attitude and subjective norms (Willock et al., 1999).

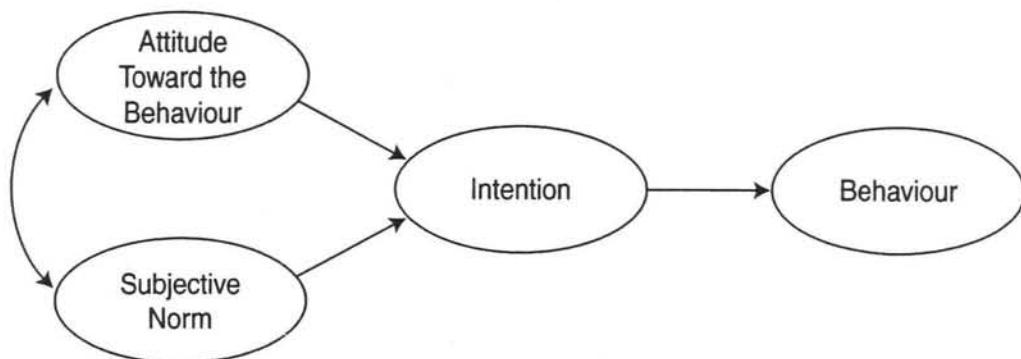


Fig. 1.1. Schematic depiction of the Theory of Reasoned Action, adapted from Fishbein and Azjen (1975).

Such shortcomings lead to the extension of the TRA by Azjen and Madden (1986) and the formulation of the Theory of Planned Behaviour (TPB). This theory features an additional predictor variable: perceived behavioural control, which was conceptualised as the perceived ease or difficulty with which the intended behaviour can actually be performed (Fig. 2). The results of Azjen and Madden (1986) suggest that the TPB is superior to the TRA, especially when the behaviour under study is hard to perform. As can be expected, the relative importance of attitudes, subjective norms and perceived control will vary from issue to issue (Deaux et al., 1993).

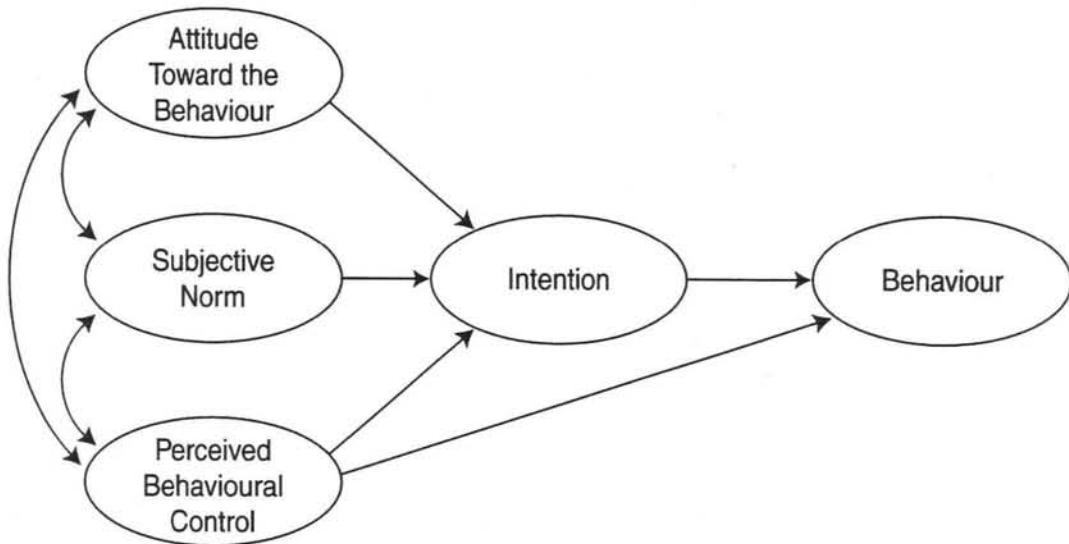


Fig. 1.2. Schematic depiction of the Theory of Planned Behaviour, adapted from Ajzen and Madden (1986).

Both the TRA and TBH have been used in a number of studies in order to explain farmer decision-making processes in relation to conservation. Pample and van Es (1977), Lynne and Rola (1988) and Carr and Tait (1991) used the TRA in order to understand conservation-oriented landholder behaviour. Beedell and Rehman (1999; 2000) used the TPB to provide valuable insight into farmer's decision-making processes and their conservation behaviour and explain why farmers behave the way they do. However, these models are more useful for predicting behaviours, than describing attitudes which is why the TRA and TPB was not used as the theoretical framework for measuring attitudes in Chapter 3.

However, the components of the TRA and TPB can be used to postulate why the loss of lowland renosterveld habitats in South Africa (e.g. Overberg Coastal Renosterveld) has most likely been occurring, in the following manner:

- Due to ignorance about the conservation value and scarcity of Coastal Renosterveld, landholders do not believe that cultivating a new field will have any significant consequences (i.e. beliefs about the consequences of the behaviour)
- An evaluation of the possible outcomes will normally hinge on the economic implications of the decision, and so the need to earn an income from a cash crop normally dictates the final outcome. Furthermore, Coastal Renosterveld normally only occurs on fertile soils that are needed for agriculture (i.e. evaluation of the possible outcomes)
- Due to the low levels of awareness about Coastal Renosterveld, other farmers in the area are not likely to exert any social pressure for not ploughing new land. Furthermore, due to the shortage of extension officer-landholder interactions, there is no motivation to comply with the expectations of relevant conservation agency (i.e. subjective norms)

- Finally, there is a lack of capacity to monitor and prosecute the unlawful cultivation of new lands where no application was made for a permit. Therefore legislation exerts no control over behavioural intentions (i.e. behavioural control).

1.2.2 International landholder attitude and behavioural investigations

Within the field of environmental conservation on agricultural land, one of the areas that the assessment, interpretation and prediction of human attitudes and behaviour has been applied to, is what influences landholder attitudes and farmer decision-making. Battershill and Gilg (1997) investigated which range of circumstances, structural or attitudinal, most influence landholder decision-making amongst 122 farms in the southwest of England. Structural factors include external factors such as government policies, economic constraints, family structure, socio-economic circumstances and geographical factors. There is a frequent assumption that economic constraints have the final say in determining farmer decision-making. However Battershill and Gilg's (1997) study showed that the influence of attitudes on farmers' behaviour and decision-making was considerably stronger than the influence of any structural influences, including that of financial constraints. This finding points to the importance of understanding landholder attitudes in order that they might be positively changed, a finding that reinforces the rationale for this thesis.

Lemon and Park (1993) concluded that farmers, when trying to achieve good practice on their farms, balance environmental, physical and commercial factors in their decisions about farming. Potter (1986) found that any change in landuse on private farm land is both 'determined' by policy, institutional and family influences and 'intentioned' by the farmer and his attitudes acting as a problem-solving individual. Clarke (1989) refer to three distinct dimensions affecting farmer's decisions of whether to implement advice about conservation, namely: external policy; advice structures; and the personality of the decision-maker. In this way it can be seen that almost all studies related to the motivational elements of behaviour have stressed that the decision to act in a certain way is affected by a balancing or 'weighing' of a number of influences. Examples of studies that have investigated what influences landholder attitudes are provided in the introduction of chapter 3 and are therefore not repeated here.

1.2.3 Local landholder attitude-behaviour studies

Within the South African context, a survey of literature by Ferrar (1983) revealed that very few in-depth analyses on private landholders' conservation behaviour have been carried out locally. For this reason, Ferrar (1983) conducted an investigation into the status of research regarding conservation behaviour in South Africa and proposed a conceptual framework for determining research priorities in this study field. Ferrar (1983) identified seven topics related to sociological structures that could also result unintentionally in behaviour that has environmental consequences including: religion or belief systems; traditions or customs;

politics; poverty; lack of resources; affluence, competing interests and ethics (e.g. the economic growth ethic, the rise in living standards ethic).

Locally, the work of Clive McDowell between 1986 and 1989 has made the largest contribution to the study of conservation behaviour in South Africa, and is the only study focussed on rare habitats. McDowell published four papers (McDowell et al., 1986a,b; McDowell et al., 1989a,b) on various aspects of the factors affecting conservation of West Coast Renosterveld by private landholders. McDowell's (1988) research was restricted to West Coast Renosterveld areas where the relationship between conservation behaviour and four categories of variables (namely demographic, land use, psycho-social and conservation strategy) were tested using various correlation and regression methods. A model was derived for predicting the conservation behaviour of farmers' who have West Coast Renosterveld on their properties, by using the variables chosen (McDowell et al., 1989a). It must be remembered that McDowell's (1989a) model parameters were determined in a very different socio-economic and political climate during the late 1980's when agricultural support, price controls and marketing boards were in place, while labour issues and tenure security were of less importance than at present. Although McDowell used quantitative techniques to analyse the data, a qualitative approach was used to collect the data, by means of in-depth, personal, open-ended interviews that were tape-recorded. Apart from the derivation of a conservation behaviour predictor model, the main contribution of McDowell's work was the method he derived for rating 'less tangible' variables – i.e. those variables for which it is difficult to assign a numerical value. To these ends, McDowell (1988) used two student assistants to independently analyse the tape-recorded interview material. For each of the 52 independent variables that were analysed, landholder responses were given a subjective, ordinal rating, although no tie rankings were allowed. Observer rankings were then averaged for each variable. Furthermore, with his inductive mode of enquiry, the 52 variables that he tested became suitable descriptive variables or hypotheses that could be tested in future studies. McDowell's (1988) findings indicated that many varied factors are correlated with the conservation activity of landholders such as *inter alia* categories of education, affluence, language and type of agriculture practised (McDowell, 1986b). Certain of McDowell's (1988) hypotheses inspired the selection of variables in this study.

However, after McDowell's (1988) contribution, only one other Cape province-based study was undertaken in the 20th century on the situation of conservation behaviour on private land. This work was done by Van Zyl in 1999, nearly a decade later. A few other works outside of the Cape were undertaken in the late 1980's and 1990's, on landholder attitudes to various conservation aspects, such as Benson (1988), Botha (1991) and Brand (1994). Since the start of the 21st century, two other conservation studies have been initiated in South Africa relevant to conservation on private land. Savy (2003) focussed on the role of economics, incentives and attitudes with regards to the conservation of Wattled Cranes on farms in KwaZulu-Natal. Parker (in preparation) has initiated a study in 2003 on the potential of rates rebates as an incentive to promote the conservation of Coastal Renosterveld on farms within the Cape Metropolitan Area.

A review of two of the most pertinent South African landholder attitude studies, besides McDowell (1988), is provided below. Van Zyl (1999) conducted an extensive mail questionnaire survey amongst 2379 farmers, to investigate the opinions of farmers in the three Cape provinces (Northern Cape, Western Cape and Eastern Cape) towards diverse topics linked to conservation on private land. Data were analysed to determine differences in farmer's opinions between (1) farmers that live in the six different biomes that occur within the Cape Province (namely the Succulent Karoo, Nama Karoo, Grassland, Moist Savanna, Dry Savanna and Fynbos), and (2) between farmers who did or did not officially conserve. Unfortunately no data was collected on attitudes to renosterveld specifically, although renosterveld is included as one of the Fynbos biome vegetation types. Van Zyl (1999) found that many of the responses received were unique to the biome in which the farmer was situated. For this reason he stressed the importance of tailor-making conservation strategies according to the unique characteristics of different regions. This finding provides further support for why an assessment of landholder opinions in select portions of the Overberg must precede any form of implementation of conservation plans for the area. In general a very low level of conservation on private lands was observed in all the provinces, especially regarding conservancies. Van Zyl (1999) came to the conclusion that in order for conservation on private land to be improved, the attitudes, management approaches and needs of farmers must be understood.

Botha (1991) investigated farmer's conservation behaviour in selected areas of four magisterial districts (namely Britstown, Postmasburg, Fauresmith and Dwaalboom) in the Northern Cape that were regarded as ecologically sensitive by personally interviewing 79 farmers. Botha (1991) used a quantitative approach to identify the causes of their behaviour by means of determining their perceptions and attitudes towards conservation, as well as the conservation status of the natural resources on their farms. The relationship between the status of natural resources on the farm and the implementation of conservation practices was found to be significant. Botha (1991) concluded that any scientific goal-orientated behavioural change (such as conservation behaviour) can only be brought about by the identification and purposeful addressing of the various field forces (such as needs, perceptions and knowledge) that affect behaviour.

1.2.4 Conservation Tools for influencing attitudes and modifying behaviours

1.2.4.1 Incentives

It is an unfortunate reality that the current situation in South Africa is not very favourable for landholders who wish to set aside land for conservation. There is little government support at local or provincial level for conservation on private land, and no financial incentives currently exist that can be offered to landholders in exchange for foregoing development. On the contrary, a number of disincentives are still operational, such as diesel rebates and higher tax on unworked land, which makes land conservation a sacrificial and costly act for landholders (Botha, 2001a). Furthermore, relational damage has been done in the past between

conservation authorities and farmers, where the “big-stick” approach for enforcing regulations has resulted in landholders’ disillusionment with conservation agencies.

Conservation on private land requires a different approach from traditional conservation on largely contiguous reserves. Botha (2001a) maintains that providing the correct incentives for landholders to modify behaviour may be far cheaper and effective than enforcing regulations. Incentives are measures that positively influence the way people think or behave and include the following types (Botha, 2001a):

- Motivational incentives that focus on education and communication by appealing to people’s basic nature to conserve
- Voluntary incentives that provide recognition for doing “the right thing”
- Property or rights-based incentives that add value or use-rights to property in exchange for a commitment to conservation
- Economic incentives that translate into direct or indirect financial rewards and may take the form of tax relief, cash grants and subsidies (e.g. fire management with public conservation funds)
- Regulatory incentives that are precautionary standards to protect against biodiversity loss.

Botha (2001a) has extensively researched the incentive needs of landholders in the Cape Floral Region by drawing on research from international authors (Young et al., 1996; Perring, 1997; Bowers, 1999; Emerton, 2000). Incentives and compensatory mechanisms have been grossly neglected in South African law and require robust guiding principles (Glazewski, 1986). Botha (2001a) proposes that a range of incentive options must be offered to South African landholders to cater for the diversity of landholder needs, tenure relationships and ownership scenarios. A guiding principle should be that the level of financial (or other) incentives for conserving land must increase in conjunction with the biodiversity value and the long-term protection enjoyed by the land (Botha, 2001a).

1.2.4.2 Conservation extension

The use of conservation extension officers (which include the positions of ‘Community Conservators’ and ‘Conservation Service’ staff within the WCNCB) to provide advice and support to landholders through personal communication has significant potential for influencing farmer’s attitude and changing their behaviours. The potential of this tool has been largely untapped in South Africa and McDowell (1988) contends that there is a general dearth of extension-related research in South Africa (McDowell, 1988). McDowell (1989a) provides general guidelines for optimal interaction with landholders to create a good impression on subjects and steer their decision-processes towards improved conservation. These generalizations are highly relevant to this study, and are discussed in more detail in the concluding chapter. A valuable contribution to extension research is provided by Barrett (1991) who investigated the role of nature conservation law enforcement officers as facilitators of environmental education. Barrett (1991)

examined the attitudes of law enforcement officers towards their dual duties of enforcing laws and providing extension services. Requirements for effective agricultural extension work (the general principles of which are also applicable to conservation extension work) have been investigated by Australian authors, Fell (2000) and Frost (2000), while Murray (2000) provides an evaluation of different extension approaches such as participatory extension approaches.

1.3 General Approach

The attitudes and behaviours of a sample of landholders who still have Ov. Coastal Renosterveld on their properties were surveyed by means of personal, semi-structured interviews with a random sample of 36 Overberg landholders. The data collected in the survey was used not only for descriptive purposes (in Chapter 2), but also to empirically construct an index for measuring the conservation attitudes of landholders (in Chapter 3). Within the Overberg, two smaller sample areas were selected for study, namely an area near the town of Bot River referred to as 'Bot River', and an area between the towns of Bredasdorp and Swellendam referred to as 'Suikerkankop' in this study. The actual selection of the location of the two areas was made with the input of the Cape Conservation Unit (CCU) of the Botanical Society of South Africa who have recently completed extensive botanical field work in the Coastal Renosterveld areas of the Overberg for the Cape Lowlands Project, funded by the World Wildlife Fund. According to the CCU, the selected study areas of Bot River and Suikerkankop contain some of the largest, and most ecologically important Ov. Coastal Renosterveld fragments in the region, and are likely to become target areas in the near future for the implementation of various conservation plans and projects (Von Hase et al., 2003). Approximately half of the interviews were conducted between June and July 2002, while the other half were conducted in late August and September of the same year. No interviews were planned prior to June or after September as these are very busy harvesting seasons for farmers in the Western Cape.

1.3.1 Justification

The intention of focussing on what landholders think, feel and do regarding Ov. Coastal Renosterveld is that the understanding gained will inform strategies for:

- (i) engaging with landholders that own and manage remaining, threatened Ov. Coastal Renosterveld fragments;
- (ii) fostering greater co-operation between landowners and authorities
- (iii) expanding conservation efforts on private land in general.

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CHAPTER 2

A case study of landholder attitudes and behaviour towards the conservation of Renosterveld, a threatened vegetation type in the Cape Floral Kingdom

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2.1 Abstract

This paper describes the findings of a survey to investigate the attitudes and behaviour of private landholders towards the conservation of Overberg Coastal Renosterveld, a highly endangered grassy-shrubland of the Cape Floral Region (CFR), currently 96% transformed. Personal interviews were conducted with 36 (predominantly cereal and sheep) farmers in the Overberg region of the Western Cape, by administering a questionnaire. The following aspects were quantitatively described using the Statistical Package for Social Scientists (SPSS): renosterveld management and utilisation behaviour, perceived value of renosterveld; landholder knowledge of the conservation importance of Overberg Coastal Renosterveld and their willingness to conserve it. Attitudes towards incentives for conservation; conservancies; and the provincial conservation authorities were also investigated. Willingness to conserve was explored further using SPSS cross-tabulation analyses. It was found that farmers who were more willing to conserve were younger, did not necessarily have a better education, and owned larger farms (> 500 ha) with a greater amount of remnant renosterveld (> 300 ha), than farmers less willing to conserve. Attitudes towards Overberg Coastal Renosterveld were largely negative, due to certain associated plants and animals which are problems for farmers, and because it is not economically advantageous to retain it. However, provision of incentives (of which assistance with fencing and land management was most attractive) and increased extension support will provide practical positive inducements for conservation. There is also a need for more landholder education regarding Coastal Renosterveld scarcity to prevent transformation of remaining fragments.

Keywords: Overberg Coastal Renosterveld, landholders, attitudes, willingness to conserve, incentives

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2.2 Introduction

In the past decade, conservation efforts in South Africa have become increasingly directed towards initiatives focused on private land, for the effective preservation of the country's biodiversity. This shift in focus has been prompted by shrinking budgets, lack of capacity and competing socio-economic priorities, which are limiting the expansion of the formal conservation network on reserves (Botha, 2001a). It has been recognised that the existing reserve system can be effectively expanded through the conservation of land "off" reserves including farms, rural areas, urban and peri-urban areas (Milton and Davies, 1994). The agricultural community privately owns about 80% by area of the most scarce and threatened habitats in South Africa, in terms of vegetation type (Botha, 2001b). This implies that the future conservation or destruction of threatened ecosystems lies predominantly in the hands of farmers and private landholders. It is therefore important that conservation planners and authorities who work with farmers understand the values and goals they are bringing to the planning table, since these important human qualities underpin most decisions made and actions taken (Fell, 2000). However, of all the facets of environmental conservation, the human attitudinal and behavioural components are the least understood and the least researched (Ferrar, 1983). So why are nature conservation researchers so reluctant to focus on people? This question, posed by Ferrar in 1983 is still relevant to the South African situation nearly two decades later. A review of the local literature shows that very few studies have addressed farmer's attitudes and behaviours towards conservation in South Africa.

Locally the work of Clive McDowell between 1986 and 1989 has made the largest contribution to the study of conservation behaviour in South Africa. McDowell published four papers (McDowell et al., 1986a,b; McDowell et al., 1989a,b) on various aspects of the factors affecting the conservation of renosterveld on the West Coast of the Cape Province. Renosterveld (Acocks veld type 46, Acocks, 1988) is a distinctive grassy-shrubland vegetation that occurs on fertile soils highly favourable for agriculture. This is why only 5-6% of the original extent of the lowland form of this vegetation type (i.e. Coastal Renosterveld) remains (Von Hase et al., 2003). As such, Coastal Renosterveld is one of the most poorly protected veld types in the Cape Floral Region (CFR) and the most reduced habitat type in South Africa (McDowell, 1989a). The current proportion of Coastal Renosterveld that is formally conserved in statutory reserves is an alarming less than 1% (Von Hase et al., 2003) making conservation of this vegetation type on private land a high priority.

However, after McDowell's (1988) work, only two other studies, namely Botha (1991) and Van Zyl (1999), have been undertaken in the 20th century on issues pertaining to conservation on private land in the Cape Province. A few other works on landholder attitudes towards various conservation aspects were undertaken in the late 1980's and 1990's in other South African provinces by researchers such as Benson (1988) and Brand (1994). Since the turn of the 21st century, two other studies have been initiated in South Africa relevant to conservation on private land and conservation behaviour. Savy (2003) focussed on the role of

economics, incentives and attitudes with regards to the conservation of Wattled Cranes on farms in KwaZulu-Natal. Parker (in preparation) initiated a study in 2003 on the potential of rates rebates as an incentive to promote the conservation of Coastal Renosterveld on farms within the Cape Metropolitan Area.

Some international examples of research on farmer's attitudes towards conservation on farmlands include the work of MacDonald (1984), Shepherd (1996) and Jacobsen (2003) which used a descriptive approach for surveying landholder attitudes. There have also been a number of contributions to this field that have used structured social psychological models, such as the Theory of Planned Behaviour (Azjen and Madden, 1986) to explain why farmers behave the way they do, including the work of Beedell and Rehman (1999; 2000). After describing and explaining landholder's attitudes and behaviour, a question that must be addressed is how can non-conservationists be recruited to the cause of conservation?

Society has developed three basic ways of motivating people to counteract the negative environmental changes that result from human attitudes and behaviour: enforcement, education and inducement (Ferrar, 1983). Botha (2001a) maintains that providing inducement through the correct incentives, may be a far cheaper and more effective means of modifying landholder behaviour than enforcing regulations. Young and Gunningham (1997) in their consideration of the potential of inducement for promoting conservation, point out that no single incentive is able to address all pressures on biodiversity and that an incentive scheme should be tailored to the area of application and the specific threats it faces. Perhaps one of the solutions to achieving conservation targets set for an area with tools such as systematic conservation planning, lies in careful negotiation with landholders regarding the adoption of various incentives. Incentives, especially financial ones such as rates rebates and tax incentives, have the potential to persuade the less conservation conscious landholders who would not normally respond to emotive appeals to conserve, to preserve threatened habitats (such as Coastal Renosterveld) on their farms.

For new approaches to conservation that promote private stewardship to be implemented in South Africa, a motivated, adequately renumerated and professional extension service is required. Conservation extension personnel would need to be able to identify priority private land, enter into negotiations with landholders about their options and provide ongoing motivation and management advice (Botha, 2001a). However such extension work can only be successful if the extension personnel have a good understanding of their target audience – the landholder himself. Current understaffing and lack of resources within many of the conservation agencies in South Africa prevents extension staff informally interacting with landholders in order to gain insight into their attitudes, motivations, values, reasons for ill-feeling towards conservation staff and plans for the future. The significance of this study is that provision of insight into landholder attitudes and behaviour will benefit conservation staff, and inform strategies for fostering greater co-operation between landholders and authorities for the preservation of South Africa's critical ecosystems on private land.

2.2.1 Aims and objectives

The principal aim of the study was to investigate the attitudes of Overberg landholders towards the conservation of Overberg Coastal Renosterveld still remnant on their land. A secondary and associated component included an investigation of certain aspects of landholder behaviour relevant to the retention of Coastal Renosterveld on their property. The study approach could be described as largely descriptive, with some explanatory components. For example, one of the objectives within the description of attitudes component of the study was to investigate what explanatory variables were related to farmers' willingness to conserve (which has been found to comprise merely one component of attitude towards conservation, see Chapter 3).

The following seven aspects were investigated in relation to landholder attitudes and behaviour:

- (i) The use and management of Ov. Coastal Renosterveld by landholders,
- (ii) Landholder knowledge and awareness levels of the conservation issues surrounding Ov. Coastal Renosterveld
- (iii) The value landholders attach to Ov. Coastal Renosterveld, both in economic and intrinsic terms
- (iv) The willingness of landholders to conserve Ov. Coastal Renosterveld
- (v) The attractiveness of a range of possible incentives for landholders to encourage conservation
- (vi) The difference in conservancy awareness levels between the two study areas, namely Bot River and Suikerkankop, to determine the success of past conservation efforts in these areas.
- (vii) The nature of previous interactions with staff from the Western Cape Nature Conservation Board (WCNCB)

An intended spin-off of the study was to increase awareness about the conservation value of Coastal Renosterveld, by virtue of renosterveld being the topic of investigation.

2.3 Methods

2.3.1 Research Design

For the purposes of describing and analysing the attitudes and behaviours of landholders in the Overberg towards Coastal Renosterveld and its conservation, a predominantly quantitative research paradigm was deemed appropriate. The quantitative approach is best suited to statistically analysing data on variables and the relationships between them, counting and quantifying patterns, and testing hypotheses, rather than generating them. McDowell (1988) produced a number of hypotheses relating to the factors that affect the conservation of renosterveld, which were used as a departure point for this study. A quantitative paradigm also offers the opportunity to search for regularities in laws of human behaviour in order to generalise the

results to larger populations and settings (Babbie and Mouton, 2001). This study aimed to extrapolate results obtained from the two study areas to all areas in the Western Cape where Coastal Renosterveld occurs.

Available time precluded conducting in-depth, qualitative interviews. An intended application of the research was to be able to construct an index of landholder conservation attitude that could be used to quantitatively describe and objectively compare landholder attitudes (Chapter 3). Statistical analyses and the construction of an index requires the use of quantitative attitudinal data, hence the decision not to use a qualitative approach. A qualitative research paradigm is better suited to examining subtle nuances of attitudes and behaviour than a quantitative approach (Babbie and Mouton, 2001). Therefore a few open questions were also included in the questionnaire in order to capture attitudes that might not have been captured by the Likert statements³ and other closed-ended questions.

2.3.2 Study Area & Sample selection

Within the Western Cape, Coastal Renosterveld occurs naturally in two regions, namely the West Coast and the Overberg. The renosterveld that occurs on the West Coast has been the subject of more research compared to the Overberg (e.g. McDowell (1989) conducted a PhD study on the conservation behaviour of farmers on the West Coast). Furthermore, Overberg Coastal Renosterveld has been identified as one of the seven most threatened broad habitat units in the Cape Floral Region (CFR) by the Cape Action for People and the Environment (C.A.P.E.) programme (Cowling et al., 2003; Fig. 2.1). The Cape Conservation Unit (CCU) was also busy with a fine-scale conservation plan for Coastal Renosterveld at the time that this study was initiated. For these reasons, the Overberg was selected as the broad study area for this investigation.

³ A Likert statement is a closed-ended question format commonly used in questionnaires, and devised by Rensis Likert. It consists of a fairly brief statement that summarises an attitude, which is presented to respondents, who are asked whether they agree or disagree with it, by choosing one of five ordinal response categories that range from "strongly agree" to "strongly disagree" (Babbie and Mouton, 2001).

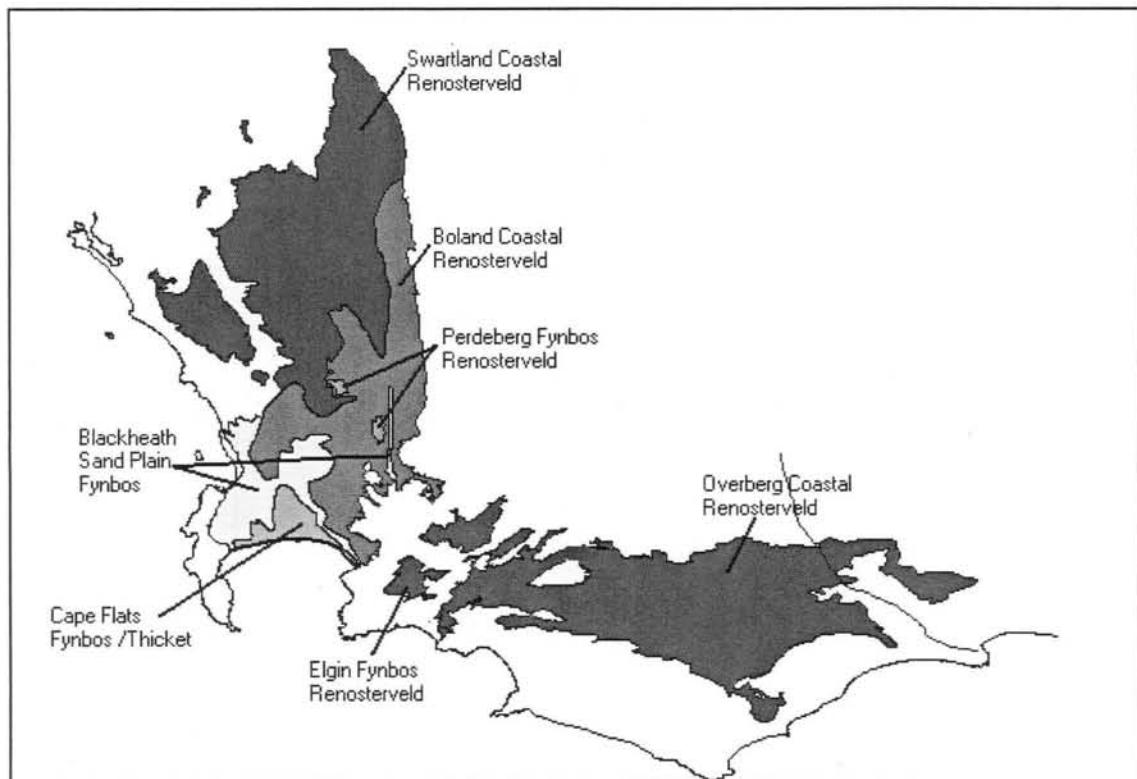


Fig. 2.1. The seven most threatened secondary Broad Habitat Units in the Fynbos Biome as identified in the CAPE study (Cowling and Heijnis, 2001) showing the location of Overberg Coastal Renosterveld selected as the vegetation type for this study (courtesy of the Cape Conservation Unit).

Within the Overberg, two smaller sample areas were selected for study, namely between the towns of Bot River and Caledon (referred to as 'Bot River' in the study), and an area between the towns of Bredasdorp and Swellendam (referred to as 'Suikerkankop') (Fig. 2.2). The reason for selecting two study areas was so that a wider, and more representative range of attitude responses could be captured. The actual selection of the location of the two areas was made with the input of the Cape Conservation Unit (CCU) of the Botanical Society of South Africa who have recently completed extensive botanical field work in the Coastal Renosterveld areas of the Overberg for the Cape Lowlands Project (Von Hase et al., 2003). At the outset of the study, the Cape Lowlands project was seeking to add information on landholder characteristics, personalities, attitudes and behaviours towards the conservation of Coastal Renosterveld fragments, to the GIS database of mapped remnant patches. It was hoped that such information could be used to identify some of the opportunities and constraints to implementing a conservation plan for the Cape Lowlands attributable to the human dimension in these areas. According to the CCU, the selected Bot River and Suikerkankop study areas contain some of the largest, and most ecologically important Coastal Renosterveld fragments in the Overberg region, and are likely to become target areas in the near future for the implementation of various conservation plans and projects (Von Hase et al., 2003). It was also postulated that landholders in Bot River have had more contact with officials from the provincial conservation agency (namely Western

Cape Nature Conservation Board) than the Suikerkankop landholders, which enabled a comparison of past conservation efforts to be made.

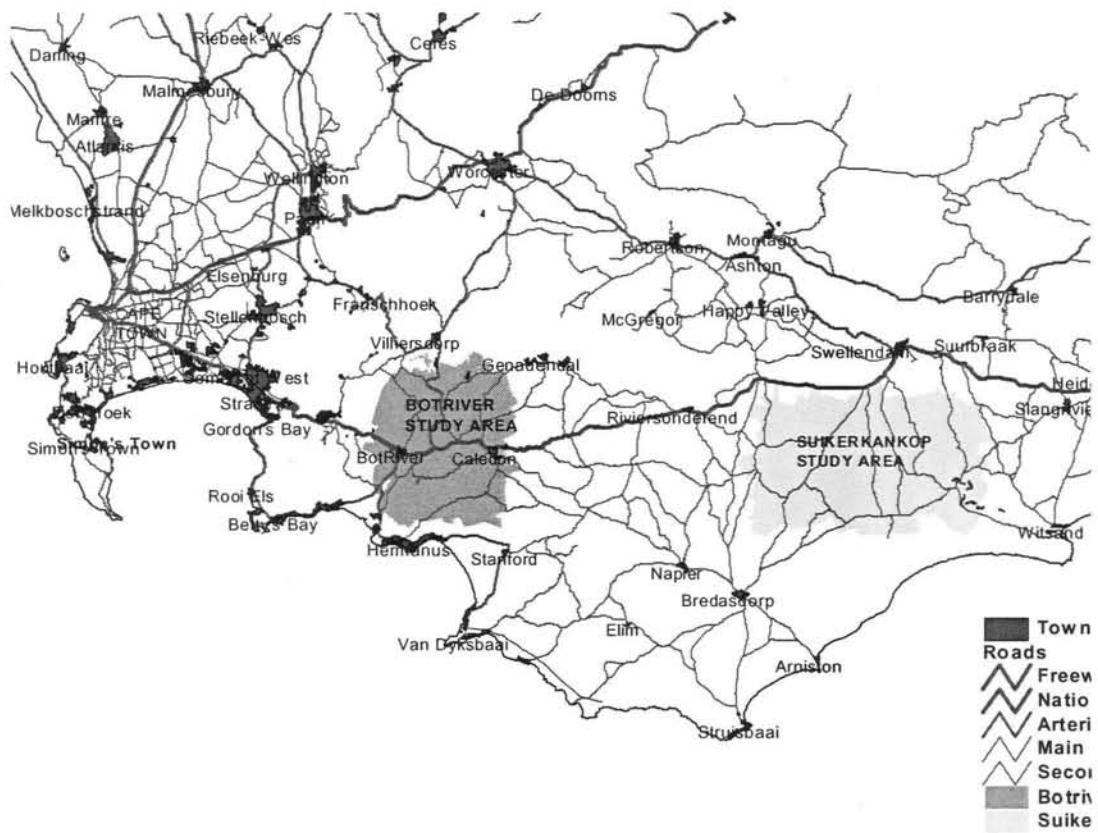


Fig. 2.2. Location of the Bot River and Suikerkankop study areas within the Overberg in the Western Cape.

Due to logistical limitations and time constraints, it was decided to draw a sample of 36 landowners, representing 40 properties. The entire population, from which a sample was drawn, consisted of all farms in the Overberg, on which pristine Coastal Renosterveld still occurred (as opposed to disturbed renosterveld which might have been ploughed before and then allowed to re-vegetate cultivated soil). Individual properties, and not landholders, were selected as the sampling unit because no sampling frame was available of all landholders that owned Coastal Renosterveld in the Overberg. However, landholders became the observational unit. For purposes of greater representivity of the sample, properties were stratified according to the area of Coastal Renosterveld on the farm.

Electronic, spatial coverage was obtained of all property cadastral in the Western Cape (courtesy of the Department of Water Affairs). The database of this spatial coverage, amenable for analysis within a Geographical Information System, (GIS) contained information on erf number, farm name and farm size for each property in the Western Cape. ArcView (Version 3.2a) was used to view this coverage. A current, working version of all remaining Coastal Renosterveld fragments in the Western Cape lowlands was obtained from the Cape Conservation Unit (CCU) and overlain on top of the property cadastral in ArcView. In order to determine how much renosterveld occurred on each property, the 'clip' function in ArcView was used. A list was then compiled of all property cadastral with Coastal Renosterveld in the two sample areas of Bot River and Suikerkankop. The properties in each study area were then sorted into three renosterveld size categories, namely small (1-50 ha), medium (51-300 ha) and large (>300 ha) for stratification purposes. Size categories were selected based on knowledge of the average-sized Coastal Renosterveld fragment that occurs on private farmland, based on consultation with CCU staff. Within each renosterveld size category for each study area, a number was allocated to each property on the list. Approximately seven properties were then randomly selected from each renosterveld size category to yield a total study sample of 40 properties. Extra properties were selected in the event that a landholder from one of the selected properties declined the request to be interviewed. Landholder address and telephone details for each property in the sample were obtained from the Provincial Department of Agriculture for the Western Cape.

Although area of renosterveld was used to stratify the sample, it was found that on arrival at the interviewee's property, the landholder's estimation of how much renosterveld they had was often different to the area estimation derived remotely with GIS data. It therefore became apparent that the original Coastal Renosterveld coverage from the CCU had inaccuracies, considering the data was a draft version not yet finalized. This changed the distribution of the number of properties in each renosterveld size category and therefore the resulting sample was no longer stratified as originally intended. For this reason, findings can only be generalised to the two populations in each study area and not the whole of the Overberg or all Coastal Renosterveld areas. Despite the stratification problems encountered, the sample was nonetheless drawn randomly.

Prior to telephonically contacting landholders to set interview appointments, a letter of introduction was sent to the randomly selected sample of farms in order to familiarize the landholders with the aims of the study and invite their participation in the interviews. Landholders were notified that the data collected would be used for a masters thesis but assured of anonymity. Therefore no landholder or property names have been used in the results. Notifying people about a survey beforehand generally increases co-operation (Benson, 1988). In order to indirectly increase awareness amongst landholders about the conservation value of Coastal Renosterveld, a renosterveld fact sheet was prepared as there was a lack of educational material available for landholders regarding renosterveld in particular (Appendix B). This fact sheet was included in an information package that was given to each subject but done so only after the interview was complete to

prevent biasing of responses. Care was taken to ensure that no information was given to the landholder on the phone or at the interview that might alter their knowledge levels or attitudes towards Coastal Renosterveld.

2.3.3 Data collection

In order to explore the attitudes of landholders towards Coastal Renosterveld in the Overberg region of the Western Cape, semi-structured, personal interviews were conducted with 36 landholders, representing 40 farms. Nineteen of these farms were located in the Bot River study area, while the remaining 21 farms were from the Suikerkankop study area. Personal interviews as opposed to mailed questionnaires were used to collect data, as previous landholder surveys experienced low return rates of less than 35% from posted questionnaires (Brand, 1994; Van Zyl, 1999). It has also been found that personal interviews are able to elicit landholders' true attitudes and perceptions more accurately than either a questionnaire received impersonally in the post, a telephone survey or an electronic survey (McDowell, 1988). Direct communication on the landholders' property also enables the interviewees to feel more at ease within the psychological "safety" and comfort of his/her own home (McDowell, 1989b).

On arrival at a farm, or after the interview, an attempt was made to view the Coastal Renosterveld belonging to the landholder or manager, as this often enabled a more meaningful discussion of the issues surrounding their renosterveld areas. The farm tour also provided an opportunity for the landholder to give background on management history. An added spin-off of the farm tour was that awareness of the conservation-value of renosterveld was heightened, and many landholders expressed surprise in the author's interest in what to them was "*boring bossieveld*" (Afrikaans term which means 'shrubland'). It is however acknowledged, that in surveys of this nature, reactivity can be high. Few people want to be labelled 'non-conservationist', and a tour prior to the interview could have increased reactivity. However, the advantages of the farm tour were considered to outweigh the possible disadvantages accorded to reactivity. Approximately half of the interviews were conducted between June and July 2002, while the other half were conducted in late August and September of the same year. No interviews were planned prior to June or after September as these are very busy harvesting seasons for farmers in the Western Cape.

2.3.4 Measuring tools

The content of the questionnaire (Appendix A) was subject to an extensive process of peer review by experts in a number of conservation organizations (Appendix C). The questionnaire was also tested in three pilot interviews that were conducted with landholders not included in the sample. These interviews served to refine the questionnaire, and to ensure that all items were appropriate to Ov. Coastal Renosterveld landholders. Initially, items were included on landholders' income in order to ascertain affluence, but these

were excluded as the subjects used in the pilot interviews indicated that their income was too sensitive an issue to be questioned on.

In order to break the monotony of verbal enquiry during the interview, visual cue cards were used to administer portions of the questionnaire, where the interviewee had to choose responses from options provided (indicated by "Show Cue card" next to certain items in the questionnaire). In order to add variety to the interview, a combination of items were used, including closed-ended questions (where some choices were provided on a list that respondents could read), open-ended questions, Likert statements and one ranking scale. The response categories "strongly agree", "agree", "unsure", "disagree", and "strongly disagree" were used in all Likert statements in the questionnaire.

The duration of interviews varied between three-quarters of an hour to three hours, depending on the amount of discussion that the questionnaire generated and the amount of time the farmer was willing to spend on the interview. In some cases, certain questions were omitted for the sake of brevity, especially if the body language of the interviewee indicated that they would like the interview to end, or if they were in a hurry. Under these circumstances, Question F6 regarding incentive options was often omitted because the nature of these questions made them time-consuming to explain and answer. However, because the sample size was relatively small (40 farms), an attempt was made to collect as much data as possible from each respondent.

The questionnaire (which was made available in English and Afrikaans) contained a total of 72 items and was divided into 7 sections. In general, closed-ended questions were used in preference to open-ended questions, due to the quantitative approach taken in the study. Furthermore, closed-ended questions provide a greater uniformity of responses and are more amenable for computer analysis (Babbie and Mouton, 2001). Within the closed-ended questions, as many answer options were developed to avoid the number of discreet variables that would require coding before the data could be analysed. Before administering the questionnaire, the author provided a short introductory explanation of the study to the interviewee and stressed that the information that was being collected was part of a Stellenbosch University masters research project, and that confidentiality would be assured for all reporting and publication purposes. A rationale for the choice of items included in the questionnaire and how they were measured is provided below. References to the question numbering used in the questionnaire are indicated in parentheses throughout the text.

Section A - Background information

This section included demographic items relating to the interviewee, as well as farm-related items that together would provide background information on the respondent, his/her property and farming activities. Easily answered, non-threatening questions (e.g. farm-related items) were placed near the beginning of the questionnaire in order to establish rapport with the respondent. Personal information, including the name, telephone, fax, cell phone number, email address and postal address of the interviewee were included for the

purpose of being able to follow-up with respondents after the interview. This became necessary when information was required that was not asked during the interview (due to time constraints or forgetfulness), in order to ensure a complete data-set. Section A was divided into two columns, one that was filled in if the interviewee was a manager and the other if the interviewee was a landholder, for those questions where a difference in response was anticipated due to the nature of their role on a farm. The wording of farm-related questions was modified when directed at managers, in order to elicit information about the owner (e.g. "Does the owner, to your knowledge, have any intention of selling the property in the next 5 years?", B7). The rationale for this is that it is normally the owner who will make important decisions on the property, such as future land use changes that might impact on the future transformation of Ov. Coastal Renosterveld.

Demographic variables are listed below, with categories indicated in parentheses. Where necessary, a rationale for the choice of response categories is provided afterwards.

- Gender (male/female)
- Role (landholder/property manager/trustee/other)
- Home language (English/Afrikaans/other)
- Bilingual ability (The capacity of the subject to communicate equally well in both English and Afrikaans, on a self-assessed scale of 1 to 5: 1 = poor/ 2 = poor-average/ 3 = average/ 4 = good/ 5 = good/ 6 = excellent).
- Permanency of residence on the property (yes/no)
- Years of farming experience (< 1 yr / 1-5 yrs/ 6-10 yrs/ 11-20 yrs/ > 20 yrs)
- Past tenure of subject – i.e. Years that the subject has owned or managed the property (< 1 yr / 1-5 yrs/ 6-10 yrs/ 11-20 yrs/ > 20 yrs)
- Past tenure of family - i.e. how long the property has been in the owner's family (number of generations)
- Age (18-35 years/ 36-55 years/ >56 years). These three broad categories equivalent to young, middle-aged and elderly were chosen because asking a person's exact age can be a sensitive question.
- Highest qualification obtained (less than matric/ matric/ first university degree/ second university degree/ postgraduate qualification/ diploma)
- Environmental group or conservation organization membership status (yes/no)
- Intention of selling the property in the next 5 years (yes/no)

Farm-related variables included the following:

- Farm size (1 – 50 ha/51-200 ha/ 201-500 ha/ > 500 ha). These size categories were selected to capture the range of variation in farm size, selected in consultation with conservationists who had worked in the Overberg)

- Primary landuse (dairy/ beef or sheep grazing/ orchards/ vegetables/ vineyards/ residential/ natural veld/ cereals). These landuses were selected based on a knowledge of what the predominant land uses are in the Overberg (Scott, 1995)
- Area of Ov. Coastal Renosterveld on property (1-50 ha/ 51-300 ha/ >300 ha)
- Size of the largest patch of renosterveld (1-10 ha/ 11-50 ha/ > 50ha)
- Slope of land occupied by the largest patch of renosterveld (steep/ gently-sloping/ flat or other)
- Fertility of the largest patch (extremely fertile/ potentially highly productive/ infertile marginal land or other).
- Whether there are ecotourism facilities on the property (yes/no)

Demographic and farm information was then used in order to determine the distribution of landholder characteristics in the sample, as well as how a landholder's willingness to conserve is influenced by certain of the demographic and farm variables (as tested in four sets of cross-tabulation analyses in Section 2.4.3). The following variables were included in the section on background information because McDowell (1988), with the aid of multiple regression modelling, found these variables to be good predictors of a landholders' conservation behaviour: i) Area of Ov. Coastal Renosterveld; ii) Area of land; iii) Education; iv.) Past tenure of family; and v.) Bilingualism (or Language orientation). Other background variables that could be expected to have a positive relationship to the conservation attitude of the landholder were also included, such as environmental group membership and ecotourism activity on farm, (see Chapter 3, Section 3.2 for these results). Certain variables that were used to predict conservation behaviour of landholders along the West Coast were not able to be included in this study, because any items relating to income or value of the land were excluded after the pilot interviews. Examples include variables such as the rateable valuation of property; the value proportion of veld to land; materialism; and overall affluence.

Section B – Renosterveld use and management

The aim of this section was to collect data on what Ov. Coastal Renosterveld areas are currently being used for, how they are managed, and the likelihood of these Coastal Renosterveld areas being transformed in the future. The current uses of renosterveld were gauged by presenting respondents with a list of 11 possible renosterveld uses, such as grazing, shelter for livestock wildflower picking, bee-keeping etc. (B2). Two contingency questions were posed to those landholders that did use renosterveld for grazing: whether renosterveld grazing had any noticeable benefit or disadvantage to livestock (B3 & B4). These questions on renosterveld usage were included on the basis of Botha's (1991) statement that the application of conservation practices are influenced by the farmer's perception of the relative advantages and disadvantages of conservation practices. Landholders were asked whether they actively manage their renosterveld areas or not (B5). Landholder behaviour with regards to the manner in which they actively manage their renosterveld areas was further investigated from options provided such as burning, implementing fire breaks, alien plant removal, using grazing camps and rotational grazing, brushcutting and erosion control (B6).

An open-ended question was used to determine the primary reason why Ov. Coastal Renosterveld was been retained on the property, as this was expected to shed light indirectly on whether it would remain untransformed in the future (B1) (which is more likely if the land is considered unsuitable for agricultural production). Responses to the two farm-related variables regarding the slope and fertility of renosterveld areas (A13 & A14) in Section A, could also indirectly indicate the likelihood of it being ploughed (e.g. if the land was flat or gently sloping and extremely fertile, it would probably be highly suitable for agricultural purposes). In a more direct manner, landholders were asked an open-ended question on whether they have any other plans for the management or use of their renosterveld in the next 5 years (B7).

Section C – Knowledge of renosterveld

Three closed-ended items were used to investigate knowledge and awareness levels regarding the conservation value and protected status of Ov. Coastal Renosterveld, and what landholders know about renosterveld in general. In particular, the following questions were posed:

- “Were you aware prior to this interview that Ov. Coastal Renosterveld is a unique and endangered type of vegetation? (C1)“
- “Do you think that people in this area are becoming more aware of the scarcity and conservation importance of renosterveld? (C5)“
- “Did you know that a permit is required in order to plough renosterveld? (C3)“

In order to solicit additional knowledge-related data not captured in closed-ended questions, respondents were asked if there was anything else that they could tell the interviewer about renosterveld and/or the plants and animals that live in it (C2). The Likert statement “The reasons why renosterveld should be conserved are clear to me” (C4a) was used to determine if a landholder’s knowledge of Ov. Coastal Renosterveld endangerment was consistent with their own perception of why renosterveld should be conserved. It was also hypothesized that any differences in the response obtained from item C4a and C1 could indicate the influence of social desirability bias.

Section D – Renosterveld value

In this section landholder attitudes concerning the utilitarian and intrinsic value of Ov. Coastal Renosterveld were measured. A ranking scale with 17 items was provided to interviewees from which they were asked to choose the three most important forms of renosterveld usage to them in descending order of importance (D1). Four Likert statements were used to measure landholder attitudes towards various aspects of renosterveld value, such as: whether they think fynbos has more value than renosterveld (D3b); whether the renosterveld areas on their property are non-productive, wasted pieces of land (D3c); whether agricultural productivity is more important than the conservation value of their property (D3d); and whether conserving renosterveld on the property offers any advantages or benefits to them or their business (D3e). Another

Likert statement that was included, but was not directed towards renosterveld specifically, measured whether landholders felt that the Overberg has a rich natural heritage that needs to be conserved and managed carefully (C2a).

In this section landholders were also asked to provide their opinions (in an open-ended question) on why there is sometimes a negative perception amongst certain landholders towards renosterveld (D4). This was expected to explain why certain respondents might strongly agree with the Likert statement (D3c) that renosterveld areas are non-productive wasted pieces of land. Respondents were asked to give their estimation of what the commercial value of renosterveld is (in Rands, D2). It was hypothesized that a landholder's opinion of the monetary value of renosterveld will be indicative of how important renosterveld is to them and therefore, whether they are likely to want to retain it on the property. Finally, the level of landholder interest in the renosterveld on his/her property and the associated plants and animals was investigated with the use of an open-ended question (D5), in order to determine the intrinsic value that landholders attach to renosterveld.

Section E – Willingness to conserve

A landholder's willingness to conserve renosterveld on their property was investigated in this section with two Likert statements and one closed-ended question. The Likert statements addressed firstly whether conservation of land is compatible with running an agricultural business (E1a), and secondly whether the respondent can realistically consider conserving renosterveld on land that they can still productively use for agriculture or another landuse (E1b). Landholders were then asked directly how willing they would be to conserve renosterveld areas on their property in the future, even if a more profitable crop could be planted where renosterveld is currently found (E2). Response categories provided for this question included "very willing", "willing in principle, but need more time to consider the implications", "unsure", "not willing now but possibly in the future", "definitely not willing" and "not applicable". This closed-ended question touched on the aspect of sacrificial conservation, where leaving natural areas untransformed that are suitable for agriculture, could mean that the landholder must forfeit income from production that could be earned from the unused land.

Section F – Incentives for conservation

In this section, landholder attitudes towards incentives for promoting conservation were investigated in a number of ways. Firstly interviewees were asked to respond to a Likert statement on whether offering landholders various types of incentives is a good idea for promoting conservation on private land. A list of 14 possible incentives (ranging from assistance with alien clearing, tax deductions to free access to all WCNCB parks and reserves) was presented to respondents to determine which of those incentives were the most attractive to landholders (F3). Respondents could choose as many of the 14 incentives as they thought were appealing, and were then asked to select which incentive was the most attractive, and why. In order to

determine what prevents landholders from conserving more renosterveld, respondents were asked whether they experience limitations such as financial, management, resources, equipment or others. Knowing what limitations landholders experience is extremely important for conservation agencies to understand. These limitations would need to be addressed if conservation is to become more of a priority for landholders. As Botha (1991) states, the application of conservation practices are influenced by the farmer's perception of the compatibility of such conservation practices with the farmer's needs or problems.

Two Likert statements were used to investigate a landholder's perception of their role and responsibility as custodian of biodiversity on their land. Respondents were asked if they agree that the protection of biodiversity outside of protected reserves should be the responsibility of private landholders (F1b) and whether Cape Nature Conservation or another government organization should bear the costs for the conservation and management of renosterveld on the property (F1c).

A hypothetical incentive scheme with three stewardship options (namely Conservation Areas, Co-operation Agreements and Contract Nature Reserve) was presented to interviewees (F6). Comment was sought on which of these options interviewees would most likely adopt and what elements of the scheme were suitable or unattractive. At the time of compiling the questionnaire, the Cape Conservation Unit (CCU) of the Botanical Society of South Africa were devising and seeking comment on a new classification and stewardship system for protected areas on private land. This new system would have to be able to cater for the incentive needs of landholders while providing the necessary protection that the biodiversity value of the land warrants. This draft classification system was used as the hypothetical incentive scheme in the questionnaire with the intention that landholder responses to the incentive scheme could be given back to the Botanical Society.

An explanation of the three options in the incentive scheme follows: A "Conservation Area" is a flexible option with no defined period of commitment. It is suitable for any land, but not a good option if the land has rare or endangered habitats or species, as this option is not binding on the landholder when the property is sold. Incentives for landholders who adopt this option could include assistance with management plans and farm maps, and advice and support through basic extension services.

A "Co-operation Agreement" is a negotiated legal agreement between the conservation authority (e.g. WCNCB) and a landholder, for conserving biodiversity in the medium term (e.g. 5 to 10 years). Specific agreements would be decided upon where WCNCB could assist with aspects such as invasive plants, fire, and animal management. Advanced extension services could also provide a higher level of incentive to attract landholders to consider managing the land for biodiversity.

The third option of “Contract Nature Reserve” would be most suitable for sites of critical conservation importance and priority areas adjacent to statutory reserves. Such sites would be bound by legally recognised contracts to protect biodiversity on private land in the long term (e.g. 30 to 99 years). Possible incentives could include substantial assistance with habitat management, increased recognition and marketing exposure, and lobbying on a landholder’s behalf by organizations such at Botanical Society, for additional incentives (e.g. rates rebates and tax incentives).

Respondents were asked two questions pertaining to the way in which the provincial conservation agency, WCNCB would administer the implementation of incentives on private land. Firstly, based on the assumption that certain incentives can only be delivered if some form of auditing is in place, respondents were asked if they would be willing to have their renosterveld areas monitored by an expert or authority (F7). Secondly, respondents were asked if they would like a representative from WCNCB to visit them in the future should the implementation of various incentive schemes become a reality (F8). It was thought that the response to the latter question would indicate the sincerity of a landholder’s interest in negotiating incentive and stewardship options for their property. To conclude the section on incentives, respondents were asked in an open-ended question if they had any general comments or concerns about incentives in general (F9).

Section G – Conservancies and Cape Nature Conservation

This section included questions to determine the level of landholder interaction with WCNCB staff and their extension officers, as well as awareness levels and opinions about conservancies. Up till now, conservancies have been used as the major tool for promoting conservation on private land. Conservancies are areas of land that are managed through the voluntary, co-operative agreement of the landholders, community and users themselves, in respect of which registration has been granted by the relevant provincial nature conservation authority (KZN NCS, 1999). In order to assess the awareness levels of landholders regarding conservancies, respondents were shown the emblem for a conservancy, which is a crested guineafowl (Fig. 2.3), and asked what they thought the meaning of the logo was (G1). The idea for including the conservancy emblem came from Van Zyl’s (1999) study who also asked respondents whether they knew the meaning of the conservancy emblem. By repeating this same question, it was intended that results to the question could be compared. Closed-ended questions were used to determine how familiar respondents were with the types of advantages that belonging to a conservancy could offer (G2), and whether they thought there was potential for a conservancy in their area (G3).

Regarding landholder interactions with WCNCB, respondents were asked whether they had had contact with personnel of WCNCB in the past and what the nature of the interaction was (G4). It was assumed that previous unpleasant experiences with representatives of a conservation organisation could mar a landholder’s attitude towards conservation in general, which could in turn affect their behaviour and adoption of conservation practices. Respondents were also asked if they ever make use of extension officers (G5). In

retrospect, a distinction should have been made between agricultural or nature conservation extension officers as this study was more interested in data related to conservation extension. With the use of an open-ended question, landholders were asked whether they wanted to convey a message to WCNCB (G6). To conclude the interview, respondents were asked if they were interested in hearing about the results of the survey in order that the author could give respondents feedback on the outcomes of the research (G7). Such feedback was given to those interested in the results by posting them a copy of a popular article written for the *Veld and Flora* Journal (Winter and Hanks, 2002) which summarized the research findings.

2.3.5 Data analysis

Descriptive statistics were used to describe results from the quantitative items in the survey. Chi-Square analysis was used to compare results from the conservancy-related questions (G1, G2 & G3) from the two study areas. It was postulated that the success of past conservation efforts in the two study areas would be reflected in the farmers' responses to these questions. It was predicted that landholders in the Bot River study area have had more contact with conservation agency staff and are therefore more aware of the concept of a conservancy than the landholders in Suikerkankop. SPSS (Statistical Package for Social Scientists) Version 11.0, Microsoft Excel 97 and Statistica (Version 6) were used to analyse data for descriptive and inferential purposes. In order to determine what explanatory variables were related to willingness to conserve, cross-tabulations were performed with SPSS between willingness to conserve and four demographic variables within the dataset. Bot River and Suikerkankop farmers were not compared in terms of responses to any other questions included in the questionnaire, because the primary aim of the study was to investigate the status of conservation attitude towards Ov. Coastal Renosterveld in general, and not to determine regional differences *per se*.

2.4 Results

Of the 40 farms representing 36 landholders that were included in the sample for the study, 19 farms were from the Bot River area and 21 farms were located in the Suikerkankop area. The primary landuse on these farms was grazing (cattle and/or sheep), with the cultivation of cereals and dairy farming representing the second and third most prevalent farming practices. Seventy-five percent of interviewees were landholders, 17.5% were property managers and 7.5% were property trustees. Considering such a small percentage of respondents were managers, it was decided that landholder and manager responses would not be differentiated. For this reason and ease of reporting, respondents are collectively referred to as landholders within this study. Only one of the forty landholders interviewed, was female. Just over half of the landholder sample were middle-aged (54%) and a substantial percentage (46%) possessed some form of tertiary or post-matric qualification. By far the majority were Afrikaans speaking (93%), and regarded themselves as having an average English/Afrikaans bilingual ability (70%). Seventeen percent regarded themselves as being

excellently bilingual while 12.5% regarded themselves as being poorly bilingual. Seventy-three percent of landholders had owned their properties for more than 11 years, and 50% had more than 20 years of farming experience. The majority (80%) of landholders had large farms (greater than 500 ha in size) and just over half (54%) of the landholders had a medium quantity of renosterveld (51-300 ha) left on the farms. Thirty percent of the landholders interviewed belonged to some type of environmental group or conservation organization and 12% had ecotourism facilities on the property.

Selected results from the questionnaire are presented in Tables 2.1 to 2.7 and Figs 2.3 to 2.5. Results have been grouped according to themes that were investigated within the questionnaire (e.g. knowledge of renosterveld; use and management of renosterveld; value of renosterveld; incentives for conservation; conservancy awareness and WCNCB interactions. Where appropriate, question numbers from the questionnaire are referred to in parentheses after the item wording.

2.4.1 Knowledge, use and management of renosterveld

Just less than half (47.5%) of the landholders were aware that Ov. Coastal Renosterveld is an endangered vegetation type (C1, Table 2.1). When asked about the perceptions of other people in their area (C5), a large majority of landholders (72.5%) felt that awareness of the scarcity and conservation importance of Ov. Coastal Renosterveld was not common among other people in their area. The majority of farmers (80%) did actively manage their renosterveld, with the use of rotational grazing camps being the most commonly practiced management technique (B5, Table 2.1). The majority of landholders who were active renosterveld managers (67.5%) also implemented controlled burns with the use of firebreaks. Very few (27.5%) of these same landholders used brushcutting to reduce the fuel load or improve grazing, as burning is a more popular and cheaper tool for achieving the same effect. Only a small proportion of landholders (15%) tried to control soil erosion to manage their renosterveld areas.

Table 2.1. Landholder responses pertaining to knowledge, usage & management of Ov. Coastal Renosterveld. Numbers in parentheses refer to numbering used in the questionnaire (Appendix A) (N = 40).

Item from questionnaire	Yes	No	Other/Unsure
■ Were you aware that renosterveld is an endangered vegetation type? (C1)	47.5%	52.5%	-
■ Did you know that a permit is required in order to plough renosterveld? (C15)	52.5%	47.5%	-
■ The reasons why renosterveld should be conserved are clear to me (C4)	82.5%	10.0%	7.5%
■ Do you think people in this area are becoming more aware of the scarcity and conservation importance of renosterveld? (D4)	25.0%	72.5%	2.5%
■ Has the grazing of livestock on renosterveld had any noticeable benefit to the livestock? (B3)	37.5%	55.0%	7.5%
■ Has grazing livestock on renosterveld had any noticeable disadvantage to the livestock? (B4)	20.0%	75.0%	5.0%
■ Do you actively manage the renosterveld areas? (B5)	80.0%	20.0%	-

In response to the question “What can you tell me about renosterveld, the plants/animals that live in the veld and how you use it?” (C2), only 17 out of 40 landholders were not able to provide any information in this regard. Some of the interesting anecdotes that were related to the interviewer included the use of renosterveld for a variety of medicinal and other utilitarian purposes. For example, the early settlers and Khoi-khoi apparently used *Helichrysum crispum* (*hottentotskoeigoed*) for bedding because it was soft and also kept fleas away. *Elytropappus rhinocerotis* (renosterbos) was dried and bundled for brooms. Leaves of *Leonotis leonurus* (willedagga) were often used to treat a number of ailments. One landholder still advocated the health benefits he received from two renosterveld species, namely *Sutherlandia frutescens* (cancerbush) and *Artemisia Afra* (wormwood). He still harvests leaves from these shrubs on his property, dries them and keeps a supply on stock for his family, which he uses to treat headaches, stomach pain and insomnia, by making a “tea” from the herbs. One respondent said that the smell of burning *E. rhinocerotis* has sentimental value to him, as it brings back enjoyable memories from his childhood of burning *E. rhinocerotis* and the smell that permeated his clothes.

2.4.2 Renosterveld value

Amongst the landholders that had grazing livestock on their farms, approximately half (55%) regarded renosterveld as providing a noticeable benefit to their livestock (B3). The minority of landholders (20%) regarded renosterveld as causing a noticeable disadvantage to their livestock (Table 2.1). In response to the question posed to explore negative perceptions further, “Why is there a negative perception towards renosterveld?”(C3), a number of interesting responses were obtained. From these responses, the disadvantages of renosterveld have been summarized and ranked from most frequently to least frequently mentioned (Table 2.2).

Table 2.2

Negative and beneficial aspects associated with Ov. Coastal Renosterveld, as reported by landholders interviewed

<p>Disadvantages</p> <ul style="list-style-type: none"> ▪ <i>Elytropappus rhinocerotis</i> (a shrub that often dominates renosterveld) is costly to keep under control and decreases the grazing value of pasture. ▪ Renosterveld is a source of unwanted plants (termed “weeds” by some farmers) which often invade surrounding cultivated lands ▪ No income can be generated from land that is not worked. ▪ Caracul (<i>Felis caracal</i>) are problem animals which live and breed in renosterveld areas, and can cause substantial stock losses. ▪ The wool of sheep is damaged by walking through renosterveld shrubs. ▪ Unploughed veld is regarded as “messy”. Many landholders like to keep their farms “clean” and so plough up everything.
<p>Advantages</p> <ul style="list-style-type: none"> ▪ Renosterveld offers a valuable source of natural grazing and is especially valuable during winter or drought conditions, when planted pastures are unable to meet all of the dietary requirements of the livestock. ▪ Renosterveld grazing also provides a form of natural medicine for livestock as well as an important source of roughage. This improves livestock resistance to disease and sickness. ▪ Renosterveld protects steep slopes from erosion and therefore serves the important function of soil erosion control. This is particularly relevant when a drinking water dam is situated at the bottom of a hill. If that land is tilled, water quality will be decreased by the large quantities of silt that will run off into the dam. ▪ Renosterveld also offers ecosystem services such as soil carbon sequestration. Natural vegetation is able to bind carbon into the soil and maintain soil fertility. ▪ Certain renosterveld plants even have human medicinal value, such as cancerbush and wormwood. Products from such plants are now being marketed for their healing properties. ▪ Renosterveld is also a source of easily cultivated garden plants (particularly beautiful bulbs) which are well-adapted to the Cape’s climate and growing conditions. ▪ Renosterveld is home to a wide variety of birds and animals as well. Enjoy bird-watching and even controlled game bird hunting on your own property! Grey-wing francolin (<i>Francolinus africanus</i>) are sought-after game birds that feed on bulbs and plants that grow in renosterveld.

The two most common reasons provided for why farmers regard renosterveld negatively (D4), included ignorance (since many people are not aware of the scarcity and conservation importance of renosterveld) and because no income can be generated from unworked, natural land where renosterveld grows.

Other than the benefit for livestock that can be received by allowing livestock to graze in renosterveld (as experienced by 36% of the respondents, Table 2.1), there are also other advantages associated with renosterveld. Through informal discussion afforded by the interview, a number of renosterveld benefits were also collated (Table 2.2). The most important advantages to landholders were those associated with the value of renosterveld as a source of grazing (especially in times of drought), natural medicine and roughage for livestock. Most disadvantages related mainly to unwanted plants (e.g. *E. rhinocerotis*) and animals (e.g. caracal) that are associated with renosterveld habitats, which interfere with farming activities and incur the farmer costs to control.

Table 2.3

Three most important forms of Ov. Coastal Renosterveld usage to landholders in the Overberg (in decreasing order of importance) (N = 40).

Renosterveld usage	No. 1 (%)	No. 2 (%)	No. 3 (%)
1. Pasturage	60.0	2.5	7.5
2. Shelter for Livestock	0.0	32.5	5.0
3. Nature Conservation	12.5	10.0	7.5
4. Soil erosion Control	7.5	10.0	25.0
5. Wild Flowers - aesthetic value	5.0	12.5	20.0
6. Wild Animals - aesthetic value	5.0	17.5	7.5
7. Recreation	2.5	2.5	12.5
8. Medicinal Plants	5.0	5.0	7.5
9. Future Agricultural fields	0.0	2.5	0.0
10. Wild Flowers - commercial value	0.0	0.0	0.0
11. Wild Animals - commercial value	0.0	0.0	0.0
12. Firewood	0.0	0.0	0.0
13. Beekeeping	0.0	0.0	0.0
14. Garden plants	0.0	0.0	0.0
15. Future peri-urban expansion	0.0	0.0	0.0

The three most important forms of Ov. Coastal Renosterveld usage selected by landholders included (in descending order): pasturage (as selected by 60% of respondents); shelter for livestock (32.5%) and soil erosion control (25%) (Table 2.3).

By far, the large majority of landholders (92.5%) were quick to agree that the Overberg has a conservation-worthy rich natural heritage (Table 2.4). In comparison to fynbos, 60% of landholders thought that renosterveld had less value, although a fairly large proportion (20%) was unsure. Just over half the respondents (57.5%) regarded the renosterveld areas as non-productive, wasted pieces of land, while 12.5% were undecided. When the subject of renosterveld value was phrased differently (D3e), a smaller proportion of landholders (30%) felt renosterveld was wasted land in that it did not offer any advantages or benefits to the business or themselves (Table 2.4). This latter finding is consistent with the result in Table 2.1 where a similar proportion (less than a third) of landholders reported that renosterveld had a noticeable disadvantage when renosterveld was utilised by their livestock.

Table 2.4

Landholder responses to Likert statements on the utilitarian and intrinsic value of Ov. Coastal Renosterveld (N = 40).

	Agree (%)	Unsure (%)	Disagree (%)
▪ The Overberg has a rich natural heritage that needs to be conserved and managed carefully (D3a)	92.5	2.6	5.0%
▪ Fynbos has more value than renosterveld (D3b)	60.0	20.0	20.0
▪ The renosterveld areas on my property are non-productive, wasted pieces of land (D3c)	57.5	12.5	30.0
▪ Agricultural productivity is more important than the conservation value of my property (D3d)	27.5	17.5	55.0
▪ Currently, conserving renosterveld offers no advantages or benefits to me or to the business (D3e)	30.0	7.5	62.5

In order to determine the economic value landholders attach to Ov. Coastal Renosterveld, respondents were asked to estimate the commercial or retail value of the land (in Rands per hectare) presently occupied by renosterveld (D2). Answers varied from a maximum of R3500/ha to a minimum of R100/ha, while a fifth of the respondents felt Ov. Coastal Renosterveld had no value whatsoever and therefore did not report any monetary value. At the other extreme, one respondent who had a deep appreciation for renosterveld, said that such land was “priceless” and he could therefore not provide a monetary estimate for a commodity of such high intrinsic value to him. Another landholder regarded the monetary value of renosterveld equivalent to the cost of the fencing that enclosed the camp. The mean value of renosterveld was $R631/\text{ha} \pm 153.155$ (SE) and the median value was R400/ha. The value of workable land at the time of writing was between R3500 and R4000/ha.

2.4.3 Willingness to conserve

A large proportion of landholders (70%) said that conservation is compatible with running an agricultural business (Table 2.5). However, these philanthropic attitudes were not reflected in the response to the Likert statement about how realistically they can consider conserving renosterveld on land that can be productively used. In this case, approximately only a quarter (27.5%) of landholders can be regarded as “sacrificial conservators” because they are willing to forgo potential income from land that is set aside for conservation purposes.

Table 2.5

Landholder responses to Likert statements on willingness to conserve (N = 40).

	Agree (%)	Unsure (%)	Disagree (%)
▪ Conservation of land is incompatible with running an agricultural business (E1a)	30.0	0.0	70.0
▪ Realistically, I can only consider conserving renosterveld on land that I cannot productively use (E1b)	65.0	7.5	27.5

Apart from the Likert statements reported above (Table 2.5), the most direct question in the questionnaire that was aimed at determining willingness to conserve, simply asked the landholder how willing he/she was to conserve the renosterveld on their property in the future, even if a more profitable crop could be planted (E2, Fig. 2.2). With the negative attitudes reflected towards renosterveld in Likert statements D3c and D3e (Table 2.4) and the disadvantages listed in Table 2, it was expected that willingness to conserve would be low. However, more than half of the respondents (62.5%) expressed a willingness to conserve renosterveld (Fig. 2.2), either without reservation (32%) or in principle (30%). Only 10% of farmers considered conservation out of the question, while 15% felt that they were not in a position to conserve renosterveld now, but possibly in the future. Twelve percent of the respondents were not sure on the issue (Fig. 2.2).

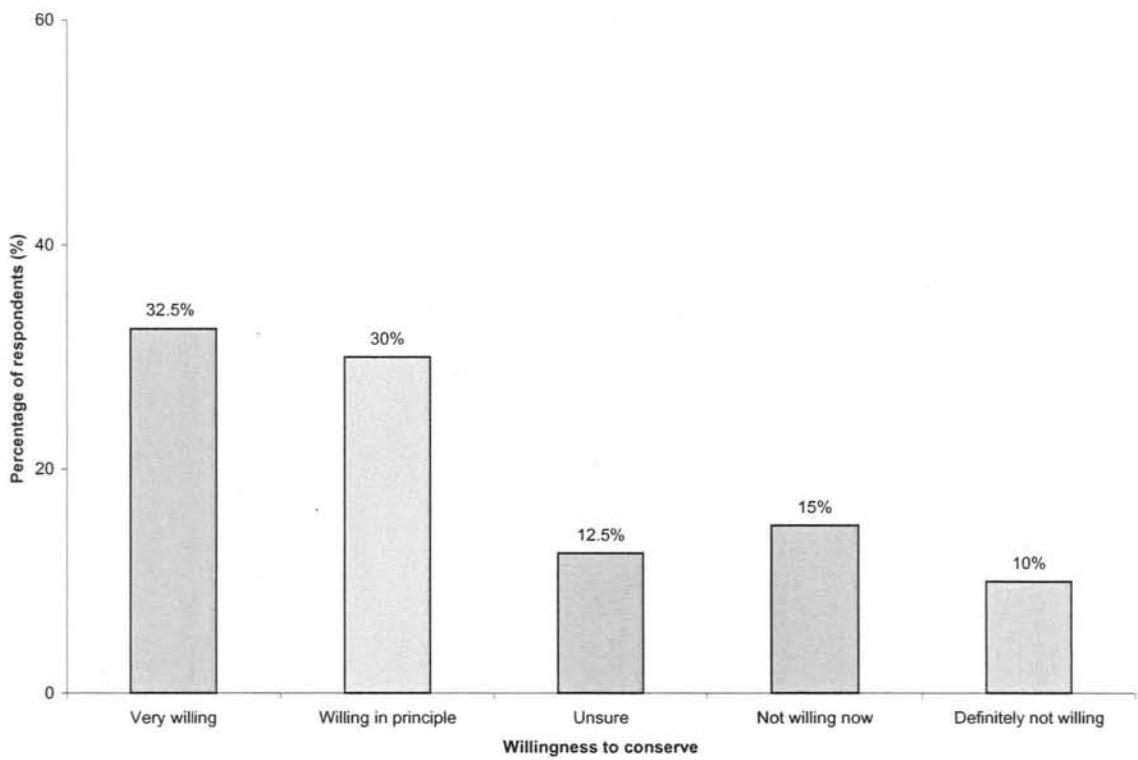


Fig. 2.2. Response to the question, "How willing are you to conserve the renosterveld areas on your property in the future even if a more profitable crop could be planted?" (E2) (N = 40).

Four sets of bivariate analyses were performed in order to investigate how willingness to conserve (as measured in C5, C2c and C2d) is influenced by attributes of the land (property size and area of renosterveld) and certain demographic variables (landholder age and education) (Appendix D). The Likert statement "Realistically, I can only consider conserving renosterveld on land that I cannot productively use" (E1b), was cross-tabulated with two farm size categories, small (< 500ha) and large (>500ha). It was found that a larger percentage (33%) of farmers on large farms tend to agree that they will conserve sacrificially, than farmers on smaller farms (14.3%). Cross-tabulations were also drawn between the categorical responses obtained from the question "How willing are you to conserve the renosterveld areas on the property in the future even if a more profitable crop could be planted?" (E2), and each of the following variables: Ov. Coastal Renosterveld area per property, landholder age and landholder education, respectively. It was found that a larger percentage (75%) of landholders with a large amount of renosterveld (i.e. > 300 ha) on their properties are willing to conserve their renosterveld, than landholders with smaller amounts of renosterveld (<300 ha). In addition, it was found that landholders that were more willing to conserve belonged to the younger generation (i.e. 71% of interviewees were between 18-35 years of age). A smaller percentage of middle-aged farmers between 35 and 50 years, and older farmers (> 50 years) are as willing to conserve. The cross-tabulation between level of education and willingness to conserve revealed that a larger percentage of

those landholders without a qualification after matric (67%) (i.e. lower educated farmers) are more willing to conserve.

2.4.4 Attitudes towards incentives for conservation

An overwhelming majority of landholders (92.5%) were of the opinion that incentives are a good idea for promoting conservation on private land. Thirty-five of the 40 landholders also regarded the protection of biodiversity outside of reserves as their responsibility, although not as many respondents (14 out of 40) were prepared to bear the costs for that responsibility (Table 2.5).

Table 2.6

Landholder attitudes towards incentives for conservation (N = 40).

Likert statement from questionnaire	Agree (%)	Unsure (%)	Disagree (%)
• Offering landholders incentives is a good idea for promoting conservation on private land (F1a)	92.5	2.5	5.0
• Protection of plants and animals outside of reserves should be the responsibility of private landholders (F1b)	87.50	5.0	7.5
• WCNCB or another government organization should bear the costs for the conservation of renosterveld on the property (F1d)	57.5	7.5	35.0

From the list of incentives presented to interviewees, assistance with fencing and land management was deemed most attractive (Table 2.6). A number of landholders expressed the desire to camp-off renosterveld areas to prevent these areas from becoming overgrazed, but the high costs of fencing prevented them from doing so. Another practical form of assistance, help with alien vegetation clearing, was considered by landholders as the second most attractive incentive. Given the high cost of alien plant clearing and the fire hazard that alien vegetation poses, the attractiveness of this incentive to landholders is easily understood. Direct financial incentives, in the form of rates relief, grants, subsidies and tax deductions were also very attractive to landholders, as selected by 65-67.5% of respondents. The least attractive incentive was that of public or community recognition, with only 15% of respondents selecting this option (Table 2.6).

Table 2.7

Attractiveness of incentives to landholders in the Overberg (in descending order of attractiveness) (N=39).

Incentive	Percentage of respondents (%)	Frequency
1. Assistance with fencing and land management	72.5	29
2. Assistance with alien vegetation clearing	67.5	27
3. Rates relief for land conserved	67.5	27
4. Grants or subsidies for conservation	65.0	26
5. Tax deductions	47.5	19
6. Access to scientific advice	45.0	18
7. Tourism incentives	40.0	16
8. Law enforcement	32.5	13
9. Access to farm planning and management support	32.5	13
10. Assistance with fire management	30.0	12
11. Free access to all WCNCB parks and reserves	27.5	11
12. Discounts for accommodation at WCNCB resorts	27.5	11
13. Advice on legal compliance procedures	17.5	7
14. Public/community recognition	15.0	6

The need for incentives is strongly supported, considering the finding that 33 of the 39 landholders interviewed would like to make use of incentives or any other form of assistance from the local conservation authority (F2, Table 2.7). Very few landholders expressed any reservation concerning the idea of having their renosterveld audited or monitored, in order for the property to be regarded as legible for receiving an incentive (F7, Table 2.7). There was clearly much interest in the concept of incentives, considering that 38 of the 40 landholders indicated that they would like a provincial conservation authority representative to visit them in the future, should the implementation of incentives become a reality (F8, Table 2.7).

Table 2.8

Landholder attitudes towards the implementation and administration of incentive schemes on private land.

Likert statement	Yes	No
• Would you prefer to maintain the natural areas on the land, including renosterveld, WITHOUT making use of incentives or assistance from the Western Cape Nature Conservation Board? (F2) ('Other' response category was selected by 2.6% respondents) (N = 39)	12.8%	84.6%
• Assuming that some incentives can only take effect if some form of auditing is in place, would you be willing to have your renosterveld areas monitored by an expert or authority (e.g. WCNCB)? (F7) (N = 39)	97.2%	2.8%
• Would you like a representative from WCNCB to visit you in the future if the implementation of various incentive schemes becomes a reality? (F8) (N = 38)	97.4%	2.6%

When questioned about what prevents them conserving more land on their property (F5), 62% of the landholder sample cited financial constraints as the reason, while only 5% of respondents considered the limitation to be management related. A mere two percent felt that a lack of resources and equipment was the reason. More of the responses (19%) fell outside the parameters of the options provided to interviewees. For instance, one respondent referred to the weather and the need to use land due to external factors, such as drought or a low economy. Another landholder that had recently had an unpleasant experience in trying to obtain a permit to cultivate new fields, blamed the “red tape, rules and bureaucracy in environmental authority departments”. The lack of co-operation he experienced in his dealings with these authorities is the reason why he is not interested in co-operating with conservationists to alter his landuse activities to achieve “their goals on my land”. Yet another respondent felt the reason was simply “ignorance” and that this was the only valid excuse for not conserving conservation-worthy habitats. This last comment supports the finding in section 3.2 where landholders felt that ignorance was the reason for the negative attitude that many farmers have towards Ov. Coastal Renosterveld.

When respondents were asked if they had any other comments or concerns about incentives in general (F9), only one landholder expressed a clear dislike and distrust for the idea, saying that he was not in favour of any development restrictions and did not want people to “tell him what to do on his land”. He felt that by signing some form of legal contract for receiving an incentive “the agreeing party becomes the boss, and you are no longer able to make decisions at your own discretion”. One respondent mentioned that the notion of incentives for conservation is not such a novel idea, as farming practices normally do not operate without some form of government assistance or subsidy. Therefore, the same principle should apply to farming practices that benefit conservation. He questioned why it has taken so long for regulatory authorities to realize the need for conservation incentives within enabling legislation. When presented with the list of

possible incentives, another landholder said that his first choice would not necessarily be tax deductions, because conservation should “not be about the money”, but the need to protect our land and natural resources for future generations. This view was shared with another respondent who re-iterated that people should not be motivated to conserve purely due to a promised financial incentive, as this would not effect change in their values, attitudes or behaviours. His suggestion was that an attempt should rather be made to instill amongst landholders, a sense of pride and personal responsibility for the stewardship of natural resources and habitats on their own property.

Unfortunately only half of the 40 landholders responded to the question on which stewardship option was the most preferred (F6), mainly because the three options was time consuming to explain. This question was therefore omitted in interviews that had time constraints. Of the 20 landholders that commented on the proposed options, 7 said that they preferred the Conservation Area option, while 8 selected the Co-operation Agreement Reserve option. Five respondents were prepared to consider both a Conservation Area and a Co-operation Agreement, but no respondents were interested in the Contract Nature Reserve, which has the highest level of security and rights restriction, as well as the highest level of benefit to the landholder. A few of the respondents that selected the Conservation Area option commented that they could probably be persuaded to enter a co-operation agreement with further negotiation.

2.4.5 Conservancies and conservation authority interactions

Three questions were aimed at determining the level of landholder awareness towards conservancies (namely G1, G2 and G3). Conservancies currently offer one of the best means available in South Africa for providing some degree of protection for land without imposing any restrictions on the landholder, due to their voluntary nature.

Firstly, the national conservancy emblem, the guineafowl, was shown to the interviewees in order to determine how many landholders knew what the emblem represented (Fig. 2.3). Only 25% of landholders were able to specify the correct meaning of the emblem. A few respondents provided some rather humorous, though incorrect answers, such as “Guineafowls are protected here” and “Be careful of guineafowls crossing the road (especially in the breeding season when the females are heavy and move slower!)”. There was no significant difference between Bot River and Suikerkankop farmers with regards to the correct identification of the meaning of the emblem ($X^2 = 0.023$; df = 1; p = n.s.).

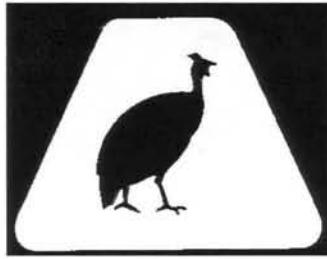


Fig. 2.3. Emblem for conservancies in South Africa.

Secondly, when respondents were asked whether they were familiar with the types of advantages associated with belonging to a conservancy, approximately a quarter of landholders answered in the affirmative, a further 40% were vaguely aware of certain advantages, and 34% were unaware of any such advantages (Fig. 2.4). There was no significant difference between Bot River and Suikerkankop farmers with regards to an awareness of the possible advantages that conservancy membership may bring ($X^2 = 3.856$; $df = 2$; $p = \text{n.s.}$) (Fig. 2.4).

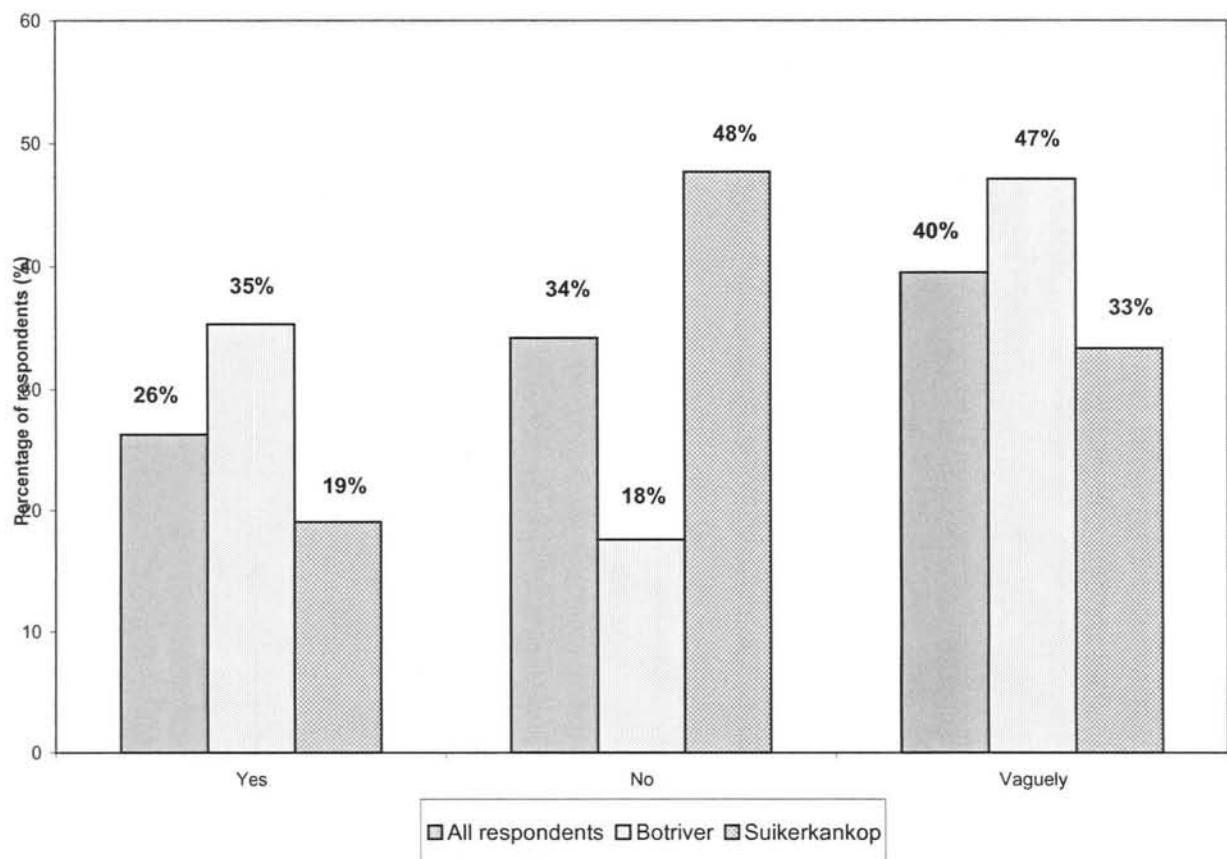


Fig. 2.4. Response to "Are you familiar with the types of advantages that belonging to a conservancy can offer?" (G2) (N=38).

There was no significant difference between Bot River and Suikerkankop farmers with regards to their opinion on the potential for a conservancy in their area ($\chi^2 = 0.015$; df = 2; p = n.s.). Sixty one percent of landholders felt that there was potential for establishing a conservancy in the area, while approximately a third (34%) of respondents did not see the potential for a conservancy. Five percent of respondents thought that potential did possibly exist (Fig. 2.5). The reason often provided by respondents for their negative opinion of conservancy potential, was that “there is nothing to conserve” on the farmlands, as there is very little natural vegetation remaining in the area. In this way, many landholders only regard land that holds big game as conservation worthy.

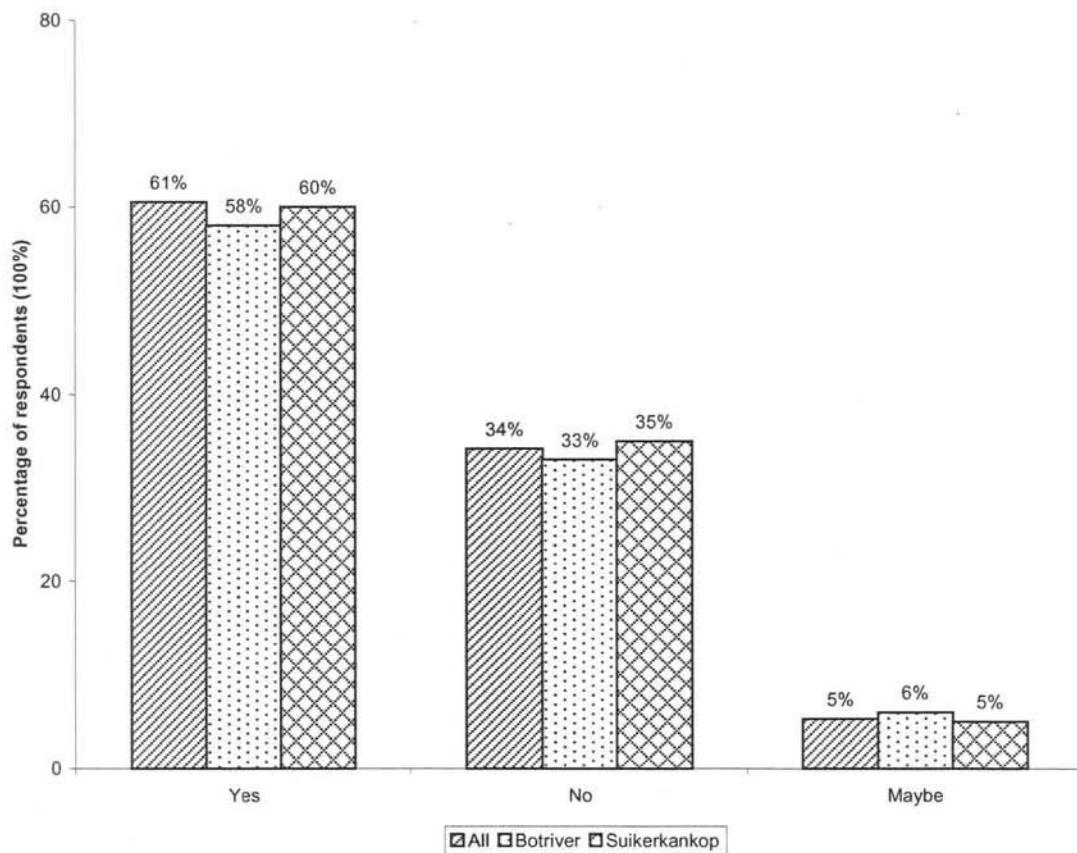


Fig. 2.5. Response to “Do you think there is potential for a conservancy in this area?” (G3) (N=38 respondents).

Finally, in response to the open question “Do you want to convey a message to the Western Cape Nature Conservation Board (WCNCB)?” (G6), only 17 out of the 40 landholders offered a response. It appeared that the 23 landholders that did not answer this question were either disinterested in WCNCB matters, or satisfied with their operations and therefore did not see a need to comment. One comment provided was that it is very important to understand a farmers' economic dependence on their land. “Land is money”, one landholder said, and therefore it is difficult to “give up” land for conservation. This same farmer also stressed the need to involve the whole community in conservation projects and not just the landholder (e.g. farm labourers, farmers' wives etc). Another landholder expressed frustration with the staff of WCNCB who often drive past

his property en route to a WCNCB reserve, but never stop to visit and make personal contact. Although he himself was a conservationist at heart, and well understood the ecological value of Ov. Coastal Renosterveld, he had a negative attitude towards conservation authorities due to his perception of their lack of interest in private landholders surrounding formally protected reserves. "More extension officers!" is what another landholder stressed was needed in order to improve conservation on private land, as he felt that one on one contact with landholders is the only way to "convert" non-conservationists. Only one of the 17 landholders who answered this question responded with "Carry on with the good work!" towards WCNCB. Two landholders requested specific advice on the best management strategies for rehabilitating renosterveld, and on implementing a burn in ways that would favour desirable renosterveld species. One respondent suggested that a WCNCB representative should give a talk at one of the local Farmers' Association meetings, in order to provide farmers with an update on the environmental legislation applicable to them as well as more about renosterveld ecology.

2.5 Discussion

2.5.1 Sampling technique and sources of error

In retrospect, and considering the constant demands on a farmer's time, the questionnaire was too lengthy as some questions had to be omitted during the interview. Therefore, a slightly shorter questionnaire would probably have been more appropriate. The sample size of 40 farms was admittedly small. While time constraints for the study precluded increasing the sample size during data collection, future studies should make use of a larger sample size to improve the representivity of the sample.

Distance between the researcher and the participant in terms of home language, culture and marital status may have introduced an unavoidable source of error, as the author was a young, single, English female while the large majority of respondents were older, married Afrikaans men. The impact of this source of error on the reliability of the results is however, considered negligible. It is possible that the researcher's level of education and university affiliation might have caused some respondents to provide socially desirable views in order to impress the researcher. Considering detailed personal information was collected in the background information section of the questionnaire (Section A), respondents who were concerned for the confidentiality of their responses (even though confidentiality was assured), might not have answered as honestly as they might have otherwise. However, none of the respondents verbally expressed such fears in this regard during the interview. Possible sources of error are discussed in greater detail in Chapter 4, section 4.4.

2.5.2 Knowledge, use, and management of renosterveld by landholders

There is clearly a vital need for more education and extension support to spread the “message” amongst landholders about the conservation importance of Ov. Coastal Renosterveld. This recommendation is supported by a number of questionnaire findings including the following:

- Less than half of the landholders were aware of the scarcity and endangerment of Ov. Coastal Renosterveld (Table 2.1);
- 43% of landholders were not able to provide any information when asked what they knew about renosterveld ecosystems.
- Nearly three quarters of the landholders interviewed felt that awareness of the scarcity and conservation importance of Ov. Coastal Renosterveld was not common among other people in their area.

It is interesting to note that 83% of the landholders agreed that the reasons why renosterveld should be conserved were clear to them (C4a). This seeming disparity in the evidence quoted in the paragraph above, may be explained by the influence of social desirability bias (i.e. respondents tend to say what they think you as the interviewer would like to hear). Social desirability bias is also referred to as evaluation apprehension, which Deaux et al. (1993) describes as an individual’s concern about the impression he or she is creating, which may render the response inaccurate. It is also possible that, after initial discussions about why the survey was being undertaken, interviewees realized that renosterveld must have conservation importance for a whole survey to be conducted even if the interviewer made efforts to prevent giving information that would bias responses.

2.5.3 Value and perceived benefit of renosterveld to landholders

During the interviews it was found that landholders tended to list the disadvantages and problems they experience with renosterveld far more readily than relating the advantages. The most influential reason for landholders’ negative regard of renosterveld, is their frequent association of the vegetation with *Elytropappus rhinocerotis* (renosterbos). *E. rhinocerotis* causes a suite of management headaches to the farmer, as it rigorously invades planted fields and becomes costly to control by hand removal. Furthermore, *E. rhinocerotis* has a poor grazing value in comparison to planted pastures. It is unfortunate that the name ‘renosterveld’ sounds very similar to renosterbos, and therefore many of the misperceptions regarding renosterveld can be traced to the connotations of this species, which often dominates renosterveld. Promoting the benefits of renosterveld is probably one of the best means of changing the way landholders value their renosterveld. To these ends, more research is needed in order to realize more renosterveld benefits than those listed in Table 2.2.

An assessment of the most popular uses of Ov. Coastal Renosterveld (namely pasturage, shelter for livestock and soil erosion control), reveals that renosterveld holds a predominantly utilitarian benefit for landholders (Table 2.3). This suggests that the aesthetic value of Ov. Coastal Renosterveld (including its conservation value and habitat value for wild flowers and wild animals) is not as valuable to landholders as its economic potential

Because Coastal Renosterveld is the most endangered vegetation type in the Cape Floral Kingdom (McDowell, 1988), renosterveld can be regarded to have more conservation value than fynbos. However, 60% of the sample of landholders regarded fynbos as having more value than renosterveld, a finding that requires interpretation (Table 2.4). Some respondents might have interpreted this statement from an economic perspective (considering that protea propagation can generate a lucrative income), while others might have regarded the ‘value’ of renosterveld in a purely ecological light.

The value farmers attach to Ov. Coastal Renosterveld is not always consistently positive or negative. This becomes apparent in farmers’ seemingly contradictory views on similar issues. For instance, although a larger proportion of landholders them (62.5%) agree that the renosterveld on their property does offer some form of advantage or benefit to the business or to themselves (Table 2.4), more than half regarded renosterveld as unproductive, wasted pieces of land (Table 2.4).

This overall negative perception is further reflected by the low median estimated commercial value that landholders attach to a hectare of Ov. Coastal Renosterveld (in R.ha⁻¹), which was approximately one tenth of the commercial value of cleared, workable ground). The reason for the low reported economic value of Ov. Coastal Renosterveld is because most renosterveld that still remains today is located on marginal land that is either too steep, too rocky or too wet to plough. This makes the agricultural potential of Ov. Coastal Renosterveld very low and further explains the sentiment that renosterveld is “unproductive, wasted piece of land” as discussed in Table 2.4. These findings point toward the tendency of farmers to maintain an overall negative perception of renosterveld, particularly in an agricultural context, irrespective of its general advantages or benefits.

2.5.4 Willingness to conserve – what affects it?

The results on farmers’ willingness to conserve reported in Fig. 2.2, suggest that conservationists can be optimistic about the future of Ov. Coastal Renosterveld, as a large majority of landholders (63%) are indeed willing to conserve Coastal Renosterveld in the future. However, the results also show that only a small percentage (28%) of landholders can realistically consider conserving Ov. Coastal Renosterveld on land that they cannot productively use. As was the case with farmers’ perception of the value of Ov. Coastal Renosterveld, their generally sympathetic sentiments towards conservation should again be interpreted

within the context of economic pressures that often force landholders to use every hectare of land productively. This is clearly illustrated by the following statements made by a number of landholders: "Yes, I am willing to conserve, but then you must come and put up the fence and help manage it" or "Yes, I am willing to conserve but I cannot do so without financial assistance". Therefore, without practical and financial incentives it is unlikely that improved education efforts to increase awareness levels about renosterveld endangerment will dramatically change landholder actions on the ground.

The finding that landholders who live on larger farms were more likely to consider conserving renosterveld on land that they can still productively use, is probably a reflection of the fact that there are more likely to be additional hectares to spare for conservation on a larger farm. Secondly, farmers with a larger amount of renosterveld on their farms being more willing to conserve, is probably due to two reasons – either the landholder (or predecessors) has enjoyed the presence of natural land for recreation or hunting purposes, or those hectares were not needed for agricultural productivity. It could also be argued that if renosterveld habitat has escaped the plough through the centuries until now, it probably occurs on marginal land and has good chances of remaining intact due to its steepness, rockiness or wetness.

Younger farmers appear more willing to conserve than middle- or older-aged farmers. This may be due to a younger person's more flexible mindset, which increases their willingness to consider new ideas. An increase in age can cause people to be more "set in their ways" and not as willing to consider new ideas, such as that of conserving land that has never held much value to them in the past. One could expect better educated farmers to be more inclined to consider conservation as they are more likely to understand environmental pressures and the need for stewarding natural resources for future generations. Therefore the finding that landholders without a tertiary education are more willing to conserve, is surprising and at first glance counter-intuitive. While education is clearly linked with level of knowledge and awareness levels, there is not necessarily a link between willingness to conserve and level of education. While there is no literature that deals specifically with willingness to conserve and what influences it, Gould et al. (1989) found that a farmer's education was an influential factor in the adoption of environmentally sound practices. However, the finding of Gould et al. (1989) is not supported by this study. Adoption of environmental practices and the willingness to conserve are not necessarily synonymous, which might explain this difference in findings.

2.5.5 Attitudes towards incentives

Due to the many commitments that landholders have in running a farm as a business, many do actively seek further information on funding programmes and financial incentives for on-farm conservation (Shepherd, 1998). This statement is consistent with the finding that:

- i.) the majority of landholders (97%) in this survey expressed interest in a representative from WCNCB visiting them in the future to discuss incentives and stewardship options further
- ii.) the majority of landholders (85%) would prefer to maintain natural areas on their land by making use of incentives or assistance from WCNCB.

Carr and Tait (1991) hold a similar view to that expressed by one of the respondents in section 2.4.4, that as long as the dominant values of the majority of the farming community remain at variance with wildlife and landscape conservation, any improvements encouraged by grants or persuasive messages are likely to be minimal or unstable. Carr and Tait (1991) go on to say that legislation and regulation may be the only effective means of ensuring stable long-term change if this proves to be the case. However, this latter view is not shared by the author or by Botha (2001a) who states that providing the correct incentives to modify behaviour may be far cheaper than enforcing regulations and more effective than elaborating on bureaucratic administrative requirements. No indication was found in the interviews conducted by McDowell (1988) that restrictive legislation has any decisive influence on conservation behaviour. The “big stick” approach has its merits in certain situations, but in general what is needed amongst landholders of threatened ecosystems is a change in mindset change from one of consumerism to responsible stewardship of the natural heritage that has been entrusted to them. In order to bring about this shift in mindset, nothing can surpass the impact of personal one-on-one communication with landholders through direct extension.

It is McDowell’s (1986b) opinion that the selective provision of subsidies appears to have certain advantages over tax based incentives on the basis that several Coastal Renosterveld landholders that he interviewed, stated that direct financial support would be the minimum requirement for them to conserve their renosterveld areas. The results of this study support McDowell’s observation, considering 65% of the 36 landholders interviewed preferred the notion of grants and subsidies while only 47.5% selected tax deductions as their most attractive incentive (Table 2.6).

The reason for a general preference by 20 respondents (F6a) for the Conservation Area option above a Contract Reserve, is that this form of habitat protection does not bind the landholder to any legal agreement or prevent them using the land for another landuse later. Thus it offers a good entry-level option for a farmer that is reticent about possible restrictions of their rights as landholder. A Contract Reserve on the other hand, would require the highest level of commitment from a landholder. In exchange for certain incentives, development rights of the landholder would be completely restricted and the area in question would require regular auditing.

It is assumed that if incentives are associated with government regulation, negative connotations could be created of red tape and bureaucracy or fines and prosecution. Therefore, among farmers the positive aspects and advantages of adopting a stewardship option should be carefully marketed and fears allayed wherever

possible. A question foremost in many interviewees' minds when the incentives section of the questionnaire was discussed, was "Where is the money going to come from for these sorts of incentives?", and many landholders were pessimistic about the likelihood of financial incentives ever being realized in South Africa. However, the prospects for South African landholders in the 21st century are not as dismal as they may seem. During the past six years, organizations such as the Botanical Society of South Africa have initiated research and action with regard to the need for incentives. They have begun lobbying for the inclusion of incentives in local, provincial and national legislation, as well as their implementation through provincial conservation agencies. Furthermore, a pilot project was launched in the Western Cape in 2003 by the Botanical Society in partnership with WCNCB, in order to test the implementation of the three-tiered incentive scheme associated with the stewardship options (F6) in three pilot areas. One of the areas of focus in the pilot project is to improve the capacity of the WCNCB extension officers to provide better levels of extension support for landholders (Winter and Botha, 2003). Advanced extension services can be considered as one of the most essential and cost-effective incentives for improving landholder co-operation and conservation behaviour. An impression was gained through the interviews that landholders could be motivated to do more for conservation on their properties when extension officers provide a committed level of advice, (non-monetary) support, and follow-up on their individual management problems and queries. However, conservation extension services in South Africa require much improvement for these kinds of motivational incentives to be realized.

McDowell et al. (1989b) maintain that every individual has needs which, with a little skill, can be translated into improved conservation behaviour. McDowell et al. (1989b) proceed to list the following individual needs that they observed amongst West Coast landholders interviewed in 1985: financial remuneration; prestige; publicity; personal recognition; privacy; guaranteed continued ownership; guaranteed grazing rights and guaranteed continued removal of problem plants or animals. McDowell (1989b) suggested that presenting special merit certificates or plaques to proprietors of worthy ecosystems was one relatively inexpensive means to satisfy the need for personal recognition, as exemplified in the approach of the South African Heritage Scheme, which was launched in 1984. While a number of critically important sites have now received heritage site status since the scheme was initiated, a major shortfall of the strategy was that declared sites were not regularly monitored, and landholders were not legally accountable in any way if the sites were not managed appropriately. Since the inception of the new South African presidency in 1999, the scheme dissolved, because the system lacks a political patron, which was formerly the state president Nelson Mandela. Moves are, however, afoot to revive the programme with a new format and by addressing its previous shortcomings (Botha, 2003 pers.comm.).

McDowell (1986b) also commented that at the time of writing, South Africa's legal system made negligible or no allowance for direct or indirect financial compensation or incentives for conservation. However, nearly seventeen years later and after much lobbying effort by civil society groups such as the Botanical Society of

South Africa, positive changes are starting to take place within South Africa's legal system. New protected area legislation provides the opportunities for private land to be contractually bound as nationally important protected areas (Botha, 2003 pers.comm.).

2.5.6 Conservancy awareness

The fact that only a quarter of the landholders interviewed were able to provide a correct meaning for the conservancy national emblem, indicates that levels of awareness regarding conservancies is poor amongst landholders, and that the option of conservancies for private land conservation should be better marketed and utilised. Although there is no significant difference between the Bot River and Suikerkankop with regards to the correct identification of the meaning of the conservancy emblem or awareness of the types of advantages a conservancy can offer, there are actually more conservancies operating in the eastern Overberg near Bot River, than in the western Overberg, closer to Suikerkankop. Therefore, more people in the Bot River region are likely to have heard about conservancies. Furthermore, an active conservancy, called the Groenlandberg conservancy, is located close to the Bot River study area, and four of the landholders interviewed had properties that were within, or very close to, the boundaries of the conservancy. It is possible that a larger sample size might have yielded a significance difference between Bot River and Suikerkankop in terms of conservancy awareness. It would be interesting to test the difference between the two areas in a few years time, once extension support has improved in both areas.

The lack of a significant difference between Bot River and Suikerkankop landholders with regards to their opinion on the potential of a conservancy in their area is not a surprising result, considering that there were no significant differences about conservancy awareness in questions G1 & G2. While conservationists would regard the potential for a conservancy to be high in any location, landholders that have not seen a conservancy in operation might be less enthusiastic. One of the greatest obstacles to the initiation of voluntary conservation initiatives, such as conservancies, on private farmland, is the perception among landholders that there is "nothing to conserve" on land used for agriculture. Consequently, expert extension skills are needed to explain to landholders the value of small fragments of natural habitat, such as renosterveld. The value of these fragments is heightened when they are linked to form corridors and achieve greater connectivity in the landscape for plant and animal distribution and pollinator interactions. From a conservation perspective, another commonly held mindset that requires changing among landholders, is the "species approach" to conservation, i.e. conserving charismatic species with public appeal. This tendency needs to be replaced by an "ecosystem approach" to conservation thinking, i.e. conserving portions of vegetation as habitat for many species is a more effective way of ensuring that species of concern will be conserved.

Perhaps the easiest way to convince landholders that managing an area co-operatively is advantageous, is if you can prove it is advantageous to them. This argument is strengthened if there is an issue that affects a number of landholders across property boundaries, such as the risk of fire, problem animals, theft or poaching. Starting a conservancy in an area requires a considerable investment of time from a conservation extension officer. Therefore one of the main reasons why there are relatively few conservancies in the Western Cape, is the limited capacity of extension staff. A conservancy also requires regular meetings and a committee to administer yearly subscription fees, initiate new projects and generally maintain momentum. Having to attend meetings, monitor expenses and keep members up to date with happenings can often be a deterrent to landholders who would prefer to “do their own thing”. Despite these potential problems, the advantages of conservancies far outweigh the possible organisational headaches, especially in terms of instilling a sense of pride, unity and ownership amongst landholders for the natural heritage in their living environment. More importantly, a greater area of threatened vegetation (e.g. Mistbelt Grassland, Coastal Renosterveld, Sand Plain Fynbos) is found in conservancies in South Africa, than in statutory protected areas (Botha 2003, pers. comm.). Other contributions to conservation that conservancies can make, include: increased conservation efficiency through co-operative land management; rehabilitation of disturbed areas and river catchments; re-establishment of indigenous fauna and flora; awareness education and participation programmes amongst the resident community; monitoring of illegal development and creation of corridors that interlink natural habitat patches (Milton and Davies, 1994; Botha, 2003 pers.comm.). The praise-worthy accomplishments of a number of conservancies in South Africa should be remembered such as the Sakriver conservancy in the Karoo, which has helped prevent the extinction of the highly endangered riverine rabbit through habitat conservation on farm land.

Unfortunately, due to the voluntary nature of non-binding conservancies, their long-term existence depends on the enthusiasm and dedication of individual landholders. If the chairman of a conservancy or a landholder that is highly involved in a conservancy moves out of an area, the future existence of the conservancy is often at stake. Therefore, we need more tools at our disposal in order to offer long-term security for sites with high conservation value. The concept of an individual Co-operation Agreement or Contract Nature Reserve that can be applied to an individual property or portion thereof, offers an excellent alternative. These options are of value to conservationists who have become disillusioned with conservancies, or who find that neighbours do not want to participate in a co-operative venture. A point in case was a landholder from the Suikerkankop area who was the most exceptional conservationist ever encountered by the author. He had a deep appreciation and love for the renosterveld areas on his farm, and had chosen to leave significant areas of land uncultivated, while many more hectares had been improved and rehabilitated through years of commitment. However, he was not enthusiastic about the idea of joining a conservancy, because he was aware of a number of problems that were being experienced by an existing conservancy close to his farm, such as disagreements between conservancy members and fund expenditure, which he referred to as “all the politics”. Such landholders should be able to receive compensation for the often sacrificial conservation

efforts that they undertake on their properties. Compensation could only be made available if the landholder in question enters a legal co-operation or contract agreement. In this way, the landholder is obligated to manage the land for biodiversity for a certain period, which is a means of ensuring a return on financial investments made through compensation and incentives.

2.5.6 Attitude change versus behavioural compliance

For conservationists, it becomes important to know how one can change negative attitudes of those people who are not sympathetic towards conservation, so that they appreciate and care for nature. Perhaps the most common way of changing a person's attitudes is by presenting him or her with a message containing information about the attitude object. Attitude change by this strategy is called persuasion (Petty, 1995). According to Kelman (1958), people's attempts to influence each other are more often aimed at changing general attitudes, rather than at forcing a change in behaviour by relying on force or threatened punishment. The advantage of attitude change over behavioural compliance is that when people's internalized attitudes are changed, they will presumably choose to engage in consistent behaviour, even if the person who brought about the attitude change is not present (Kelman, 1958). This has become the rationale for introducing incentives for conservation, rather than enforcing compliance with legislation.

2.5.7 Implications for conservation agencies

To assist with the conservation and management of priority ecosystems on private land in South Africa, conservation authorities need to understand the attitudes, management approaches, needs and limitations of the private sector that owns nearly 80% of this priority land. As Mossman, 1985 so aptly emphasizes, one cannot expect conservation to be undertaken at levels beyond the interests and abilities of the landholders who own land where these priority ecosystems are located. Tools of research outside those of the biological sciences are therefore necessary to come to grips with, and properly understand the life-world of the private landholder.

It is recommended that provision is made for landholder relationship building and attitude surveys in the strategic plans of the different WCNCB business units. This recommendation extends further to a suggestion that more sociologists or social-ecologists should be employed within conservation authority personnel structures. Up until now, conservation bodies tasked with protecting the nation's fauna and flora have rarely called upon sociologist expertise. However, in many ways conservation can be regarded to be first and foremost about people. Securing natural heritage will only be possible if we learn how to engage the people who own it. Just as most commercial companies have public relations personnel and make substantial provision within their annual budgets to ensure that the public views their product or service favourably, so

should conservation authorities pay more attention to improving their public relations with landholders and stakeholders that own property around statutory reserves.

McDowell (1989) provides a code of conduct for extension agents to induce positive conservation attitudes in landholders (see 4.4.3 below). He uses two case studies of separate landholders that contrast good and bad modes of conservation liaison. To prevent duplication of McDowell's (1989b) work, it is recommended that all new or existing extension agents are made to familiarize themselves with McDowell's (1989b) code of conduct. It is further recommended that conservation agencies provide regular landholder communication and negotiation training, which specifically focuses on improving landholder interactions through impression management and effective decision steering.

2.5.9 Advice for future landholder surveys

It is recommended that any landholder survey or needs-analysis should be kept as brief as possible, without jeopardizing the collection of adequately detailed data for analysis. If the questionnaire developed for this study were to be used again for a similar survey, it is recommended that the following items be omitted, as they did not add as much value to the survey as other items: A13, A14, A24, B5, B6, C2, F6 and F7 (Appendix A). It is also important to convey to the person being interviewed that all their opinions or answers are valuable and valid, and that there are no "wrong answers". It was the author's experience that, as an independent researcher who was not wearing the sometimes threatening government official uniform with green epaulettes, trust was more easily established and therefore landholders expressed their true feelings more readily. It is advisable to send notification of the intended survey by post first, and then phone landholders to arrange a convenient interview time. As the interviewer, ensure that you are not late for appointments, nor should you arrive too early. Furthermore, do not arrive during the typical lunchtime period, as this tends to annoy farmers. Lunchtimes were however found to be the best time for reaching a farmer telephonically, as they were generally always at home during that time. It is also a good idea to leave an information resource, pamphlet, or even a small free gift (if available) with the interviewee on completion of the interview, as a token of appreciation for the time they afforded to take part in the survey.

2.6 Conclusion

The problems that threaten the survival of threatened vegetation types such as Ov. Coastal Renosterveld, are complex and uncertain. The solutions required are not only adjustments to current landuse and agricultural practice, but may be relational and attitudinal adjustments between conservation authorities and the landholders themselves. As stressed by McDowell et al. (1989b), personal interaction has a far greater potential than any other medium for persuading landholders who own and control threatened ecosystems, to modify their landuse practices. Before implementing a conservation strategy for an area targeted,

conservationists should first and foremost consider whether an adequate assessment has been made of the attitudes, opinions and general feelings of private landholders in the intended area of operation. Although this would appear to be common sense, many conservation projects have been launched without these sort of landholder considerations. This will ensure maximum effectiveness for any conservation work, and the best return for resources that were invested.

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CHAPTER 3

An index to measure the conservation attitudes of landholders towards Overberg Coastal Renosterveld, an endangered vegetation type in the Cape Floral Kingdom, South Africa

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3.1 Abstract

The aim of the study was to construct and validate a user-friendly index to measure the attitude of landholders towards the conservation of Overberg Coastal Renosterveld, a distinctive grassy-shrubland now critically endangered in the Cape lowlands. A questionnaire was administered to a random sample of 36 private landholders in the Overberg region of the Western Cape. An iterative item reliability analysis was executed on the data, using Spearman Rank Order correlations and Cronbach's Alpha. The results yielded an index with two dimensions and a Cronbach Alpha co-efficient of 0.67. The dimensions or components of conservation attitude towards renosterveld included: (i) a landholders' perception of the perceived benefit of Coastal Renosterveld; and (ii) their willingness to conserve it. The mean conservation attitude score amongst the sample was 0.6 (± 0.03), indicating that landholder attitudes were generally sympathetic towards Overberg Coastal Renosterveld conservation. The following variables were found to have significant associations with conservation attitude: (i) area of renosterveld; (ii) landholder environmental group membership status; (iii) presence of ecotourism activities on the property; and (iv) how long the property had been in the owner's family. The intended application of the index is that index scores (amenable for use in a Geographic Information System database) can assist conservation practitioners in deciding where resources should be allocated, on the assumption that high-scoring individuals are more likely to want to take part in conservation initiatives.

Keywords: index, conservation attitude, renosterveld, perceived benefit, willingness to conserve, Cronbach alpha

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3.2 Introduction

Over the last 50 to 60 years the study of attitudes has proliferated. It is likely that more research has been conducted and more written on the topic of attitude formation, measurement and change than on any other single subject in the social sciences. Attitudes are constructs central to understanding why people make certain decisions and behave the way they do. A construct is a theoretical creation based on observations but which cannot be observed directly or indirectly (Babbie and Mouton, 2001). A person's attitude towards conservation can be more easily defined theoretically than observed in real life because it includes a wide variety of aspects or dimensions. Dimensions of attitudes to conservation can include the evaluations people hold of themselves either as careful custodians or rightful owners of their natural resources; other people or officials involved in conservation; and issues such as resource use, conservation projects and environmental problems. Attitudes towards the conservation of a specific vegetation type, such as Ov. Coastal Renosterveld, can then comprise a further suite of attitude dimensions. Constructs such as these can be operationalised in empirical research by rendering them either measurable or observable through composite measures such as indexes and scales. An index is a measure that combines several distinct indicators of a construct into a single score. A scale, on the other hand is a measure, which captures the intensity, direction, level or potency of a variable construct, and arranges responses or observations on a continuum (Babbie and Mouton, 2001).

In contrast to attitudes, behaviours are observable actions, while attitudes are not necessarily observable, they are measurable (Gray, 2002). Attitudes can be measured directly by asking respondents to report their beliefs or evaluations, or indirectly by studying responses that are thought to be related to attitudes (Bohner and Wanke, 2002). Direct attitude measures may consist of single-item numeric response scales (i.e. asking a person a single question about their general evaluation of an attitude object) or multi-item scales such as the frequently employed Likert scale (Likert, 1932). The major disadvantage of single-item measures is that their reliability may be low, or difficult to assess. The use of multiple-item indicators of attitudes has been found to improve the ability of attitudes to predict behaviour. This addresses in part the controversy in the literature regarding the inconsistency between attitudes and behaviour which can be due to the discrepancy between what people say and do (Steel, 2000). In this study, the attitudes of landholders towards the conservation of Ov. Coastal Renosterveld were measured directly with a multi-item index, in order to express all the possible dimensions of such attitudes in one summary measure.

Renosterveld is a grassy shrubland vegetation renowned for its spectacular diversity of geophytes, which occurs in the Western Cape and parts of the Eastern Cape of South Africa. Coastal Renosterveld is one of the most threatened and poorly protected vegetation types in the Cape Floral Region (CFR), having been reduced to between 5 and 6% of its original extent (Von Hase et al., 2003). Less than 1% of renosterveld is formerly conserved in statutory reserves in the Western Cape, of which only 0.5% is conserved in the

Overberg domain. Only 0.28% of the West Coast area of the Western Cape offers formal protection for Coastal Renosterveld (Von Hase et al., 2003). The only feasible prospect for conserving the remaining Coastal Renosterveld fragments that are scattered throughout agricultural landscapes, is through voluntary conservation by private landholders. Understanding landholder attitudes is therefore a critical first step for conservation agencies to consider before engaging with landholders that own such threatened habitats.

There are a number of examples in the literature of landholder attitude investigations towards conservation (Carr and Tait, 1991; Botha, 1991; Van Zyl, 1999) or agro-environmental schemes (Battershill and Gilg, 1997; Falconer, 2000; Wilson, 2001; Fish, 2003). Few examples exist where an objective, quantitative measure, such as an index, has been used to measure landholder attitudes towards conservation on private farmland. While qualitative surveys of landholder attitudes can provide a valuable tool for private land conservationists, there is a need to express and communicate the results of detailed survey work in a simple, easy-to-understand fashion. An objective, quantitative method is required to compare the conservation attitude of one landholder with another, especially when interviews or informal discussions are conducted by a number of different individuals or officials. Use of a quantitative method can improve the validity of the data by avoiding the influence of researcher bias. Personal interviews can also become lengthy exercises, and if a conservation authority wishes to assess the attitudes and needs of landholders over a large area, a quick and rigorous means to assess landholder attitudes is required. Furthermore, such a method must be easy to compute and analyze, if the tool is to be used by the layperson and not for academic purposes only.

There is burgeoning literature on what influences attitudes towards conservation, but there is very little on what constitutes the actual components of conservation attitudes among farmers. For example, Ferrar (1983) lists the following empirically untested factors that could influence people's attitudes (and behaviour) towards conservation through psychological means: (i) the personal environment (i.e. home-culture, socio-economic status, work environment); (ii) experiential events (i.e. the value of a single enlightening experience that stimulates future interest and understanding); (iii) urban crowding syndrome and the value of open space; and (iv) the effects of the media and advertising influence. Attitudes of farmers can also be influenced by the family situation, the farmer's goals and the type of farm (for examples see Gasson, 1974 and Cougenheur and Swanson, 1988). Furthermore, farm size, farm income, off-farm income, erosion potential on the farm and length of farming experience have been found to significantly influence farmer's attitudes toward the environment (Lasley et al., 1990; Featherstone and Goodwin, 1993). However, Newby (1977) found that farm size alone could not explain farmer's attitudes towards conservation. This finding led to further investigations on the topic to consider both a farmer's interest in conservation and his financial constraints. Rhodes et al., (2002) found that exposure to information about the attitude object can also influence attitudes, where more informed pastoral farmers in New Zealand had a more positive attitude towards the adoption of riparian management measures.

Lemon and Park (1993) concluded that farmers, when trying to achieve good practice on their farms, balance environmental, physical and commercial factors in their decision-making. Potter (1986) found that any change in landuse on private farmland is both ‘determined’ by policy, institutional and family influences and ‘intentioned’ by the farmer and his/her attitudes acting as a problem-solving individual. Our study differs from other studies on landholders and environmental conservation in that it does not consider what influences farmer decision-making or conservation behaviour as such, but rather seeks to measure the attitudes of farmers towards the conservation of a critically endangered type of vegetation on their properties. The value of a focus on attitude measurement is that a person’s attitudes are one of the components that could affect their behaviour towards natural ecosystems, which has significant implications for the future retention or destruction of many threatened habitats (e.g. Coastal Renosterveld) and species.

3.2.1 Aims and objectives

The purpose of this study was to derive an index of conservation attitude from survey data collected in an earlier study by means of personal interviews with approximately 40 landholders in two areas of the Overberg in the Western Cape (Chapter 2). The initial survey explored the attitudes and behaviours of landholders towards the conservation of Ov. Coastal Renosterveld by investigating the following four aspects:

- (i) Landholder knowledge and awareness levels regarding Ov. Coastal Renosterveld
- (iv) The use and management of renosterveld including
- (v) The value of renosterveld to landholders
- (vi) The willingness of landholders to conserve renosterveld

Other questions included in the initial survey explored attitudes and behaviours towards other more general conservation issues not limited to renosterveld conservation. These included:

- (i) The attractiveness of possible incentives to encourage conservation
- (ii) Landholder knowledge of “conservancies” (i.e. mechanisms for conservation by which a group of landholders voluntarily manage their living environment in a sustainable and co-operative fashion) and their attitudes towards conservancies
- (iii) The attitudes of landholders towards the provincial conservation authority, namely Western Cape Nature Conservation Board (WCNCB).

While frequency data from all questions included in the interview schedule were analysed and presented in Chapter 2, an overall measure of conservation attitude was lacking. The principal aim of this study was to measure conservation attitude in one, all-encompassing index. A determination of the underlying components of conservation attitude, as well as a determination of how other landholder-specific, demographic variables are empirically related to conservation attitude, accompanied the process of

constructing an index. The second aim of the study was to consider the applications of a Conservation Attitude Index for informing the extension strategy of conservation authorities for privately owned land.

Originally the intention of the study was to compile an index to reflect Coastal Renosterveld vulnerability to future transformation, which was thought to be determined by the characteristics of the landholder and their future intentions for transforming or developing the land. However, the results of the item analysis discussed in section 3 showed that this was not statistically possible with the questionnaire that was developed for purpose of constructing an index. For this reason, the purpose of the index became a measure of the conservation attitude of landholders and not the vulnerability of the land to future transformation.

3.3 Methods

3.3.1 *Study Area & sample selection*

The initial landholder attitude survey (Chapter 2), which provided the baseline data for this study, was conducted in two study areas within the Overberg of the Western Cape Province. The two study areas included an area between the towns of Bot River and Caledon (referred to as "Bot River") and an area between the towns of Bredasdorp and Swellendam (referred to as "Suikerkankop"). The location of these two study areas is shown in Fig. 3.1. The boundaries of these two study areas were selected in association with the Cape Conservation Unit (CCU) of the Botanical Society of South Africa, who had recently completed extensive botanical field-work in the Overberg as part of the Cape Lowlands Project (Von Hase et al., 2003). These study areas contain some of the largest, and most ecologically important Coastal Renosterveld fragments in the Overberg, and are likely to become target areas in the near future for the implementation of various conservation plans and projects.

A sample of farms in the Bot River and Suikerkankop areas was randomly selected (originally intended to be in a strategic fashion, based on the area of Ov. Coastal Renosterveld that occurs on each property). The sample frame, consisting of property cadastral and the Ov. Coastal Renosterveld fragments map (courtesy of the CCU), was scrutinized using ArcView (Version 3.2a) (1998). Three renosterveld area size categories (based on CCU knowledge of Coastal Renosterveld fragment sizes) were chosen, namely less than 50 ha; between 50 & 300 ha; and greater than 300 ha. Random numbers were allocated and approximately seven properties were randomly selected from each renosterveld size category to yield a total study sample of 40 properties. Extra properties were selected in the event that a landholder from one of the selected properties declined an interview. On arrival at the interviewee's property, the landholder's estimation of remaining Ov. Coastal Renosterveld was often different to estimations derived remotely with Geographic Information System (GIS) data. It therefore became apparent that the original Coastal Renosterveld coverage from the CCU had inaccuracies considering it was a draft version not yet finalised. This changed the final distribution

of the number of properties in each renosterveld size category. Despite stratification problems encountered, the sample was nonetheless, randomly drawn. Landholder address and telephone details for each property in the sample were obtained from the Provincial Department of Agriculture for the Western Cape.

3.3.2 Data collection

Semi-structured, personal interviews were used to collect data from a sample of 36 landholders representing 40 properties in the Overberg area. Nineteen of these farms were located in the Bot River study area, while the remaining 21 farms from the Suikerkankop study area. Personal interviews as opposed to mailed questionnaires were used to collect data, as previous mailed landholder surveys experienced low return rates (less than 35%) (Brand, 1994; Van Zyl, 1999). Personal interviews are able to elicit landholders' true attitudes and perceptions more accurately than either a questionnaire received impersonally in the post, a telephone survey or an electronic survey (McDowell, 1988). Approximately half of the interviews were conducted between June and July 2002, while the other half were conducted in late August and September of the same year. No interviews were planned prior to June or after September as these are very busy harvesting seasons for farmers in the Western Cape.

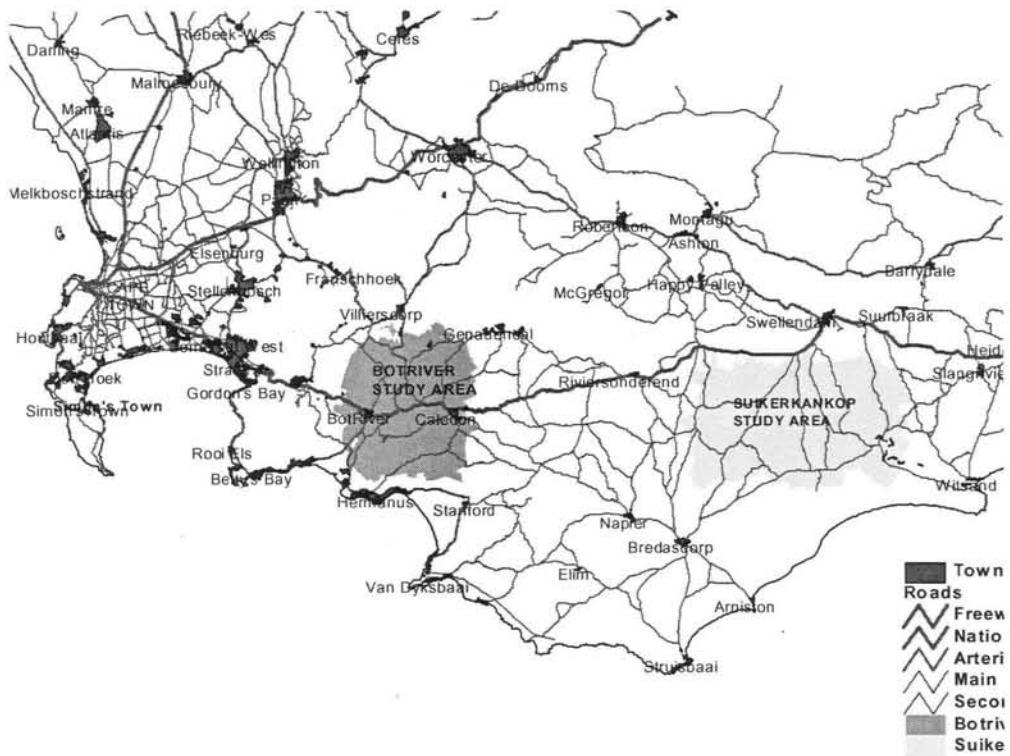


Fig. 3.1. Location of the Bot River and Suikerkankop study areas within the Overberg in the Western Cape.

3.3.3 Index construction methodology

According to Babbie (1995), the following steps are involved in the construction of an index:

- i) Select possible dimensions and/or items
- ii) Allocate scores to the items
- iii) Combine some dimensions into an index
- iv) Validate the index by examining their empirical relationships.

These steps were followed in order to construct an index of conservation attitude in the manner described in below.

A composite measure should represent only one dimension (Babbie, 1995). For this reason, items reflecting conservation behaviour should not be included in a measure of conservation attitude, even though the two variables might be empirically related to one another. Furthermore, what people say they feel or think does not always correspond to the way people behave (Wicker, 1969; Steel, 2000).

On the basis of face validity, the following were considered likely candidates for dimensions that could comprise or determine the conservation attitude of landholders towards Ov. Coastal Renosterveld:

- i.) What landholders know or believe about Ov. Coastal Renosterveld (referred to as ‘knowledge’)
- ii.) The economic value that landholders place on renosterveld, including the perceived benefit of retaining unploughed natural vegetation (referred to as ‘perceived benefit’);
- iii.) The aesthetic and intrinsic value of pristine renosterveld to landholders including their general interest and enthusiasm for renosterveld (referred to as ‘interest’ hereon);
- iv.) The willingness of landholders to set renosterveld land aside for conservation (referred to as ‘willingness to conserve’);
- v.) The reasons why some renosterveld has been retained on the property and the likelihood of it remaining intact based on the landholder’s intentions to sell the property in the future (referred to as ‘retention intentions’).

These identified dimensions were measured with items from a questionnaire, consisting of a total of 12 items out of the original 72 items from a longer questionnaire. A combination of 4 Likert statements, 6 closed-ended questions and 2 open-ended questions were used as the measuring instruments for the index. Because conservation attitude is a reflection of a landholder *per se* and not his/her land, questions that reflect the characteristics of the property (e.g. size of farm or area of renosterveld) were excluded from the index. Socio-economic attributes (e.g. landholder age or education) were not included either, as these are not direct influences of conservation attitude, but rather indirect influences.

Scores were assigned to the various items, which after a careful consideration of face validity, were deemed to be good indicators of each possible dimension of conservation attitude. The allocation of scores was done in such a way that the maximum score reflected the most positive conservation attitude. Scores with different maximum values were standardised to scores between 0 and 1 by dividing each question by the maximum score for that question, thus preventing some items carrying more weight than others. An equation was derived to combine all conservation attitude items into one summary measure between 0 and 1 by dividing the total of all the indicator scores with the number of dimensions included in the index (i.e. a divisor of 2 was used for two dimensions). All dimensions were weighted equally.

Iterative item/reliability analysis was executed on the questions selected for each of the following items: knowledge; economic value; intrinsic value; willingness to conserve and retention intentions. Spearman's Rank Order correlation was used for items with two indicators, while Cronbach's Alpha was used for an empirical investigation of relationships when more than two indicators for each item were being considered. Cronbach's Alpha (Cortina, 1983) takes the average correlation among items in a dimension and adjusts for the number of items. A process of elimination removed indicator questions from each dimension if there were no significant relationships between indicators.

Internal validation refers to the relationship between individual dimensions included in the composite measure and the measure itself (Babbie and Mouton, 2001). One such measure of internal reliability is Cronbach's Alpha, which is appropriate for use when the index contains more than two dimensions. Spearman's rank order correlations can be used to test index reliability when there are only two dimensions. Dimensions that are not significantly correlated are disregarded from the index. Reliable indices are ones with high average correlation and a relatively large number of factors (Kent, 2001). The Cronbach Alpha coefficient varies between zero for no reliability to 1 for maximum reliability. Despite the wide use of Cronbach's Alpha, there is little guidance in the literature as to what constitutes an acceptable or sufficient value for alpha to achieve. The desired degree of reliability is a function of the purpose of the research, for example whether it is exploratory or applied (Nunnally, 1978; Kent, 2001). Nunnally (1978) suggests that for basic or exploratory research, which characterizes this particular study, reliabilities of 0.70 or higher will suffice.

3.3.4 Other statistical analyses

The mean conservation attitude score for the two study areas, namely Bot River and Suikerkankop was determined, as well as the mean scores in each study area for each of the individual dimensions which comprise the index. A Mann-Whitney U test (Daniel, 1978) was used to determine whether there was a significant difference in conservation attitude between the two study areas. Further statistical analyses were performed between the final conservation attitude index scores and ten demographic variables from the

questionnaire. An analysis of variance (ANOVA) was performed on environmental group membership and ecotourism activity because they are both categorical variables. Spearman's rank order correlations were performed on the variables of bilingualism, farm size, age, education, farming experience, past tenure of the subject and past tenure of the family, considering they are ordinal variables.

3.4 Results

In this section, the process for deriving the index for conservation attitude is outlined. Relationships between this index and various demographic variables are then presented.

3.4.1 Reliability analysis

The following dimensions were considered for deriving a composite score for conservation attitude:

- (i) Knowledge
- (ii) Perceived benefit
- (iii) Interest
- (iv) Willingness to conserve
- (v) Retention intentions

A reliability analysis was conducted for each potential dimension of conservation attitude in the following manner (a description of dimension components is provided in Tables 3.1 and 3.2): K1 and K2 were significantly correlated ($r = 0.6$, $p < 0.01$) and therefore considered as potential indicators for the dimension of knowledge. For the dimension of interest, potential indicators I1 and D1 were positively correlated. However, D1 was removed on the basis of face validity, because this item investigated the most important forms of renosterveld usage to landholders, and not interest levels *per se*, and is therefore not included in Table 3.3. In this way, only one question, namely I1 was considered a likely indicator for interest. A reliability analysis was conducted on the potential indicators of perceived benefit, which showed that questions P1 & P2 were significantly correlated ($r = 0.415$, $p < 0.01$). The other potential indicator for perceived benefit, namely P3 (Table 3.3) was excluded on the basis of the lack of correlation between P3 and P2. The potential indicator of willingness to conserve, namely W4 (Table 3.3) was discarded on the basis of the improvement of Cronbach's Alpha from 0.386 to 0.647 if W4 was deleted. In this way W1, W2 and W3 were chosen as indicators of willingness to conserve. Two questions thought to indicate retention intentions (namely R1 and R2) were not positively correlated ($r = -0.05$, $p = 0.75$), and therefore this dimension was excluded.

Once satisfactory indexes were derived for each of the dimensions, these dimensions were validated in terms of their contribution towards measuring conservation attitude. The dimension of interest was removed from

the index because there was an improvement in the Cronbach Alpha value from 0.114 to 0.485 with its removal. This decision was supported by the Spearman Rank Order correlation results, which indicated that there were no significant correlations between interest and any of the other potential dimensions. Retention intentions were removed from the index because the Cronbach Alpha value improved from 0.318 to 0.465 with its removal. Knowledge and perceived benefit were positively correlated with $r = 0.34$ ($p=0.03$). However, the correlation between knowledge and willingness was not significant ($r=0.16$, $p=0.3$) which suggested that knowledge should be removed from the index. The Cronbach Alpha value increased from 0.478 to 0.671 when knowledge was removed, further validating its removal in order for the index to be statistically reliable. The strongest correlation existed between perceived benefit and willingness ($r = 0.46$, $p<0.01$). In this way, three of the five dimensions (namely retention intentions, interest and knowledge) considered for inclusion in the index were eliminated, while only perceived benefit and willingness to conserve remained as reliable components of an index for conservation attitude. Perceived benefit and willingness to conserve, were positively correlated with one another ($r = 0.456$, $p < 0.01$) and collectively reflected the construct of 'Conservation Attitude'. The index can be calculated in the following manner:

$$\text{Conservation Attitude} = (\text{Perceived Benefit} + \text{Willingness to conserve}) / 2 \quad (1)$$

The equation used for calculating the composite scores for conservation attitude is represented below:

$$\text{Conservation Attitude} = \{(P1/5 + P2/5)/2 + (W1/2 + W2/5 + W3/5) / 3\} / 2 \quad (2)$$

Index components are explained in Table 3.1.

Table 3.1

Dimensions included in the index for conservation attitude and numerical scores allocated to the indicators for each dimension.

Index component number	Item wording (Numbers in parentheses refer numbers used in the original questionnaire)	Scores allocated to answers
<u>Perceived benefit:</u>		
P1	The renosterveld areas on my property are non-productive, wasted pieces of land (i.e. "weggooi land") renosterveld areas on my property are non-productive, wasted pieces of land (i.e. "weggooi land") (D3c)	Strongly agree = 1 Agree = 2 Unsure = 3 Disagree = 4 Strongly disagree = 5
P2	Currently, conserving renosterveld on the property offers no advantages or benefits to me or to the business.	Strongly agree = 1 Agree = 2 Unsure = 3 Disagree = 4 Strongly disagree = 5
<u>Willingness to conserve:</u>		
W1	Do you have any other plans for the management or use of the renosterveld in the next 5 years? (B7)	From the variety of answers given, a suitable score was allocated in the following manner: Plans will definitely include conserving renosterveld = 2 Plans might only possibly include conserving renosterveld = 1 Plans are incompatible with conserving renosterveld = 0
W2	Conservation of land is incompatible with running an agricultural business (E1a)	Strongly agree = 1 Agree = 2 Unsure = 3 Disagree = 4 Strongly disagree = 5
W3	Realistically, I can only consider conserving renosterveld on land that I cannot productively (E1b)	Strongly agree = 1 Agree = 2 Unsure = 3 Disagree = 4 Strongly disagree = 5

Table 3.2

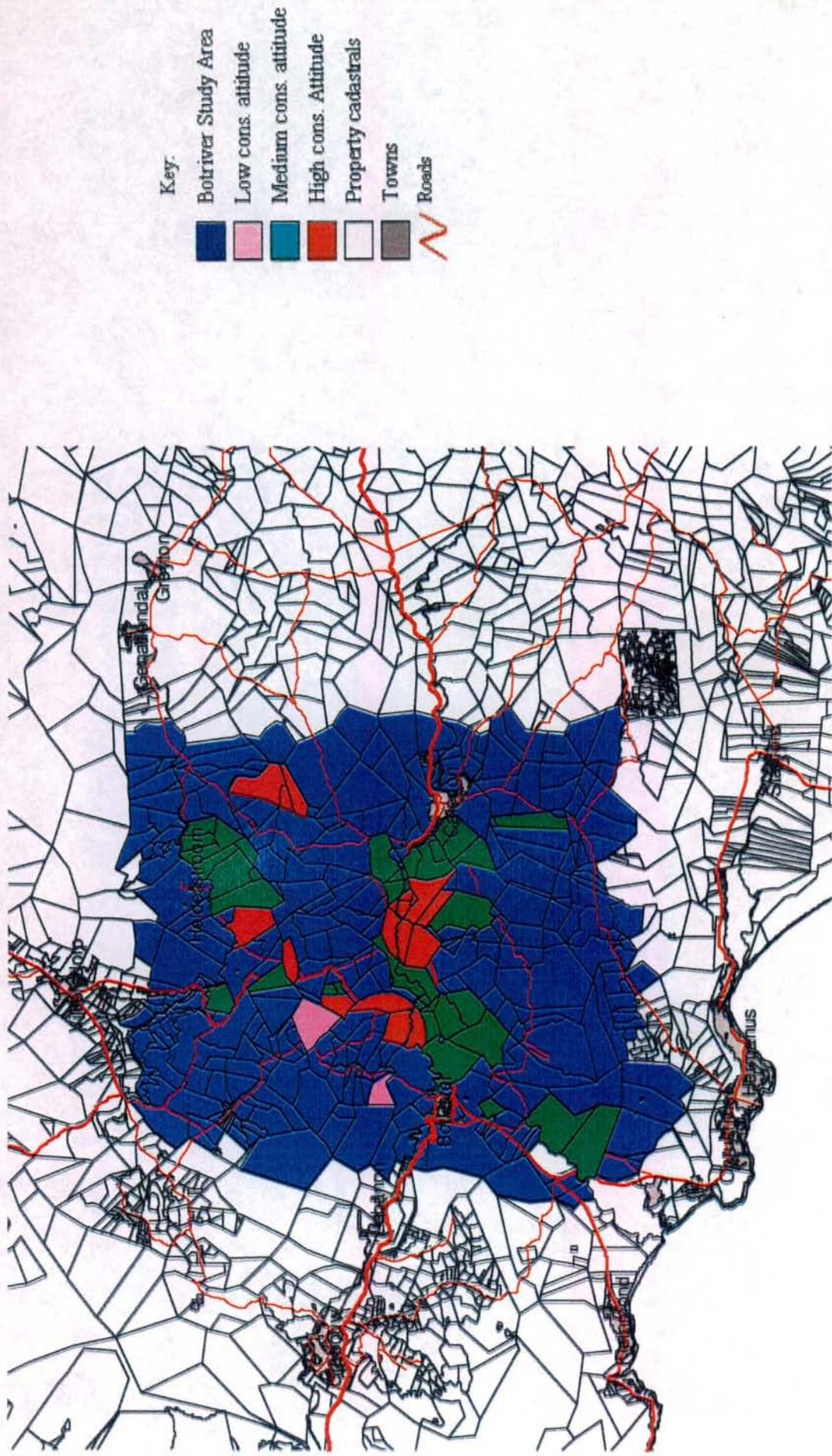
Indicators of dimensions that were excluded from the index of conservation attitude based on non-significant Spearman Rank Order correlations or Cronbach Alpha value results.

Dimension	Item wording (Numbers in parentheses refer numbers used in the original questionnaire)	Scores allocated to possible answers
<u>Willingness to conserve:</u>		
W4	If a more profitable crop could be planted where renosterveld now currently is, how willing are you to conserve the renosterveld areas on your property in the future? (E2)	Very willing = 1 Willing in principle = 2 Unsure = 3 Not willing now, but possibly in the future = 4 Definitely not willing = 5
<u>Retention intentions:</u>		
R1	Do you have any intention of selling the property in the next 5 years? (B7)	Yes = 0 No = 2 Maybe = 1
R2	We are aware that renosterveld has been retained on the property. What was the primary reason for this? (B1)	“Renosterveld land is marginal ground, so will never be ploughed” = 2 “Renosterveld land could possibly be utilized for agriculture, but inherited/bought farm like that” = 1
<u>Interest:</u>		
I1	Rate your level of interest in renosterveld and the associated plants and animals, from a nature and aesthetic point of view (D5)	Not interested = 0 Moderately interested = 1 Highly interested = 2
<u>Knowledge:</u>		
K1	Were you aware, prior to this interview that renosterveld is a unique and endangered type of vegetation? (i.e. less than 4% remains and < 1.6% is conserved in reserves) (C1)	Yes = 1 No = 0
K2	Did you know that a permit is required in order to plough renosterveld? Do you know which department or person to contact should you wish to obtain such a permit? (C3)	Yes = 1 No = 1
<u>Perceived Value:</u>		
P3	Has the grazing of livestock on renosterveld had any noticeable benefit to the livestock? (B3)	Yes = 1 No = 0

3.1.2 Further analysis

The final composite scores for Conservation Attitude are represented for each property surveyed in the two study areas (Figs 3.2 and 3.3). Refer to Appendix E for the index results for the individual components of perceived value and willingness to conserve. It was not considered unethical to graphically display landowner conservation attitude scores because the figures are not labelled with property or landholder names. Furthermore, landholders were notified in the letter of introduction distributed beforehand that the results would be used for Masters-level research (which normally implies publication of results). No concerns were raised by any interviewees about using their opinions and information they provided the interviewer. The mean score was 0.5905 (± 0.027) while the minimum and maximum values were 0.216 and 1 respectively. Three index score categories were selected to represent low (0 - 0.3), medium ($>0.3 - 0.6$) and high ($> 0.6 - 1$) conservation attitude scores. Fifty percent of the scores lay between 0.48 and 0.7 within the medium and high score categories, indicating that the majority of the landholders that were interviewed had attitudes that were sympathetic towards the conservation of renosterveld.

Fig. 3.2. Graphical representation of the conservation attitude scores for each property interviewed in the Bot River study area.



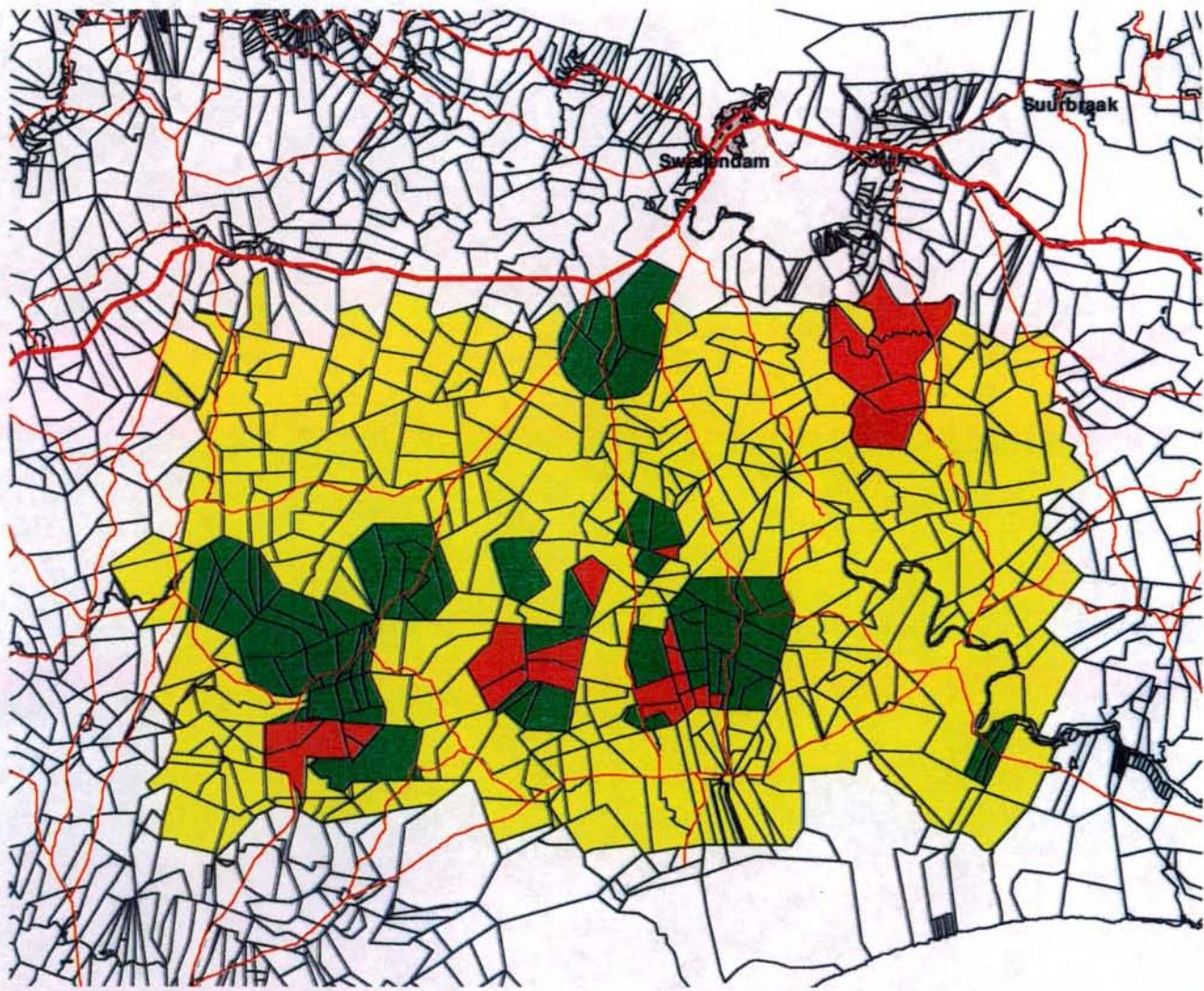


Fig 3.3. Graphical representation of the conservation attitude scores for each property interviewed in the Suikerkankop study area.

The results of the Mann-Whitney U tests showed that there was no significant difference in conservation attitude between the study areas, Bot River and Suikerkankop. Similarly, no significant differences existed in the scores between the dimensions of perceived benefit and willingness to conserve (Table 3.3).

Table 3.3

Mean scores for the dimensions of, and overall Conservation Attitude for the two study areas and the both areas combined (standard errors are indicated in parentheses)

	Bot River ¹	Suikerkankop ¹	All ¹	p-level ²
Perceived benefit	0.59 (0.06)	0.58 (0.03)	0.60 (0.03)	0.766 (n.s.)
Willingness to conserve	0.63 (0.05)	0.55 (0.04)	0.60 (0.03)	0.946 (n.s.)
Conservation Attitude	0.57 (0.25)	0.57 (0.04)	0.56 (0.03)	0.967 (n.s.)

¹Standard error indicated in parentheses

²Significance level indicated in parentheses

The results of the analysis of variance and correlations performed between the final conservation attitude index scores and some of the demographic variables from the questionnaire, showed that of the ten variables tested, a significant relationship existed between only four of these variables and conservation attitude. The significantly associated variables included: area of renosterveld; landholder environmental group membership status; whether the landholder had any ecotourism facilities on the property; and how long the property had been in family tenure (Table 3.4).

Table 3.4

Analysis of Variance and Spearman's Rank Order correlations between the composite scores of conservation attitude and selected landholder demographic variables (significance level is indicated in parentheses: * is significant at the 5% level; ** is significant at the 1% level; *** is significant at the 0.1% level; and n.s. is not significant).

	Conservation Attitude Index Score	
	ANOVA	Spearman Rank Order
	Correlations	
Area of renosterveld on property ¹		R = 0.219 (n.s.)
Landholder environmental group membership status ²	F _{1,38} = 15.907 (p < 0.01)**	
Ecotourism activity on farm ³	F _{1,38} = 8.298 (p < 0.01)**	
Bilingualism of landholder ⁴		R = 0.132 (n.s.)
Farm Size ⁵		R = 0.127 (n.s.)
Landholder Age ⁶		R = -0.014 (n.s.)
Landholder Education ⁷		R = 0.100 (n.s.)
Years of farming experience ⁸		R = 0.186 (n.s.)
Past tenure of subject ⁹		R = 0.102 (n.s.)
Past tenure of family ¹⁰		R = 0.499 (p = 0.001)***

¹Number of hectares of renosterveld which occur in total on the property (1 = 1-50 ha; 2 = 51-300 ha; 3 = > 300 ha)

²Whether the landholder belongs to an environmental group or conservation organisation (Yes = 1; No = 2)

³The presence of any ecotourism facilities on the property (e.g. Bed and Breakfast, chalets, hunting, hiking routes) (Yes = 1; No = 2)

⁴A self-assessed evaluation of how bilingual the landholders thinks he/she is on a scale of 1 to 5 (1 = poor; 2 = poor-average; 3 = average; 4 = good; 5 = excellent)

⁵The total size of the property (1 = 1-50 ha; 2 = 51-200 ha; 3 = 201-500 ha; 4 = > 500 ha)

⁶The age category of the landholder (1 = 18-35 yrs; 2 = 36-55 yrs; 3 = > 55 yrs)

⁷The highest qualification of the landholder (1 = less than matric; 2 = matric; 3 = diploma; 4 = first university degree; 5 = postgraduate qualification)

⁸Number of years of farming experience (1 = none; 2 = < 1 yr; 3 = 1-5 yrs; 4 = 6-10 yrs; 5 = 11-20 yrs; 6 = > 20 yrs)

⁹How long the subject has owned or managed the property (1 = none; 2 = 1-5 yrs; 3 = 6-10 yrs; 4 = 11-20 yrs; 5 = > 20 yrs)

¹⁰How long the property has been in the owner's family (1 = none; 2 = 1-5 yrs; 3 = 6-10 yrs; 4 = 11-20 yrs; 5 = > 20 yrs)

3.5 Discussion

3.5.1 Index interpretation

The study attempted to explore the construct of conservation attitude with the aim of developing and validating an index as a measuring instrument. This index is intended to measure how positively or negatively orientated landholders are towards the conservation of the highly threatened vegetation type, Ov. Coastal Renosterveld. Results yielded an index comprised of two dimensions, namely perceived benefit and willingness to conserve with a Cronbach Alpha value of 0.67, implying a moderate level of construct validity. The meaning of the index can be interpreted in the following manner. When landholders perceive the retention of renosterveld on their property to provide some form of benefit to them or their farming operation (such as, an alternate source of grazing especially in seasons of drought, natural resistance against livestock disease or prevention of soil erosion on steep slopes), they will be more willing to conserve their renosterveld. It can also be deduced that land more vulnerable to future transformation will be owned by landholders with a low conservation attitude (i.e. they regard the natural vegetation as offering little to no advantage to the business, and they are not willing to conserve these habitats.)

As discussed in Chapter 2, landholder attitudes towards Ov. Coastal Renosterveld were found to be largely negative, due to certain associated plants and animals which are problems for farmers, and because it is not economically advantageous to retain it. However, the mean conservation attitude index score has an above-average value of 0.6 (± 0.027). This seeming contradiction can be explained on the basis that while the perceived benefit of Ov. Coastal Renosterveld is low due to its poor agricultural value, landholder willingness to conserve is in some cases higher than expected. Therefore the contribution of willingness to conserve to the construct of conservation attitude, improves the ‘positivity’ of the final score.

3.5.2 Index components and discarded dimensions

It was expected that when landholders are more knowledgeable about the conservation importance of Ov. Coastal Renosterveld, their attitude towards renosterveld in general is likely to be favourably affected. It was therefore surprising that the results of the item analysis showed that knowledge reduced the validity of the index when included. Despite the exclusion of knowledge from the index, based on the qualitative observations from interviews with 36 landholders, it is maintained that landholders could be “converted” to conservation simply by being made more aware of the uniqueness and endangered status of Ov. Coastal Renosterveld. One interviewee was incredulous that the interviewer should want an appointment with him in order to hear his views on what he regarded as the “boring, worthless shrubland” on his property. Rhodes et

al.'s (2002) finding that exposure to relevant information positively influenced a farmer's adoption of specific riparian management measures in New Zealand, supports the notion that knowledge can influence landholder attitudes towards aspects of environmental conservation.

An observed example of the lack of correlation between a landholder's expressed interest in Ov. Coastal Renosterveld and his/her general conservation attitude was exemplified by one landholder who repeatedly emphasized his dislike for *Elytrapappus rhinocerotis* (renosterbos), which is one of the less desirable, dominant species in renosterveld. His lack of interest was due to the negative connotations attached to the natural invasiveness of this hardy shrub and the management difficulties associated with keeping it out of planted fields that are surrounded by renosterveld. However that same landholder expressed a general willingness to conserve the natural areas and wildlife on his farm, when *E. rhinocerotis* was not taken into account.

In hindsight, the two indicators of retention intentions (R1 & R2) that were excluded from the index can be seen as independent items that are not components of conservation attitude but rather indicate the degree of threat relevant to untransformed Ov. Coastal Renosterveld. A landholder's intention to sell property (R1) might be determined by a number of external factors (e.g. family decisions and business or investment opportunities) which may override positive inclinations towards the natural habitat on the property. Similarly, the reason why renosterveld was retained on the property may be more reflective of management decisions taken by previous owners than the current landholder's attitude towards renosterveld. However, as stated in the aims and objectives of this thesis in Chapter 1, section 1.3, the initial choice of index items was based on the original aim of constructing an index to reflect the vulnerability of Ov. Coastal Renosterveld to future transformation, which is why retention intentions were considered.

The final inclusion of the two dimensions, perceived benefit and willingness to conserve, represent affective and behavioural components of conservation attitudes. If the dimension of knowledge had been included in the index, it would complete the third cognitive component of the tripartite model that is used to describe attitudes (Bohner and Wanke, 2002). However, it is not necessary for a person to think, feel and intend to act towards an object in order to have a well defined attitude, seeing as the tripartite model assumes that cognitive, affective and behavioural components are independent elements of attitude (Bohner and Wanke, 2002).

3.5.3 Index validity

Three aspects of validity (i.e. whether the index measured the construct it was designed to measure) were considered in developing the index for conservation attitude, namely content validity, face validity, and construct validity. Content validity was established by clearly defining the construct of conservation attitude at the outset of the study, and thereafter systematically developing indicators to reflect each of the possible sub domains or dimensions of the construct. Face validity was established through the process of expert scrutiny and peer review, eliminating unsuitable dimensions from the original total of five dimensions (with 22 indicators) to two dimensions (with five indicators). Construct validity was established through application of an item analysis, yielding a single index with a moderate level of internal reliability. In this study an attempt was made to combine closed-ended questions into an index. Normally, multi-item scales, such as Likert statements are used to measure attitudes. “Yes/No” type responses might have reduced some of the variability, which might account for the relatively low Cronbach Alpha value of 0.67. Interestingly, four of the five indicators included in the final derivation of the index were Likert statements, while the last item was originally an open-ended question that was later categorised into a closed-ended question.

3.5.4 What affects conservation attitude?

McDowell's (1988) assessment of conservation attitude was restricted to a person's knowledge or understanding of general nature conservation principles and their receptiveness towards ideas and suggestions regarding the natural habitats on their properties. Through the development of the index in this study, the components of conservation attitude have been extended to include how beneficial people perceive the retention of natural ecosystems to be for them or their business, and the willingness of people to keep renosterveld areas undeveloped in the future.

While the analysis of variance results in Table 3.4 showed that there was no significant relationship between landholder age or education and conservation attitude, studies conducted in different socio-economic circumstances have shown otherwise. Wilson (1996) found that age, education, length of residency, farming philosophy and the existence of remnant semi-natural habitats on farms are important variables explaining farmers' dispositions toward conservation and participation behaviour in the Cambrian Mountains Environmentally Sensitive Areas (ESA) scheme in the Southwest of England. Part of Wilson's (1996) findings relating to existence of remnant habitat on farms are in agreement with this study's finding that there is a significant relationship between the area of remnant Ov. Coastal Renosterveld per property and the landholder's conservation attitude. However, other findings of Wilson (1996) do not support this study's

results which show that there is no significant relationship between length of residency (similar to past tenure of subject), age, education and conservation attitude (Table 3.4).

The lack of a significant relationship between conservation attitude and landholder age in this study did not support Featherstone and Goodwin's (1993) finding that landholder age influenced farmer's attitudes toward the environment. The finding that farm size and farming experience is not significantly related to conservation attitude towards renosterveld, is in contrast to the results of Rahm and Huffman (1984) and Lasley et al. (1990) accordingly. These authors found that each of these factors did significantly influence farmers' attitudes towards the environment. However, these studies were related to a much broader investigation of environmental attitudes in general and not attitudes towards the retention of a specific threatened vegetation type, which could explain these discrepancies. In the previous case study on landholder attitudes (Chapter 2), it was found that there was a relationship between landholder age and willingness to conserve (i.e. those more willing to conserve belonged to the younger generation), whereas a better landholder education was not associated with willingness to conserve. It becomes clear that the conservation attitude index, comprised of a landholder's perceived benefit as well as willingness to conserve, reflects different relationships than when willingness to conserve is considered alone.

The finding that past tenure of the family is significantly related to conservation attitude is in agreement with McDowell's (1986b) finding amongst West Coast Renosterveld owners that prolonged family ownership of farms appears to benefit long-term conservation. It is suggested that the longer the farm has been in the family, the deeper the affinity the owner has for his land, seeing as it is part of his family heritage. Whereas, farmers who have recently acquired their property, might still only regard the farm as an economic asset and not an intrinsic one.

Potter and Lobley (1992) suggest that generalizations should not be made about how conservation attitude can be affected by demographic variables such as age, education, environmental group affiliation etc. Each area and type of natural habitat under discussion is likely to produce a very different attitudinal profile within that particular farming community (Potter and Lobley, 1992). Similarly, Van Zyl (1999) found that many of the responses received to a mailed questionnaire to investigate attitudes to conservation on private land were unique to the biome in which the farmer was situated. For this reason he stressed the importance of tailormaking conservation strategies according to the unique characteristics of different regions. However, the results from this study did not support his suggestion, seeing as there were no significant differences in conservation attitude between the Bot River and Suikerkankop study areas. It is unlikely that a larger sample size might have produced significant inter-study area results when one considers the highly non-significant p-values (Table 3.4). Generalizations can however, be made in this study regarding the influences of

demographic variables on conservation attitude. This statement can be made on the premise of the representivity of the sample drawn randomly for this purpose, and because Bot River and Suikerkankop are situated in the same broad vegetation type and not in different biomes as was the case in Van Zyl's (1999) study.

It has been argued that external influences (also referred to as structural factors), such as financial pressures, government policies and family structure are more likely to have the final say with regards to the behaviour or decision-making of the landholder. Lynne and Rola (1988) were able to show that a positive attitude towards the environment and a higher income were predictive of conservation practices. However, the influence of affluence or financial constraints on the attitudes of landholders in the Overberg was not determined. Questions relating to income and affluence were originally included in the questionnaire, but removed after the subjects from the three pilot interviews suggested to the author that these were sensitive and inappropriate questions. Battershill and Gilg (1997) examined the attitude-structure dilemma in order to determine which farming and personal circumstances were most important in influencing farmer decision-making. By examining the attitudinal dispositions and socio-economic constraints of 122 farms in the Southwest of England, they found that the influence of attitudes was considerably stronger than any structural influences on farmers' behaviour and decision-making, including that of financial constraints. However, Battershill and Gilg's (1997) surprising finding is in contrast to the large body of literature that suggests that attitudes are not always good predictors of behaviour. (e.g Wicker, 1969; Carr, 1988; Willock et al., 1999; Steel, 2000; Shipworth, 2000). Nonetheless, the conclusion reached by Battershill and Gilg (1997) about the important influence of attitudes on farmer decision-making supports the notion that investigating and measuring the attitudes of landholders should be a vital component of any conservation strategy for private land. Towards these ends, use of the conservation attitude index can make this process more quantitatively rigorous and easy to administer over large areas.

3.5.5 Applications for conservation extension strategies

One way of improving a landholder's conservation attitude is to promote the benefits of biodiversity for their farming operations. Therefore the advantages of renosterveld need to be actively promoted and more research undertaken, to be able to add to the "list" of known renosterveld advantages. It is possible for the perceived benefit of Ov. Coastal Renosterveld, as a dimension of conservation attitude, to be influenced or changed through education and focussed extension efforts. However the second dimension, willingness to conserve, is perhaps less easy to manipulate on its own, and might only be improved when a landholder not only perceives, but receives tangible benefits from conserving renosterveld. Of relevance here is the

provision of motivational and fiscal incentives to persuade less-conservation minded landholders to leave some renosterveld areas undeveloped.

Index scores are amenable for use in a GIS data-base and spatial representation over a landscape (e.g. Figs 3.2 & 3.3). Visually displaying index scores on a cadastral map can provide an extremely valuable tool for conservation agency staff to be able to quickly identify properties belonging to landholders with a positive conservation attitude. It is recommended that the conservation officials responsible for the Bot River and Suikerkankop study areas take note of which landholders had low conservation attitude scores. A detailed investigation of the condition, location and extent of the natural vegetation on these low-scoring properties should then follow and careful negotiation with the landholder ensue, in order to prevent valuable untransformed Ov. Coastal Renosterveld remnants being developed or cultivated. Landholders with the highest conservation attitudes scores (i.e. > 0.6 , Figs. 3.2 & 3.3) are the most likely to agree to enter into a legally recognised Co-operation Agreement or declare a Contract Nature Reserve to conserve land on their property in perpetuity. Therefore, the return on extension effort by conservation officials is likely to be most optimal for these high-scoring individuals. Where conservation resources are highly limited, as is currently the case in South Africa, there is good reason to prioritize investing resources into areas where the landholder in question has a positive conservation attitude and is most likely to co-operate.

In practice, it is suggested when a new area is tackled that has not received any conservation interventions that a conservation official or extension officer should first make contact with the landholder and simply build relationship and trust, without producing a questionnaire or score sheet. Then at a second, follow-up visit, the extension officer could ask the various index component questions in a informal, non-threatening manner. However, it is not recommended that the extension officer tells the landholder that his purpose is to rank and compare the landholder's conservation attitude against other landholders in the community. In this case, social desirability bias could cause the respondent to give answers that would give him/her a more favourable rating. Rather, administration of a questionnaire could be explained to be part of a conservation needs analysis for the area.

3.5.6 Suggestions for future studies and applications

The index developed for measuring the conservation attitude of landholders towards Ov. Coastal Renosterveld should not be applied in other areas of the Western Cape where renosterveld is not the characteristic vegetation type for the area, or generalised for use in other South African provinces. However, it is possible that this index could be applied and adapted provided careful consideration is given to the specific contextual factors of the vegetation type and land tenure in the area in question. The index is also

amenable for use in a posted questionnaire survey if time constraints prevent personal interviews with all landholders in the area. It is recommended that the survey is repeated in the Bot River and Suikerkankop areas in 10 years time, by using the same index questions to determine whether conservation attitudes in those areas have improved with time and whether any dedicated education or extension efforts have been successful. New dimensions (and indicators for these dimensions) should be considered and re-validated for measuring conservation attitude in order to improve the Cronbach Alpha value to a value closer to the ideal maximum of 1. It is also suggested that future studies should rely more on Likert statements than closed-ended questions for measuring attitudes by means of an index.

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CHAPTER 4

Concluding Remarks

4.1 Key messages

It has become apparent from this study that in Overberg Coastal Renosterveld, and more generally in South Africa, there is a lack of:

- (i) Consideration of landholder attitudes for planning where resources will be spent for achieving conservation objectives and scheduling the implementation of conservation plans
- (ii) Understanding between farmers and conservationists. Conservationists are often not sympathetic to a farmer's economic dependence on their land and why it is difficult in their view to "give up" land for conservation. Furthermore, many farmers are negatively stereotyped by conservationists as unco-operative and not open to suggestions by personnel of conservation agencies. Such stereotyping will hinder the construction of new, positive relationships with landholders in the future.

The intended application of the index developed in this study for measuring conservation attitude is that index scores (amenable for use in a GIS database) can assist conservation practitioners in deciding where resources should be allocated. This is based on the assumption that high-scoring individuals are more likely to want to take part in conservation initiatives.

4.2 Recommendations for a new approach to extension

Of all the insights gained through this landholder survey, the most critical one that can be practically addressed, is the need for more extension officers and community conservation officers to interact with, advise, support and motivate landholders. However, it is not simply a case of improving the critical mass of officers, but rather that a newly capacitated kind of extension officer is needed. Currently, extension officers can spend up to 90% of their time in law enforcement activities, whereas 90% of their time should rather be spent on improving landholder public relations and supplying them with practical support and advice. Thus, a shift from reactive extension (i.e. responding to problems and enforcing regulations and permitting procedures) to proactive extension (i.e. engaging with a landholder before a problem is created) is required. Extension officers need to be better equipped with skills relating to conflict resolution, relationship building, and land negotiation, as well as with the hands-on knowledge, in the form of practical guidelines for managing natural ecosystems.

But if extension officers are to play such a critical role in influencing landholder attitudes and effecting behavioural change, then their status and salary scale within the conservation organizations needs to be drastically improved. Informal discussions with a number of extension officers during the study period revealed that there is a considerable lack of motivation and morale, due to the disempowering position of "being overworked and underpaid". For example, one single extension officer was responsible for an area of 313 740 ha, with a very limited budget and no field rangers to assist him. It is therefore not surprising that he had not been able to visit many of the farmers within his area of responsibility in order to build good relations with them. On the contrary, all of his time was taken up by often unpleasant, confrontational law enforcement duties and mundane permitting procedures.

It is also proposed that the potential of women as effective extension officers has been overlooked in South Africa. It is the author's opinion that women are often less threatening communicators than men, and that male landholders are more co-operative when asked to change a particular behaviour, if asked by a woman instead of a man.

Unfortunately, new extension officers will often be faced with the problem of landholders who have not had a positive relationship with a previous conservation officer, or have unresolved issues with the person and/or the conservation agency. The best solution is possibly to acknowledge their grievances, appeal to them to let bygones be bygones, and ensure that a similar situation does not occur again. It is suggested that a newly appointed extension officer should visit as many landholders in their area of responsibility as soon as possible after appointment, before any problems arise in order to introduce themselves and conduct a form of "needs analysis". Questions that could be included in a needs analysis could focus on, for example: the problems landholders experience on their property; limitations to their own conservation behaviour; the history of wildfires or species introductions in the area; and landholders' feelings and perceptions on a number of conservation management issues. This will make landholders feel that their thoughts and problems are important to the conservation authorities in their area, and in this way a line of communication is opened under non-confrontational circumstances.

4.3 Effective communication guidelines for conservation extension

McDowell (1989b) has extensively researched and documented some very helpful general recommendations for persuading a landholder to conserve natural ecosystems through effective communication. McDowell (1989b) provides the following six guidelines for creating a good impression amongst landholders:

- i.) In order to “get your foot into the door” by creating a favourable impression with a landholder, it is important to remember that a conservation agent represents a standard bearer for a cause, and a favourable personal interaction will create a favourable label for that cause.
- ii.) As already mentioned above, personal visits to farmers at their homes should be carefully pre-arranged at their convenience
- iii.) General appearance of the conservationist is important, in particular the choice of clothing, which should be modest, neat and clean
- iv.) If the subject’s home language differs from that of the conservationist, an attempt by the latter to at least initiate communication in the same language will enhance goodwill
- v.) Adjust vocabulary and language style to correspond with that of the subject, in order to optimize communication
- vi.) Be an attentive and sympathetic listener
- vii.) Express knowledge and enthusiasm (where possible) about the subject’s pet interests. This will engender greater respect for “messages” which the extension agent may wish to convey.

McDowell (1989b) also maintains that a landholder’s decision-making processes can be steered towards improved conservation, which he terms “decision steering”. McDowell (1989b) defines “decision-steering” as the active creation of a positive conservation attitude shift through effective one-to-one communication. With regards to decision steering, McDowell (1989b) found the following general rules of thumb to be applicable to the farmers that he surveyed to date:

- i.) Other factors assumed equal, older people have less flexible attitudes and opinions than younger people do.
- ii.) Provision of an intricate scientific rationale for conservation is often completely wasted on the subject
- iii.) The more similar the extension agent and the subject are in terms of their beliefs, values, social status, level of education, etc. (i.e. “homophilous”), the more effective the communication will be
- iv.) It should not be apparent that extension agents are “telling subjects what to do” concerning conservation on their properties.
- v.) Express admiration for what the subjects own or manage
- vi.) Assess the primary need/s of the subject and determine how the conservation message can best be tailored to fulfill such needs.

Fell (2000) emphasizes the importance of the choice of words in communicating with landholders. He highlights the expression that “words are cheap”, because it is actions that really count. However, he maintains that the use of words can be regarded as a particular kind of action, with subtle and profound consequences that

are easily underestimated. Fell (2000) further points out the need to establish strong, personal connections, of heart as well as head, for extension work to thrive and improve.

4.4 Possible sources of error

There are a number of possible sources of error that might have threatened the validity of the data collected in the general attitudes and behaviour survey (Chapter 2) as well as the conservation attitude index (see Chapter 3). Sources of error can arise from aspects relevant to the researcher and/or the participant (Mouton, 1996). The possible sources of error in this study will now be discussed according to this classification. Aspects relating to the reliability of the index were discussed in section 3.5.3 of Chapter 3 on index validity.

In terms of researcher characteristics, distance between the researcher and the participant in terms of home language, culture and marital status may have introduced a source of error, as the author was a young, single, English female while the large majority of respondents were older, married Afrikaans men. The affiliation of the researcher is not regarded as a possible source of error, because the author is associated with a highly reputable university, known for the quality of its research. However, the possibility cannot be excluded that participants might have tried to impress the researcher with somewhat untruthful answers if they were not as well educated and felt threatened by the researcher's credentials. The image of the researcher may cause respondents to be mistrusting and guarded in their responses if they view the researcher to be a stranger or intruder. Alternatively, participants may naturally wish to co-operate with the researcher and in this way provide valid and reliable information. In this study, the latter is more likely, as all of the landholders that the author approached were happy to offer some of their time to participate in the survey and all interviews were conducted in a co-operative, friendly spirit.

In terms of participant effects, one of the most important variables that can influence the validity of the data collection process, either positively or negatively, is the participant's level of motivation. The level of motivation is clearly influenced by a variety of factors such as interview characteristics, contextual factors and the manner in which questions are phrased. The more interesting the respondent finds the topic, the more highly motivated they will be to provide accurate and detailed responses (Mouton, 1996), especially in the open-ended questions. In order to raise the interest of the landholder in the interview topic, namely Ov. Coastal Renosterveld, an attempt was made to view the renosterveld with the landholder prior to or after the interview. This provided an opportunity for the landholder to provide background on management history and point out features that concerned them. Care was taken not to provide information during the farm tour that could bias the responses of the landholder in the subsequent interview. The length of the interview often reflected respondent

interest levels, as interviews were longer in duration when respondents seemed to enjoy expressing their opinions and relating incidents about their property and their renosterveld.

It is possible that items in the questionnaire pertaining to a landholder's intentions of selling his/her property or plans for the management or use of their renosterveld areas in the future, might have been perceived as threatening to respondents. However, no respondents expressed any hesitancy or suspicion when asked to respond to such questions and therefore this is unlikely to have affected the validity of the responses. Considering detailed personal information was collected in the background information section of the questionnaire (Section A), respondents who were concerned for the confidentiality of their responses (even though confidentiality was assured), might not have answered as honestly as they might have otherwise. Questions related to landholder income and affluence were excluded because the farmers used for the pilot interviews felt that such items were sensitive issues not appropriate for an interview. It is also improbable that acquiescence response set bias could have influenced the validity of responses to the Likert statements as some of the statements were phrased in the negative to prevent respondents agreeing or disagreeing to virtually all the items (Babbie and Mouton, 2001). Furthermore, the eleven Likert statements in the questionnaire were separated into two groups and asked in different stages of the interview to avoid a fatigued response pattern.

The observation effect that most likely influenced the results of this study the most was social desirability bias. Responses most prone to social desirability bias would have been those which investigated a respondent's self-reported knowledge of Ov. Coastal Renosterveld (e.g. C1, C3), conservancies (G2) and their level of interest in renosterveld (D5). Some of the Likert statements which would have made the respondent appear to be obviously anti-conservation depending on their response, are also prone to social desirability bias (e.g. agreeing with the statement (D3d) that agricultural productivity is more important than the conservation value of the property). In these instances caution should be exercised when interpreting the results.

The author is confident in the validity of all questions relating to landholder preferences (e.g. most attractive incentives, F3), landholder opinions (e.g. why there is a negative perception towards renosterveld among some landholders, D4) and landholder behaviours (e.g. management actions and uses). While attitudinal responses can be more prone to social-desirability bias than factual responses, this can not always be counteracted without avoiding the core issues that are being investigated. It is advised that future studies also make use of indirect attitudinal measures (i.e. studying responses that are thought to be related to attitudes) to support or refute data collected more directly by single or multi-item response scales. Furthermore, future studies should use a larger sample size than what was used in this study to improve the representativity of the findings and the ability to extrapolate these over wider areas. Care must be taken when stratifying a sample by area of renosterveld to avoid the stratification problems that were encountered in this study. Due to these stratification problems

experienced, caution must be exercised when generalising findings further than the two populations in Bot River and Suikerkankop. A possible source of error not addressed in this study was that tests for differences between landowners, managers and trustees were not done. This should have been done when it was decided not to differentiate between owners and managers when analysing the data.

4.5 Applications of research outputs

Thus far, this study has produced the following outputs:

- (i) A renosterveld fact sheet was compiled by the author to issue to the interviewed farmers (Appendix B). This highlighted the need for a more widely available, professionally produced renosterveld brochure that contained more information than the previous WCNCB renosterveld flyer. A new renosterveld brochure entitled "Renosterveld: Hidden Jewels of the Cape" was subsequently published and sponsored by the Cape Action Plan for People and the Environment (C.A.P.E.) programme.
- (ii) A popular article was written for the *Veld and Flora* Journal entitled "Understanding a farmer's position" (Winter and Hanks, 2002) (Appendix F).
- (iii) Personal feedback was given to the WCNCB extension officers responsible for the Bot River and Suikerkankop study areas. A few follow-up visits were made by the author to key landholders in order to introduce them to the relevant extension staff.
- (iv) The input of the author was requested at an Overberg expert mapping workshop as part of the Cape Lowlands Project in order to provide landholder attitude information that could assist with the prioritisation of Ov. Coastal Renosterveld areas. Information provided was incorporated into a GIS database for the Lowlands Project.
- (v) Feedback has been given to the co-ordinator of the Threatened Plant Programme recently launched in 2003 by the National Botanical Institute, which will be using part of the Bot River study area as one of the pilot sites for promoting civil society efforts to protect threatened plants on private land.
- (vi) WCNCB in partnership with the Botanical Society has initiated a two-year Conservation Stewardship Pilot Project (previously called the Conservation Incentives Project) in the beginning of 2003, to investigate ways of encouraging stewardship on privately owned areas in the Western Cape (Winter and Botha, 2003) (Appendix G). Three pilot areas have been selected for this project, two of which coincide with the Bot River and Suikerkankop study areas. In this way, best value is gained from the landholder relationships that were established in those areas for this study and contacts made can be followed up on by the new CNC Stewardship Programme extension officer employed for the Bot River pilot site.

4.6 Recommendations for future study

Ferrar (1983) provided a valuable conceptual framework for determining research priorities in the study field of conservation behaviour in South Africa as well as recommendations for the scope and emphasis of these research priorities. Ferrar's (1983) recommendations should be re-visited to stimulate interest in the interaction between human attitudes, behaviour and the natural environment.

More specifically, it has become apparent from this study that landholder attitudes towards conservation in general and/or Coastal Renosterveld specifically should be regularly monitored. Monitoring attitudes every five years is recommended, in order evaluate whether landholder perceptions are affected with changing socio-economic circumstances over time (e.g. drop in agricultural crop market values), climatic events (e.g. drought) or new conservation agency interactions (e.g. launching a pilot project in the area). This is necessary in order to ensure that conservation agencies remain relevant to the social and economic climate, and needs of the landholder. Some suggested topics for future research into conservation attitude and behaviour and stewardship options include:

- (i) Evaluation of the effectiveness of legislation to provide incentives for conservation
- (ii) Regular and repeated evaluation of the effectiveness of environmental education for positively changing conservation behaviour
- (iii) Effectiveness monitoring of public relations efforts of conservation agencies.
- (iv) Examination of the relationship between perceived economic returns from different landuses and actual benefits
- (v) An investigation of the value of renosterveld in a farm context, specifically its importance for providing a wide spectrum of nutrients and the possibility of an associated enhancement of animal health. Data on this and other aspects might go a long way to helping argue the case for its retention.

More research is needed amongst the landholders of other threatened vegetation types to further an understanding of landholder attitudes and values that might lead to positive conservation behaviour by individuals. Approximately ten percent of all vegetation types are threatened in South Africa (National Botanical Institute, *in press*). To date, the only threatened vegetation types for which landholder surveys have been designed include Coastal Renosterveld (McDowell, 1988 and this study) and Mistbelt Grassland (Savy, 2003).

Not only should landholders be the focus for promoting positive conservation behaviour, but key decision-makers (e.g. politicians and policy makers in fields such as environmental affairs, physical planning, and agriculture) are recognised as having prime importance in determining whether legislation will contain enabling

provisions for conservation on private land. To these ends, more persistent lobbying effort by civil society groups is required.

4.7 References

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APPENDICES

Appendix A

Questionnaire used to investigate the attitudes and behaviours of landholders towards the conservation of Overberg Coastal Renosterveld



INTERVIEW SCHEDULE FOR INVESTIGATING THE ATTITUDES AND BEHAVIOURS OF LANDHOLDERS TOWARDS THE CONSERVATION OF OVERBERG COASTAL RENOSTERVELD

Section A – Background Information

A1.) Area: 1. Botriverside 2. Suikerkankop

A2.) Name of farm:

A3.) Name of interviewee:

A4.) Sex of subject:

1. Man
2. Woman

A5.) Role:

1. Landowner
 2. Property Manager
 3. Trustee
- Other

A6.) Postal Address: P O Box /

.....

Postal Code:

A7.) Phone:

H W

cell

A8.) Email address:



(not applicable)

A9.) What is the size of the property? (ha):

1. 1-50 ha
2. 51 – 200 ha
3. 201 – 500 ha
4. > 500 ha

A10.) What is the primary landuse on the property (i.e. > 50%)?

1. Dairy
2. Grazing (Beef and/or sheep)
3. Orchards
4. Vegetables
5. Vineyards
6. Residential
7. Natural veld
8. Cereals

Other

A11) How many hectares of renosterveld occur in total on the property?

1. 1 - 50 ha
2. 50 -300 ha
3. > 300 ha

A12) What is the size of the largest patch of renosterveld (hectares)?

1. 1 – 10 ha
2. 11 – 50 ha
3. > 50 ha

A13.) How would you describe the slope of the land occupied by the largest patch of renosterveld?

1. Steep
 2. Gently-sloping
 3. Flat
- Other.....

A14.) How would you describe the fertility of the largest area of renosterveld on the property?

1. Extremely fertile
 2. Potentially highly productive
 3. Infertile, marginal land
- Other.....

A15.) Are there any ecotourism facilities on the property (e.g. Bed & Breakfast, chalets, hunting, hiking routes)?

1. Yes
2. No

A16.) (IF YES) Could you describe the scale of the ecotourism operations (e.g. large, full time / small, side-line business)?

MANAGER

A17.) Do you live on the property permanently (i.e. for the majority of week days)?

1. Yes
 2. No
- Other.....

A18.) How long have you managed this particular property?

1. < 1 years
2. 1 – 5
3. 6 – 10
4. 11 – 20
5. > 20

A19.) How long has the property been in the owner's family?

1. < 1 years
2. 1 – 5
3. 6 – 10
4. 11 – 20
5. > 20
6. Unsure

OWNER

A17.) Do you live on the property permanently (i.e. for the majority of week days)?

1. Yes
 2. No
- Other.....

A18.) How long have you owned this particular property?

1. < 1 years
2. 1 – 5
3. 6 – 10
4. 11 – 20
5. > 20

A19.) How long has the property been in your family?

1. < 1 years
2. 1 – 5
3. 6 – 10
4. 11 – 20
5. > 20
6. Unsure

A20.) Does the owner, to your knowledge, have any intention of selling the property in the next 5 years?

1. Yes
2. No

A21.) To what degree do you have authority over long-term decision-making for the property?

1. Complete authority
2. Partial authority, decisions must be made in consultation with owner
3. No authority

Other:

A22.) How many years of farming experience do you have?

1. None
2. < 1
3. 1 – 5
4. 6 – 10
5. 11 – 20
6. > 20
7. Not applicable. Reason:.....

A23.) What is your home language?

1. English
2. Afrikaans
3. Other.....

A24.) How bilingual (English/Other) would you say you are on a scale of 1 to 5?

Poor 1 2 3 4 5 Excellent

(OPTIONAL QUESTION)

A25.) Into which age category do you fall?

1. 18-35 years
2. 36-55
3. 56 +

A26.) Are you a member of any environmental or conservation group or organization?

1. Yes
2. No

A27.) What is your highest qualification?

1. Less than matric
2. Matric
3. First University degree
4. Second University degree (Honours)
5. Postgraduate qualification (Masters / Doctorate)
6. Diploma
7. Other

A20.) Do you have any intention of selling the property in the next 5 years?

1. Yes
2. No

A21.) N/A

A22.) How many years of farming experience do you have?

1. None
2. < 1
3. 1 – 5
4. 6 – 10
5. 11 – 20
6. > 20
7. Not applicable. Reason:.....

A23.) What is your home language?

1. English
2. Afrikaans
3. Other

A24.) How bilingual (English/Other) would you say you are on a scale of 1 to 5?

Poor 1 2 3 4 5 Excellent

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4. Second University degree (Honours)
5. Postgraduate qualification (Masters / Doctorate)
6. Diploma
7. Other

Section B – Renosterveld use and management

B1.) We are aware that renosterveld has been retained on the property. What was the primary reason for this?

.....
.....
.....

B2.) What are renosterveld areas currently used for on the property?

1. Grazing sheep
2. Grazing cattle
3. Personal recreation
4. Firewood
5. Disposal of refuse
6. Large-scale wildflower picking for sale or export
7. Small-scale wildflower picking for flower shows
8. Bee-keeping
9. Medicinal plant harvesting
10. Shelter for livestock
11. Nothing, kept as they are
12. Other.....

(SKIP IF NO GRAZING PRACTISED)

B3.) Has the grazing of livestock on renosterveld had any noticeable benefit to the livestock?

1. No
2. Yes (specify)
Other.....

(SKIP IF NO GRAZING PRACTISED)

B4.) Has grazing livestock on renosterveld had any noticeable disadvantage to the livestock?

1. No
2. Yes (specify)
Other.....

B5.) Do you actively manage the renosterveld areas (e.g. burning, alien plant removal, brushcutting)?

1. No
2. Yes

(IF NO, SKIP THE QUESTION)

B6.) Which of the following types of management tools do you use for your renosterveld areas?

B6.) Type	Yes	No
a. Burning & fire breaks		
b. Alien Plant Removal		
c. Grazing camps & rotation		
d. Brushcutting		
e. Erosion control		

B7.) Do you have any other plans for the management or use of the renosterveld in the next 5 years?

.....

Section C – Knowledge of renosterveld

C1) Were you aware, prior to this interview that Coastal Renosterveld is a unique and endangered type of vegetation? (i.e. less than 4% remains and < 1.6% is conserved in reserves)

1. Yes
2. No

C2) Is there anything else you can tell me about renosterveld, the plants/animals that live in the veld and how you use it? (e.g. medicinal plants, pests that breed in it)

.....
.....

C3.) Did you know that a permit is required in order to plough renosterveld? Do you know which department or person to contact should you wish to obtain such a permit? (this also applies to any virgin land that has not been disturbed for 10 years) (IF YES, ASK FOR DETAILS)

1. Yes
2. No
3. Vaguely

C4.) To what extent do you agree with the following statement?:

	strongly agree	agree	unsure	disagree	strongly disagree
C4a.) The reasons why renosterveld should be conserved are clear to me

C5.) Do you think that people in this area are becoming more aware of the scarcity and conservation importance of renosterveld?

1. Yes
2. No

Section D – Renosterveld Value

D1.) From the list provided, choose the three most important forms of renosterveld usage or potential usage to you (in descending order of utility value):

- 1 Pasturage
 - 2 Wild flowers – aesthetic value
 - 3 Wild flowers – commercial value
 - 4 Firewood
 - 5 Wild animals – aesthetic value
 - 6 Wild animals – commercial value
 - 7 Nature conservation
 - 8 Future agricultural fields
 - 9 Recreation
 - 10 Future peri-urban expansion
 - 11 Soil erosion control
 - 12 Beekeeping
 - 13 Garden plants
 - 14 Predator control
 - 15 Shelter for stock
 - 16 Medicinal plants
 - 17 Other
 - 18 I do not use the renosterveld for any of the uses listed above
-

D2.) In your opinion, what is the estimated or potential commercial value (R) of the land on your property presently occupied by renosterveld?

1.
2. Don't know

D3) To what extent do you agree with the following statements?

	strongly agree	agree	unsure	disagree	strongly disagree
D3a.) The Overberg has a rich natural heritage that needs to be conserved and managed carefully					
D3b.) Fynbos has more value than renosterveld					
D3c.) The renosterveld areas on my property are non-productive, wasted pieces of land (i.e. "uitvalgrond")					
D3d.) Agricultural productivity is more important than the conservation value of my property					
D3e) Currently, conserving renosterveld on the property offers no advantages or benefits to me or to the business					

D4) Why do you think there is sometimes a negative perception towards renosterveld amongst certain landowners?

.....

.....

D5.) Rate your level of interest in renosterveld and the associated plants and animals (from a nature and aesthetic point of view):

1. Not interested
2. Moderately interested
3. Highly interested

Other:.....

Section E - Willingness to conserve

E1) To what extent do you agree with the following statements?

E1a.) Conservation of land is incompatible with running an agricultural business					
E1b.) Realistically, I can only consider conserving renosterveld on land that I cannot productively use					

E2.) If a more profitable crop could be planted where renosterveld now currently is, how willing are you to conserve the renosterveld areas on the property in the future?

1. Very willing
2. Willing in principle, but need more time to consider the implications
3. Unsure
4. Not willing now, but possibly in the future
5. Definitely not willing
6. Not applicable, as I am not the landowner and cannot make such decisions

Section F – Incentives for conservation

F1.) To what extent do you agree with the following statements? (SHOW CUE-CARD)

	strongly agree	agree	unsure	disagree	strongly disagree
F1a.) Offering landowners various types of incentives (e.g. financial, motivational, property or rights-based) is a good idea for promoting conservation on private land					
F1b.) Protection of plants and animals that occur outside of protected reserves should be the responsibility of private landowners					
F1c.) The Western Cape Nature Conservation Board or another government organization should bear the costs for the conservation and management of renosterveld on the property					

F2.) Would you prefer to maintain natural areas on the land, including renosterveld, without making use of incentives or assistance from the Western Cape Nature Conservation Board (WCNCB)?

1. Yes
2. No

F3.) Which of the following incentives sound attractive to you? (Choose the four most attractive options, assuming all could be offered) – SHOW CUE-CARD

1. Assistance with alien vegetation clearing (resource provision, e.g. labour, equipment)
2. Assistance with fire management
3. Tax deductions
4. Free access to all WCNCB parks and reserves
5. Grants or subsidies for conservation
6. Discounts for accommodation at WCNCB resorts
7. Rates relief for land conserved
8. Assistance with fencing and land management
9. Access to scientific advice
10. Advice on legal compliance procedures
11. Access to advice on farm planning and management support
12. Law Enforcement (e.g. snaring, illegal flower harvesting, monitoring of squatting)
13. Public / community recognition (e.g. certificate, article in magazine, photos)
14. Tourism incentives (e.g. savings on ecotourism advertisements)
15. Other.....

F4.) Which of the above-listed incentives is the most attractive to you (select from 1 to 15) and why?

F5.) What prevents you conserving more land on the property? (e.g. Do you experience certain financial, management or resource constraints?)

F6.) What do you think of each of the suggested stewardship options applicable to private land? (e.g. what elements do you like or dislike, which options are suitable/unsuitable for the property, would you like to discuss any further with a conservation authority?) (SHOW CUE-CARD)

Type of Protected Area	Where suitable	Restriction of rights / security	Compensation or Incentives
F6.a) CONSERVATION AREA	<ul style="list-style-type: none"> Any natural land is suitable but not a good option if your land has rare or endangered habitats or is an important ecosystem. Unless this initial designation is seen as part of a plan to progress to higher conservation security 	<ul style="list-style-type: none"> Very few, but the area needs to retain its natural character 	<ul style="list-style-type: none"> Advice & support through basic extension services Assistance with management plans & farm maps

Response:

.....

.....

Type of Protected Area	Where suitable	Restriction of rights / security	Compensation or Incentives
F6.b) CO-OPERATION AGREEMENT	<ul style="list-style-type: none"> Suitable for any conservation worthy land (especially wetlands and water catchments), including small and isolated fragments. 	<ul style="list-style-type: none"> Land must be managed for biodiversity 	<ul style="list-style-type: none"> Specific agreements for fire, alien, plant and animal management Advanced extension services (e.g. alien clearing planning)

Response:

.....

.....

Type of Protected Area	Where suitable	Restriction of rights / security	Compensation or Incentives
F6.c) CONTRACT NATURE RESERVE	<ul style="list-style-type: none"> Priority areas adjacent to statutory reserves or sufficiently large to be self-contained ecosystems. Critically important and threatened sites 	<ul style="list-style-type: none"> No development or land use rights will be permitted, but access and residence rights will not be restricted in any way. Owners retain title 	<ul style="list-style-type: none"> Substantial assistance with habitat management Increased recognition and marketing exposure Lobbying on your behalf for additional incentives (e.g. rates rebates)

Response:

.....

.....

(ASK ONLY IF INTEREST EXPRESSED IN INCENTIVES)

F7.) Assuming that some incentives can only take effect if some form of auditing is in place, would you willing to have your renosterveld areas monitored (by an expert or authority, e.g. Western Cape Nature Conservation Board)?

1. Yes
2. No
3. Maybe

9
F8.) Would you like a representative from Western Cape Nature Conservation Board to visit you in the future if the implementation of various incentive schemes becomes a reality?

1. Yes

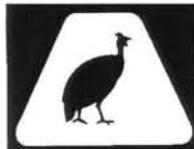
2. No

Comment:.....

F9.) What general comments or concerns do you have about incentives in general that you like the Conservation Incentives Working Group to consider?
.....
.....

Section G – Conservancies & Cape Nature Conservation

G1.) Do you know the meaning of this logo? If yes, what is the meaning?



1. Yes
2. No

G2.) Are you familiar with the types of advantages that belonging to a conservancy can offer?

1. Yes
2. No
3. Vaguely

Comment:.....

G3.) Do you think there is potential for a conservancy in this area?

1. Yes
2. No
3. Maybe

Comment:.....

G4.) Have you had contact with personnel of Western Cape Nature Conservation Board in the past? Could you tell me a bit more about it? (e.g. For what reason was contact made, was it to your satisfaction or not and why?)
.....
.....

G5.) Do you ever make use of extension officers?

1. Yes
2. No

G6.) Would you like to convey any message to Western Cape Nature Conservation Board?
.....

G7.) Are you interested in hearing about the results of this survey?

1. Yes
2. No

G8.) Do you have any questions or other comments?.....

Thank you for your time and participation!

Appendix B

**Renosterveld fact sheet compiled by the author and given to each subject after
the interview**

What exactly is renosterveld?

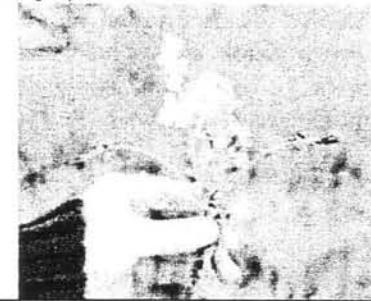
Renosterveld is a small-leaved, evergreen shrubland that is found only in the South, South West and South East Cape of South Africa. It is frequently dominated by the renosterbos (*Elytropappus rhinocerotis*) although this is often due to past disturbance.

It is also extremely rich in species and bulbs (geophytes) which produce magnificent flower displays in spring. Many of these are endemic, which means they occur nowhere else in the world. Renosterveld can have a high grass cover and provide valuable grazing for animals.

Typical renosterveld species include many members of the daisy, lily, iris and oxalis family.

Did you know?...

...More than 1000 species have been found in pristine renosterveld areas, while 200 species of these are bulbs. 188 of the endemic plant groups are threatened while at least 50 groups of bulbs are threatened.



How did renosterveld get its name?

Did you know?...

...Almost all large mammals have disappeared from renosterveld areas, while the Quagga, Bluebuck and Cape Lion are extinct. Due to the actions of farmers and the reation of the Bontebok National Park, the extinction of the bontebok was prevented.



- The connection with the 'renoster' remains a mystery – one suggestion is that the dull, grey appearance of a group of renosterveld bushes when viewed from a distance resembles the wrinkled hide of a rhino.
- Another suggestion is that rhinos, which once roamed the Cape used to regularly use renosterveld for food and shelter.

Did you know?...

...The first account of renosterveld was made by Simon Van Der Stel in 1685 when he passed through the Oliphants River Valley in the south western Cape.

How does renosterveld differ to Fynbos?

Did you know?...

... One third of all species endemic to the Cape Floral Kingdom are renosterveld plant species.

...The Fynbos biome includes not only Fynbos, but in the lowland areas is comprised of:

1. Fynbos
2. Renosterveld
3. Strandveld

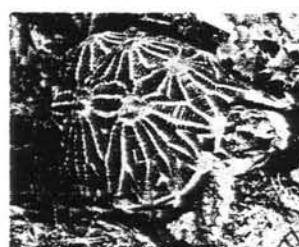
Renosterveld can be distinguished from Fynbos in 4 ways:

1. Renosterveld grows on fine-grained, clay-rich soils (eg. Shales), whereas Fynbos occurs on sandy, nutrient-poor soils.
2. Renosterveld occurs under different climatic conditions to Fynbos: rainfall is between 250 – 600 mm per year (at least 30% occurs in winter), and the altitude is less than 300 m above sea level. Where the rainfall and altitude is higher, renosterveld usually gives way to Fynbos.
3. It normally lacks Cape reeds (restoids)
4. Proteas and ericas are extremely rare

Why is renosterveld so scarce and how much is left?

Renosterveld used to be wide-spread in the Cape, but because it always occurs on fertile soils, more than 90% has been replaced by agricultural lands. The transformation of renosterveld to pasture and cereals accelerated when mechanised agriculture expanded in the Cape after World War II.

Today less than 4% of renosterveld's original extent remains, while a mere 1.6% is formally conserved in reserves.



Did you know?...

... The Geometric tortoise occurs only in renosterveld and is the only species of tortoise that is endemic to Fynbos. Because only small patches of renosterveld remain, it has become highly endangered and approximately only 4000 – 5000 individuals remain. Geometric tortoises are very specialist feeders and eat bulbs and succulents in the renosterveld.

Why does renosterveld not look the same everywhere?

There are a number of different types of renosterveld that have different characteristic species and other features. Renosterveld is divided into two broad categories: **mountain renosterveld** occurring at higher elevations with a higher proportion of succulents than **coastal renosterveld** on the lowlands.

Renosterveld is geographically distributed in two different blocks – **western** (Swartland) and **southern** (Overberg) areas. Western communities have a stronger Fynbos influence, a sparser grass cover and higher variety of annuals and bulbs. The southern renosterveld has a higher rainfall, greater altitudinal variation and more grass cover.

Did you know?... that there are different types of renosterveld...

Renosterveld (RV)

Coastal RV

Mountain RV

West Coast renosterveld

South West Coast renosterveld

South Coast renosterveld

How can humans use renosterveld?

Did you know?...

... The renosterbos was used as a remedy to treat influenza in the 1918 epidemic and to treat typhoid fever.



- Renosterveld provides protein-rich grazing for livestock.
- The renosterbos burns well even when green and can be used as fuel.
- The tips of the branches are infused in wine or brandy and used to treat dyspepsia and other digestive disorders.
- A number of renosterveld plants provide valuable traditional medicines and various oils widely used in the flavour and pharmaceutical industries.

What are the threats to renosterveld?

- Overgrazing
- Invasive alien plants
- Incorrect veld burning practices
- Illegal flower picking
- Bad ploughing practices and development
- Use of non-biodegradable poisons and fertilizers



Did you know?...

... Renosterveld was not historically dominated by renosterbos to the extent it is today. Burning and overgrazing by the European settlers in the early 1800's caused the grass component to decline and renosterbos to become the dominant species.

How should renosterveld be managed?

Did you know?...

... Once disturbed, it takes a long time for renosterveld to recover and regain the full variety of species that it originally had. A partial recovery is perhaps possible after 25 years of non-disturbance



- **Burning** – If one wishes to re-establish the grassland in renosterveld, autumn is considered the best season for burning renosterveld. It is important to let the veld recover sufficiently between burns, and to be careful not to graze too heavily after a burn.
- **Grazing but not burning** – A loss of diversity (i.e. variety of different types of plants) will be caused by this form of management as the species that need fire to germinate and re-sprout will be excluded. Selective grazing can be used to stimulate palatable species to the detriment of unpalatable plants.
- **Brushcutting** – this favours grasses, bulbs and resprouting shrubs, but can cause a decline in the diversity of plants.

Did you know?...

... Threatened renosterveld insect species include:

- ❖ Dickson's Monkey Blue butterfly
- ❖ Cottrell's Blue butterfly
- ❖ Lion's Head Copper butterfly

Did you know?...

Some of the threatened renosterveld birds include:

- ❖ Lappet-faced vulture
- ❖ Martial eagle
- ❖ Cape Vulture
- ❖ Stanley's Bustard
- ❖ Ludwig's Bustard
- ❖ Grass Owl

Did you know?...

Mammals found in renosterveld that are threatened include:

- ❖ Honey badger
- ❖ White-tailed mouse
- ❖ Serval
- ❖ African wild cat
- ❖ Antbear
- ❖ Cape Mountain Zebra

Appendix C

List of peer reviewers that gave comment on the first version of the questionnaire before testing it with three pilot interviews

Name	Organization	Capacity
1. Mr Fanie Bekker	Western Cape Nature Conservation Board	Director of Operations
2. Mr Andrew Knight	Terrestrial Ecosystem Conservation Unit (TERU), University of Port Elizabeth	PhD candidate
3. Mrs Val Charlton	Ukuvuka Firestop Campaign, Cape Town	Operations Manager

Appendix D

Results of the cross-tabulation analyses between willingness to conserve and property size, area of renosterveld, landholder age and landholder education

Table D1

The relationship between farm size and landholder willingness to conserve.

	Farm size (ha)	
	< 500 ha	> 500 ha
I will only conserve renosterveld on non-productive land (E1b ¹)		
Agree	85.7%	66.7%
Disagree	14.3%	33.3%
N ²	7	30

¹ E1b: "Realistically, I can only consider conserving renosterveld on land that I cannot productively use".

² N = 37, missing cases = 3

Table D2

The relationship between area of renosterveld on a farm and landholder willingness to conserve.

	Area of renosterveld on property (ha)	
	< 300 ha	> 300 ha
How willing are you to conserve? (E2 ¹)		
Willing	59.4%	75%
Hesitant or not willing	40.6%	25%
N ²	32	8

¹ E2: "How willing are you to conserve the renosterveld areas on the property in the future, even if a more profitable crop could be planted where renosterveld now currently is?".

² N = 40 respondents, no missing cases.

Table D3

The relationship between the age of landholders and their willingness to conserve.

	Landholder Age		
How willing are you to conserve? (E2) ¹	18-35 yrs	36-55 yrs	> 55 yrs
Willing	71.4%	66.7%	50.0%
Not willing	28.6%	33.3%	50%
N ²	7	21	12

¹E2: "How willing are you to conserve the renosterveld areas on the property in the future, even if a more profitable crop could be planted where renosterveld now currently is?"

²N = 40 respondents, no missing cases

Table D4

The relationship between the education of landholders and their willingness to conserve.

	Highest education of respondent	
How willing are you to conserve? (E2) ¹	Matric or less	Formal education after matric
Willing	66.7%	60.0%
Hesitant or not willing	33.3%	40%
N ²	15	25

¹E2: "How willing are you to conserve the renosterveld areas on the property in the future, even if a more profitable crop could be planted where renosterveld now currently is?"

²N = 40 respondents, no missing cases

Appendix E

Index scores for each landholder in Bot River and Suikerkankop, as well as each of the dimensions of the Conservation Attitude index.

Landholder ¹	Perceived benefit	Willingness	Conservation Attitude
B1	0.4	0.70	0.55
B2	0.9	0.87	0.88
B3	0.6	0.70	0.65
B4	1	1.00	1.00
B5	0.5	0.50	0.50
B6	0.3	0.43	0.37
B7	0.5	0.50	0.50
B8	0.8	0.50	0.70
B9	0.8	0.53	0.60
B10	0.9	0.70	0.40
B11	0.8	1.00	0.40
B12	0.2	0.30	0.45
B13	0.4	0.60	0.40
B14	0.5	0.80	0.70
B15	0.6	0.70	0.65
B16	0.6	0.30	0.65
B17	0.8	0.27	0.67
B18	0.6	0.60	0.80
B19	0.2	0.30	0.90
S1	0.6	0.80	0.25
S2	0.5	0.70	0.50
S3	0.4	0.40	0.65
S4	0.4	0.40	0.65
S5	0.5	0.40	0.45
S6	0.4	0.40	0.53
S7	0.6	0.80	0.60
S8	0.6	0.70	0.80
S9	0.7	0.90	0.73
S10	0.6	0.87	0.65
S11	0.6	0.70	0.70
S12	0.8	0.60	0.70
S13	0.8	0.60	0.57
S14	0.6	0.53	0.70
S15	0.8	0.60	0.70
S16	0.7	0.70	0.63
S17	0.7	0.57	0.53
S18	0.5	0.57	0.43
S19	0.3	0.57	0.22
S20	0.3	0.13	0.25
S21	0.8	0.40	0.60

¹B1 to B19 refer to the Bot River properties; S1-S21 refer to the Suikerkankop properties

Appendix F

Popular article written for *Veld and Flora*, a Journal of the Botanical Society of South Africa
(reprinted with permission)



Top *Moraea neopavonia* (now thought to be con-specific with *M. tulbaghensis*). Photo: Amrei von Hase.

Centre and below *Moraea villosa* and *Moraea gigandra*.

Photos: Nick Helme

PEACOCK MORAEAS

These striking moraeas belong to the group of seven 'peacock' moraeas, a name derived from their characteristic coloration with prominent iridescent spots in the centre of the flowers. This feature is found in a wide range of species from completely different families and often hints at pollination by monkey beetles (*Hopliini*, *Scarabidae*). Indeed, research on three of the peacock moraeas has shown that monkey beetles are the primary, if not exclusive, pollinators. The beetles are attracted by strong visual cues, such as the brightly coloured petals, and they use the flowers as mating sites and also feed on pollen and nectar. The black or blue peacock spots seem to closely resemble the beetle or fly pollinators themselves, and some authors have suggested that they play a role in sexual mimicry.

UNDERSTANDING A FARMER'S POSITION

When University of Stellenbosch Botany student Sue Winter headed out over Sir Lowry's Pass into the renosterveld to carry out the first of forty interviews with landowners for her Masters thesis, she expected most farmers to be on the defensive, yet she encountered a refreshing openness and a willingness to engage. Karoline Hanks chatted to her about her findings.

Less than ten percent of original renosterveld remains today after decades of commercial farming. The Cape Lowlands were rated as a number one priority for conservation by Cape Action for People and the Environment (C.A.P.E.) based on the irreplaceable nature of their indigenous remnants. As most of these are owned by commercial farmers, it became apparent that a better understanding of their attitudes, needs and willingness to conserve the renosterveld remnants on their farms was needed before any conservation plans could be implemented.

'We are far too quick to point fingers and to claim that the fate of the Cape Floral Kingdom lies in the hands of the farmers', says Sue. 'What we don't do is ask what is currently preventing them from conserving the veld, or how these obstacles can be overcome.' In the past the opinions of the farmers have seldom been taken into account, and farmers were quick to bemoan local conservation authority's lack of presence. It is not surprising then, that we know very little about what would drive one farmer to conserve his or her patch, and others not. And this does indeed vary across the board. 'We have to embrace a much more sociological approach to our work', says Sue. 'In the past, ecological studies have been divorced from a consideration of the people who have to live on and manage the precious ecosystems under study. Without this level of engagement, we are wasting time'.

'If it is of no use to me, it is of no concern'

More than half of the farmer's interviewed were not aware that the renosterveld was endangered or had any botanical significance at all. Eighty seven percent regarded renosterveld as 'uitvalgrond'. For the most part, the areas which have remained untouched are inaccessible – too high, too rocky, too wet or on steep slopes which are impossible to plough.

Many of the farmers had a negative perception towards renosterveld. One such perception (albeit incorrect) is that renosterveld is a breeding site for caracal (rooikat), which is regarded as a pest by many farmers. Stock losses of over one hundred lambs a year have been recorded on one farm – and when a lamb fetches R350 on the local market, these losses are significant enough for farmers to feel they ought to destroy all the veld on their farms. Other farmers see renosterveld as 'messy' and too costly to manage. It is also a source of weeds which invade into planted pastures, and a tick breeding site, all of which add to

Appendix G

**Article written for *Veld and Flora* on the Conservation Stewardship Project,
previously called the Conservation Incentives Project
(reprinted with permission)**

PARTNERSHIP IN ACTION

CONSERVATION INCENTIVES PROJECT IN THE CAPE LOWLANDS GETS GOING

by **Mark Botha & Sue Winter**

With the recent focus on threatened lowland habitats in the Cape Floral Kingdom, there is an urgent need to secure the remaining fragments of these critical ecosystems. But how are we to secure these critical sites on private farmland? Sue Winter's survey of landowner attitudes towards renosterveld in *Veld & Flora*, December 2002, showed that willingness to conserve was not the real obstacle for conservation, but rather practical assistance and financial incentives.

In response to the urgent need for incentives for private land, the Conservation Incentives Project was initiated with the formation of a partnership between the Western Cape Nature Conservation Board and the Botanical Society, funded by the Critical Ecosystems Partnership Fund. The project will investigate ways of encouraging private stewardship of priority sites in the lowlands. Three pilot areas in the Western Cape have been chosen (two in the Overberg and one on the West Coast) to test and negotiate three newly proposed private conservation models. Willing landowners can now have more than just the one option (a Private Nature Reserve) for conserving habitat on their property. Each of the proposed options is associated with a different suite of incentives and conditions, which vary with the level of security that the land will enjoy under that agreement. We aim to determine the utility of these novel agreements as legal, contract documents for securing any investment made in alien clearing,

fire management, or future tax incentives that might become available.

Another aspect of the project is to set up a dedicated extension service to engage landowners and provide advice and practical support. A landowner's manual will also

be compiled, consisting of a series of fact sheets on practical management guidelines on fire management, alien clearing, veld condition assessment, renosterveld rehabilitation and other issues.

The Incentives Action Team will implement the project in the three pilot sites. Sean Ranger and Sue Winter have recently

been employed to carry out the project objectives, while Mark Botha from the Botanical Society and Chris Martens from Western Cape Nature Conservation Board are the project leaders.

The Conservation Incentives Project is the first of its kind in South Africa to actively seek incentive opportunities for private landowners. While much lobbying work must still be done before legislation and municipal bylaws actually cater for land that is privately conserved (through, for example, rates rebates or tax incentives) we are optimistic about the potential that this project holds. Our vision is to see private landowners in South Africa set land aside for conservation voluntarily, while at the same time enjoying tangible benefits for these actions.

For more details contact Sue Winter at winters@nbict.nbi.ac.za.



Some of the members of the Incentives Action Team. (l to r) Steve Gildenhuys, Chris Martens, Sean Ranger, Shaun Page, Louise Vermeulen, Matthew Prophet, Sue Winter, Mark Botha and Irene Steyn.



management costs. Basically, land under renosterveld has little or no perceived value. The challenge lies in changing these perceptions.

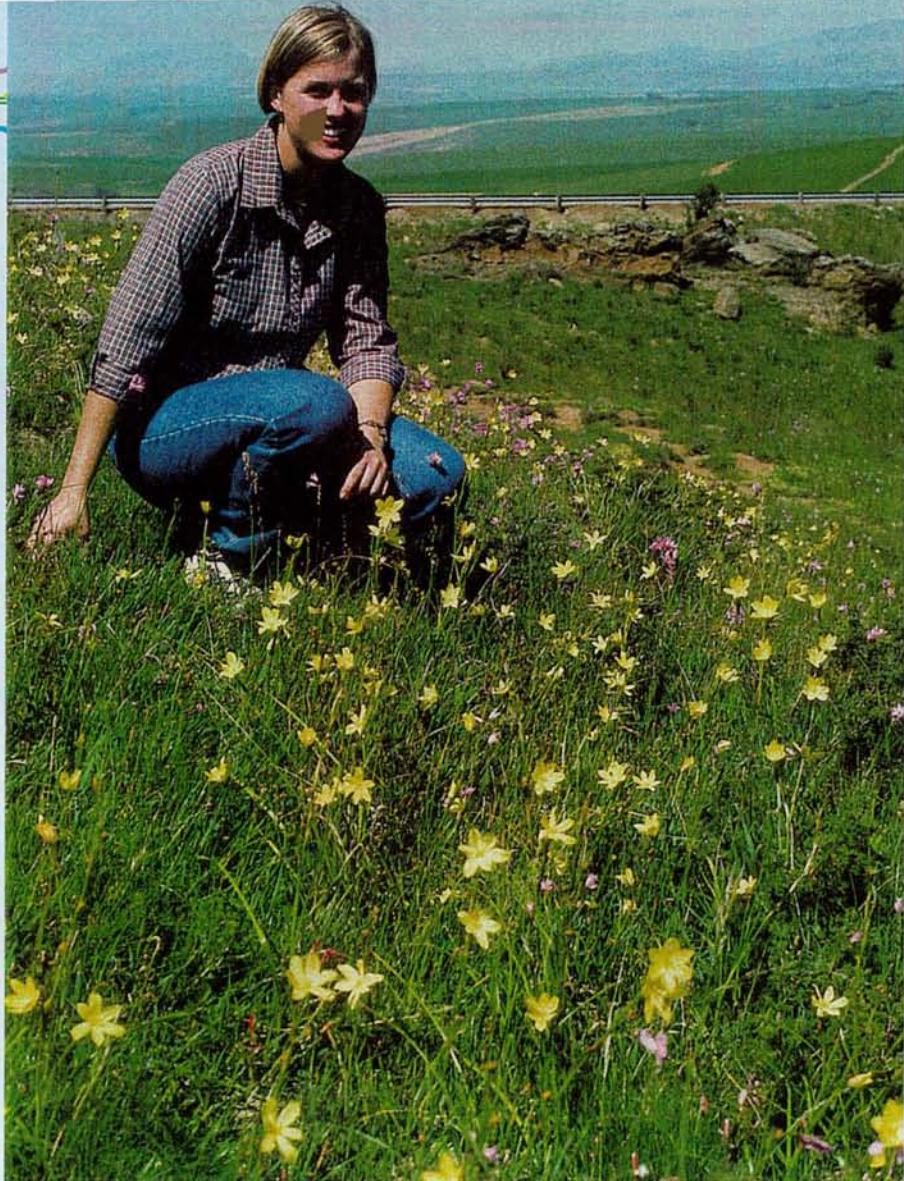
'Over and over again, I would hear that it was too expensive to manage and that money could not be earned from renosterveld.'

Farmers are at the mercy of a tight economy, which in some cases forces them to make every hectare of land productive in order to earn a living,' says Sue. Presented with emphatic economic arguments, it is difficult to argue the case for biodiversity value. When asked what monetary value farmers would place on renosterveld, the answers were varied. Some put a price tag of R100/ha, and one ventured R2000/ha. When compared to the value of workable land at approximately R3500/ha, the difference is indeed worth noting.

Some farmers have, however, found a use and value for renosterveld. Some use it as a protein rich grazing supplement for livestock and an important source of roughage, a kind of 'grazing bank' in drought periods, and others use it as a source of easy-to-cultivate garden plants. One farmer recognized that the grey-winged francolin depends on bulbs in the renosterveld and sees this as a hunting/ecotourism opportunity where a single bird could fetch up to R500. A number of farmers make use of the medicinal properties of certain renosterveld species, for treating digestive disorders, insomnia and cuts and bruises. It is also cited as protecting the quality of drinking water in areas where it has been conserved around dams, as well as protecting slopes against erosion.

'The obvious challenge', says Sue, 'is to demonstrate that the pros of renosterveld far outweigh the cons, and we need more research to substantiate this.'

Sue's study found that 63% of farmers were willing in principle to conserve renosterveld on their farm in the future, and 13% were unsure. A further 15% of farmers were not willing to conserve now, but possibly in the future with more assistance, while only 10% refused to consider conservation.



Sue Winter in a profusion of renosterveld flowers. Photo: Karoline Hanks.

In her questionnaire, Sue incorporated a large section on Conservation Incentives. With guidance from Mark Botha of the Botanical Society's Cape Conservation Unit Conservation Partnership Programme, she set out to establish what incentives and co-operative management models would attract farmers. The three most attractive incentives offered were assistance with alien plant clearing, assistance with fencing to enclose remnants and subsidies or tax relief for land that is conserved. She also presented farmers with three possible management models: voluntary reserves, management agreement reserves and contract reserves, each with a specific set of incentives. The results showed that voluntary reserves were favoured.

Sue concludes that more dialogue is needed to explain the mutual benefits that a management agreement can offer, and to address many farmers' fears. 'It is

abundantly clear that we need to commit more time and money to a renosterveld education and awareness campaign, as the levels of ignorance regarding renosterveld rank high,' she said. 'As the saying goes, "People will only conserve that which they love, and they will only love that which they know." More importantly, as conservationists, we need to talk less and listen more, in order to truly understand a farmer's reality.' □

Sue Winter has spent the past few months researching her Masters thesis for a new course in Ecological Assessment. Entitled 'Investigating landowners willingness to conserve renosterveld in the Cape Lowlands', the research component of her project involved visiting numerous farms in the Overberg region of the Western Cape. **Karoline Hanks** is a media consultant with Alex Hetherington Media.