UNIVERSITY OF CAPE TOWN

SCHOOL OF ENVIRONMENTAL STUDIES

AN ENQUIRY INTO GAMEFARMING IN THE CAPE PROVINCE

University of Cape Town

by

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in partial fulfilment of a Master's degree in Environmental Studies

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ABSTRACT

Gamefarming in Africa has generally failed to exploit the potential biological productivity of indigenous wildlife populations. This study enquired as to the reasons for such failure within the Cape Province. The enquiry focused on management, research and marketing aspects of gamefarming. Personal interviews, a questionnaire and a literature analysis provided the information for the study. A description of the overall gamefarming situation is provided. Those management problems identified were found to be largely dependent on individual farmer's methods and the intensity of game utilisation. The primary uses of game were aesthetic appreciation and sport hunting. Such useages, being of low intensity, were accompanied by low levels of management effort. The lack of a stable economic incentive was found to be the major inhibition against adopting intensive commercial means of game utilisation by cropping, safari hunting and live sale.

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I. A DESCRIPTION OF GAMEFARMING IN THE CAPE PROVINCE

I.I. DEFINITIONS AND OVERVIEW

The term 'gamefarming' is used in this study to describe the running of wild ungulates on commercial farms for whatever purpose the individual farmer sees fit.

In Field (1979) the intensive management of game animals in fenced paddocks is described as 'gamefarming', with their domestication being one aspect of this. The extensive, free range running of wildlife, with periodic cropping, is termed 'game ranching'. Both have the production and sale of meat as their goal.

The situation in the Cape falls between these categories of gamefarming and game ranching. There are considerable variations in the size of the fenced paddocks, intensity of animal husbandry and herding, and methods of cropping. Domestic animals are frequently grazed in the same paddocks holding game populations, the latter tending to range or be stocked over all or part of the farm. The farms themselves vary in size from 50 to 40 000 hectares. A number of game species move at will within and between farms, avoiding control by fences. Supplementary feeding, the use of veterinary and mineral licks, and the provision of waterpoints are used as management tools to varying degrees by some farmers. Domestication was not found to be a management aim of any farmer participating in this study.

Game on farms is utilised in various ways, referred to here as 'game useages'. There are five major game useages:

Aesthetics - the enjoyment gained by the farmer and his family in having and seeing game species on the farm.

Sport - the use of game for recreational hunting by the farmer, his family, and friends.

Cropping - the cropping of game for the sale of venison and its by-products.

Safari - the sale to a paying client of the opportunity to hunt game animals.

Live sale - the capture and sale of a live animal to a paying client.

The farmer may place an aesthetic value on the ownership of an animal that occurs naturally on his land in that he desires a a degree of control over it. A farmer may also place an aesthetic value on an animal for its own sake, and may thus go to the expense of importing further individuals, or species, onto the farm for that reason.

Hunting of game for sport has long been a past-time in the Cape. Annual 'shoots' where relatives, friends and influential people take part in a day's hunting en masse are less frequent and on a smaller scale than before. The local value of game appears to be more keenly appreciated, even if only for their use as a source of ration meat. The local use and informal bartering of venison and its products stems from sport hunting, and grades eventually into the sphere of commercial cropping.

Cropping varies from the occassional marketing of venison products by the farmer himself, to the handling of the meat by a local butcher, and eventually to the large-scale commercial cropping and international marketing undertaken by specialised firms.

Safari hunting depends largely on overseas clients to provide substantial profit margins. This leads to high trophy values for animals with suitable characteristics, usually in terms of the rarer species, subspecies or exceptional horn size. Depending on the client's motives, emphasis may be placed on, or shared between the trophy itself, a stimulating hunting experience, and the facilities provided during the stay. The farmer may do everything himself, from attracting a client to sending him away happy with a suitable trophy. Alternatively he may merely lease out the animal and the hunting opportunity to a commercial safari hunting concern.

Live sale tends to be a capital and expertise - intensive game useage. There has been considerable trade between farmers in the past; rising costs appear to be introducing organised game capture by specialist concerns dealing with live sales. The variety of techniques, circumstances of capture sites, physical and behavioural charaoteristics of the species to be caught, and the possibilities of animal and equipment loss or damage make this game useage unpredictable as a commercial venture. The resulting high prices for animals, due as much to low availability as to capture expenses, makes the stocking of farms with game species expensive.

A number of Government institutions, primarily the Department of Nature and Environmental Conservation (DNEC), have dealings with gamefarmers. The DNEC is responsible for enforcing Provincial Ordinances regulating poaching, hunting, and game transportation, and for licensing property owners as, effectively, gamefarmers. The latter procedure involves a DNEC inspection of the farmers' perimeter fences to ensure their adequacy for controlling the movement of those game species present. On receipt of the Certificate of Adequate Enclosure (CAE), valid for three years, the property owner is exempt from normal hunting restrictions on teohniques, bag limits, and shooting season, thus enabling the cropping of suitable species. Rabie (1976) elaborates on the above - mentioned legislation on wildlife utilisation.

Local health authorities in the Cape Province have By - laws controlling the conditions of slaughter and sale of venison within their areas, whilst the national Veterinary authorities oversee the adherence to those health standards set by the country receiving venison as an export commodity from South Africa. This authority also regulates the movement of game and its products across designated foot - and - mouth disease boundaries. None of these boundaties falls within the Cape Province at the present time, nor does it seem likely that they shall in the foreseeable future.

Only two commercial concerns of any size have an influence on the commercial cropping ventures in the Cape. KOVISCO has recently been acquired by Vleissentraal, the co - operative marketing agency that handles the vast majority of the red meat market under the auspices of the South African Agricultural Union. The second and smaller concern in the venison export market is SA Wild. Both firms use similar cropping methods, these being helicopter cropping by day, and night shooting of game from vehicles where conditions or preferences dictate.

Of the voluntary associations having a significant influence on the utilisation of game, the Northern Cape Game Farm Owners Association (NCGFOA) and the Eastern Cape Game Management Association (ECGMA) are the largest. The former was inaugurated in 1975 and the latter in 1981. Both rely for their effectiveness on the enthusiasm of those farmers making up the central and co-opted committees. They hold meetings and conferences at which ideas are exchanged and grievances aired by those farmers having an interest in game utilisation. The Cape DNEC and these associations are in contact with each other so allowing for the exchange and explanation of viewpoints and problems.

I.2. METHODS

I.2.1. Introduction

Descriptive material was gathered using a postal questionnaire. The concept and structure of this questionnaire were heavily influenced by interview experiences and discussions with farmers, DNEC staff , and members of the School of Environmental Studies.

The questionnaire had two objectives. The first was the description of selected farm parameters. The second was the listing of problems which the farmer experienced in his gamefarming activities. Strictly, this second objective falls under '2. RESTRICTIONS ON GAME UTILISATION', but for ease of description is included here.

A copy of the final questionnaire is given below in Table I.

Table I : THE FINAL QUESTIONNAIRE

AN ENQUIRY INTO GAME FARMING	'n ONDERSOEK NA WILDBOERDERY
INTRODUCTION	INLEIDING
1. Could you please describe any major problems which you encounter in the management and utilization of your game farm?	1. Beskryf asseblief enige besondere probleme wat u in die bestuur en benutting van u wildplaas ondervind.
.....	.....
(if necessary please continue on the attached sheet)	(indien nodig vervolg op die aangehegde vel)
2. In the table over the page, could you please, as far as possible; • in the first column indicate with either a tick, or a rough estimate of their numbers, those species which you have on your farm? • give an approximate date of introduction for those species concerned. • by ticking one or more of the last five columns, indicate how you use each or your game species. The different game uses are: * Sport - hunting done by the farmer and his friends. * Aesthetics - the pleasure the animals give the farmer. * Cropping - for the sale of meat. * Safari - hunting done by a paying client. * live sale - of animals for restocking purposes.	2. Sal u asseblief sover moontlik in die teenoorstaande tabel; • in die eerste kolom aandui watter spesies u op u plaas het deur of 'n merkie te maak of 'n geraamde getal in te vul? • 'n benaderde datum aangee waarop die betrokke spesies ingevoer is? • een of meer van die laaste vyf kolomme merk en daardeur aandui hoe u elke spesie aanwend. Die verskillende aanwendings van wild: * Sport - jag deur die boer en sy vriende. * Estetiese bevrediging - die plesier wat die diere die boer besorg. * Oesting - vir die verkoop van vleis. * Safari - jag deur kliente teen vergoeding. * Lewende verkope - van diere vir aanskaffingsdoeleindes.

2.

SPECIES/SPESIES	Approx Numbers - Geraamde getal	Date of introd. - Datum van vestiging	SPORT/SPORT	AESTHETICS/ESTETIESE	CROPPING/OESTING	SAFARI/SAFARI	LIVE SALE/ LEWENDE VERKOPE	
GEMSBOK								
RED HARTEBEEST/ROOI HARTEBEES								
BLESBOK								
BLACK WILDEBEEST/SWARTWILDEBEES . . .								
KUDU/KOEDOE								
BUSHBUCK/BOSBOK								
ELAND								
MOUNTAIN REEDBUCK/ROOIRIBBOK								
VAAL RHEBOK/VAALRIBBOK								
IMPALA								
BONTEBOK								
LECHWE/BASTERWATERBOK								
BLUE WILDEBEEST/BLOUWILDEBEES								
SPRINGBOK - COMMON/GEWONE								
WHITE/WIT								
BLACK/SWART								
NYALA								
BUFFALO/BUFFEL								
OTHERS & EXOTICS/ ANDER & EXOTIESE SOORTE:								
.....								
.....								
.....								
.....								
.....								

3.

STATISTICS SECTION

This section will be very helpful in the establishment of a data base for use in future problem-solving efforts.

Hierdie afdeling sal baie nuttig wees in die daarstelling van 'n databank wat in die toekoms gebruik kan word om probleme op te los.

◀ 3. Please indicate the size of your entire farm/s

3. Hoe groot is u plaas?

in morg ..... or/of in ha .....

◀4. Would you please list your more important farming enterprises - in order of importance if possible?

4. Maak asseblief 'n lys van u vernaamste boerderyondernemings - in orde van belangrikheid, indien moontlik

.....

.....

.....

.....

◀5. Could you please, even roughly, estimate the proportion of the total area of your farm that is used for the following purposes :

5. Dui asseblief, selfs net ruweg, aan watter proporsie van u plaas na raming vir die volgende doeleindes gebruik word :

- exclusively for game farming ——— / ——— uitsluitlik vir wildboerdery ☐

- for game farming as well as other enterprises (e.g. sheep and springbok in the same paddock) —— / —— vir wildboerdery sowel as ander ondernemings (b.v. skape en springbokke in dieselfde kamp) ☐

- exclusively for enterprises other than game farming —— / —— uitsluitlik vir nie-wildboerdery ondernemings ☐

◀6. If you have no objection, would it be possible for you to provide even a very rough estimate of the contribution that game farming makes to your farm income?

6. Indien u nie beswaar het nie, dui asseblief aan watter bydrae wildboerdery na raming lewer tot die totale inkomste van u plaas?

Very little/Baie min ☐ Up to/tot 10% ☐

10% - 50% ☐ More than/Meer as 50% ☐

◀ 7. Many game farmers experience problems with or hear complaints from neighbours who have little interest in game farming themselves. Could you please indicate below the number of farmers neighbouring directly on your boundary that are;

7. Baie wildboere ondervind probleme met of ontvang klagtes van bure wat nie self by wildboerdery belang het nie. Dui asseblief aan hoeveel van die boere wat op direk aangrensend plase boer;

Cooperative in Game Matters / Goed saamwerk in wildsake ☐

Neutral on Game Matters / Neutraal staan teenoor wildboerdery ☐

Complain about Game Matters / Klagtes het oor wildboerdery ☐

◀ 8. Could you please fill in the postal code for your area?

8. Vul asseblief die poskode van u gebied in

....

Many thanks for your invaluable cooperation and assistance.

Baie danke vir u waardevolle hulp en samewerking.

I.2.2. Questionnaire design

The design considerations are presented in two parts emphasising response and information efficiency. The problem statement question is discussed and the pilot run of the draft questionnaire is described.

Response efficiency:

This term refers to the completeness, reliability, and return frequency of the questionnaire responses. To stimulate these factors in the questionnaire design;

- Short, lucid and plain-language phrasing of questions was attempted.
- The layout of each question, and the entire questionnaire, was designed to give a clear-cut visual impact for ease of response. The use of multiple-choice formats, although preferable for this reason, had to be excluded where they might lead the respondent to a given reply.
- The length of the questionnaire and the number of questions contained were reduced to the absolute minimum such that not more than ten to fifeteen minutes were required for its completion.
- Alternative question sequences were examined to reduce any bias or leading tendencies. Two approaches could have been made. First the simpler multiple-choice questions could have been placed first such that the respondent was gradually 'drawn-in' to the questionnaire, and so would not baulk at the more complex and open-ended questions. Second, to reduce any tendencies to provoke certain categories of response in the open-ended problem areas question, the latter could have been placed first to ensure a spontaneous response. (This approach may have caused a number of questionnaire rejections as a result of respondents having to start with a complex and negatively-phrased question.)

  The second approach was adopted as sponteneity of response was considered to be more important then a higher percentage return.

To further stimulate return rates, a 'business reply service' envelope (self-addressed and postage-paid) was provided. Also, a

covering letter specifying the study's sponsors, purpose, and the need for participation by individuals on an anonymous basis headed the questionnaire.

The layout of the bilingual text was decided on following experience with the pilot run. The possibility of designing the questionnaire to allow for direct computer coding on return was rejected in favour of maintaining as simple and uncluttered a format as possible. The questionnaire was printed on both sides of the page to reduce its bulk,a factor the author considered necessary in preventing widespread rejection or erroneous responses.

Postage of the questionnaire was kindly undertaken by DNEC using official envelopes. A response period of one month was specified in the covering letter,and allowing two weeks for delivery, this meant that those replies received more than six weeks after postage were not considered in this survey. The response pattern showed a peak return rate in the fourth week after postage, with only twelve returns being received after the six-week deadline.

Information Efficiency:

The primary concern in the compilation of the questionnaire was which facts best characterised and differentiated farms making use of their game resource. Three categories of such facts, or parameters, are discussed below.

Game-orientated activities. Measures of the species, their numbers on the farm,and the uses made of them are the objectives of question two. The more common species were listed, with space being left for additions to be made by the respondent. The game useages were described in the questionnaire, with columns being provided for the indication of which species are used in one or more of these ways. Finally an approximate date of introduction, where appropriate, was requested. The entire question was set up as a table on its own page.

Farm statistics and activities. The farm's general locality was determined from its postal code area. A consideration was that, for analysis, no identification of individual farms was necessary, so enforcing the confidential nature of information returned.

Farm size was asked for in either morgen or hectares. This parameter was needed in assessing stocking rates and for general description.

A list of the farmer's more important farming enterprises was requested, in order of priority if possible. This information was to be used in characterising gamefarm activities and to see whether specific problems tended to arise from specific farm activities. (Neither of these proved feasible in this study.)

Gamefarming as a land use. The intention was to assess the importance of gamefarming activities relative to other farm activities.

The most sensitive question was what proportion of the total farm income does gamefarming provide. As sufficiently vague and 'safe' response options, four very broad percentage categories were provided in a multiple-choice fashion.

An estimate of land apportionment to game, relative to other enterprises, was sought as a measure of comparison with the financial parameter. The farmer was asked to assess the proportions of land given over to game exclusively, to game mixed with other stock, and exclusively to other enterprises. Even if the response to the question on income contribution was of a low order, this question would still enable some measure of the relative value the farmer places on his game.

Finally , as a measure of outside pressure and degree of surrounding acceptance of gamefarming, a question on problem neighbours was asked. The three categories of co-operative, neutral and problematical neighbours allowed for a broad response. The reasons for any such problems would, if significant, hopefully have been given in the question on gamefarming problems.

Problem Statement question

This question was designed to elicit a spontaneous expression of management-related problems encountered by the farmer. The

question was 'guided' in that it refers to management situations. The question avoids bias by being open-ended, by using the expression 'management and utilisation',and its placement before any other question which might have led the farmer into a particular type and topic of response. The use of a multiple-choice format was ruled out by the complex nature of the issue, and the bias inherent in the style and topic selected for multiple-choice responses.

The question wording was reworked many times to reduce ambiguity, but it was obvious with all versions that a number of differing interpretations was unavoidable. Consequently a classification of the responses was undertaken to allow for apparent differences in interpretation.

Being open-ended, the question responses were expected to vary in length. Rather than cramp a longer response, or put too many answer lines on the opening page, a separate sheet of paper was provided in the questionnaire.

Pilot Questionnaire

Prior to administering the final questionnaire, a pilot run was held in the Uitenhage area of the Winterhoek and Dias areas of the Eastern Cape. The aim was to assess the response efficiency of a draft questionnaire using a group of farmers having an above-average interest in gamefarming. The recipients of the questionnaire were members of the Uitenhage Bushveld Game Management Branch of the ECGMA. They were easily accessible for subsequent interviews from a central point and, through having interviewed their Chairman Mr. A. Rudman, a fair degree of co-operation was expected.

The draft questionnaire is given in Appendix I. This questionnaire was posted with a covering letter specifying the trial nature of the exercise, together with a stamped and addressed envelope with which it could be returned on completion to Mr. Rudman. A personal visit was made to the area ten days after postage, and on-site assessments made as to the quality of the

replies. Ten individuals out of the fifty-two participants were interviewed on their impressions and interpretations of the questionnaire. Eight of these gave constructive comments, with the following points being made:

- There was ambiguity with the word 'farm' in that, given the topic of the questionnaire, it could refer to the entire farm or merely the game side of it. The descriptive 'entire' was added to the question.
- The use of the phrase 'expanding or improving' caused either confusion, or economics-directed replies. The phrase was changed in the final questionnaire.
- There were reservations concerning the income contribution responses. This was hopefully improved in the final questionnaire by placing this question towards the end.
- There was an enthusiastic response to the question on game species and their uses. It was mentioned three times as a preferred question and so was used as the second question in the final questionnaire.
- The printing of the English and Afrikaans versions on opposite sides of the page created some confusion in page ordering. A split-page format was therefore used.
- All but one of the interviewees mentioned the simplicity of the questionnaire and how easy it was to complete.

I.2.3. Questionnaire Administration and Processing.

The address list used in this survey was derived from the register of those landowners who had applied for CAEs (see page 3) since their inception in 1976. The names and addresses were typed directly from the handwritten register onto a computer, from which a set of self-adhesive address labels was printed. Once stuck onto envelopes, alphabetical sorting for duplicate addresses was done by hand simultaneously with the collation and insertion of the questionnaire, covering letter, attached A4 sheet and Business Reply Service envelope. From an initial 2039 addresses, 1587 were

eventually posted after elimination of duplicate and blatantly inadequate addresses. It is noted that not all duplicate addresses (due to renewal of expired certificates) could be detected for reasons of mistyped addresses, ownership of more than one farm, and CAEs registered in family members names.

On receipt of the questionnaire returns, the responses were recorded on computer coding sheets. The interpretation, code assignment and transcription were all according to predesigned and standardised procedures. Each respondent filled a single computer card/line in a fixed format which allowed for alpha-numeric sorting by computer programme. This alpha-numeric sorting, according to a schedule specifying the sorts of information needed for description, led to the collection of the resulting data into profiles for each of the Divisional Council Areas in the Cape (referred to here as DCAs -see Figure I.). Thus by having a full set of 'Gamefarm Profiles', as they were labelled, for all of the DCAs comparisons and classifications for each parameter were made possible. The full set of gamefarm profiles were too bulky to include as an appendix, but are available from the Department of Nature and Environmental Conservation. The Provincial gamefarm profile is given below in Table 2.

TABLE 2. The Provincial Gamefarm Profile.

1) LAND OWNERS: 28 733 2) AVERAGE FARMSIZE: I 957 ha

3) No. SPECIES	I	2	3	4	5	6	7	8	9
No. of Farmers	I04	I07	57	4I	I4	2I	6	6	9

No. species	I0	II	I2	I3	I4	I5
No. of Farmers	5	2	I	5	I	2

Mean = 3.I6 Standard Deviation (SD) = I.78 (56%)

4) No. of EXOTIC SPECIES	0	I	2	3	4
No. of Farmers	356	24	2	2	0

5) No. of HEAD per farm. Mean = 27I hd. SD = 296 (I09%)
Range : 0 to I97I hd. Density = 37.9 hd./I000 ha.

Table 2 (cont.)

6) DOMINANCE INDEX	0.1 - .0.2	0.2 - 0.3	0.3 - 0.4	0.4 - 0.5	0.5 - 0.6	0.6 - 0.7	0.7 - 0.8	0.8 - 0.9	0.9 - I.0
No.Farmers	II	2I	40	29	43	27	32	4I	I23

Mean = 0.64 SD = 0.96 (I5I%)

The Dominance Index is the diversity index ascribed to Simpson in Odum (I97I).

7) SPECIES LIST - Dominant species counts

(I) Springbok -286- (2) Kudu -22-
(3) Reedbuck -20- (4) Blesbok -I7-
(5) Bushbuck -I0- (6) Klipspringer -9-
(7) Gemsbok -7- (8) Hartebees -4-
(9) Impala -4- (I0) Eland -3-
(II) Blue Wildebees -3- (I2) Vaal Rhebok -2-
(I3) Giraffe -I- (I4) Black Springbok -I-
(I5) Fallow Deer -I-

- Total Species counts

(I) Springbok -332- (2) Blesbok -I37-
(3) Kudu -I07- (4) Gemsbok -I00-
(5) Reedbuck -9I- (6) Hartebees -4I-
(7) Vaal Rhebok -38- (8) Impala -37-
(9) Bushbuck -34- (I0) Black Wildebees -33-
(II) Eland -27- (I2) Black Springbok -26-
(I3) Fallow Deer -22- (I4) White Springbok -20-
(I5) Blue Wildebees -20- (I6) Ostrich -I8-
(I7) Klipspringer -I6- (I8) Burchell's Zebra -I5-
(I9) Bontebok -I2- (20) Giraffe -6-
(2I) Blue Duiker -3- (22) Hartmann's Zebra -3-
(23) Hog Deer -3- (24) Buffalo -2-
(25) Nyala -2- (26) Indian Deer -2-
(27) Lechwe -I- (28) Waterbuck -I-
(29) Mountain Zebra -I- (30) Indian Buffalo -I-
(3I) Desert Camel -I- (32) Red Duiker -I-
(33) Red Deer -I- (34) Camel -I-
(35) Barbary Sheep -I-

Table 2 (cont.)

8) GAME USES

No. of Farms	Frequency of Useage															
	0	I	2	3	4	5	6	7	8	9	I0	II	I2	I3	I4	I5
Sport	I03	I36	84	3I	I9	5	3	2		2						
Aesthetics	I64	74	60	29	20	I0	9	3	4	2	3	2		3	I	I
Cropping	I84	I48	38	7	5	2	I			2						
Safari	337	I6	6	4	3	4	2	2	I	4	3	I	I		I	
Live sale	3I0	36	I2	5	5	5	2	4		2	I	2			I	

9) PERIOD OF INTRODUCTION

	Pre I930	I930-I949.	I950-I959.	I960-I964.	I965-I969.	I970-I974.	I975-I979.	Post I980
No. of Farmers	82	40	44	44	2I	43	48	20

I0) FARM AREA

Mean = 7 I58 ha.

Range = I4I to 40 000 ha.

II) FARM ENTERPRISES

(I) Wool -95-
(2) Sheep (unspec.) -88-
(3) Wool & Mutton -38-
(4) Mutton -33-
(5) Mohair -33-
(6) Cattle -30-
(7) Livestock -II-
(8) Smallstock -9-
(9) Beef -6-
(I0) Sheep stud -5-
(II) Irrigation -4-
(I2) Goat meat -I-
(I3) Goats -I-
(I4) Cattle stud -I-
(I5) Corn -I-
(I6) Grapes -I-
(I7) Pineapples -I-
(I8) Recreation -I-

I2) GRAZING AREA RATIO Numbers of farms with grazing patterns.

	Game Area larger	Mixed Grazing	Domestic area larger
Free Range	2	73	I2
Split Range			39
Both	I	54	I96

Split range differs from Free range in that the farmer prefers to keep his game separate from his domestic stock.

Table 2 (concl.)

I3) INCOME CONTRIBUTION

	Minimal	below I0%	I0 - 50%	above 50%
No. of Farmers	239	96	24	4

I4) NEIGHBOUR

RATING	Co-operative	Neutral	Problematical
No. of Farmers	I99	I2I	8

I.3. RESULTS

Five sections are given below on the geographical range, farm resources, game useages, intensification of game useages, and the intensification of marketing operations, all as characteristics of gamefarming in the Cape Province.

I.3.I. Geographical Range

The range was intended to indicate the geographical extent of significant levels of gamefarming activities. As with other parameters used in this study, CAE application statistics were used as the base data, the restrictions inherent in this information being as follows. Firstly all CAE holders are considered to use their game resource to approximately the same degree of intensity. Secondly all landowners are assumed to practise some form of gamefarming,apart from incidental uses, if they have applied at some stage for a CAE. (There are indications that, for reasons such as inadequate fencing standards for a particular species, some farmers may not make any attempt to apply for a CAE). Finally it may well be that several past CAE holders no longer make use of their game, and as such are erroneously considered gamefarmers.

Much of the following survey was based on the division of the Cape Province into its Divisional Council Areas (DCAs), as given in Fig. I. Also the Agricultural Census Report (Dept. Agriculture and Fisheries - I978) was used as the source of comparative and census data.

The statistics for each DCA were grouped into three categories as depicted in Fig. 2, and described below:

- Low density areas. DCAs with between I and 5% of the land-owners having applied for CAEs. These include:

  Namaqualand - Gordonia - Stellaland - Kareeberg
  Nuwe Roggeveld - Langeberg - Dias - Stormberg - Drakensberg

- Moderate density areas. DCAs with between 5 and 30% CAE applications, including;

  Kenhardt - Kuruman - Vaalrivier - Hay - Koup
  Winterhoek - Smaldeel - Midlands - Grootrivier

- High density areas. DCAs with more than 30% CAE applications, including;

  Prieska - Bo-karoo - Sentrale Karoo - Kamdeboo

The remaining DCAs, left blank on the map, showed fewer than I% CAE applications, and so were not considered for further study. Not suprisingly only five of the 400-odd questionnaire returns were from these areas.

The percentage returns of questionnaires from the DCAs were used to indicate either inadequate sampling methods, or disinterest on the part of the farmer, both of these leading to low return rates and hence unrepresentable data for the relevant DCAs. Fig. 3 indicates those DCAs whose percentage returns differed markedly from the modal range of 20 to 30%. To comment on these, the low return rates, coupled with low numbers of original CAE applications, gave rise to unrepresentable data for Langeberg, Namaqualand, and Nuwe Roggeveld. Kenhardt (three returns) and Drakensberg (four returns) were on the margin of reliability, and were included with reserve being held on the quality of any extrapolated findings. Winterhoek DCA showed below average return rates, which was probably due to the pilot run being held in this area prior to the final questionnaire. This probably makes the Winterhoek data somewhat biased, but in what way the author could not determine.

FIGURE 1 : THE CAPE DIVISIONAL COUNCIL AREAS

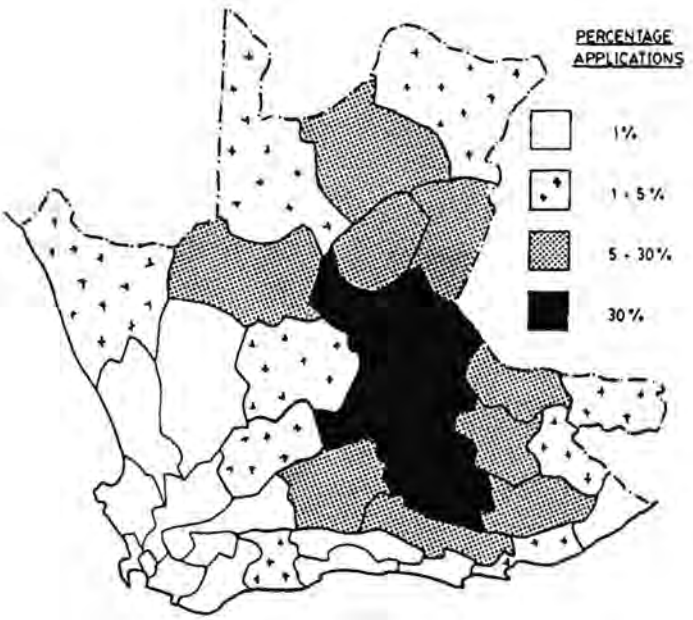

FIGURE 2 THE PERCENTAGE OF FARMERS HAVING APPLIED FOR CERTIFICATES OF ADEQUATE ENCLOSURE

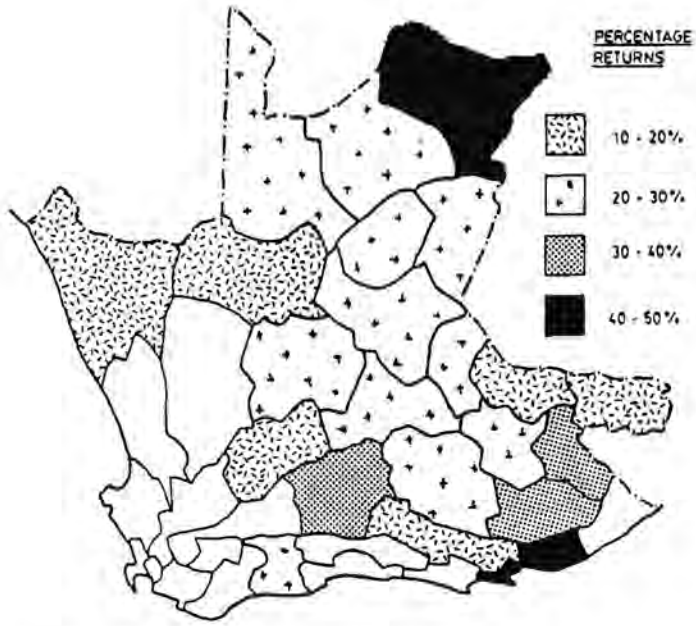

FIGURE 3: PERCENTAGE RETURNS OF QUESTIONNAIRE

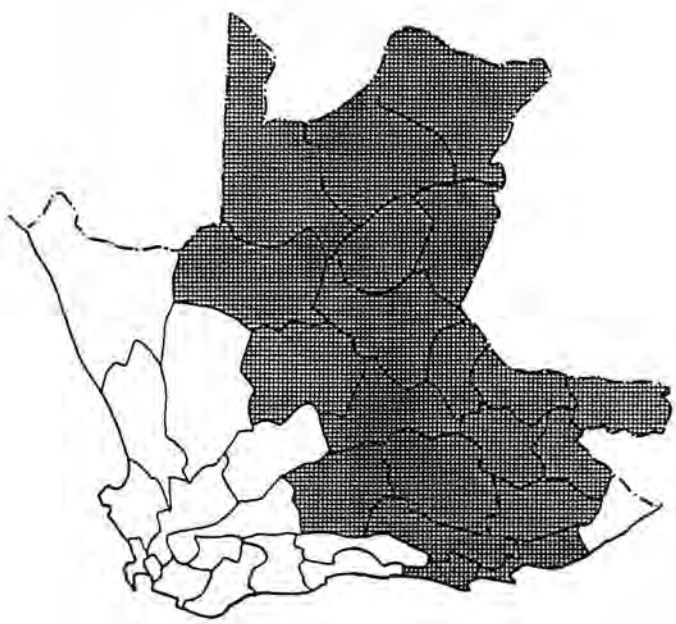

FIGURE 4: MAP OF THE SURVEY AREA (SHADED)

Thus , apart from further restricting the study area, the major emphasis drawn from the above patterns is the tenuous reliability of data from Kenhardt and Drakensberg, and the very favourable response rates gained from Stellaland and Dias.

As an addendum to the above patterns it is noted that 25% of the questionnaires failed to reach the addressees and were returned-to-sender. The return rates given above have taken this into account. Those DCAs having a sufficient data base for further analysis are shown in Fig. 4 and these form the study area which will be the subject for the remainder of this survey.

I.3.2. Farm Resources

Within the study area, registered game farmers constitute about 10% of the farming population and own about 26% of private land. With Duiker, Steenbok and Grysbok excluded, most farmers (70%) hold no more than three species of game (Fig. 5). The five most commonly held species are Springbok (87%), Blesbok (36%), Kudu (28%), Gemsbok (26%) and Mountain Reedbuck (24%). The numbers of animals per farm averaged 271 head on an average farm area of 7 158 hectares.

In looking at the pattern of these parameters across the study area, the central Karoo region has below average number of species per farmer (Fig. 6). By contrast there are high species density areas in the Eastern Cape, the Northern Cape and the Northwestern Cape DCA of Kenhardt. These higher species density areas tend to have lower levels of statistical variation, indicating the consistency of their patterns.

Figs. 7 and 8 show, respectively, patterns of species occurence on farms (irrespective of their numbers), and species dominance on the farm (by virtue of their numbers). A number of conclusions were drawn from these two patterns and the author's experiences in interviewing gamefarmers. The overall dominance of springbok can be attributed to its long-standing distribution on many farms. This has led to their acceptance, use, and often appreciation by the farmer, and a favourable status from which the species has been able to multiply by virtue of its hardiness and reproductive potential. The blesbok is widely distributed, but its dietry preference for grass (a scarce commodity in much of the Cape) means its numbers are frequently restricted. In contrast the kudu has a more restricted yet expanding range. Its ability to jump most fences and so select optimum habitats according to circumstance has led to a dramatic increase in its range and numbers over the past fifeteen to twenty years (pers. comm. with various farmers and DNEC staff). Mountain reedbuck have likewise relied on their ability to avoid fencing restrictions and so to adapt to farm conditions. Gemsbok distribution patterns resemble

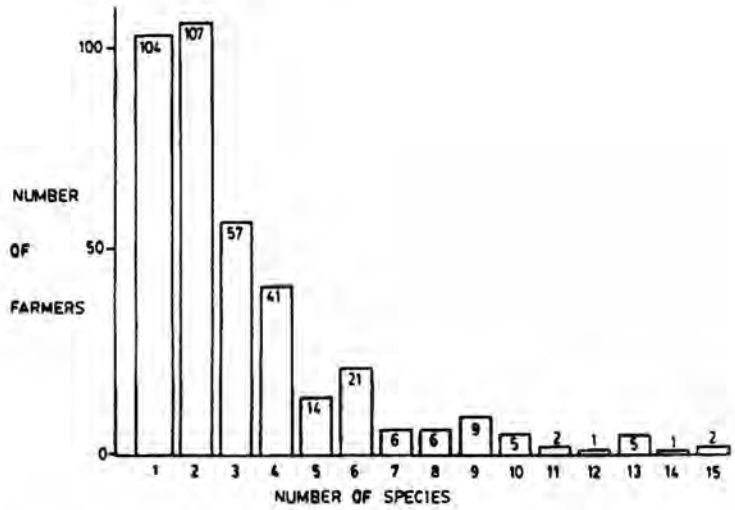

FIGURE 5: DISTRIBUTION OF SPECIES NUMBERS PER FARM

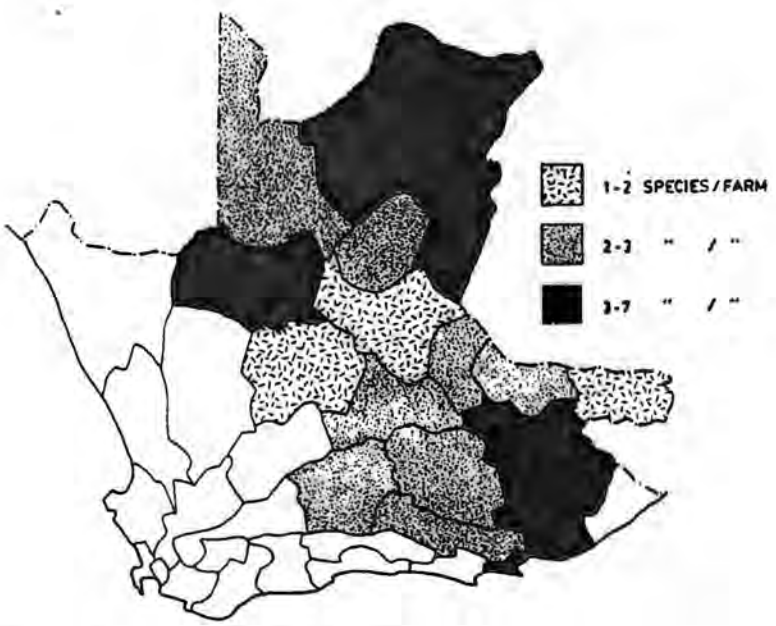

FIGURE 6: SPECIES DENSITIES PER FARM

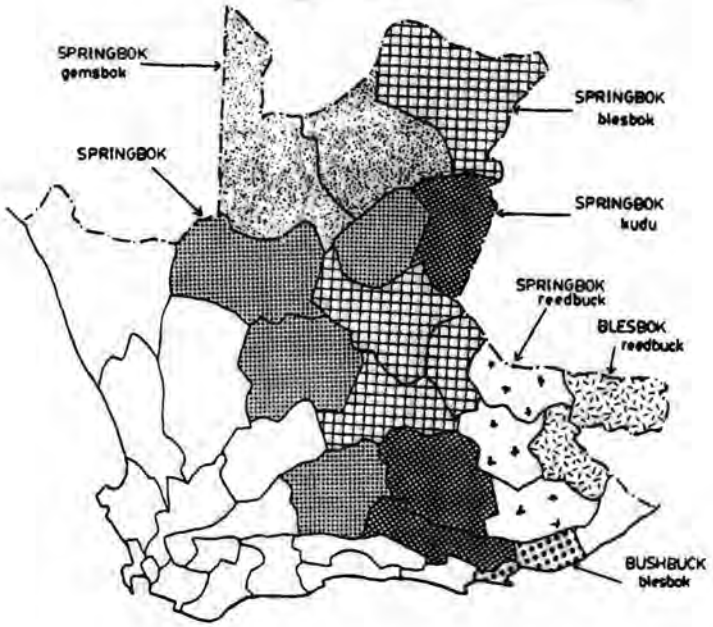

FIGURE 7: SPECIES DISTRIBUTION - MOST FREQUENTLY OCCURING SPECIES

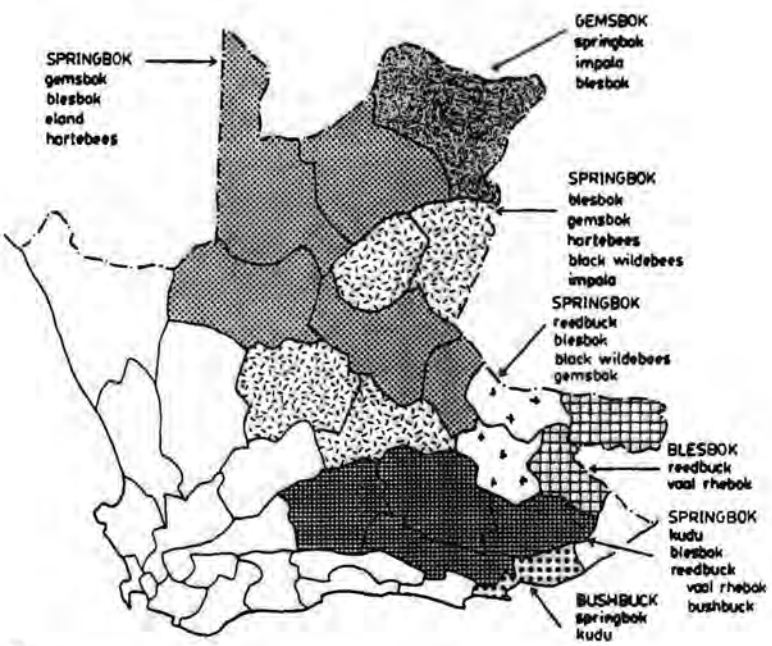

FIGURE 8: SPECIES DISTRIBUTION - MOST FREQUENTLY DOMINANT SPECIES

those of blesbok in that, as a 'glamour' species, it is widespread through intensive translocation efforts, often to unsuitable habitats. Thus their numbers appear to be restricted due to sub-optimum conditions on the farm.

This observation of stocking species in suboptimum conditions will assume greater significance where the farmer, in desiring a fuller selection of game species, stocks animals of uncertain adaptability into habitats which are insufficient, either inherently or due to management restrictions such as undersized paddocks, or overstocked grazing areas.

The density of game animals per I 000 hectares (Fig. 9) shows a clear east-west decline in stocking rates. This appears to be determined jointly by increasing aridity and by the decreasing popularity/frequency of gamefarming on this gradient. Neither of the two explanations suffices on their own. The total number of head held by the respondents to the questionnaire was I03 783 (excluding duiker, steenbok and grysbok). If extrapolated to all past and present CAE holders, the total head count comes to just over 430 000. This is naturally dependent on the quality of the respondents replies, and the justification of such an extrapolation.

The species dominance index reflects the extent to which the total game population on the farm is dominated by a minority of the species present. In examining the patterns of these dominance indices (Fig. I0) a broad pattern of similarity with that of species density (Fig. 6) can be seen. This was to be expected as the number of species was a factor in the calculation of the dominance index. A point of detail is that the Eastern Cape region shows a greater species diversity than the Northern Cape regions. Also, those regions with higher diversities have higher levels of variation, due to a minority of farmers in those areas having exceptionally low dominance indices, so lowering the mean for the DCA but also raising the variance of this parameter.

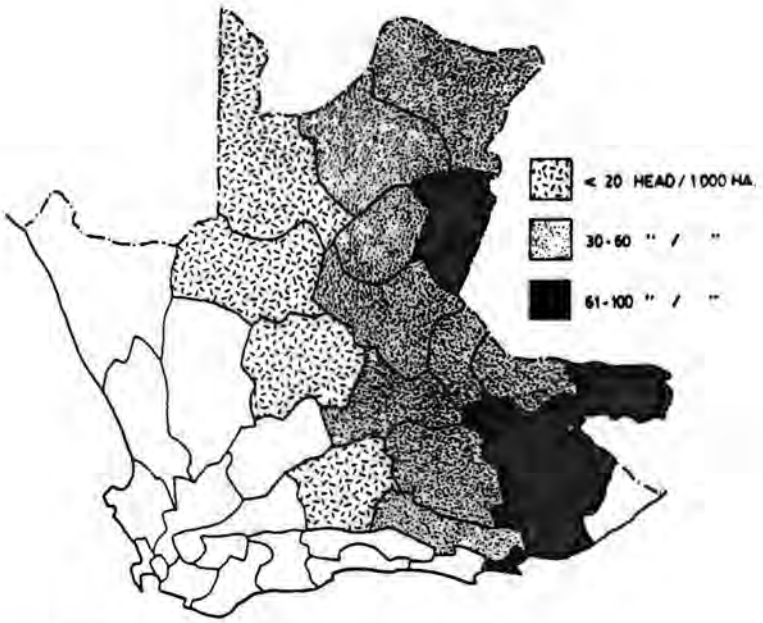

FIGURE 9: DENSITIES OF GAME PER 1000 HECTARES

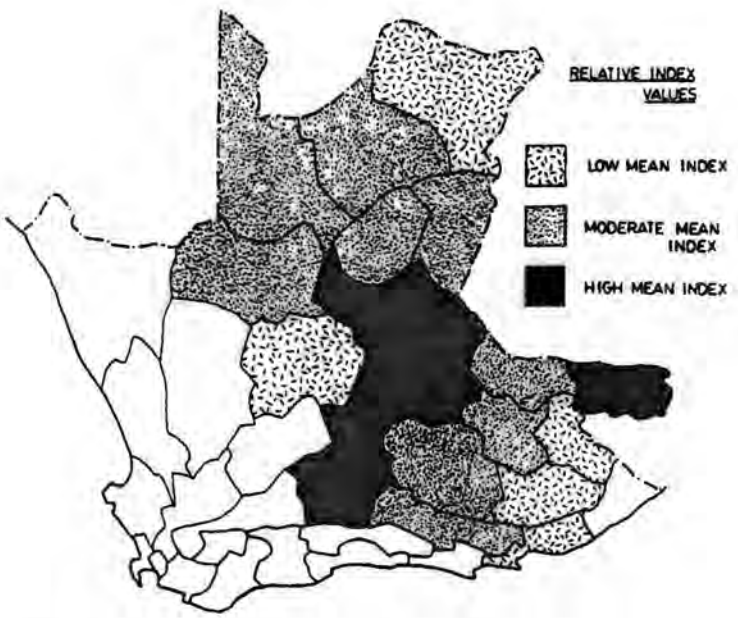

FIGURE 10: DISTRIBUTION OF DOMINANCE INDICES

I.3.3. Game Useages

The more informal game useages of Sport and Aesthetics are the two dominant methods of wildlife utilisation in the Cape. Of the more formal useages, cropping is undertaken 65% , live sale 33% and safari 24% as frequently as sport. The differing levels of intensification, or formalisation, within the useages of cropping, safari and livesale have led to a variety of marketing situations from local on-farm bartering, to co-operative and commercial export of merchandise.

The measurement of game useage was derived from the questionnaire table where the respondent indicated to which of the five uses each of his game species was put. The number of indications per useage were then summed and assigned to the appropriate total in a frequency table for that useage. Such tables were compiled for the gamefarm profiles of each DCA and overall for the Province (see page I4 - '8) GAME USES').

Two ratios were used to analyse patterns of useage. The Extent ratio measured the proportion of farmers who made any use of any game species for that particular useage. That is, the total non-zero responses as a decimal fraction of the total number of responses. The Intensity ratio expanded on this by stating the proportion of all available species that were used in a particular way. That is, the total number of indications as a decimal fraction of the maximum number of indications possible, considering the number of game species theoretically available for such use.

The use of these two ratios can be illustrated as follows. If all the farmers in the study area use one out of three species in a particular way, then the extent ratio will be I.0 (all farmers make some use of game in that way) and the intensity ratio will be 0.33 (one third of all available species are made use of). Therefore such values would indicate the widespread but lower key nature of that particular useage. By contrast, where the intensity ratio exceeds the extent ratio, the indication is that a few farmers with above average numbers of species are

using almost all of these, whereas the majority of farmers in that area make no such use of any species. Thus the useage is not widespread, but where operative it is intensively so.

For general descriptive as opposed to analytic purposes, a single ratio was considered more useful. This ratio, the Game useage ratio, was derived by multiplying the relevant extent and intensity ratios, and taking the square root of the product.

Prior to the description given below, it is noted that the measures of useage employed here are simplistic. They do not take into account such factors as how many head within each species are used, how frequently game is made use of in that way, or even directly how much interest the respondent has in that game useage. Also, it may be misleading to say that a particular useage is more prevalent merely because more species are involved in that useage. As a preliminary measure, however, the author has no serious misgivings in its validity as it is used below.

Fig. II illustrates the game useage, extent and intensity ratios for the Province. The co-dominant nature of sport and aesthetics is clear, with cropping, livesale and safari following respectively.

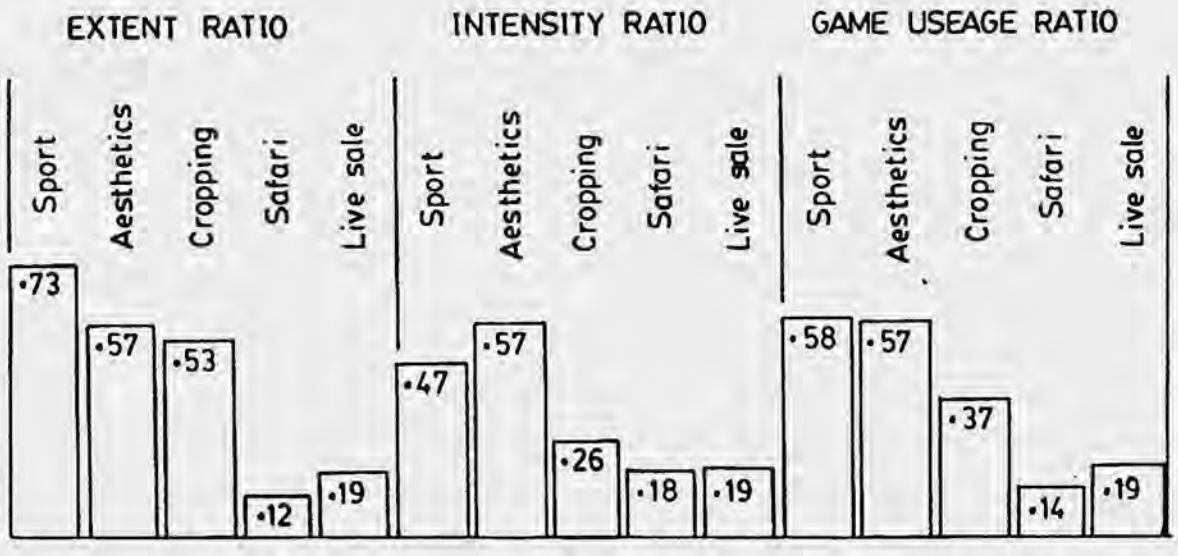

Figure II. BAR CHARTS OF PROVINCIAL UTILISATION RATIOS

Aesthetics is consistent in its extent and intensity as opposed to sport which is more widespread but for which fewer species are used. Whether the species used in these ways are different is not known, but this is possible as the farmer who imports a few animals of a certain speoies, for aesthetic or commercial reasons, would naturally consider it wasteful to hunt them for casual recreational purposes. The author, in touring various farms, noted a high level of awareness as to games' value. Thus even common species were not shot except for meat or for management reasons, and only then might these opportunities be taken for recreational sport hunting. Certainly the traditional mass 'shoots' of the past are not nearly as frequent today.

The extent and intensity ratios for the DCAs, from which the following patterns were drawn, are presented in Appendix 2.

In looking at the corresponding patterns of above average sport and aesthetic useages across the study area (Figs. I2 and I3), the overlap between the two is extensive, exoept for DCAs where one or the other useage is particularly prevalent. Their corresponding ratio values and distribution patterns do not necessarily show that sport and aesthetics are co-requisites, but neither are there any grounds for considering them to be mutually exclusive.

Cropping is the dominant commercial, or formal, game useage. Its ratio values show that, although 53% of the respondent farmers crop game, only 26% of the available species are so used. The distribution of cropping ratio values shown in Fig. I4 show that the central Karoo region dominates this game useage. The low species densities in these areas explains the much lower intensity over extent ratios. On any farm with, say, even four or five species it is normal for only one or two of these to be the regular subjects of cropping programmes.

Safari hunting shows the lowest useage value of all. In examining its ratio values it is unique in that, despite its restricted distribution, its intensity of species utilisation is the greater. Its restricted distribution as a game useage is shown in Fig. I5. Its intensity ratio is explained by the fact

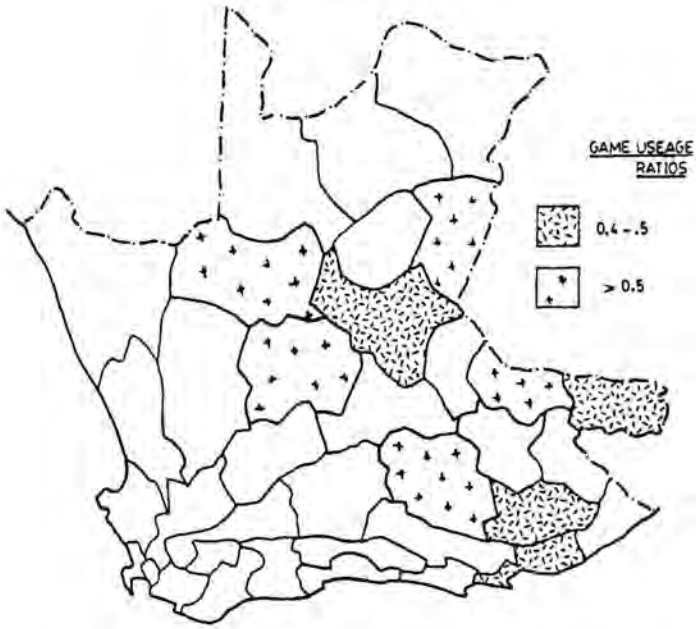

FIGURE 12 PATTERNS OF SPORT USEAGE

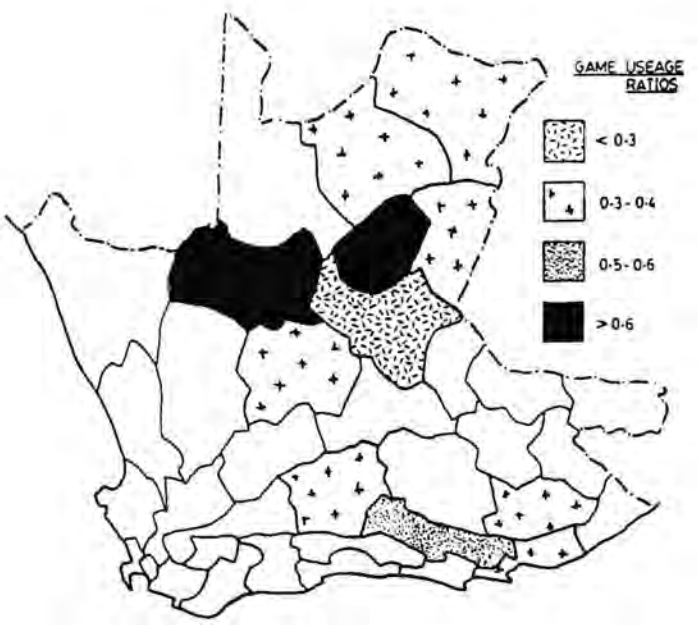

FIGURE 13 PATTERNS OF AESTHETIC USEAGE

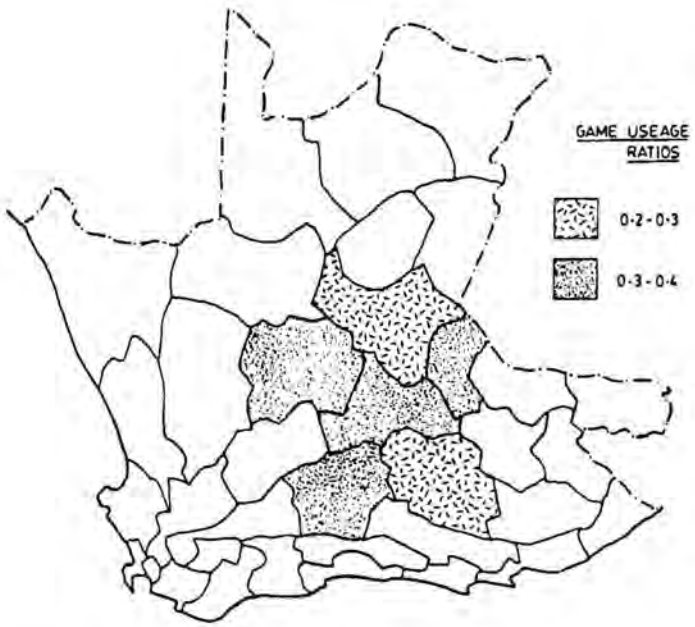

FIGURE 14. PATTERNS OF CROPPING USEAGE

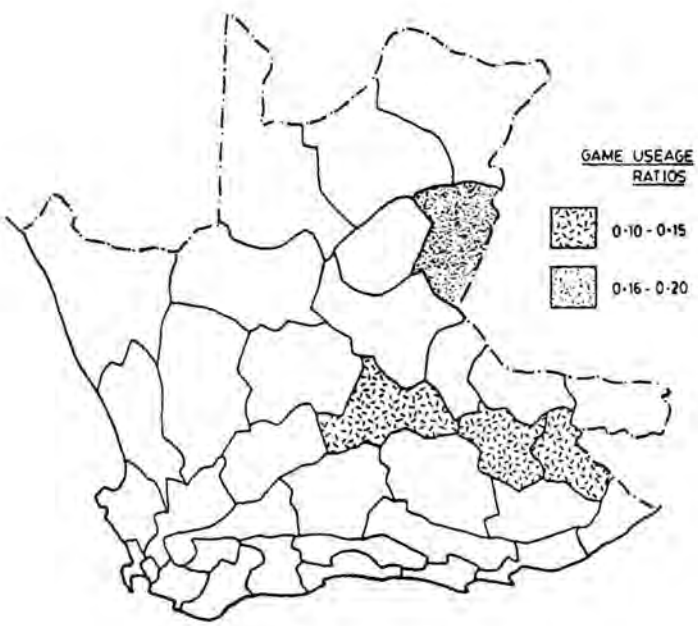

FIGURE 15 PATTERNS OF SAFARI USEAGE

that only a few farmers recorded their safari useage of game, but that they use their larger variety of species specifically and intensively to this end.

Live sale shows a somewhat greater useage value and equal extent and intensity ratios. This consistency is a mask over a variable situation illustrated in Fig. I6. Kuruman DCA, at the top of the crescent of DCAs in the Northern Cape, is the dominant member of this group. Its intensity of species utilisation is also higher than the remaining DCAs. Here it appears that a few farmers emphasize the capture and sale of animals from various species , whereas the majority of farmers concentrate on one or two species, presumably those more amenable to live capture and sale.

Fig. I7 provides a map of what are termed 'Game useage regions'. The names of the regions indicate firstly their locale within the Cape Province, and secondly their most characteristic (usually dominant) game useage. It is, in effect, a summary of the above discussions on each game useage. DCAs with similar useage ratio characteristics were broadly grouped together to give this overall pattern of the different priorities of game utilisation within the Cape.

I.3.4. Intensification of Game Useages

Within the useages of cropping, safari and livesale there are various degrees of intensification,or formalisation. At the less formal end of the continuum, the entire procedure is conducted by the farmer for on-farm purposes. At the opposite end of the spectrum, the process is largely commercial in approach with outside services and marketing arrangements assuming a more important role.

The effect of such intensification on the management of game is marked. Certainly many new problems can arise from the need to improve management efforts such as population census, more efficient and exhaustive utilisation of existing game populations and so on. Thus it is of interest to note the degree and distribution of intensification in the various game useages across the Cape Province.

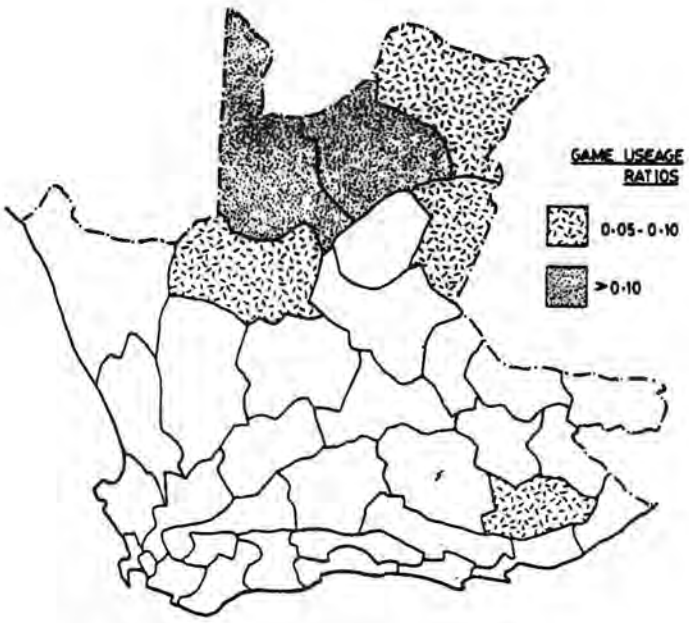

FIGURE 16: PATTERNS OF LIVE SALE USEAGE

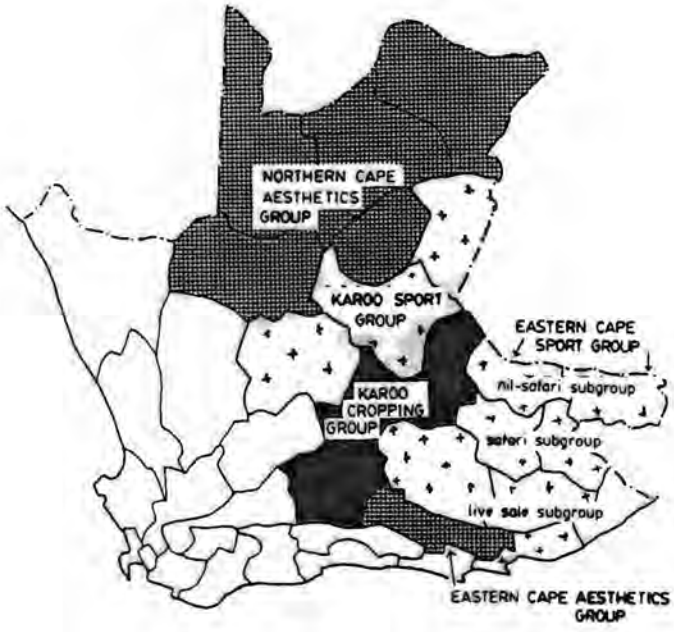

FIGURE 17: GAME USEAGE REGIONS

Four parameters were used to measure intensification; period of introduction onto the farm of the first imported game species, the contribution game utilisation makes to the farm income, a rating of the proportion of farm land used by game, and the history of CAE applications. Within the first three parameters, the extent of the variation within each DCA is a measure of the strength and consistency of the trend implied by their mean or mode. Where this variation is marked, the comparison of DCAs by use of the mean or mode is of limited validity.

The period of introduction of the first game species onto the farm is presented in Fig. I8 as the percentage of first introductions occuring after I960. Given the high level of variation which detracts from a detailed description, the general theme is that those DCAs with current interests in livesale are those in which the majority imported their first game species after I960. The central Karoo area, extending into parts of the Eastern Cape, have either always had game on the farm or introduced their first species prior to I960. In these cases springbok, kudu and mountain reedbuck are usually the species referred to.

For income contributions by game, only I3% of the respondents indicated that game utilisation made up more than I0% of the total farm income. The pattern of income contributions is given in Fig. I9. The pattern of higher income contribtions appear to correlate with the occurence either of cropping as a dominant useage, or of livesale or safari as significant secondary useages. Bo-karoo and Smaldeel are exceptions, respectively, to these two patterns for unknown reasons.

The game area rating was derived as a follow-up parameter to that of income contribution. This represents the extent of land apportioned, i.e. invested, in forage for game species. The lower the rating, the less land is given over to game. Only I% of the respondents indicated that the majority of land was given over to game. 34% indicated approximately equal apportionment to game and other land uses. The pattern of high game area ratings shown in Fig. 20 appears to correlate with those DCAs having higher levels of either livesale or safari useages. Midlands is the only exception to this. Otherwise those areas with aesthetics, sport

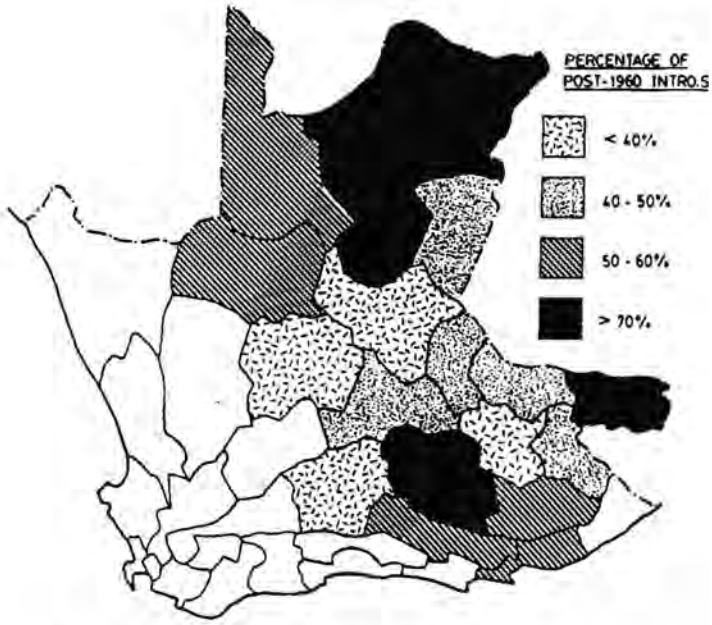

FIGURE 18: PERIOD OF FIRST SPECIES INTRODUCTION

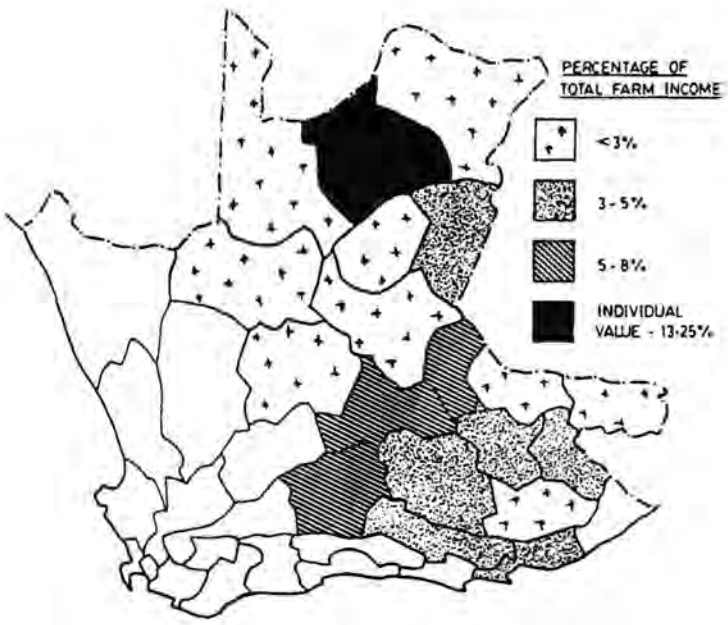

FIGURE 19: INCOME CONTRIBUTED BY GAME

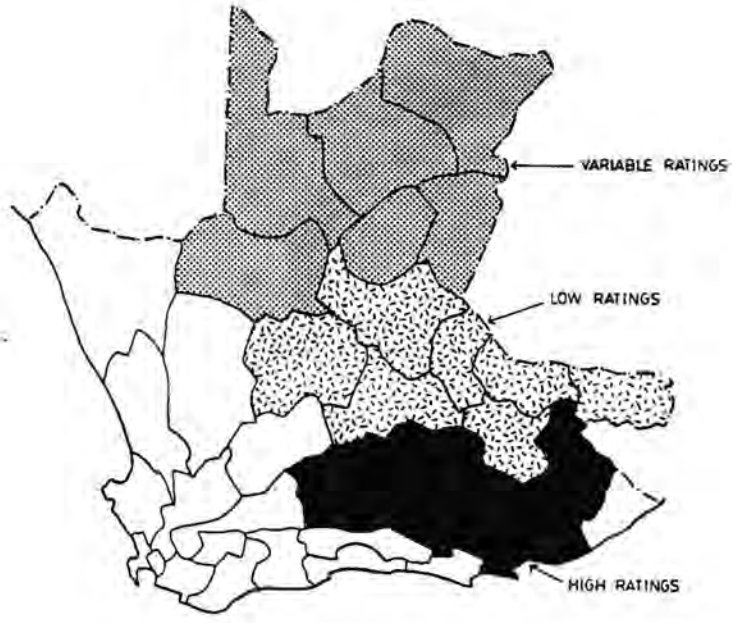

FIGURE 20: PATTERNS OF GAME AREA RATINGS

or cropping emphases and lower safari and livesale indicators all have lower game area ratings. Winterhoek is an unexplained exception to this statement.

It must be borne in mind that 90% of farms run at least some of their game and livestock together, and that species such as kudu are rarely confined by fences. Thus the farm area given over to game is difficult to state categorically but was instead estimated as an overall proportion according to the respondents' replies.

The history of CAE applications helps illustrate the booms and recessions that gamefarming, and especially cropping for venison have experienced over the past ten years. The correlation is made possible by the observation that many gamefarmers are opportunistic in that they do not apply for a CAE until they have a definite proposal from a cropping company (the latter, in turn, being dependent on the state of the international venison market). In examining Fig. 21, which shows the trends in CAE applications since their inception in 1976, there is a distinct trough in 1979. This is despite the fact that the large number of CAEs issued in 1976 would have fallen due for renewal in 1979, their being valid for only three years. The reason for the dramatic decline in applications for 1979 appears to have been a drop in demand for export venison in 1978, continuing into 1979, largely due to severe competition from New Zealand Roedeer venison (J.Westoott - pers. comm.). By examining the history of CAE applications for each DCA, and particularly their responses to the 1979 depression of the venison market, and consequently opportunistic cropping, it was hoped that distinctive patterns of applications would provide some clues as to gamefarming motivation. The DCAs were grouped together according to the nature of their trends in applications since 1976. The resulting distribution of group trends, or profiles are illustrated in Fig. 22.

Group one patterns, where CAE applications fail to regain pre-1979 depression levels, are strongest in the central Karoo areas, especially in Prieska DCA. The indication is of a high past but now reduced level of cropping useage. Cropping, of a less opportunistic nature, maintains its dominance in the three south-central Karoo members, but not so with Prieska and the Northern

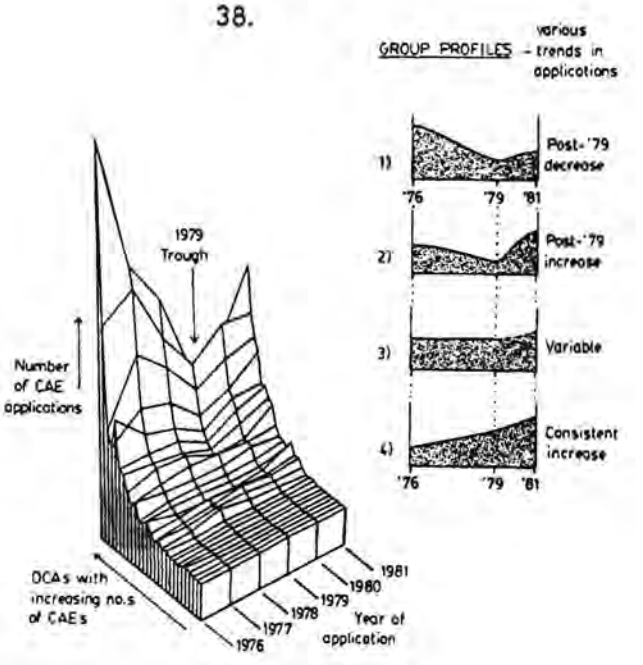

FIGURE 21: TRENDS IN APPLICATIONS FOR CERTIFICATES OF ADEQUATE ENCLOSURE

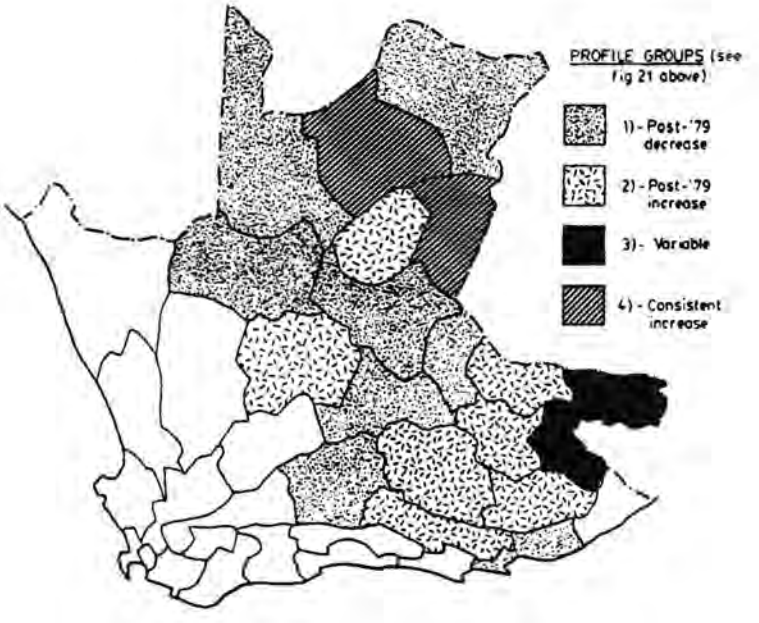

FIGURE 22: DISTRIBUTION OF CAE PROFILE GROUPS

Cape members of Group one. The latter DCAs were the subject of cropping exercises in the past, but are not able to provide the concentrations of springbok currently needed for commercial cropping.

Those members of Group two, where CAE applications have regained their past levels, are dominant in the Eastern Cape. Here diversification into other useages of safari and live sale have apparently helped in the recovery. Also the aesthetics and sport motivations, in being removed from commercial considerations, have provided a stable basis for the maintainence of gamefarming efforts.

Vaalrivier and Kuruman DCAs (Group four) showed no reaction to the 1979 depression, and in fact have been consistently increasing their numbers of CAE applications. That their primary useages of sport and aesthetics have helped seems certain, but also, as with Group two, their emphasis on safari and live sale has proved secure against opportunistic cropping trends.

Group three, also having sport, safari and live sale, have shown no dramatic decrease in CAE numbers to date, yet their patterns of application are highly variable and apparently reliant more on local motives than national or provincial trends.

Generally it seems that the original flood of CAE applications in 1976 contained a fair proportion of opportunistic gamefarmers. These have apparently been discouraged by the fluctuations in market conditions which demanded persistence from those who remained. Aesthetic and sports motivations have apparently played a major role here, and safari and live sale have both provided alternative commercial useages for those wishing to diversify their gamefarming activities.

I.3.5. Intensification of Marketing Operations

Joubert (1974) in his paper on game utilisation in South-West Africa indicates the need for economic success with gamefarming activities to ensure a lasting conservation policy on private land. Mentis (1978) includes economic criteria in the management decision on which species mixes and stocking rates

should be adopted - a process which, intuitively, largely concerns natural resource parameters such as carrying capacity which are to be utilised to the full. This is an indication of the importance and influence of economics, and ultimately market conditions, on management decisions.

This section concentrates on the marketing of venison and its by-products with a later comment on the safari and live sale situation. The observations presented here were made generally during the management interviews with farmers, and specifically from interviews with representatives of the two cropping companies operative in the Cape at the time.

Local Cropping

This activity , aimed at providing venison and/or biltong for local consumption, grades into sport hunting at the one end of the spectrum and commercial cropping at the other.

At the sport hunting interface the past practise of 'shoots' where large numbers of animals were shot in a day and then taken away by the participants for biltong is now seldom found. Today farmers realise the true value of their animals. One component in this change in valuation is that the game animal has come to be seen as a source of ration meat for farm labourers; prime venison cuts are also valued for use at the farmer's table (much of the 'gamey taste' myth having been discredited); and the value of game for biltong and for social 'bartering' is now appreciated. Such use of game obviates the excessive use of domestic stock for such purposes.

Within certain areas local butchers play an active rôle and have approached farmers with proposals for cropping on a limited scale for cash. In the Graaff Reinet and Jansenville areas in the Eastern Cape, kudu are hunted for this purpose by organised teams of four or five hunters. The author estimates that a minimum of 900 animals a year are marketed in this fashion. This form of local marketing, with informal contracts, has developed into an organised and more formal system in the Uitenhage area of the Eastern Cape. Again, kudu are the target animals. A group of farmers have organised themselves into the Uitenhage Bushveld Game

Management Branch, under the ECGMA. They have a committee and a constitution aimed at furthering the local farmer-controlled marketing of their game. A number of preliminary contracts provided for the sustained supply of carcasses to a Port Elizabeth firm which undertook the processing and marketing. A constant supply was ensured by a cropping rotation between member farms according to an agreed schedule. Cropping was done by the farmer himself, with price incentives for efficient shooting and slaughtering. Subsequently, in a study on the feasibility of a self-sustained marketing arrangement, the branch came to the conclusion that a minimum of about L 500 carcasses per annum were needed to justify the enterprise. This would have necessitated the expansion of their membership to achieve the quota. (The above information was kindly supplied by Mr. A. Rudman during visits to his farm and in subsequent correspondence.)

From this it can be seen that the amount of organisation and administrative work that goes into such an attempt tends to become excessive for all but the most determined and organised farmers. Thus commercial cropping companies have developed to handle, for a price, the larger scale cropping, processing and marketing of game products.

Commercial Cropping

The following discussion is based on conversations with Mr. J. Westcott of SA Wild Ltd. and Mr. P. Neethling of KOVISCO Biltong Ltd. These companies' areas of more intensive operation in the Cape incorporate the central Karoo regions with concentrations in the Beaufort West, De Aar and Britstown areas. The operation is usually large scale, intensive helicopter cropping, with open country and reasonable concentrations of animals being preferred for ease of operations. The slaughtering, transport and processing of the carcasses are closely monitored to ensure observance of health regulations. The majority of fresh venison is exported, with limited local distribution of biltong and frozen venison. Goulach, ration meat, and supply of offal to pet food manufacturers form the balance of the

meat marketing, whilst curio manufacture and skin and hide sales are secondary industries.

Prior to the 1975/76 season, most large scale cropping was done on a regional basis, each region having its own cold room facilities from where frozen carcasses were railed and then exported to Austria, France and Switzerland. In late 1974 the export market collapsed, but improved again later in 1975. By 1976 KOVISCO had initiated helicopter cropping which was well suited to deal with the 1977 exports to West Germany, a market considerably larger than was previously catered for but which also required adherence to stringent health regulations. The current situation demands cropping teams using a helicopter, two or three small trucks and a large cool truck visiting pre-contracted farms over the five to six month winter shooting season. Under strictly controlled conditions, the animals are shot from and transported by helicopter to slaughter sites. Here the throat is cut within three to seven minutes of the animal being shot, gutted in ten to twelve minutes, beheaded and the lower limbs removed before being stamped by a veterinary stock inspector as it is loaded into the cool truck. The cooled carcasses must be at the factory within 72 hours, at which point unloading into coldrooms or direct onto the processing line is supervised by a veterinary health inspector. KOVISCO 'loses' about 10% of its potential export carcasses by not meeting this deadline. These strict time-related procedures lead to excessive strain on men and equipment, making an already expensive cropping operation even more so.

At the factory, venison processing is similar to that of a normal abatoir, with skinning and jointing of the carcasses. On being packed, the joints are frozen and transported to containerisation depots in Durban and Capetown which are licensed to deal with export meat. The short cropping season and limited cold storage space (KOVISCO - 5% of annual harvest) mean that there is intensive activity for half the year, and very much quieter periods for the remainder. With the capital development, labour training and marketing committments involved, this pattern is a difficult one for a commercial enterprise to accomodate.

The export markets are Austria, France, Switzerland and West Germany, the latter taking 80% of the production. (At the time of writing only West Germany has bought venison for the 1982 season.)

Competition for the goulash (meat cubes) market from Kangaroo cropping in Australia has caused a decline in this market since 1980. This has particularly affected impala, blesbok, and the less favoured meats of gemsbok, kudu and eland, for which there is little demand. Only springbok has shown some degree of resistance to kangaroo and New Zealand roedeer competition.

Compared to the export market local sales of biltong, dried wors and, more limited, venison account for a minor share of the commercial production (about 13% of KOVISCO's operation). Nevertheless it is known that there are substantial sales of biltong and dried wors from farms and local butcheries for which figures are not availiable. The resistance to venison consumption by the South African urban market is severe partially beoause of the poor quality of carcasses and meat presentation in the past. The resulting bad image coupled with 'hearsay' and ignorance about venison and its quality as a meat makes large-scale, national marketing options marginal. At the First National Game Congress, Steenkamp (1982) stated that from a random telephone survey of 100 households, only one respondent knew anything about preparing venison, and where to get it. A number of interviewees did not know what venison was! A contrast is provided by the response to ration meat packs which are extremely popular with the poorer sectors of the South African population. However the profitability of this market is insufficient to support the commercial cropping operation on its own.

Skins and hides together with horns and feet provide materials for the curio trade. The facial masks are sold to factories manufacturing gelatin.

Approximate figures for export venison cropping in the Cape show that 52 000 springbok and 3 000 mountain reedbuck were cropped in 1982. Blesbok and impala were cropped in the other three Provinces. The Cape figures of 55 000 carcasses compares with

37 000 for the remaining Provinces. Alltold, the Republic's export tonnage handled by SA Wild and KOVISCO came to approximately I I70 tons, and was worth about 5.5 million rand. In addition KOVISCO marketed I00 tons as biltong and dried wors, and two tons as frozen venison. By comparison to the approximately I00 000 game carcasses formally marketed in I982, Vleissentraal abatoirs handled 740 000 cattle and 3 million smallstock in I980, a total of 964 000 tons of red meat (Nicholas - I982).

The major problems facing the commercial venison companies are escalating costs, due in part to strict health regulations (J. Westcott - pers. comm.), and the need for expanding or stable contacts in the overseas market. Escalating costs relative to prices are illustrated in the following table (Westcott - pers. comm.)

Table 3: CHANGES IN COSTS AND PRICES IN COMMERCIAL CROPPING (I976 - I982)

	I976	I982	%increase
Price paid to farmer per kg.	R I.30	R 2.30	77%
Shooting costs	R 0.35	R I.05	200%
Selling price	R 2.50	R 3.90	56%

South African venison contributes a minor and expendable proportion of West Germany's imports (RSA/Namibia combined = I.5% from Steenkamp - I982) and thus is in a vulnerable position. Springbok is marketed overseas as roedeer, and this makes its promotion in its own right difficult. In addition the South African market is resistant and will require a good deal of promotional work. The conclusion is that the immediate future of commercial game cropping is uncertain, but that eventually the position of venison should stabilise, with transference of emphasis from the export to the national market.

Safari and Live sale

Data were not purposefully collected for these game useages during the study, and so only a few isolated comments will be passed.

Safari contractors, be they farmers or organised firms, all experience the difficulty of attracting high paying clients. A number of unethical performances on the part of a minority of unscrupulous contractors, and a shrinking clientele due to economic restrictions are the two most commonly quoted reasons for this problem. Solutions have been proposed in terms of either enforcing uniform minimum standards for safaris (and codes of ethics on safari operators), or diversification into the lower-paying but more easily satisfied and stable local hunting market. Indeed a number of farmers maintain that the majority of South African farms provide neither sources nor surroundings for trophy-quality hunting demanded by overseas clients. Considering the requirement for diversity of habitat and target species, the average farm in the Cape cannot realistically supply trophies and atmosphere on a sustained basis. Thus the more successful enterprises tend to extend their safari radius by travelling to associate farms in different parts of the country, and 'renting' game from neighbouring properties. As with cropping, the more commercially intensive the scheme, the more complex and administratively expensive are the ancillary requirements.

Live sale of game for profit suffers from being a skilled, complex, risky and therefore expensive business. There are a number of private concerns in this field, but a good proportion of the live sale material is provided by DNEC and Natal Parks, Game and Fish Preservation Board. Their pre-set prices, being below commercial ones, tends to upset the auction bidding system common at private sales (preventing high prices soaring even further?). At present losses in terms of equipment, animal mortalities and the currently restricted availability of animals for sale all affect the price per head of game. High prices mean that, for most species, only a breeding nucleus can be bought. Thus it takes a number of years to breed-up a useable population, and makes the re-establish-

ment of game following drought mortality a long term prospect. There seems little alternative to large-scale organised efforts, with the possibility of subsidisation from the relevant authorities (in the form of equipment loans and use of expertise) if sale of live game is to be commercially viable.

I.4. CONCLUSIONS

A survey of gamefarms in the Cape Province shows that the necessary animal resources are widely established. Aesthetic appreciation and sport hunting are the most common means of using game. Cropping is the most significant commercial useage whilst live sale and safari are only subsidiary commercial useages for most farmers (although a few of them have concentrated on these useages).

Cropping, and especially safari and live sale are, however, still in their commercial infancy. Cropping and safari rely heavily on the lucrative but unstable overseas market to the exclusion of potentially large, albeit resistant South African markets. Although small scale and more stable cropping activities are still widespread at the local level, there is a need for intermediate regional or national scales of marketing to dampen the recessions inherent in the overseas markets. Safari hunting likewise needs to diversify away from the international market. Live sale suffers from not having any such 'stepping stones' to enable gradual and stable commercial intensification. This feature of live sale is particularly unfortunate considering its role as the supplier of breeding stock for the gamefarming industry. To date the erratic availability of animals for sale, and their high prices, has proved one of the major hinderences to the prospective gamefarmer.

The dominant game useages of sport and aesthetics have, and still do, provide the primary stimulation and stabilising influence in gamefarming. In this sense gamefarming in the Cape Province is predominantly informal by nature and characterised more by individual farmer's motivations than by commercial concerns.

2. RESTRICTIONS ON GAME UTILISATION

2.I. INTRODUCTION

The ability of wild ungulates to provide a substantial protein supply and, by inference, a competitive land use option for the farmer is the basis for advocating the more widespread adoption and utilisation of wildlife on the farm. The first such statement widely publicised was that by Dasmann and Mossman (I96I) following their experimental utilisation of wildlife on a ranch in Southern Rhodesia (Zimbabwe). Their argument was based on the long term co-evolution and co-adaptation of wild ungulates, the natural vegetation, diseases and parasites, and general bioclimatic conditions. This leads, intuitively, to the expectation that game populations should thrive more readily than domestic stock through their ability to feed on a wider range of vegetation more efficiently, to resist debilitation through disease and parasitism, and to accomodate themselves to the range of bioclimatic extremes under which they had evolved.

Since the inception of this argument of ecological co-adaptation between wild ungulates and their environment, the resulting expectations for wildlife productivity and profitability have met with considerable disappointment. A number of possible reasons for this have been presented in the literature, the first category of which are reassessments of the ecological co-adaptation concept. Field (I979) and Walker (I979) provide summaries in which they show that, although earlier claims for game's productive superiority over domestic stock were exaggerated, the current levels of game production still do not meet the revised estimates of its potential productivity. Other possible restrictions preventing the efficient utilisation of the wildlife resource will be detailed in section 2.4., but can be mentioned here briefly as; enquiries into the management techniques; economic viability; health restrictions; institutional practises; and management motives that effect the adoption of gamefarming.

Following the above pattern, the methods adopted in this Chapter for the fields of research and management were designed to enquire into the nature and range of reasons for the failure to

achieve optimal production from wildlife in the Cape. Research was perceived as the source of information on which management (the farming body) could base its decisions. An enquiry, beyond the description of the status quo given in section I.3.5, was planned for the economic and marketing aspects of gamefarming. Shortage of time prevented a systematic investigation of what is certainly a very important component of the wildlife industry in this study.

2.2. MANAGEMENT SURVEY

2.2.I. Methods

Two approaches were used in assessing the management situation. Firstly a series of interviews were held with a small number of farmers. And secondly, partially as a result of the above interviews the problem statement question within the questionnaire (described in detail in section I.2.I.) provided a wider sampling base for the study area.

Management interviews

The objectives behind the interviews were;

(a) to achieve a wide sampling basis in terms of both geographical distribution and a range of gamefarming activities.

(b) to select those farmers known for the efficient management of their game resources. (The reason for this biased selection was firstly to provide a good starting point in the author's exposure to gamefarming by avoiding uncertainty and confusion especially evident with less enthusiastic or experienced gamefarmers. Secondly, those individuals with experience in game management could be expected to have a greater awareness of general situations and issues in at least their immediate area.)

(c) to elicit from the interviewees, in as unbiased a manner as possible, their opinions on selected topics and yet still allow for the extrapolated or spontaneous discussion which would bring new topics to light. The latter point was particularly important considering the author's lack of experience or knowledge of the management aspects of game and orthodox farming.

(d) to spend at least two hours with the farmer whilst he was working on or touring the farm. This gave more opportunity for the discussion of specific management problems. In addition this approach allowed for a greater degree of appreciation of previous and subsequent discussion points.

The names and addresses of potential interviewees were gathered firstly by personal contact during a symposium held at Grahamstown in February, 1982, and secondly from recommendation by the DNEC.

One interview was conducted whilst the author attended the Grahamstown symposium, following which two trips were made to farms in the Eastern Cape, and the Central and Eastern Karoo regions. (A further trip to the Northern and Western Cape areas was planned but was not undertaken due to shortage of time and funds).

The first trip to the Eastern Cape and Central Karoo areas was made in early March, 1982. Two weeks before this letters were sent to prospective interviewees asking if a specific date would be convenient for the visit. One week after posting, the interviewees were contacted by telephone and arrangements confirmed. During this telephone contact the purpose and procedure of the study was further explained. The nine farmers approached in this way were all able to provide some opportunity for an interview.

A second trip, to the Kimberley area, was undertaken in late March. In this case attempts to organise visits by telephone were only partially successful, with two out of four farmers being able to oblige. The degree of pre-visit preparation for the interviewee was limited to a brief description given over the telephone, and followed up with a short note which was received by the farmers just prior to the author's arrival on their farms. The farm sites where interviews were conducted is given below in Fig. 23.

All the interviews were conducted on the basis of the framework given in Table 4. This is a list of those topics which the author originally perceived as being possible problem areas.

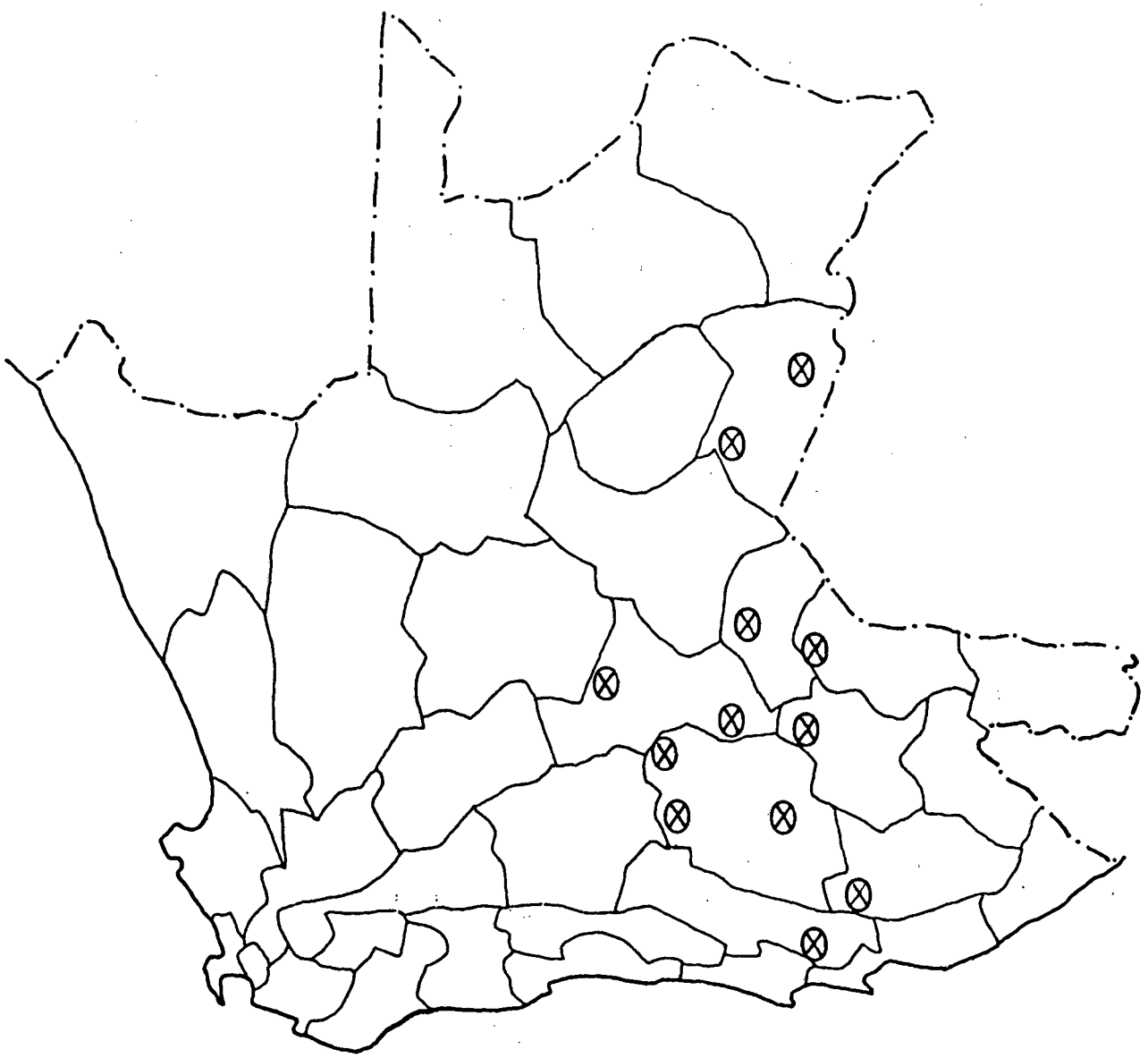

FIGURE 23: MANAGEMENT INTERVIEW SITES (⊗)

Table 4 : FRAMEWORK FOR MANAGEMENT INTERVIEWS

Management Issues:

A. Information

- Status of information base (its character and useability)
- Sources of practical information (local; research)
- Collation of local sources (to form common information base)

B. Logistics

- Economic role of game (its viability)
- Marketing and demand for game products
- Management techniques

Table 4 (cont.)

C. Administration

- Organisational structure on the farm (its suitability to gamefarming)
- Decision-making (ad hoc; systematic)
- Monitoring of resource basis (animal and vegetation)
- Active development of management techniques
- Co-ordination of gamefarming with other land uses.

D. Legislation/Formal requirements

- Veterinary regulations
- Other regulations and prohibitions
- Areas requiring legislation
- Degree of voluntary conformation with regulations

E. Human Aspects

- Attitudes and perceptions of farmers
- Adequacy of appropriate training programmes for managers
- Availability of skilled manpower and expertise.

On arrival at the farm, there were two possible procedures to be followed, depending on the situation.

Firstly, if the period of stay was to be less than two hours, then the image presented was one of a clipboard-wielding interviewer. Pleasantries were politely observed, with the interview following immediately. The proposed approach to the discussion was outlined, with an appeal being made to the farmer to state whatever responses and side-issues came to mind. Open-ended questions were used as introductions to topics for further discussion if the interviewee so chose. Where there was apparent lack of clarity in communicating the question, typical responses from other farmers were quoted as an invitation to comment. Notes were made throughout the interview, with points emphasised by the farmer being recorded as such. Transitions from one topic to another were attempted gradually where possible, in the hope of drawing out the farmer's rationale or underlying assumptions. As far as possible, the same sequence of topics was raised in all interviews, except where discussions went off on a tangent and brought in subsequent topics.

A second procedure was followed if the period of stay was longer than two hours, in which case the discussion was more drawn-out and informal in approach. Topics of discussion arose haphazardly especially when driving through the farm and coming across items of

interest. In two cases, towards the end of the visit, a quick question-and-answer session was necessary to complete the set of topics according to the framework.

For both interview procedures, the interview was summarised at the end of the day, with further points of interest being noted if thought necessary. During the course of the trips comparisons between interviews were made in an attempt to better understand the farmer's point-of-view. Also while recording the original responses during the interviews, opportunities were taken to verbally rephrase responses in the hope that, by confirming or correcting the author's interpretation of his statement, the farmer would help clarify his position. Those aspects of the farmer's behaviour and mannerisms which accompanied the response often gave a clue as to his degree of interest in the issues under discussion. There was, naturally, a great deal of variation in the personality and approach of the different farmers. This fact necessitated an appropriate change in the author's approach such that, for instance, a more diplomatic interviewee required more prompting to express his personal opinion than was the case for an assertive interviewee.

Apart from the physical listing of the interview results, there were the subjective impressions gained by the author during these visits. Their effect was particularly relevant during the design of the questionnaire, and the interpretation of the results. Without such a subjective picture of the gamefarming business on the ground much of the data collected in this study would have been either meaningless or ambiguous.

2.2.2. Results.

The results of both the management interviews and the questionnaire survey, described in detail in section I.2., are presented in the form of problem statements.

Analysis of these statements was comparative in approach, for which purpose it was necessary to group statements into similar categories. In attempting to define categories a simple flowchart was designed to link the relevant farm resources by management-directed and/or natural processes. The purpose of the flowchart

was to help the author 'place' a problem statement in the context of gamefarming as a functional system, i.e. to place the problem statement in a practical farming situation.

In broad terms two categories of statement were discerned from the start:

- Natural resource processes and consequences - especially as manipulated by management.
- Institutional (Outside) factors influencing management motivation.

For descriptive purposes, two flowcharts were constructed on the above dichotomy, the first being the Management flowchart and the second the Motivation flowchart. These are presented as Fig.s 24 and 25, respectively. They are not models in the formal sense, but merely graphic representationsof concepts which are inter-related.

Using the flowcharts as a tool for comparing statement similarity, the problem statements were gathered into related Statement Types. These in turn were collected into more general Statement Groups, which fall, according to their nature, under the categories of Management Issues or Motivation Issues (corresponding to the two flowcharts of that name).

Analysis was by both Statement Group and Statement Type, for which purpose Problem Statement Profiles were constructed for each DCA. The collected profile data is given in Table 5 as the Provincial Problem Statement Profile. The detailed listing of questionnaire responses making up this profile are given in Appendix 3, and for the management interviews in Appendix 4.

There are numerous complications and drawbacks inherent in the process outlined. Firstly, the differing methods of data collection between the questionnaire (one 'simple' question) and the management interviews (prolonged interactive discussions) renders these bodies of information largely incompatable. Consequently the questionnaire data is used here as a series of responses based on individual situations, and the management interview data as a series of commentaries on regional and future considerations.

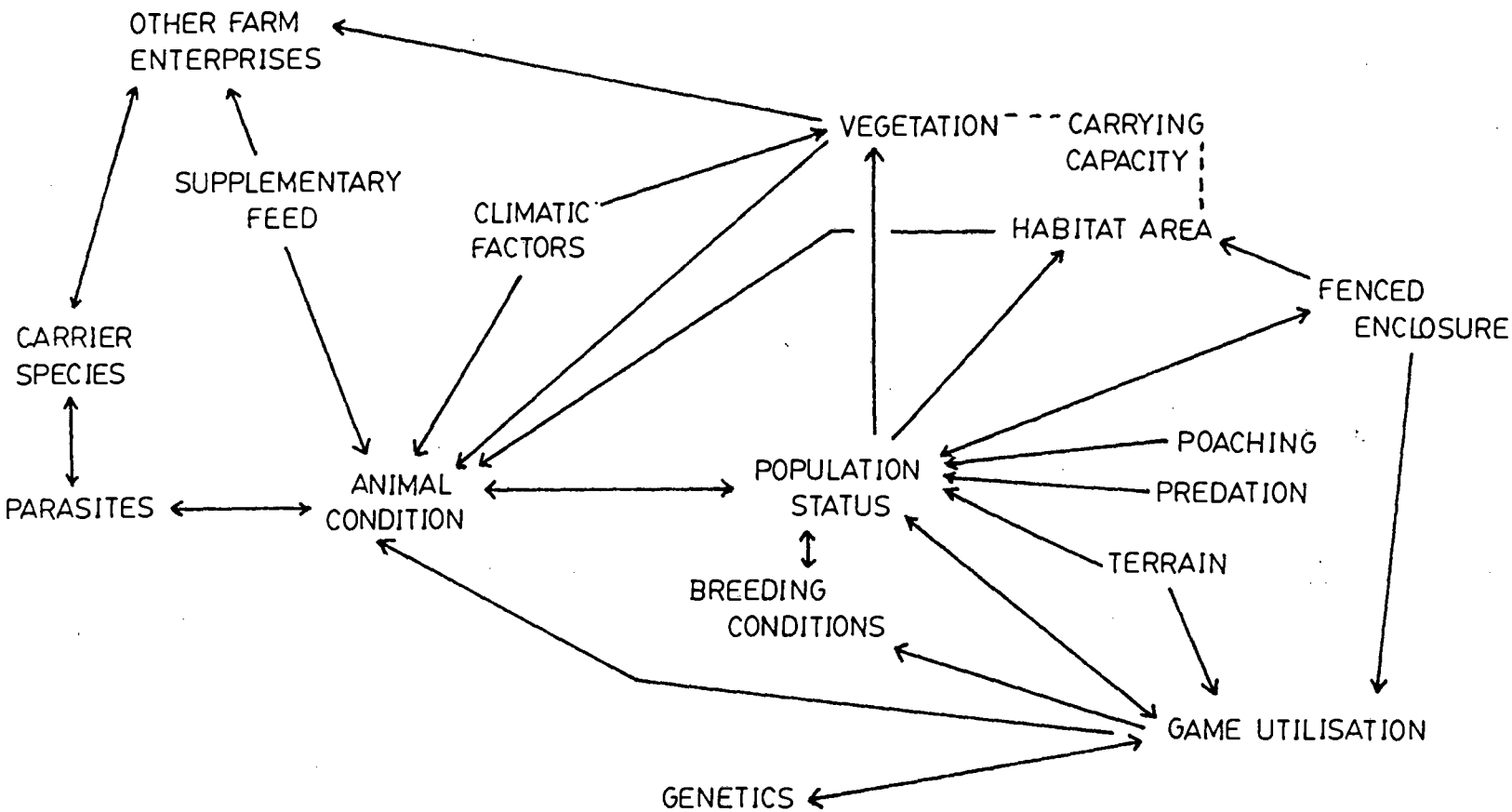

FIGURE 24: THE MANAGEMENT FLOWCHART

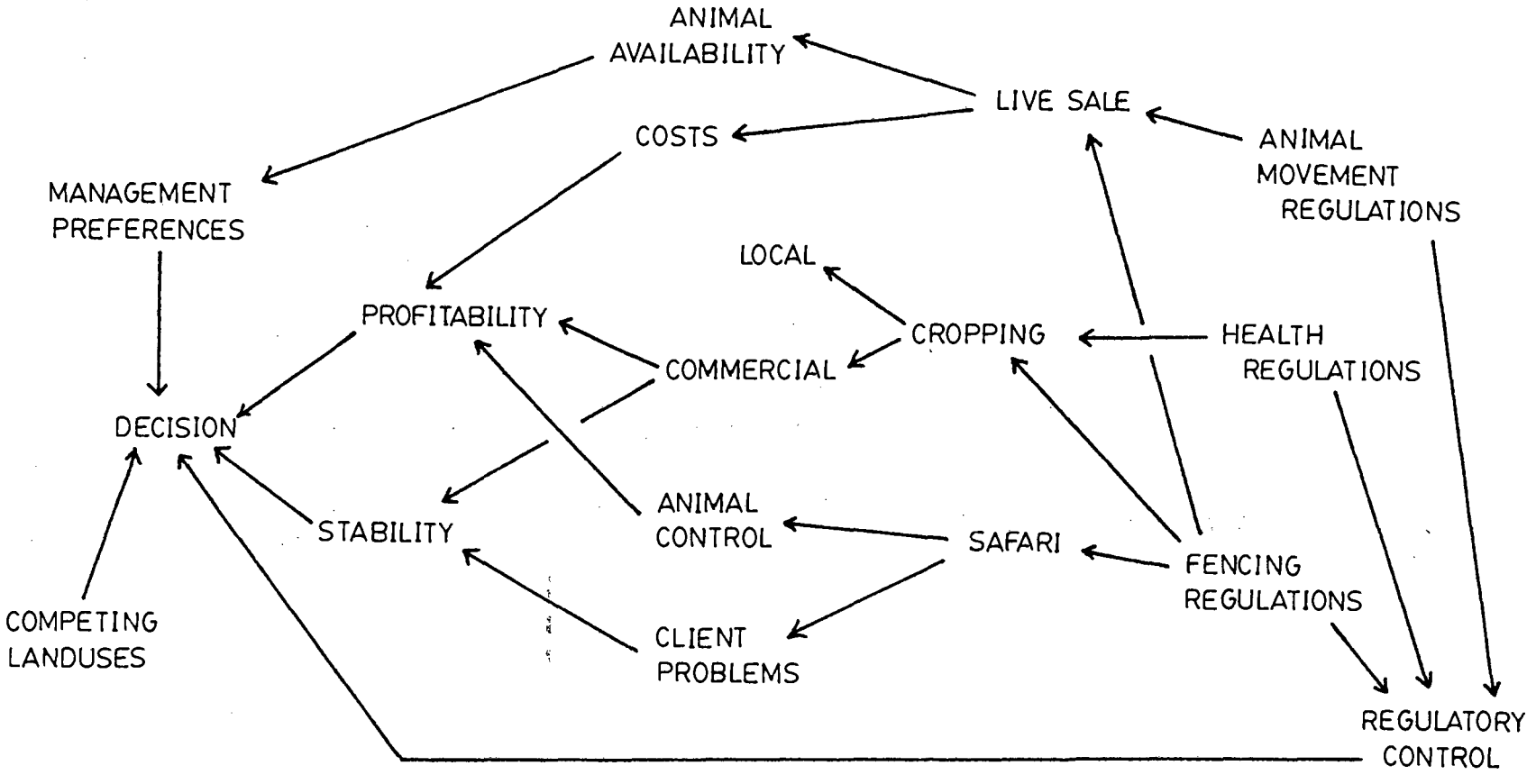

FIGURE 25: THE MOTIVATION FLOWCHART

TABLE 5 : The Provincial Problem Statement Profile

(questionnaire : interview data)

A) MANAGEMENT SECTION (65:32) % statement frequency

Problem Group		Problem Type	
I. Habitat Suitability	(8:8)	I.I.Fodder & Cover Adequacy	(1:3)
		I.2.Drought	(5:0)
		I.3.Parasitism	(2:5)
		I.4.Loss of Condition	(1:0)
2. Breeding Cycles/Population Maintainence	(20:3)	2.I.Herd build-up	(1:0)
		2.2.Breeding Performance	(4:1)
		2.3.Population Information	(1:1)
		2.4.Population Control	(3:0)
		2.5.Predation	(6:0)
		2.6.Poaching	(7:2)
3. Controlled Grazing and Herding	(23:8)	3.I.Origin	(-:0)
		3.2.Grazing Control	(1:4)
		3.3.Grazing Problems	(1:0)
		3.4.Movement Control	(16:1)
		3.5.Fencing Impacts	(2:0)
		3.6.Fence Damage	(3:0)
		3.7.Supplementary Feeding	(1:2)
4. Game Use Aspects	(9:5)	4.I.Game Utilisation	(4:0)
		4.2.Effects on Breeding	(1:0)
		4.3.Constraints on Utilisation	(2:1)
		4.4.Effects on Genetics	(2:0)
		4.5.Species Imports	(3:4)
5. Competing Land Uses	(5:9)	5.I.Type Statement	(-:0)
		5.2.Grazing Conflict	(1:3)
		5.3.Pest Conflict	(2:3)
		5.4.Parasitism Conflict	(2:0)
		5.5.Supplementary Feeding	(1:2)

TABLE 5 (cont.)

B) MOTIVATION SECTION (35:68) % statement frequency

Problem Group		Problem Type	
I. Preferences	(18:9)	I.I.Farming Status	(13:3)
		I.2.Rationale	(5:5)
2. Institutional Impacts	(5:32)	2.I.Information	(1:20)
		2.2.Profitability	(2:5)
		2.3.Stability	(1:5)
		2.4.Regulations	(2:3)
3. Utilisation Processes	(7:18)	3.I.Cropping	(3:12)
		3.2.Live Sale	(3:1)
		3.3.Safari	(2:6)
4. Regulations and Costs	(5:9)	4.I.Type Statement	(-:-)
		4.2.Fence Regulations	(2:1)
		4.3.Game Movement Reg.s	(1:2)
		4.4.Health Regulations	(1:1)
		4.5.DNEC Role	(1:2)
		4.6.Representative Bodies	(1:3)

Secondly, the variable depth of expression in the responses from various individuals affect the interpretation of these responses. This is particularly true for the questionnaire, where there was no opportunity to confirm a response. There is thus an unavoidable difficulty in confidently comprehending the exact meaning of every problem statement. This was heightened by the proportion of Afrikaans responses for which the efficiency of the author's interpretation was restricted. An example of the variability of response can be shown where the subject of concern ranged from a simple statement of "drought" (which has its ambiguities) to a full two written pages detailing reasons for the conservation of game. (In three responses the author failed to trace the subject of the statement.) In the case of similar subjects of concern, the depth or complexity of expression varied. For example, one response stated 'parasites are a problem', and two others specified · 'mortality under stress', and 'game acting as disease carriers'

as being more specific parasite problems. The problem is whether to catalogue these as equivalent statements or, if not, then how to describe the differing levels of expression.

It was at this interface of interpretation that the frameworks outlined above proved useful. Thus the reference to game acting as hosts for disease-carrying parasites was categorized as a 'parasite conflict' statement type within the statement group of 'conflicting landuse'. The reference to parasite-induced mortality was assigned to 'herd build-up' type within the 'population maintainence' group. Finally, the general parasites statement was listed under 'parasitism' within the group of 'habitat suitability'.

Often there was indecision as to which category was to be used, usually where a statement was non-specific or referred to more than one issue. If a number of issues could be clearly discerned, then they were recorded as individual statements. If a single, general statement covered a number of categories, then either it, or its type were repeated to account for this. For example, the statement type 'supplementary feeding' falls into both 'controlled grazing' and 'competing land uses'.

2.3. RESEARCH SURVEY

The reason for this survey was that wildlife-related research provides, theoretically at least, the information on which management decisions are made. Two questions were addressed in this survey; firstly, to what extent research activities contribute to management knowledge, and secondly which problem areas prevent research itself from operating efficiently?

2.3.I. Methods

Two methods of investigation were used; personal interviews with professional research workers, and an analysis of the research literature published up till 1979.

Interviews

All Universities and Government agencies involved in wildlife-related research accessible to the author were visited.

The initial approach was made using a letter outlining the study and asking for an interview. On confirmation of an appointment, further information on the subject and method of interview were specified in a follow-up letter. Those interviews finally held, and their respective dates are as follows.

Institute of Natural Resources Dr. J.G. Grimsdell	I2.I2.8I
Natal Parks Board R. Collinson	I2.I2.8I
Mammology Research Institute Prof. J. Skinner Dr. N. Fairall	I8. 2.82
Nature Conservation Division, T.P.A. Dr. R. Parris	I8. 2.82
Combined Scientific Programmes, CSIR Dr. A. Ferrar	I8. 2.82
Centre for Resource Ecology, Johannesburg D. Peddie	20.I2.8I
Faculty of Forestry, University of Stellenbosch Prof. R. Bigalke	30. 5.82
Department of Nature and Environmental Conservation, C.P.A. Dr. R. Liversidge.	3I. 4.82

Emphasis was placed on those persons well experienced in research and with some experience in applying research data to management situations.

The interview itself was conducted at the respondents' places of work and usually lasted approximately one hour. The author wore smart casual attire and carried a clipboard and a briefcase. The interview was conducted in a courteous manner, although some interviewees preferred more informal 'chats' rather than formal question-and-answer sessions. In conducting the introductory,

explanatory and enquiry phases of the interview, the numerous pitfalls elaborated in Babbie (1973) were borne in mind.

Preceeding the interview itself, a brief introduction to the rationale and structure was given, together with a more detailed explanation of the questionnaire format. This format was a series of topics (given below in Table 6) which the author thought could be of significance, and on which open ended questions were asked in an attempt to stimulate discussion.

Table 6 : FRAMEWORK FOR RESEARCH INTERVIEWS

Research Issues:

A. Information
   - Status of information base (its form, availability and coverage of topics and species)
   - Co-ordination within the field of Research
   - Communication with outside interests (e.g. management)

B. Logistics
   - Funding; adequacy and use
   - The availability of adequate technology and methodology
   - the availability of materials and utilities

C. Administration
   - Organisational structure (efficiency and suitability)
   - Decision-making processes (research directions and priorities)
   - Official links with research and other bodies.
   - Degree of self determination (reliance on outside decisions)

D. Legislation and rights
   - Access to information
   - Access to research sites (ownership affects)
   - Areas of responsibility (especially with outside agencies)

E. Human
   - Training programmes and manpower (expertise)
   - Specialism versus Holism
   - Attitudes and approaches affecting research efficiency.

The wording of the questions and the extent of further explanation varied between interviewees. The respondent was asked to express his private opinion, and experiences if necessary, and was prompted to discuss his rationale further. In all cases, following a discussion point, the interviewer summed up what he

considered to be the respondent's viewpoint, and asked him to confirm it as such. The confirmed response was recorded. Those topics on which the respondent was uncertain, or expressed no opinion, were recorded as non-responses. At the end of the interview the respondent was asked if he would mind participating in a postal follow-up. In all cases the response was positive.

The follow-up procedure involved the analysis of each interview with the more definite statements being recorded in a separate list. This list was exclusive to that particular respondent, and was prefaced with a letter thanking him for his help. He was also asked if he would rate each of the statements from his particular interview. The scale provided was a five-point one, with categories of 'strongly agree; agree;neutral; disagree; strongly disagree'. This allowed for confirmation of the statement as one expressed by himself as well as for rating the conviction with which this view was held. In addition, the respondents were asked to indicate whether they objected to the publication of their viewpoints in the final thesis.

On receipt of the final replies, the statements were split into a group commenting on the application of research results in management practises (referred to here as 'research application') and those commenting on factors restricting the efficiency of research activities (referred to here as 'research restrictions'). Within these two groups the statements are arranged at the secondary level into similar topics, and further qualified as to whether they agree or disagree with other statements in that topic.

Literature Analysis

The aim of this analysis was to assess research material available for application by management interests. Availability was defined as those articles listed in the Wildlife Bibliography (Stewart - 1977) and its supplement (Keep - 1981). These bibliographies are lists of papers, publications and theses produced prior to 1978. They deal mostly with Africa-specific wildlife-related topics. The analysis was undertaken on two lines. Firstly the spectrum of species, and number of articles per species covered in the bibliography were examined. The analysis was restricted to a list of those species that are, or could become of

relevance to a gamefarmer in the Cape. Subspecies not occuring in the Cape were exoluded if the topic of the article indicated limited relevance to Provincial circumstances. Secondly, an analysis of the spectrum of topics covered, and the number of articles per species was undertaken. The topics were restricted to those relevant to game species studies. Thus range management, if not referring to a species, was excluded from the analysis. Thus this analysis does not provide an assessment of species-specific versus general ecosystem-type studies. The topics used for analysis were derived from the bibliography's own classification with some modifications for convenience.

The basis for the analysis was a table, or matrix, with species and research topic as the two axies. Within this matrix, the various articles were placed and rated for relevance to the farmer. Only the title of the article was used in this procedure. It presumes the articles would all be equally available to the farmer, and that the titles were fair reflections of the contents. The relevance of each article was assessed using three parameters; regional relevance, topical relevance, and length (as an indicator of comprehensiveness) of the articles.

The regional relevance of an article was scored as positive only if the article related to the geographical and bioclimatic regions reasonably equivalent to those of the Cape Province. Much of the work in Namibia and areas of Botswana was considered relevant to the Northern and Western Cape. Anything specific to, say, the Transvaal Highveld was held as irrelevant. The fact that the site of research will affect the regional relevance of some research topics more than others was appreciated, but not taken into account in this study.

The topical relevance was scored as positive only if the article appeared to be of interest and decipherable by an enthusiastic gamefarmer. Topics such as histology and many of the more technical articles on pathology, being of little use to the farmer,did not score any points for topical relevance. If the article encompassed more than one topic, then these additional topics were treated as separate entries. However the article dealing with the species in general ,even if comprehensively, could only be scored

against the general or ecological topic once. Insufficient account was thus taken of articles covering a wide range of specific topics not mentioned in their titles.

The length, or comprehensiveness of the article was scored as positive if, in relation to its topic, that article seemed to contain a comprehensive description. Thus theses, review papers and the longer information booklets scored positively, whereas many 'notes, 'observations' and one-page articles did not achieve any score.

Following the above three-way rating, an overall relevance score was assigned to each article depending on the number of positive parameters scored by the article. Thus the maximum possible score was three. However, if the topical relevance was negative, then the remaining parameters were ignored and the article was given an overall zero score. Obviously regional relevance and comprehensive content mean nothing if the topic has no relevance to the farmer. The total scores for all the articles dealing with each topic for each species were expressed as a percentage of the maximum possible score.

2.3.2. Results

Interviews -

Many of the statements gained from the research interviews were inconclusive or uncertain in expression. A few points tended to be emphasised whilst the remainder of the issues assumed far lesser significance. Also, there were usually contrasting viewpoints on issues given by different individuals. Table 7 provides the summary of the interview responses, indicating the frequency of issue occurence, and its contentiousness by the number of conflicting statements. The term 'conflicting statement' refers to the presence of opposing viewpoints on that issue. A 'strong statement' as listed in the table is one which the respondents indicated as being firmly held opinions.

Table 7 : SUMMARY OF STATEMENTS FROM RESEARCH INTERVIEWS

Statement Group (explained in text)	Number of Statements		
	Total	Conflicting	Strong
I. Research co-ordination	22	6	6
2. Decision-making	II	5	I
3. Methodology	7	3	I
4. Administrative restrictions	7	3	-
5. Funding	6	2	I
6. Manpower	6	4	-
7. Information availability	5	-	-
8. Information status	I5	4	4
9. Research methodology	I3	4	2
I0. Research-management links	8	2	-

A brief description of the Statement Groups listed in Table 7 follows:

I. Research co-ordination - refers to the joint co-ordination of work to be undertaken by normally independent research institutions.
2. Decision-making - refers to the selection of appropriate projects and the determination of research priorities.
3. Methodology - refers to the validity of currently employed research methodologies.
4. Administrative restrictions - refers to the administrative regulation of funds, manpower and decision-making processes.
5. Funding - refers to the availability and use of funds.
6. Manpower - refers to the availability of qualified, skilled manpower.

The above groups fall within the category of Research restrictions and the following groups fall within the category of Research application.

7. Information availability - refers to the accessability of existing research data, for both research and management interests.

8. Information status - refers to the coverage of research topics and species of interest.
9. Research methodology - refers to the relative advantages and shortcomings of 'pure' and 'applied' research approaches.
10. Research-management links - refers to the communication links and information exchange between research and management bodies.

Literature Analysis -

These results are depicted in Fig. 26 (research publications by species) and Fig. 27 (research publications by topic).

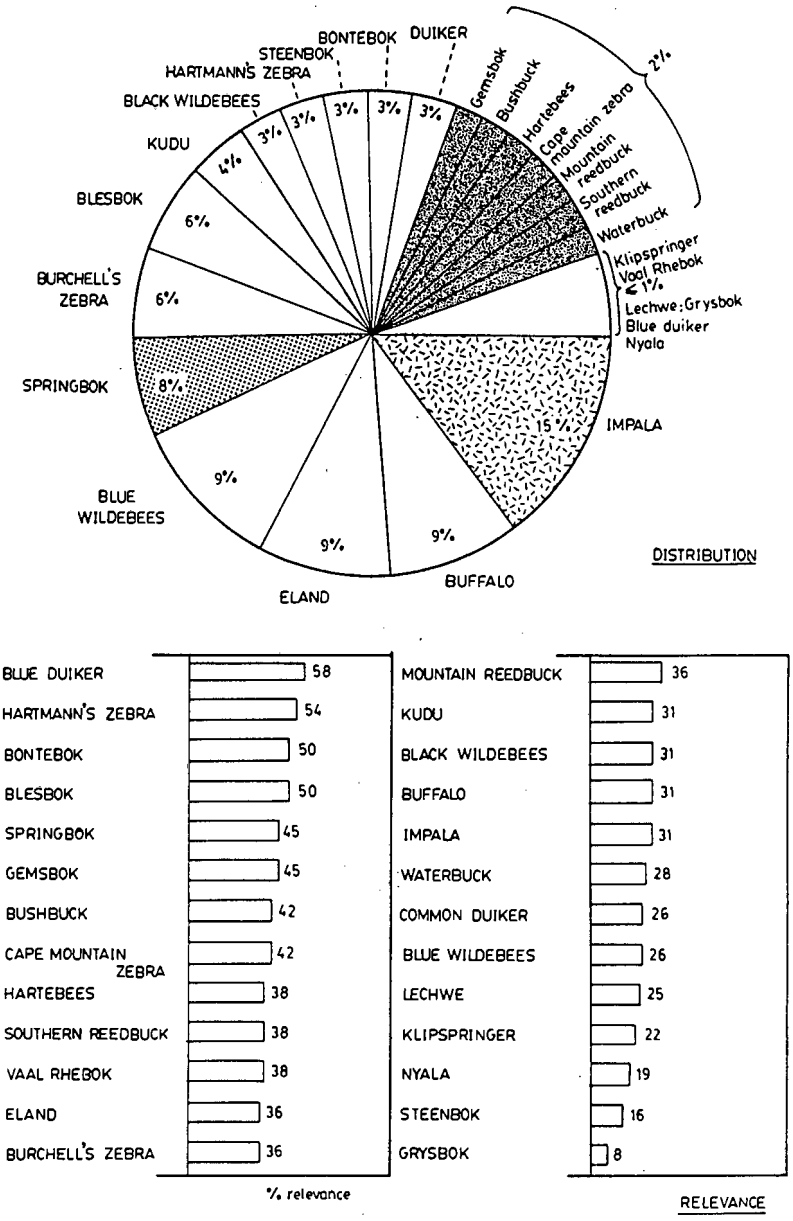

FIGURE 26: DISTRIBUTION AND RELEVANCE OF RESEARCH BY SPECIES

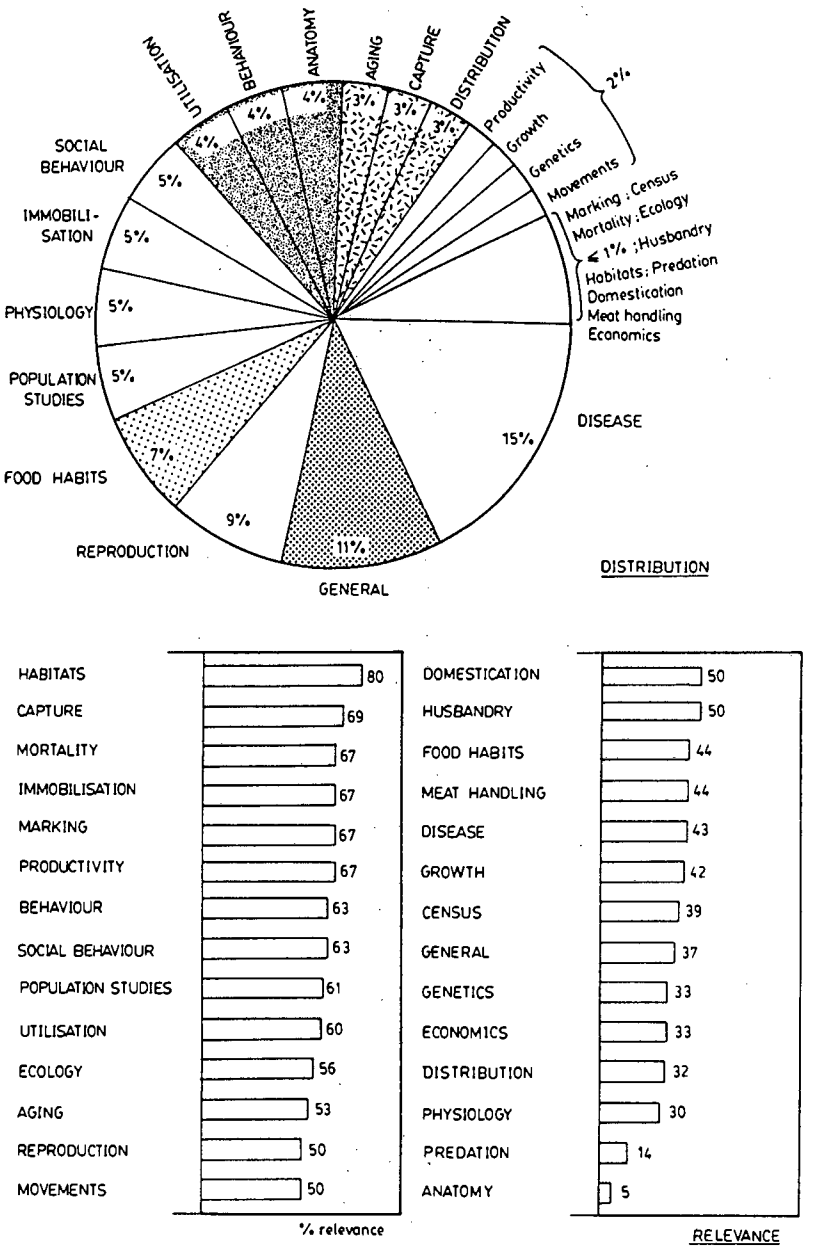

FIGURE 27 : DISTRIBUTION AND RELEVANCE OF RESEARCH BY TOPIC

2.4. DISCUSSION

2.4.I. Management Problems

In the following discussion, the questionnaire data is used to elaborate on management issues, whilst the interview data is used to describe the motivation issues. The reason for this approach is that those farmers participating in the interviews were more interested in intensive gamefarming, and thus more concerned with motivation issues such as economic and regulatory control. This is reflected in the proportion of problems raised in the interviews as motivation issues (68%). By contrast, motivation issues accounted for only 35% of those problems quoted in the questionnaires. The less intensive approach to gamefarming apparent in the questionnaires is reinforced by the frequency (22%) of respondents who stated either "I am not a gamefarmer", "no problems", or did not respond to the first question whilst completing the remainder of the questionnaire. Also, the lack of any dominant problem trends within the majority of DCAs, indicates that these farmers' personal circumstances and expectations are the predominant influences on their problem perceptions. Pye diagrams of the frequency of statements for both questionnaire and interview data are given in Fig. 28.

Management Issues

The dominant problem group mentioned was that of Controlled Grazing (23%). These problems arise from the fact that most if not all farms are split up into feneed paddocks in order to control the movement of domestic stock. The latter is behaviourally adapted to handling and herding by such methods, but this is not so for wild ungulates. Except for those able to jump or crawl through them, fences interfere with games' natural migratory, territorial and foraging movements. These movements can not be easily mimicked or accomodated for by current management methods. This topic has been mentioned as an important one by Walker (I979), whose long term solution lies in domestication, Conroy (I982), Mentis (I980b), who considers the fencing phenomenon of utmost significance in selecting suitable game species for the farm, and Ferrar (I980) who notes the general lack of

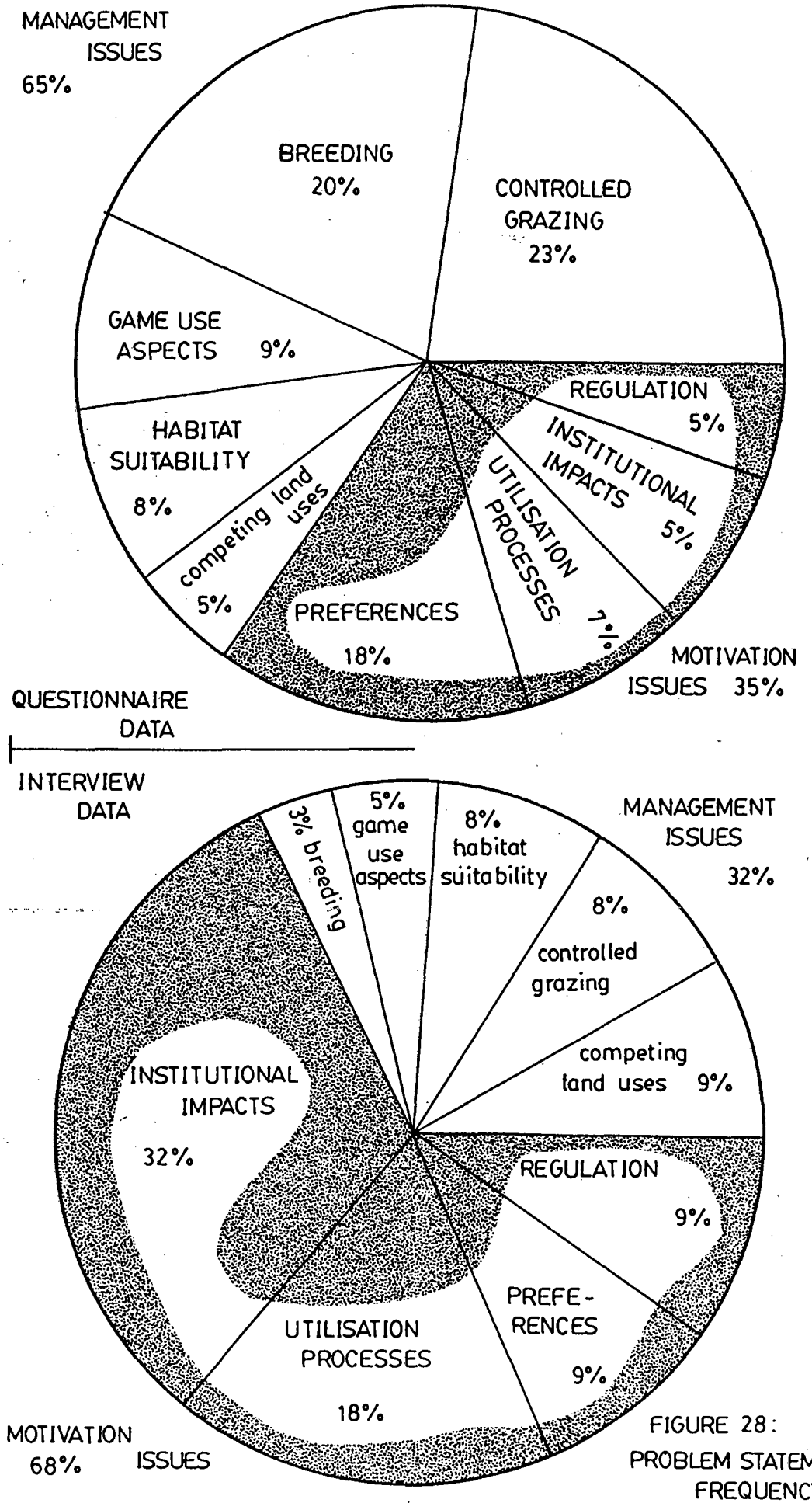

FIGURE 28:
PROBLEM STATEMENT FREQUENCY

management knowledge and skills to deal with such problems. To help overcome the consequences of restrictive fencing, animal stocking rates are calculated from the vegetation's ability to support game animals with different dietry requirements. Mentis (1977,1978,1980c), Mentis and Duke (1976), and Meissner (1982) are examples of papers where methods and measures of evaluating how many of which species whould be kept on how much land. Severe problems arise with multispecies mixes, that is more than one species in a paddock, where the theoretical calculations become extremely complex and quite impractical for most gamefarmers. Knowledge of the composition and condition of the vegetation on which the game is expected to thrive is necessary, as well as the consistent monitoring of vegetation and animal conditions. These requirements for the successful management of game become excessive in terms of management expertise and time, especially as the whole system is intensified and pushed to its maximum yield limits.

The results of mismanaging controlled grazing systems include: overgrazing in paddocks from which game cannot be easily withdrawn; territorial fighting and mortalities where subdominant males cannot escape (Bigalke - 1976); fence damage where determined or desperate males attempt to overcome the barrier; and parasite buildups in permanently occupied paddocks. Given the wide range of its possible effects it can be noted that the ubiquitous fencing of farmland places the gamefarmer in a potentially difficult situation.

The second most important problem group of Population Factors (20%) refers to the need to maintain or stimulate herd numbers. The most frequently quoted restriotions were poaching (7%) and natural predation (6%), with lesser references to poor breeding conditions, inadequate population growth, and population control. The levels to which these factors affecting the game population are tolerated will vary, but are often based on livestock standards. Hence once game utilisation has become highly commercialised, the loss of animals through natural predation becomes less tolerable and thus a focal point of management effort. An essential problem with population regulation is the need for accurate census information - something which is frequently inadequate on gamefarms.

At a lower frequency of 9% is the problem group of Game Use Aspects. Live capture and commercial cropping techniques were quoted as requiring refinement to either avoid excessive animal losses or improve yield efficiency. Side effects of game uses include the suppression of lambing percentages through trauma or the influence on population genetics of selective culling. There are a number of statements, backed up by observations and widely-held opinions, quoting the need to maintain the cropping or removal of animals in order to stimulate herd productivity. Ferrar (1980) maintains that, in the Zimbabwe situation, the very low cropping percentages are a major factor in the failure to achieve optimum production. Mossman and Mossman (1976) and Walker (1979) pass similar comments. The need for high cropping percentages are emphasized in overstocked paddocks. The lack of sufficient and efficient live capture activities has led to high prices for the restricted number of animals available for sale each year. This makes the stocking of a farm with game an inordinately expensive and troublesome affair.

Habitat suitability forms about 8% of all the statements. Drought is the dominant problem type, particularly so when the expense involved in restocking is concerned. Parasitism is not a frequent problem in the drier parts of the Cape. Where tick populations have a chance tc build up, heartwater disease becomes an issue, especially where eland are available as hosts. Nasal-worm in Red hartebees has also been recorded as a problem. Debilitation and mortality due to excessive loads of internal and external parasites can often be traced to habitat restriction on food or cover, or fencing restrictions on movement (Horak - 1982).

Finally the keeping of game can result in conflict with other land uses. It is a minor consideration in the questionnaire responses though (5%). Game can be conceived as competing with domestic stock for fodder, both natural and supplementary. Also game can act as carriers and hosts for diseases and parasites. This point has consequence in, say, Zimbabwe (Foggin - 1980) but has not proved a big problem in the Cape. These are very real considerations when intensification of co-habiting game and domestic stock are taken to the limit of the land's carrying capacity.

Finally, game species capable of overcoming fence barriers are often attracted to crops, irrigated pastures and orchards where they can do considerable damage.

The management problems recorded during the management interviews centred around game as potential commercial competitors to livestock. Thus 27% of the statements recorded referred to games' consumption of time and resources that could be more profitably turned to domestic stock. Mentis (1980b) specifically states that game are, on their own, inferior in this sense. In the interviews, Grazing Control was also an important issue. In contrast to the questionnaire data, Breeding issues were infrequently quoted. Instead, considerations of the need to avoid stocking game in unsuitable habitats and the whole problem of game stocking difficulties and expense were more widely referred to. In common with the questionnaire data, poaching assumed some importance.

Motivation Issues

Those responses recorded during the management interviews were stimulated, directly or indirectly, by specific open-ended questions asked by the author. This inherent bias, essentially different from the questionnaire procedure, is reflected in part by the frequency of statements dealing with topics of information and advice availability. This included references to the state of the average farmer's ecological awareness, the sources of knowledge commonly used by farmers, current research requirements, and the need for adequate extension and interpretive services.

The average farmer's awareness of the ecological processes underpinning his games' productivity was variously considered adequate (the majority) and not so. The use of veld management principles, which are apparently widely known, should provide a reasonable starting point in game management. One side-effect, however, may be the use of domestic stock management methods which are not necessarily applicable to game. Ferrar (1980) considers that local knowledge of both game and the veld are of primary importance in sustained wildlife utilisation.

The sources of knowledge used by most farmers are popular farmer's magazines such as ' The Farmer's Weekly ', and that

exchanged by word of mouth. Much knowlege is gained first hand when managing game. Symposia were quoted in one instance as being useful forums of information exchange, both formally and casually.

Requests for research centred on the topic of carrying capacities of the veld for game, and also on cropping rates and ratios, tickborne deseases and parasites, population dynamics, and live transportation. Similar lists are presented by Conroy (I982) and Mossman and Mossman (I976) who also mention the financial aspects of game utilisation. Field (I974) quotes the need for techniques to enable comprehensive census of game populations and the monitoring of vegetation reactions to foraging by game. Esser (I977), quoting in the West African context, also emphasises census studies, and includes the training of technical personnel as a vital need. The emphasis in the interviews was on research results which would relate directly to individual problems with the minimum of further local research.

For the interpretation of the relevant research and the provision of general advice, the need for competent and easily available interpretation agencies was quoted by eight farmers. The range of topic requirements was from general wildlife education to specific problem-orientated advisory services.

The topic of information and advice availability extends into the Research Survey, disoussed in section 2.4.2.

Still within the problem group of Institutional Impacts, considerations of commercial profitability and stability follow that of Information and Advice Availability. Game is often considered an inferior commercial competitor to other land uses (Mentis - I980b), yet the aesthetic and other non-monetary considerations are mentioned as values which are too often neglected in such assessments. Part of the reason for low profitability is the under developed state of the national market (as was the case in Kenya - Field,I974 - and Zimbabwe - Ferrar,I980) and the instability of the export venison market. Further influences are listed under the problem group of Utilisation Processes where the cropping enterprisès face the problem of providing quality products and marketing services (which are expensive) and simultaneously

overcoming the national urban market resistance. Farmers, however, will not produce at the intensive levels necessary to justify a national marketing initiative, without an adequate profit motive. And yet the profit margin will not improve until the market expands. The deadlock poses problems, with education of the public as potential consumers being the obvious answer.

The standardisation of the safari operation is mentioned as a need. The setting of appropriate standards and prices is seen as the most pressing issue, in an attempt to provide stability and saleability of the enterprise. As with cropping, there is a desire to lessen dependence on the overseas market and to provide a different style of safari for the local hunter. The latter would not require the exceptional trophy animal which the overseas hunter demands. Indeed the feasibility of consistently providing such trophy animals on the typical Cape farm, fenced and developed as it is, has been questioned.

The effect of regulations and the relevant agencies enforcing them emphasize the problems inherent in the intensification of gamefarming. As the commercialisation proceeds, the restrictions on the freedom of product use (e.g. national or export sales) tend to increase. Confusion over restrictions on the freedom of use has arisen due to the legal position of game ownership (noted in Mentis - 1980b, and Conroy - 1982). At present the State accepts legal ownership and hence responsibility for game by virtue of the latter's "res nullias" status. To quote Rabie (1976);

> "A 'res nullias' is a thing which belongs to nobody, but which can become the property of anyone who assumes possession of it through 'occupatio'. Here possession forms the basis of the acquisition of ownership. The fact that wild animals are regarded as 'res nullias' means that, save in the exceptional case where someone has acquired ownership of them, there are no private law remedies available to the citizens of this country where wild animals are killed, captured or injured. The common law crimes of theft and malicious damage to property are, furthermore, not applicable in such instances. Consequently, this would have left wild animals without any legal

protection had the state not intervened by legislating for their conservation."

A degree of freedom from this conservation legislation is allowed to a landowner who obtains a CAE. However he still does not own it in the legal sense, and much emotional wrangling has resulted. Even given legal ownership of game farmers would not be freed of regulations governing the transport of game or its products, and health standards and procedures. Both Zimbabwe and Namibia have ceded ownership to the landowner, apparently with excellent results in terms of conservation and utilisation of wildlife (Joubert - I974, and Ferrar - pers.comm.), but this has no bearing on the regulation of game utilisation, which must still remain. The management and marketing problems imposed by game movement and health regulations are of long-term nature, although their petty and less essential affects may be alleviated by ammendation. The need for CAE regulations depends primarily on the outcome of the ownership issue. Also, the criterion of adequate fencing enclosure of game as a condition for freedom of utilisation is not the only alternative. Indeed, with the sort of fencing needed for kudu, the requirement to enclose a large farm perimeter merely to enable the non- or partial commercial utilisation of game seems impractical. A solution may lie in the existence of enthusiastic gamefarmers' associations whose intention is to organise game utilisation under codes of ethics and standards of management. Co-operation by DNEC with such bodies to help in the avoidance of game abuse by jointly enforcing any codes or standards may be more effective and efficient than relying on legislation alone.

A number of respondents expressed frustration at the lack of response DNEC was able to give certain requests, particularly on the law enforcement side. That DNEC is drastically understaffed and underfinanced is often appreciated, but does not help the farmers when they need reaction to, say, poaching pressure.

Finally, for the interview data, the problem group of Preferences (personal approaches to gamefarming) is not as prevalent as for the questionnaire data. It does, however, show the same underlying

trend of a dominant aesthetic motivation in the face of financial and institutional disincentives.

2.4.2. Research Problems

Knowledge of resource processes is essential in any successful attempt to manage or guide them. The derivation of this knowledge for wild ungulates and their habitats is referred to here as 'pure research'. Such research is commonly conducted by Universities and other State-sponsored academic institutions. The study of the management techniques by which the resource processes are manipulated is referred to here as 'applied research'. It is noted that applied research is tied, by definition, to management needs whereas pure research is not and can indeed function perfectly well independently of them.. In reality pure and applied research are not mutually exclusive, but can still be distinguished in terms of goals and objectives.

The issue of research contribution to management will be discussed below, followed by considerations of restrictions on research itself.

Research contributions to management

It has been noted that the importance of research knowledge to gamefarmers was frequently stated during the management interviews discussed previously. The contributions that research has made to potential sources of management knowledge can be partially gauged by an examination of Figs 26 and 27, depicting the results of the literature analysis. The quantity of research articles is apportioned predominantly (63%) to Impala, Springbok, Buffalo, Burchell's Zebra, Eland, Blue Wildebees, and Blesbok, amoungst which the proportion of research topics covered varies from 50% to 79%. The proportion of articles useful to gamefarmers peaks at 58% and averages 35% for the eight species. Certain research topics such as Diseases and parasites, Reproduction and Population studies are more frequently researched. The relevance of most of these topics to farmers is limited. Certain topics such as Habitat relations Capture, Immobilisation, and Productivity have greater relevance to the farmer but are usually little researched by comparison.

In the research interviews opinions were sought on this issue of information relevance, or status as it is termed. It was accepted that the data base was not complete but a more contentious point was the useability of existing data in gamefarming. The jargon, methods of data presentation and individual articles dealing in disjointed fashion with wider issues may all cause problems. Also, the accessibility of the material eventually published will vary considerably with the availability of the publishing medium. Naturally a researcher in presenting an article is more strongly influenced by the explicit rules of presentation inherent in most sciences than by the need to communicate efficiently his knowledge to its potential users. To quote from a different discipline, but one also faced with joint technical and communication requirements (Laker, 1979):

> "If a soil surveyor cannot communicate his information, he has failed and the soil survey might just as well not have been done."

The substitution of wildlife research/er for soil survey/or gives an idea of the opinion expressed by some interviewees.

The need for further informative articles and booklets, in summary form, together with extension services were frequently quoted during the interviews, as well as in articles such as Mentis (1980b) and Ferrar (1980). This would help overcome the minimal use that farmers make of existing research data.

The above discussion has implications for the role of research in management. To what degree should research accomodate the requirements of managers ? Mentis (1980a), in a paper on the soientific management of terrestrial ecosystems, considers that management decisions are not made on perfect information, but that rather a 'best-choice' situation is closer to the truth. As such he sees research as providing data on which the reliability of the various management alternatives can be judged. Management then becomes a controlled experiment using such data that does exist as a guide. This viewpoint is extended by Giles (1971) who quotes:

"..that research is best viewed as a subsystem producing inputs to the management decision-making and planning process . ."

The quotation provides a contrast to research's role as a discipline in its own right, i.e. not necessarily as a service to management. Wildlife research to date has remained largely in the Universities as an academic pursuit whereas agricultural research, for instance, is very much management-orientated (Conroy,1982). Both the pure and applied motives supply, in the author's opinion, equally valid criteria for deciding the course of a particular project or policy. The point appears to be one of finding a balance in the distribution of research effort and resources between the two approaches, whilst maintaining their close co-operation. At present it appears that the institutions and training necessary to support pure research development are fairly well established, as opposed to those for applied research. The possibility of incorporating applied research into existing institutions raises the need for close co-operation of these institutions with management representatives. In the author's opinion this would not stand to succeed. With the establishment of an extension agency to communicate knowledge to the farmer, a concommittent role of relaying management requirements to research circles seems less likely to prejudice either research or management standpoints.

Restrictions on research

In that restrictions on research will tend to undermine the gaining of further knowledge, these restrictions on research are of interest to management concerns.

Research co-ordination was the most common issue raised in the interviews. It was argued that some degree of co-ordination of research policies was needed to prevent duplicating research efforts and to ensure some continuity in fields of research which are little studied at present. The lengths to which such co-ordination should be taken is limited by the need to allow for some institutional autonomy which is vital for maintaining incentive and the ability to respond to local circumstances. The form that any co-ordination mechanism could take varied from advisory to

omnipotent committees, the latter being favoured by those interviewees more concerned with the application of research in the field. It was recognised that the differing policies and viewpoints of the various research institutions made any co-ordination efforts difficult.

Decision-making procedures within research institutions were generally inadequate, mostly through the lack of explicit decision criteria that should be provided in comprehensive policy statements. As a result many contentious issues remain unresolved, and most institutions can be criticized for a lack of continuity in their research efforts. The need for quality leadership was stated as a co-requisite to explicit policy statements in guiding rational research programmes whilst still maintaining individual initiative and incentive.

Methodological stagnation within research training institutions was quoted as a problem. The perpetuation of long-standing viewpoints in the training disciplines has stifled the originality and diversity of thinking that is essential in the ever-changing field of biological research. Romsberg (I98I) reviews the philosophical basis of past wildlife research. He considers that this basis is too weak at present to provide reliable information on which action can be taken. Walker (I982) states the essential difference between ecology and the 'harder' sciences as being the complex situation with which ecologists must work. Thus the importance of adopting the less assertive but more realistic probabilistic approach to research where perfect knowledge of the system is practically unobtainable. One of the consequences, stated by an interviewee, of the less flexible attitude of South African training institutions is the proliferation of specialists as opposed to those trained in holistic studies, the latter being considered vital in the development of wildlife research.

Of those more tangible restrictions on research, administrative procedures, lack of funding and the shortage of manpower have been quoted. Conflicts often arise between administrators, the controllers of research resources (e.g. funds) and researchers, the consumers of these resources, particularly with the larger research

institutions. Funding is naturally quoted as a problem in a profession where the regulation of funds, and often their sources are transparent. Within research itself, the past efficiency of expenditure has been questioned. Perhaps this is to be expected considering that the average researcher is not trained, and possibly not even expected to efficiently regulate funds. The position with manpower shortages is not clear. The lack of posts for relatively inexperienced researchers would lead ultimately to a shortage of professionals to fill the more senior posts. A lack of funding for junior or assistant posts is probably the reason for the observed shortage. The situation with technicians is apparently even more serious. The manpower situation in South Africa was mentioned at a wildlife management conference reported by Macdonald (I98I).

In conclusion it can be stated that pure research, as a discipline justified in determining its own course, cannot be expected to await the provision of direction by management interests. However, research remains an indispensable source of data for future application, and it is essential to ensure the adequate flow of this data to farmers. An extension agency is the most reasonable solution. A second function of such an extension agency would be to stimulate and possibly co-ordinate applied research efforts. The more material restrictions in funding, manpower shortages and administrative processes are obvious. Of greater importance is the need for balanced and explicit decision-making both within and between research bodies. The primary need in this regard is for definite policy statements allowing for the assessment of project and development priorities.

2.4.3. Optimum wildlife utilisation

From the preceeding discussion on management problems it can be seen that farmers experience a wide range of restrictions centering on competing land uses already dominant on the farm, inadequate resource knowledge and management techniques, and sub-optimal marketing conditions.

However the perception of restrictions is largely dependent on expectations, or what the farmer wishes to gain from his game.

If these expectations are being largely met, or the expenses involved in alleviating any restrictions are excessive then, as far as the farmer is concerned, he is using his game resource in the optimum fashion.

Despite the concept that maximum biological productivity or even profitability represents the optimum potential and hence expectation of the gamefarmer, the data obtained here on game useages indicates otherwise. The majority of farmers do not attempt to achieve anything like maximum production as their aims centre on non-production game useages (in the sense of Spillett, I970), nor do they necessarily strive for maximum financial profitability considering the non-monetary sources of aesthetic and sport 'profits'. Certainly many farmers would not complain if their game populations were to proliferate beyond belief, and the demand for venison would justify any cropping expense. But with conditions on the farm (e.g. fenced paddocks) and with the markets being restricted, it would take considerable effort and expense to manipulate these farm and market resources so as to improve production and profitability. As a result cost-benefit realities deny maximum biological production. Also the importance of non-monetary values in the cost-benefit equation (given for example in Mentis, I978) have given the impression of suppressed profitability. The author believes that the previous concepts of optimum wildlife utilisation have concentrated unrealistically on the material nature of production, and on the monetary aspects of profitability (for example in Catto, I976) both to the exclusion of aesthetic and recreational benefits. Certainly it can be expected that, as economic conditions and expectations change, the forms of desired production will alter. If, in the future, the demand for venison increases sufficiently to motivate an increase in venison production, despite costs, then perhaps the wildlife industry may achieve something closer to games' biological production potential. Currently, however, such an increase in production would be suboptimal in all but the impression the resulting production figures would give. In the interim it is the aesthetic and recreational sport values of game that ensure their their continued existence on farms as a resource which can be

utilised for more material purposes in the future.

Such changes in production priorities will meet with problems especially as perceived by those innovative farmers and other concerns who will attempt to stimulate the acceptance and viability of their own concepts of wildlife utilisation. A current example of this is the increasing expectation that venison can provide a substantial source of farm income. Restrictions are being met, however, in the marketing field where expenses are escalating and the demand for export venison is highly unstable. Given the solution of these problems, the next perceived restrictions will be the need for the knowledge and techniques allowing for the increase of stocking rates and efficiency of herd manipulation and cropping. It can thus be noted that problems will arise with the increased fields and depths of knowledge and greater management efforts necessary in stimulating game production levels.

3. CONCLUSIONS AND RECOMMENDATIONS

3.I. CONCLUSION

There are various means of game utilisation in the Cape, the dominant useages being for aesthetic or recreational sport hunting purposes. These are also the dominant motives for keeping game.

More recently the possibilities of making game pay have expanded. Cropping, safari and live sale useages are, despite past fluctuations, providing some incentives to intensify the production and management of game resources.

Those problems arising on gamefarms depend mostly on the farmers expectations and perceptions as well as on how intensively commercialised the operation is. However a number of general points can be made. Game production clashes with the provision of fences for the management of domestic stock which is still the dominant land use. The control of game movements, population growth, and mortality (natural or otherwise) are proving to be complex management tasks. Generally on-farm management techniques are not well developed and infrequently applied. A poor knowledge base is apparently not so much the problem as the difficulty of implementing management decisions explicitly gained from such information. Much information is too specific or detailed to be applicable with the rough management techniques presently available.

Problems become more complex with the commercial utilisation of game, where products or services are provided to an outside market. The right to use game is regulated beyond the farm boundaries e.g. for health reasons. There are numerous problems in the techniques of utilisation. Commercial cropping is an expensive operation with efficient large-scale efforts being required. To justify these expenses an expanding and stable market must be established both locally and overseas. This cannot be achieved without a consistent supply from reasonably intensive gamefarming enterprises, the farmers of which, however, do not have sufficient profit incentive to achieve this. The solution to this apparent deadlock is two-fold. Firstly,those involved in the production and marketing of game products should invest capital in the relevant

advertising and distribution activities necessary to stimulate the the industry of which they are a part. Secondly, the proliferation and gradual intensification of local marketing efforts may provide the basis for the stimulation of the regional markets. Certainly some gamefarming situations are more amenable to local-level operations (such as kudu cropping in the Eastern Cape) and others to national or export operations (such as springbok cropping in the Karoo).

Safari hunting is a potentially lucrative but demanding game useage. Apart from the option of leasing hunting opportunities to safari companies, the individual operator faces problems of market instability and extensive demands on his personal and management time. The need for greater stability has, as for cropping, turned attentions to the local hunting market which is of considerable size, even if not so profitable.

Live sale operators face increasing running costs, high animal losses, and unpredictable capture circumstances. Thus the [illegible] shortage of animals for sale has led to high prices. This makes the stocking with anything but small numbers of game a difficult and expensive exercise - a considerable disincentive for those hoping to farm game where animal mortality could be high due to drought or poaching.

Given such a complex management situation, it is difficult to assess whether game is being optimally utilised. If the informal aesthetic and recreational values are included with aspects of profitability, then the author feels that wildlife in the Cape Province is being used more efficiently than is apparent from first impressions. The achievement of games' production or profit potential in the future will depend largely on the gamefarmers' response to market demands for venison, these being unclear at the present time.

3.2. RECOMMENDATIONS

In the author's view, DNEC, with the formal goal of conserving the Cape flora and fauna, is dealing with farmers whose personal goals and priorities are not necessarily the same. Hence, although

aesthetic motives play a large part in gamefarming, they are not always restricted by perceptions of conservation (and more specifically, genetic conservation). Whether game should be managed primarily for nature conservation purposes is a question not addressed in this study. This survey has indicated,firstly, that an individual farmer's motives should be accomodated and indeed used as a testing ground for the practicability of new conservation management ideas. That is, if one cannot convince a farmer to adopt established ideas over the long term, it is probable that the recommendations are not ideal in that situation. Secondly, effective conservation deals with habitats as much as with individual components. As such, if the farm habitat is drastically altered or managed on non-conservation lines, then the purpose of managing the so-called wildlife populations to maintain, say, their original gene pool, falls away. The wild ungulate, in other words, is facing a new set of environmental stresses and should not be forced to do so with the limited and specialised gene pood previously at its disposal.

The difference in goals between DNEC and the gamefarming community is relevant to the role an extension service will play. As part of DNEC, the gamefarming section must tailor its extension programme to meet the Department's floral and faunal terms of reference. This orientation may well lead to gamefarmers adopting a reserved attitude to the Department, thus limiting its effectiveness. This potential problem gives rise to the first of the recommendations listed in point form below.

(i) The goals of the gamefarming section should be explicitly laid out in a formal, widely-publicised policy statement. The statement should be formulated in the light of conservation policies and practises, farm management aims, and marketing organisations and activities. Such considerations should be specifically mentioned for purposes of future decision-making and for the resolution of conflicts.

(ii) Any extension agency must study the human aspects of management and use this information to guide its policies and practises. To quote from a report on a wildlife research and

management symposium (Anon., 1977);

> "The great majority of conservation bodies in South Africa are concerned solely with technological or biological aspects of environmental conservation. Little attention, if any, is being given to administrative, economic and social aspects of environmental problems in the country."

Williamson and Teague (1971) also emphasize the human aspects of resource management. Consequently, either appropriate posts must be provided, or closer liaison with the existing agricultural extension services must be established, particularly for training purposes.

(iii) Apart from the provision of an advisory service to the farmer, a second role for the gamefarming section could be the provision, stimulation, or co-ordination of farm-based applied research. This role would carry a heavy staffing requirement to ensure adequate supervision and evaluation of those trials undertaken. Given the appropriate committment, there are extensive requirements for developing techniques for the evaluation of habitat suitability (leading to estimates of species-specific carrying capacity), and census undertakings (to establish stocking densities). Following from such basic resource information there are requirements for establishing practical methods of controlling animal movements, of effective live capture, and for cropping strategies and techniques.

(iv) The standards and codes of conduct essential for establishing stability in gamefarming should be left largely to organised gamefarmers' bodies. Given a reasonable degree of support from the gamefarming community, any recommendations made by these gamefarmers' bodies should be followed by the majority of gamefarmers without the need for extensive enforcement. An extension service relying completely on the goodwill of the farmer should avoid enforcement responsibilities in the direct sense. By remaining independent of formal enforcement the extension agency will be viewed by the farmer as relatively impartial and consequently receive comments and compaints arising out of requirements.

(v) The marketing aspects of gamefarming are normally beyond the control of any conservation agency. However, as an advisory body and in conjunction with the gamefarmers' bodies, influence might be had over the private and public agencies involved in marketing operations. It is essential to maintain a variety of marketing modes to accomodate the range of requirements held by both the farmer (as producer), and the public (as consumers). For instance, in the venison market there is a need for a spectrum of outlets from intensive national and international operations to local and perhaps irregular markets which do not require specialised and expensive services. The problem of developing the national venison market could also be approached simultaneously from the perspective of heavily commercial, nationwide marketing campaigns and from the gradual expansion of localised markets and outlets. It appears advisable to maintain marketing diversity and certainly, considering the need for innovation and incentive in an expanding but marginally profitable enterprise, to maintain a free enterprise approach to these commercial aspects of game utilisation.

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Appendix I : THE DRAFT QUESTIONNAIRE USED IN THE PILOT RUN

AN ENQUIRY INTO GAME FARMING

Introduction.

1. The major part of my work centres on the identification of problems experienced in all aspects of farming game. Are there any dominant problems which you feel prevent you from expanding or improving your game farming activities?

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

(if necessary please continue on the attached sheet.)

2. Many game farmers experience problems with or hear complaints from neighbours who have little interest in game farming themselves. Could you please indicate below the number of farmers neighbouring directly on your boundary that are;

Co-operative in game matters ☐ Neutral on game matters ☐ Complain about game matters ☐

Statistics Section.

. this section will be very helpful in the establishment of a data base for use not only in this study, but also in future problem-solving efforts.

3. Please indicate the size of your farm;

in morgen . . . . . .
or hectares . . . . . .

4. Would you please list your more important farming enterprises (in order of importance if possible)?

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

Appendix I (cont.)

Statistics Section (cont.)

5. Could you please, even roughly, estimate the proportion of the total area of your farm that is used for the following purposes ?

- exclusively for game farming ☐

- for game farming as well as other enterprises (e.g. sheep and springbok in the same paddocks). ☐

- exclusively for enterprises other than game farming. ☐

6. If you have no objection, would it be possible for you to provide even a very rough estimate of the contribution that game farming makes to your farm income ?

Very little ☐ Up to 10% ☐

10% - 50% ☐ More than 50% ☐

7. Of the game species listed below could you please;

- indicate those species which you currently have on your farm ?
- for each species give even a rough estimate of numbers in 1982 (before any culling) ?
- for those species concerned, the approximate date of their introduction onto your farm ?
- for each species indicate which uses are made of them - the different uses are described on the next sheet together with the table.

If any of the above information cannot be easily provided, then please merely fill in that which is available - even a partially filled-in table is of considerable use.

Appendix I (cont.)

Descriptions of the different Game Uses:-

Recreational Hunting - Hunting done largely by the farmer himself, and on occassions with friends and relatives.

Commercial cropping --The cropping of animals for meat and skins (e.g. Helicopter or night shooting).

Safari Hunting - Hunting by local or overseas clients who pay for the animal and backup services.

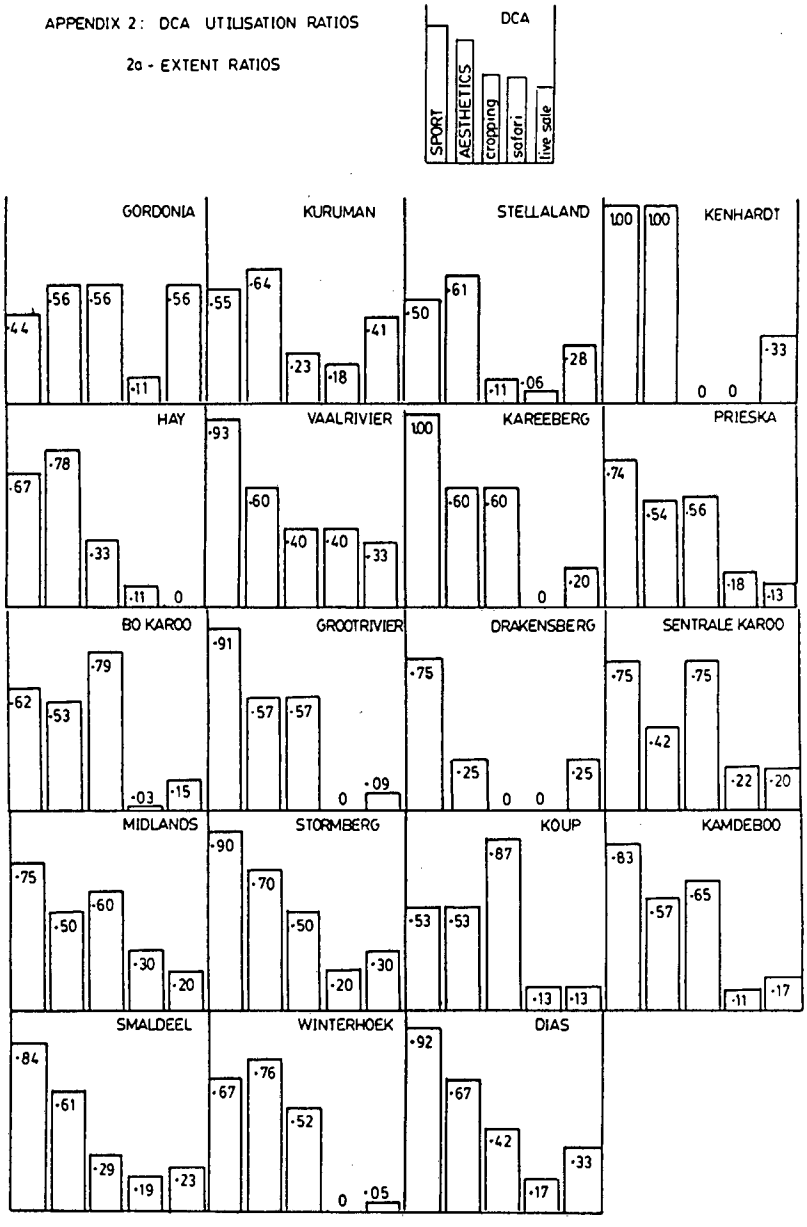
Tourism - The use of the area for photographic safaris and other sightseeing activities.

Aesthetic interest - Having the animals on the farm for the pleasure they give the farmer and his family.

Game species	Approx. Numbers	Date of Introd.	Recreational Hunting	Commercial Cropping	Safari Hunting	Tourism	Aesthetic Interest
SPRINGBOK							
GEMSBOK							
RED HARTEBEEST							
BLESBOK							
BONTEBOK							
BLACK WILDEBEEST							
KUDU							
BUSHBUCK							
ELAND							
MOUNTAIN REEDBUCK							
COMMON LECHWE							
VAAL RHEBOK							
BLUE WILDEBEEST							
IMPALA							
Others, including exotics							

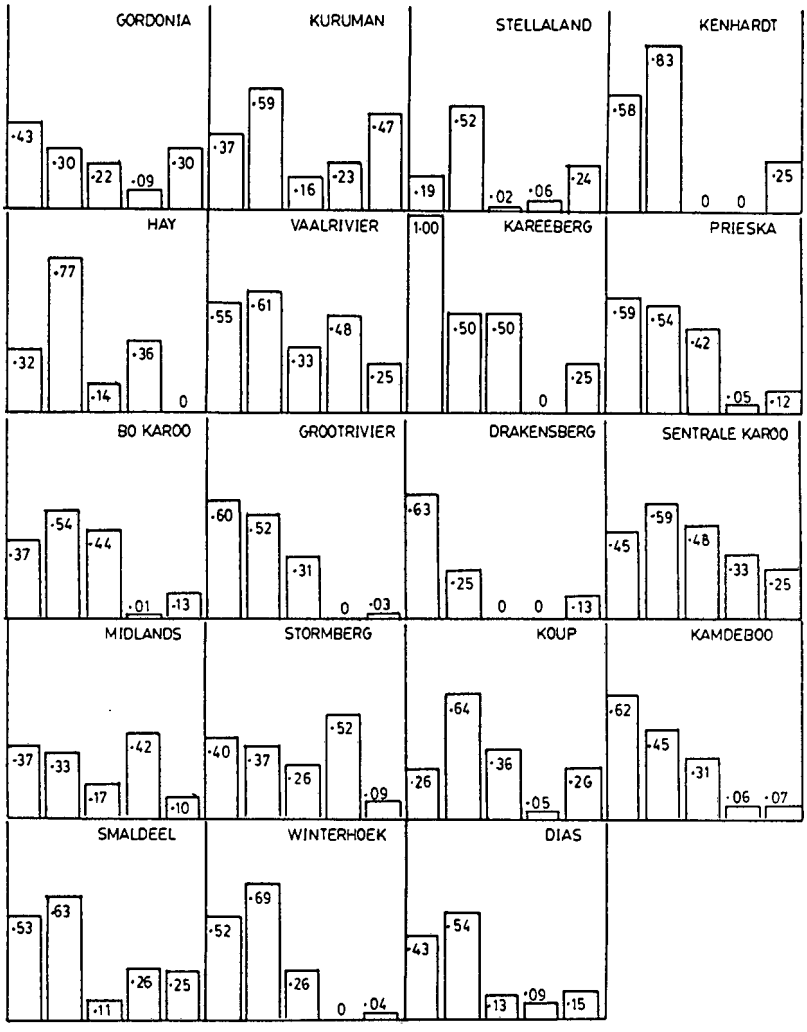
APPENDIX 2: DCA UTILISATION RATIOS

2a - EXTENT RATIOS



APPENDIX 2 (cont.)

2b - INTENSITY RATIOS



APPENDIX 3 : Problem statements classification for the Questionnaire survey

A) MANAGEMENT SECTION.

AI. Habitat suitability.

AI.I. Fodder and Cover Adequacy:-

"Lack of suitable grazing and shelter"

"Problems with habitat suitability"

"Buck have adapted, breeding well"

AI.2. Drought conditions:-

"Intermittant droughts"

"Heavy mortalities between droughts"

"Young die off"

AI.3. Parasitism:-

"Parasites"

"Internal parasites"

"Internal parasites lead to mortality under stress"

"Paralysis tick on Ribbok"

"Horsefly, luise, bosluise, especially with eland"

"Heartwater problems"

AI.4. Loss of condition:-

"Unaccountable loss of condition"

A2. Breeding cycles/Population maintainence

A2.I. Herd build up:-

"Buck have adapted, breeding well"

"A long period is required for breeding up herds"

"Blue lice, in stress periods, reduce numbers"

"Sex ratio of herds imbalanced"

A2.2. Breeding performanoe: -

"Large increase in the number of kudu"

"Poor breeding performance"

"Small herds have low lambing percentages"

"Blesbok reproduction suffers during drought"

"Blue lice cause loss of condition leading to aborted foetus's"

A2.3. Population information:-

"Terrain makes (harvesting and) census difficult"

"Census techniques needed"

A2.4. Population control:-

"Has to keep numbers down"

"Surplus animals cropped"

"Culling required during droughts"

"Numbers restricted as unable to rotated"

"Limit game with other enterprises in mind"

A2.5. Predation:-

"General predation"

"Black eagle"

"Jackals"

"Lynx"

A2.6. Poaching:-

"General"

"Public roads"

"Night shooting"

"Dogs and snares"

"Stray dog packs"

"From railway line"

A3. Controlled grazing and herding

A3.I. Origin:-

"Springbok originally inadverantly included with the erection of jackal-proof fencing"

A3.2. Grazing control:-

"Veld in poor condition due to past overstocking"

"Bush encroachment"

"Excessive stocking rates are leading to veld deterioration"

"No problems as long as camps not overstocked"

"Grazing management particularly difficult during droughts"

A3.3. Grazing problems:-

"Selective grazing problems with springbok"

"Removed Blesbok as they were obliterating the grass element"

"Imported impala problematical"

A3.4. Animal movement control:-

"Undecided as to advisability of controlling animal movement"

"Rotation to enable cropping of alternate camps"

"Camp rotation difficult"

"Wants to make camps smaller for animal control"

"Fences control game yet disrupt natural rotational movements"

"Animals go through fences"

"Springbok jump fences"

"Poor fences mean wandering animals"

A3.5. Social impacts of fencing:-

"Separation of young animals from herd"

"In small camps, subordinate males killed by dominant ram"

"Black wildebees show aggression with both eland and red hartebees"

"Gemsbok/eland and springbok/blesbok combinations must be avoided"

A3.6. Fencing damage:-

"Fighting between fences"

"Animals break fences"

A3.7. Supplementary feeding:-

"Game won't take feed during drought"

"Supplementary feed used"

"Kept alive with supplementary feed"

A4. Game use aspects

A4.I. Game utilisation techniques.

A4.I.I. Live capture:-

"Live capture is a problem for smaller farmers"

"Methods are needed for the capture of small numbers of game"

"Too many losses"

"The use of drugs on freshly captured animals had negative results"

A4.I.2. Cropping:-

"Difficult to do own large-scale cropping"

"Availability of hunters poor"

"Helicopter cropping is good but unreliable"

"Until the advent of helicopter shooting, shottists were hard to obtain and logistics were difficult"

"A helicopter is the only thing usable in the topographic situation"

A4.2. Effects on breeding conditions:-

"Springbok ewes are pregnant during the hunting season"

"No breeding in year following commercial cropping"

"Very low lambing % following a drop in hunting pressure"

A4.3. Constraints on utilisation:-

"Small camps prevent significant levels of gamefarming"

"Fencing clashes with aesthetic and safari requirements"

"Terrain makes it difficult to use game in any way"

"Terrain makes harvesting difficult"

"Difficult to hunt in duiker habitat"

A4.4. Effects on genetical aspects:-

"Cropping techniques need to be refined to avoid inadvertant genetic side effects in populations"

"The size of springbok is decreasing"

"There is a deterioration of trophy characteristics through the cropping of rams"

A4.5. Species Importation:-

"New blood wanted at reasonable prices"

"Wants to bring in new blood"

"Few species available locally"

"Obtaining game from 'Parks Board' difficult"

A5. Competing land uses.

A5.1. Type statement:-

"Limits game with other enterprises in mind"

A5.2. Grazing conflicts:-

"Need to assess the vegetative impacts of game"

"Springbok compete with sheep for palatable food"

"Springbok do not compete with sheep, but do with other antelope"

A5.3. Pest conflicts:-

"Kudu attracted to cultivated lands and feeding sites"

"Escaped fallow deer becoming a pest"

Parasitism conflicts:-

A5.4. Parasitism conflicts:-

"Internal parasites accumulate in constantly grazed camps"

"Game carry and spread parasites and cannot be dosed"

"Need to be able to deworm and dip game to prevent parasites being carried onto domestic stock"

A5.5. Supplementary feeding:-

"Game will not take feed during a drought"

"Supplementary feed used"

"Game kept alive with supplementary feed during droughts"

"Game poisoned by urea"

B) DESIRABILITY SECTION

BI.

BI.I. Farming status:-

"I am not a gamefarmer"

"I have just started with game"

"Gamefarming is just a side line"

"No management efforts made with game"

"Gamefarming is undertaken on the same footing as traditional farming"

"Refuses to commercialise game"

"Intends attempting a commercial cropping venture"

BI.2. Rationale for keeping game:-

"Keep game for pleasure"

"Game kept for own curiosity"

"Game kept for aesthetics, surplus animals being cropped"

"Game kept for sport and conservation attraction"

"Farm is a wildlife refuge"

"Highly emotive game conservation stance"

"Preservation interest aroused by severe and repetitive drought"

"Gamebird enthusiast"

"Would like to capture game rather than hunt it"

B2. Institutional impacts

B2.I. Information and advice availability:-

"Lack of literature pertaining to gamefarming"

"Confusing and conflicting 'facts' and advice"

B2.2. Profitability:-

"Gamefarming not considered profitable"

"Sheepfarming gives a better income for the veld used"

"Economic considerations influenced by aesthetics"

"Costs are high in gamefarming"

B2.3. Stability:-

The trophy market is very erratic"

"The general marketing situation is not stable"

"The venison market looks better than the trophy market"

B2.4. Regulatory requirements:-

"Controlling bodies, with little direct interest in farmer's bodies, are attempting to exert control from behind their desks, so leading to conflicts"

"Control of game has decided a farmer on reducing his animal density"

"Legislation aimed at protecting game is counter-productive as it hinders the gamefarmer"

"As all the expense and trouble of establishing game has been personal, he resents control over his use of them"

B3. Utilisation processes

B3.I. Cropping:-

"It is difficult to do his own large-scale cropping"

"Availability of hunters poor"

"Until the advent of helicopter shooting, shottists were hard to come by, and logistics were a problem"

"Local prices are poor, but to justify travelling to better paying markets, production volume must be higher"

"Prices from casual sales are not good relative to other meat prices"

"Marketing of produce used to be very difficult"

"Marketing by private organisations looks like being stifled by co-operatives"

"Helicopter is the only thing useable in the topographical situation"

"Helicopter cropping is good but unreliable"

"The venison market looks better than the trophy market"

B3.2. Live sale:-

"Drug immobilisation necessary for handleability"

"The use of drugs on freshly captured animals had negative results"

"Live capture is a problem for smaller gamefarmers"

"Methods are needed for the capture of small numbers of game"

"There are too many losses involved"

"Live capture is very expensive and so leads to high prices"

B3.3. Safari:-

"Cannot guarantee kudu as they jump fences"

"Most clients cannot shoot"

"The nuisance value of hunters during the open season"

"The trophy market is very erratic"

"The safari clientele is shrinking under economic constraints"

"There is a need to set up organised price structures in hunting"

B4. Regulations and costs.

B4.I. Type statement:-

"Legislation aimed at protecting game is counter-productive as it hinders the gamefarmer."

B4.2. Fencing regulations:-

"Has trouble obtaining a fencing permit"

"Having to renew permits every three years, with a degree of uncertainty always attached, is just another destabilising factor in full-time gamefarming"

"The requirement for unacceptably and unnecessarily expensive fencing prevents more humane cropping by using helicopters"

"It is impractical to ensure completely adequate enclosure"

"Fencing costs are high and unavoidable"

"Fencing costs are too high for legal large-scale cropping"

B4.3. Game movement regulations:-

"Restrictions on moving game"

B4.4. Health regulations:-

"Uitenhage health inspector insists on meat going through abatoirs"

"Lack of health authority co-operation makes marketing to urban areas difficult"

B4.5. DNEC role:-

"Could DNEC use reserves as stocking sources"

"Wants DNEC to help prevent road poaching at night"

"As all the expense and trouble of establishing game has been personal, he resents DNEC control over his use of them"

"Nature Conservation sale lists are notoriously slow, with it being difficult to get game at all."

"Getting game from 'Parks Board' is difficult"

B4.6. Representative bodies:-

"Need for an organisation to look out for the gamefarmers' interests"

"Co-operative unions appear to be stifling the efforts of private enterprise"

Appendix 4 : PROBLEM STATEMENTS CLASSIFICATION FOR THE MANAGEMENT INTERVIEWS

A) MANAGEMENT SECTION

A.I. Habitat suitability

A.I.I. Fodder and cover adequacy.

"Only optimally adapted species should be run"

"The stocking of species in unsuitable habitats causes problems"

A.I.3. Parasitism.

"Possible heartwater problems with eland"

"Possible nasalworm problems with hartebees"

"No snotsickte problems with black wildebees"

"No veterinary problems"

A.2. Breeding cycles/Population maintainence.

A.2.2. Breeding performance.

"Aware of the influence of sex composition on productivity"

A.2.3. Population information.

"The farmer often does not know the status of his game"

"Difficulty in assessing the status of the kudu herd"

A.2.6. Poaching.

"The fines for illegal hunting are too low"

"Problems with poaching from roads"

A.3. Controlled grazing and herding.

A.3.2. Grazing control.

"Estimates the multispecies carrying capacity by himself"

"Veld management problems"

A.3.4. Animal movement control.

"Stock and game do not go together because of the need for fencing"

A.3.7. Supplementary feeding.

"Lucerne and other feeds are used in droughts"

A.4. Game use aspects.

A.4.3. Constraints on utilisation.

"Aware of the effect of camp size on productivity"

A.4.5. Species importation.

"The availability of animals for stocking is very low"

"The cost of buying in game is too high"

A.5. Competing land uses.

A.5.- Comments.

"The management time demanded by game is critical in comparison with similar demands by other farm activities, even with a manager to help"

"The use of game on surrounding farms for a fee gives these animals a value and reason to conserve them"

A.5.I. Type statement.

"Sheep and springbok in the same area caused no problems"

A.5.2. Grazing conflicts.

"Many farmers do not reduce domestic stock when they introduce game, so resulting in critical overstocking intimes of drought"

"Domestic stock and game areas are kept largely separate for grazing purposes"

A.5.3. Pest conflicts.

"Problem animal excuse used by those who are anti-game"

"Neighbour problems"

B) MOTIVATION SECTION.

B.I. Preferences.

B.I.I. Farming status.

"Do not actively manage game"

"The majority of farmers are unaware of games' potential"

"Larger farms may have more space to experiment or relax attitudes on game management"

"Larger farms can afford to be lethargic, but likewise have more complex situations to manage"

B.I.2. Rationale for keeping game.

"Younger generation farmers are more pro-game"

"The present gamefarming emphasis is on species diversity"

"Many gamefarmers are aesthetically motivated"

"The management motivation for meat production is very low"

"Game kept for aesthetic purposes is often mismanaged"

"Keeps game because he likes it despite its lack of profitability in comparison with other activities"

B.2. Institutional impacts.

B.2.I. Information and advice availability.

"There is a need for applied research on carrying capacities"

"There is a need for applied research on cropping rates"

"The average farmer is aware of broad ecological veld issues"

"Farmers are not aware of research results"

"There is a need for interpretive services within research bodies"

"There is a lack of awareness education on wildlife issues"

"Many farmers are ignorant of ecological cause and effect processes"

"There is a need for applied research into tick-borne diseases and parasites"

"There is a need for applied research on population dynamics"

"Most knowledge is gained personally or by communication with other farmers"

"There is a need for applied research into live game transportation"

"Symposia are useful sources and forums of information exchange"

"Local knowledge of game and its habits is very important in management and utilisation"

"The 'Farmer's Weekly' and 'Landbou Weekblad' provide the most significant sources of management knowledge"

"Sufficient pure research exists on basic biological matters, but has not been communicated to farmers"

"No one authority exists to provide advice on game matters"

B.2.2 Profitability.

"Although game has other advantages it is only judged on cash income basis"

"Gamefarming is too financially and managerially unstable to compete directly with other land uses"

"An unrealised potential lies in secondary product marketing"

B.2.3. Stability.

"The marketing situation is a limiting factor"

"The costs of marketing are killing the demand"

"External markets should not be relied on so heavily"

B.2.4. Regulatory requirements.

"All legislation that is inadequately enforced is counterproductive"

"Farmers tended to be sensitive on any authoritarian approaches"

"The present flexible tax status of game makes its future formalisation a complication"

"Favours strict standard setting in management and marketing fields, with the appropriate disciplinary measures"

B.3. Utilisation processes

B.3.I. Cropping.

"There is a lack of a systematic approach to cropping and production"

"Prefers the ease of cropping firms doing the work and handing over the cheque"

"There is a need to establish a pricing mechanism for meat sales"

"For large scale production, the farmers are dependent on marketing organisations"

"Local demand for venison is way below its potential, preventing large scale local marketing"

"The marketing of Blesbok is difficult due to past bad quality supplies"

"Constant meat supply and reasonable prices are co-requisites"

"The local informal market is substantial, with much bartering replacing cash sales"

"There are problems with the effect of cropping methods on the quality of the meat"

"Cropping is currently the most immediate bottleneck in the possibility of increasing production"

"Farmer finds that the local demand for meat exceeds his supply"

"Cropping methods are critical to meat quality"

B.3.2. Live sale.

"Live capture techniques are too under developed to be financially viable"

B.3.3. Safari hunting.

"There is a need for standards and price setting"

"Too much emphasis is placed on overseas clients, thus leading to instability"

"South African farms are not optimum sources or settings for big trophy hunting"

"Safari hunting and cropping are compatable game uses"

"The use of surrounding farmers' game for hunting gives these animals a value in the fee paid per head"

B.4. Regulatory requirements and costs.

B.4.I. Type statement.

"Those exotic species frowned upon by conservationists can form a very substantial meat production source"

B.4.2. Fencing regulations.

"Some animals, because of their habits or low density, are not worth fencing in. But they should still be useable with the aid of a general hunting license"

B.4.3. Game movement regulations.

"There is too much control over animal importation"

B.4.4. Health regulations.

"The formalisation of marketing will lead to localised abatoirs which local health authorities would prefer to be centralised"

"Potential problems with ambiguous legislation and otherwise health authorities"

B.4.5. DNEC role.

"Has experienced frustration due to lack of support from DNEC"

"Has no complaints against DNEC"

B.4.6. Representative bodies.

"Farmers have not used existing channels to express their opinions"

"Farmer is anti-monopoly and would prefer regional co-operative marketing"

B.4.7. Hunting regulations.

"The existing bag limits are counterproductive in effect"

C) GENERAL COMMENTS SECTION

"The gamefarming situation and its problems are very diverse"

"Public attitudes are not conducive to wildlife conservation or use"

"Uses game area as an educational base for local schools"

"Making the best use of a productive game population is complex "

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