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Abstract: Progress report of the cheetah study that was conducted from 1984-1986 in Namibia. Details on ranging behaviour, diet and depredation on livestock during the report period are presented.

THE ECOLOGY, BEHAVIOUR AND MOVEMENTS
OF CHEETAH ON THE FARM AREAS
OF S.W.A. (NAMIBIA)

PROGRESS REPORT - OCTOBER 1985

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Introduction:

Here - in is the progress report for this project for the time period November 1984 to November 1985.

It must, right at the beginning, be emphasised that this report is only a reproduction of the progress made with the fieldwork of the project for the above time period. No attempt has been made to discuss this information in detail, since the second phase of the project will be the start of fulltime fieldwork. The information collected so far will thus only be briefly and superficially discussed.

The time available for fieldwork on this project

during this report period, was extremely limited and often interrupted by AD-hoc work. (a total of 96 days from Nov '84 to Oct '85 were spent in the field, compared with 182 days from Feb - Nov '84, in other words 45% of the previous year) The limited and interrupted time in the field greatly hindered the project. Considering the study area of this project lies entirely on private land, continual informing and communication with the relevant landowners was an essential requirement for the success of this project.

At the beginning of the project the lack of thorough communication and informing, during a very short time period, led to an extremely negative attitude of the landowners in the study area towards the project, which hindered the project progress. Only after a personal visit and intense communication and informing, did the attitude towards the project improve. At the

end of last year a high point was reached when 16 cheetah were fitted with radiotransmitters and released into the area.

The success which was reached at this stage, is little more than was already known and accepted; that it can continue by itself allowing the involved persons time for other AD HOC tasks.

The direct consequence of this limited and interrupted fieldwork led to a decline in the communication and informing programme, and the co-operation of the farmers, for this short time period, was once again limited to a minimum.

A negative attitude of the landowners towards the project was definitely one of the largest reasons why the 8 marked cheetahs should be removed from the study area.

A further important consequence of this limited & interrupted fieldwork was that the planned intensive observations (behaviour, hunting habits, prey ratios, catching frequencies etc) of the radio-collared cheetah could not be carried out, and thus the fieldwork of the

project had to be extended. Through this the trust of the concerned farmers was also lost, since fieldwork was initially only planned for 2 years.

Another big and serious problem experienced was that during the agreement with the farmers to carry out the project on their land, some form of "acknowledgement" for their co-operation shall be granted by the Directorate.

This created huge problems - legal aspects which the State is bound by, potential problems which restrain such an "acknowledgement", departmental policies, etc. Even private "conservation" organisations were not willing to grant any form of "acknowledgement" to the concerned farmers.

It must be strongly emphasised that the above-mentioned facts, discussed here in detail, are not

to 'break off' the project or to create a negative attitude -
(on the other hand, under the circumstances relatively good progress has been made with the project, and a lot of important information has been collected)
- but instead to illustrate the problems concerned with such a project, Especially since this is the first time such a project on carnivores has been carried out on private land, and the Directorate can surely benefit and learn from the results.

Intensive and continual communication between all concerned parties and a form of "acknowledgement" is, with such a project, definitely one of the most important factors for success and should thus be promptly established with future projects.

As already mentioned the fieldwork progress is discussed here, and the results

collected will only be briefly discussed.

At this stage a plan is needed to collect information which is still required (observations on behaviour, activity and prey relationships) to finish the project in a meaningful way, through a short intensive UNBROKEN time period in the field; this then to re-write and as quickly as possible make the situation available to the International Conservation.

Organisations so that the needed approval can be granted for the limited hunting and trade of cheetah.

The necessary management recommendations for future successful conservation of the cheetah on farm areas, and the reduction of stock-loss shall also then be made available.

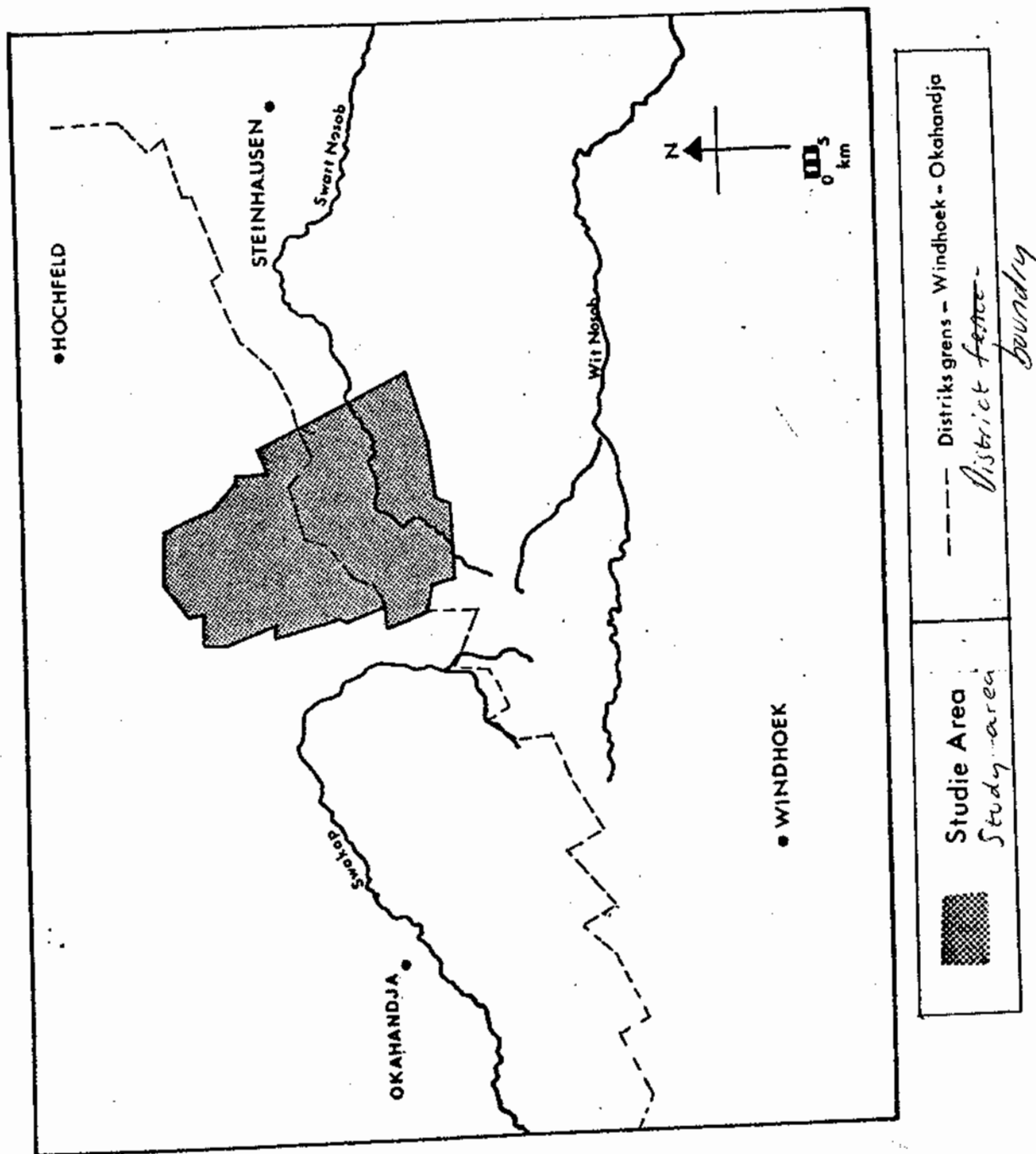
STUDY AREA

20 farms in the 'Steinhausen - Hochveld' area with a total area of about 100 000 hectares (see fig. 1). The radio collared cheetah, during 1984, moved almost without exception within this area. During this report time period only one cheetah moved fulltime (exclusively), and another sometimes, within the study area. This other cheetah moved to 6 km North, 120 km West and up to 80 km SW of the study area.

METHODS AND TECHNIQUES

As in November 1984 progress report complete discussion, the cheetah in the study area were caught in trapeages by 'play trees', tranquilized, fitted with radio-collars and released.

The marked animals were followed by foot, vehicle and



FIGUUR: 1
 LIGGING VAN DIE STUDIE AREA
Location of the Study Area

aeroplane (5 times or 23 hours during recorded time period) and tracked with an antennae and receiver apparatus. The positions of the marked animals were plotted weekly by means of a compass bearings and trigonometry on a 1:50 000 map.

With the tremendous distances that the cheetah have moved this year, and the limited and interrupted available tracking period/time, collectively hindered the tracking of the animals. Many hours were spent simply plotting the animals positions weekly.

Due to other obligations, the aeroplane was only available once a month for the first half of the year and not at all in the second half of the year. Thus up to 2 to 3 days were spent tracking one cheetah.

This problem experienced emphasizes the absolute necessity of having an aeroplane for a minimum of 2 times per month for such a study

Observations on prey relationships / composition is currently done with the help of carcasses which are found in the veld. Faecal samples (scats) are collected on an uninterrupted basis. Complete post-mortems are conducted on all cheetah which died during the time period. Blood samples, organs, stomach contents, reproductive organs and the skull of each is collected.

Current data on stock-loss is as far as possible collected with the help of the concerned farmers. Unfortunately there is still only one farmer in the whole study area who keeps records of all mortalities of his cattle, and it is with his consent that this information is acquired.

PROGRESS RESULTS

During this report time period only 3 young cheetah were marked with radiotransmitters. The 3 were caught and released during November 1984 on the farm "Otjisauna Nord" of Mr. D. Metzger. Two months later the animals were caught on the farm 'Okumukuru' of Mr. E. Hammar, and destroyed on account of large cattle losses experienced.

Eight radiocollared cheetah were removed from the area in this time period: - One adult ♂,
7 sub-adult ♂ and one adult ♀.

6 of these animals were destroyed and 2 donated to a cheetah breeding station.

One of the marked cheetah, an adult ♀, was lost during July 1985 and could not be tracked after numerous intensive searches from the ground and air. It is presumed that the cheetah was caught and killed by labourers on an uninhabited farm (See Table 1)

MOVEMENTS AND TERRITORY SIZES

① Adult lone ♂

Marked: 8/4/84 on Otjisaunaa Nord

- still being followed

Tracking period - 17 months

Territory size - 244,76 km²

(See fig: 3 and 4)

This ♂ had an interesting home range over the last 17 months: Up to and including November 1984 the ♂ moved in a relatively limited area, 83.05 km². For 3 weeks he moved in a

small area 20km out of his original area, and for the rest of the time period up to 31 October he moved in a limited area of 60.5km², 90km from the original area. Thus far no explanation can be found for the shifting of home ranges.

② Adult lone ♂

Marked - 9/6/1984 on 'Otjisauva Nord'

Died - 25/1/

Tracking period - 7 months

Home range - 179.85 km²

This was the only marked cheetah which moved in an Easterly direction after release, and settled in an area 40km East of the study area. This ♂ also

had 2 definite separate home ranges, with a 'transition - area' which was revealed over the 7 months of tracking. The size of the first area was approximately 39,6 km² and the second area 13,75 km², until his death in January this year. Once again, no explanation for the shifting of core (nucleus) areas, can be found.

③ One group of 2 adult ♂'s

Caught: 21/12/1983

Died: 13/9/1984

Tracking period: 9 months

Home range: 133,11 km²

(Fig. 7)

These 2 cheetah were originally part of a group of 3, but the third cheetah was, shortly after it had been caught, again caught in a trap cage and died

of hunger.

The remaining two moved and hunted together for the rest of the time period, and after 9 months of tracking had a relatively limited home range of 133.11 km².

During this period the whole area was reasonably fully occupied. It is interesting to note that these specific cheetah were caught and released five times in trap cages. Three other cheetah, all ♂'s, were also on various occasions again caught and it is thus possible, as far as ♂'s are concerned, to catch cheetah repeatedly (even in the same trap cage).

These two ⁽²⁾ specific ♂'s caught more cattle calves after each release, and it was thus decided to destroy them.

④ One group of 3 sub-adult ♂'s

Marked : 15/11/84 on 'Otjisauna Nord'

Died : 18/1/85

Tracking period : 2 months

Home range : $86,35 \text{ km}^2$
(Fig 6)

The 3 ♂'s were caught over two days on Otjisauna, all 3 fitted with radio collars and released. The animals moved 30km over 3 days in a westerly direction, and settled in an area of approximately $26,95 \text{ km}^2$ for the rest of the time period. All 3, during January of this year, were caught on 'Okumukuru' farm, and due to heavy cattle losses by the owner at that stage, all 3 were destroyed.

⑤ One family of 6 cheetah:

(one adult ♀, 4 sub-adult ♂'s
and one sub-adult ♀)

Marked - 26/4/1984 on Otjisauna Nord

(see table 1 & Fig. 8)

These cheetah are all part of a family caught over 3 days on 'Otjisauna Nord', and all fitted with radio collars. The individuals were followed from 11 to 18 months and thus valuable and interesting information on the movements and distribution of each animal could be attained.

The family moved as a group of 6 for 2 months, over an area of 137.5 km^2 , where-upon the mother moved away from the young and within 2 months she had her next litter, and for the next 9 months moved over an area of approximately 82.5 km^2 .

This ♀ has been missing since June 1985, it is presumed that she is dead and her radio destroyed.

The 5 young moved in a very limited area for 28 days, and there-after moved apart.

The only ♀ of the 5 moved in an area of 59.95 km^2 for 3 months, had her first litter

and for the following 13 months moved in an area of 35.75 km^2 . (1st sep 1982 plus Fig 2)

The 4 ♂s moved in a westerly direction, covering 120km in 3 days; One of the 4 was caught on the farm 'Okatjiho', 30km west of Okahanja. The animal was again released, and moved over 'Waldau' to 'Von-Bach game reserve', where he stayed for about 3 weeks, and then returned to the study area and his original home-range. Eventually this ♂ (until his death in April 1985) settled in an area of 57.20 km^2 , 70km west of the ~~study~~ study area.

His 3 other brothers were also caught - 2 months after their brother - on the same farm 'Okatjiho'. The farmer did not want to release the cheetah, thus the 3 were released in the vicinity of 'Von-Bach game reserve'. The 3 moved, for the following 9 months, in an area of 23.65 km^2 , about 30km North of 'Von-Bach game reserve'

One of the 3 ♂s was killed by a vehicle on the main road between Otjiwarongo and Okahonja in June 1985. The remaining 2 were again caught on the farm 'Okatjiho' in October, and given to a breeding centre.

⑥ One adult ♀

Marked : 7/4/1984

Died : 15/7/1984

Tracking period : 3 months

Home range : 148.5 km²

(Fig 10 and 12)

This cheetah was caught on the farm 'Otjisavana Nord', fitted with a radio-transmitter and released.

The radio transmitter was tracked 3 months later in the 'Ovitoto-Herero reserve'.

, after one of the Herero's, with dogs, hunted and shot the cheetah in a tree.

On account of the short follow-up time period, unfortunately no clear home range can be distinguished. In 3 months she moved over an area of 148.5 km². She was shot in the area 68.5 km west of this 'home range' area.

⑦ One adult ♀

Marked - 6/12/1983 on 'Schweizerland'

- still being followed

Total tracking period - 21 months

Home range 207.36 km

(fig. 12 + 14)

This ♀ was caught with 2 6 month old young. Seeing as the young were not old enough to

TABEL 2:

territory sizes of the 16 radio-collared cheetahs

TUISAREA GROOTES VAN DIE 16 RADIO- GEMERKTE JAGLUIPERDS

- van DES. '83 tot NOV. '85 -

- from Dec. '83 to Nov '85 -

<u>VOLWASSE</u> : ADULT :		
1 lone ♂	17 mos	
ALLEENLOPENDE MANNETJIE		244.76 km ² .
1 lone ♂	7 mos	
ALLEENLOPENDE MANNETJIE		179.85 km ² .
group of 2 ♂'s	9 mos	
GROEP VAN TWEE MANNETJIES		133.11 km ² .
1 lone ♀	3 mos	
ALLEENLOPENDE WYFIE		148.50 km ² .
♀ with young		
WYFIE MET KLEINTJIES		311.86 km ² .
♀ with young		
WYFIE MET KLEINTJIES		216.50 km ² .
<u>SEMI- VOLWASSE</u> : Sub-ADULT		
1 lone ♂	9 mos	
"ALLEENLOPENDE MANNETJIE"		57.2 km ² .
EEN GROEP VAN DRIE MANNETJIES	9 mos	31.35 km ² .
one group of 3 ♂'s		
WYFIE MET EERSTE WERPSEL	13 mos	381.71 km ² .
♀ with first litter		

86.35 in last

to be collared, only the ♀ was collared and released. 6 months later the ♀ was found with 3 'new' young.

In July 2 of the young were shot by a farmer, after he found the 4 at a carcass of one of his calves.

In the 21 months of tracking the ♀ moved over a constant area with only one 'wandering out' of 'about 40 km being recorded.

TOTAL COUNT OF CHEETAH IN THE
STUDY AREA

- NOVEMBER 1984 - NOVEMBER 1985 -

Dead:

A total of 22 cheetah were destroyed in the time-period in the study area (See table: 3)

According to the permit record of the Directorate

TABEL 3:

Total number cheetah removed out of study area
TOTALE AANTAL JAGLUIPERDS VERWYDER UIT DIE STUDIE AREA

— VAN NOV. '84 - NOV. '85 —
from

GESKIET <i>Shot</i>		4
<i>caught in trap cage</i>		
GEVANG IN VANGHOK:		
	<i>died</i> GEDOOD	14
	<i>sold</i> VERKOOP	3
	VRYGELAAT <i>released</i>	2
ANDER: <i>other.</i>		
	DOODGERY <i>run-over</i>	1
	DOODGESLAAN <i>beaten to death</i>	1
	<i>caught in trap (snare)</i> IN STRIK GEVANG	2

Total number cheetah dead
TOTALE AANTAL JAGLUIPERDS GEDOOD :

<i>actual number dead</i> WERKLIKE GETAL GEDOOD	22
<i>according to permit system</i> VOLGENS PERMITSTELSEL	12

For the same area and time period, 12 cheetah were destroyed. This is once again proof that a large number of farmers have no permit to destroy cheetah, and that the official record of cheetah deaths over the whole of S.W.A is about 50% defective.

Spoor, direct observations and density of all cheetah in the Study area.

Spoor, and observations of unmarked cheetah in the study area for the past report time period, is continuously noted.

During the time period a total of 48 individual cheetah were marked in the study area. includes young

With the 22 cheetah dead, 48 marked and the 2 radiocollared ♀'s with their total of 8 young - is a total of 80 cheetah for the period November '84 to November '85 in an area of approximately 100 000 hectares.

It must be strongly emphasized that probably only about 20 of these cheetah

occupied and moved within this area permanently, and the remaining 60 only sometimes stay in the area, or move through the area.

The density calculated for the 20 cheetah in the area is -

1 cheetah on 5000 ha (50 km²)

Compared to the density of the total number of cheetah -

1 cheetah on 1250 ha (12.5 km²).

FEEDING

The planned agreement of accurate prey composition by direct observation, did not materialize due to the limited and irregular fieldwork.

Notes, were, however, taken on all carcasses that were seen by chance during the tracking of the marked cheetah.

The following prey items were found:

- Hartebeest calves - not older than an estimated 8 months
- Koedoe calves - up to 2 years old
- Gemsbok calves - not older than estimated 4 months
- Springbok - large bulls were found
- Young warthog - unknown age

It must be strongly emphasized that this is an inaccurate indication of the prey composition of the cheetah. None of the smaller game - which makes up a large portion of the diet - has been recorded. The reason for this is that the prey composition was recorded only by chance.

with the aid of vultures and jackals which helped locate the larger carcasses. The smaller prey animal remains are consumed quickly by other carnivores, leaving no evidence in the veld. The only method of gaining a complete prey composition data, is by direct observations and analysis of faecal and stomach content samples.

It is interesting to note here two recorded cases where cheetah fed on carrion. In the first case a ♀ and 3 young cubs returned 4 days after killing a sheep, to feed. Another ♀, also with young, returned after 8 days to her prey and consumed all the remaining flesh.

This observation has also been made that prey animals older than 2 to 3 months are only caught by a group of cheetah,

and only in one case by an individual.

REPRODUCTION

As already mentioned 2 ♀s with young were collared. Litter sizes ranged from 3-6.

Since the animals were not directly observed, it is not known to what age the young are weaned, and also what the sex ratio is at birth. The young were independent by 17-20 months.

The time period between litters ranged from 2-3 months, after the previous litter have become independent.

The one sub-adult ♀ had her first litter of 5 at about 21 months.

STOCK - LOSS (See Table 4)

Due to the short and interrupted time period spent in the field during this report time-period, the stock losses were only superficially investigated, and not thoroughly followed up. It must be strongly emphasised that the figures collected are as accurate as possible.

It was also found that in fact all the farmers in the study area are now aware of the calf losses being experienced. It is not common anymore, such as in the past, that a carcass found in the veld or even a calf which has gone missing, to simply 'write it off' to cheetah predation. The carcass is now, as far as possible, tracked down and the cause of death determined.

On account of the large farms, thick bushy areas and often shortage of labour and time, the carcasses are often not tracked down - in most cases the calf is simply recorded as 'missing'.

It is important to note at this point how many calves die of 'natural causes':

According to the accurate records of Mr. Metzger a

total loss of 13,8% is recorded for November '84 to October '85.

- 1,4% of these are confirmed deaths by 'natural causes'
- 10% 'missing' where 1,4% are older than 2 months and thus "possibly" caught by cheetah
- 1,8% cheetah predation
- 0,6% jackal predation

Of the total number of missing calves, - 10% - is estimated as 'calves which should have been born' in other words where the cow was tested positive as pregnant, but never had the calf. The calf can thus be a miscarriage before birth, during birth, still born, born weak, eaten by jackals or possibly caught by cheetah.

During the time period Jan '84 to Nov '84 a total loss of 9,5% is recorded - 7,8% natural

causes and 'missing' and 1,7% caught by cheetah and leopard.
(Also very interesting here are the figures obtained from a separate questionnaire insertion - by the Directorate of Veterinary services in 4 districts on the issue of stock losses of the TOTAL NUMBER OF CATTLE :

According to this 1,8% of the losses are due to natural causes, " falling into aardvark holes, hunger, and dead at birth and unknown", and 0,5% due to carnivores.

It has always been, and will continue to be, difficult to convince farmers that by far the largest % of 'missing calves' are not due to cheetah predation, but infact deaths due to 'natural causes'!!

As can be seen in Table 4 the average stock-loss due to cheetah predation on the 13 farms in

the study area is - 3,37% cattle calves
- 9,61% goat
- 9,24% sheep

Very interesting, and important to note here is that the calf losses due to predation by cheetah in the study area was 3,1% in 1984 and 3,4% in 1985.

As far as can possibly be determined, the cheetah which were again released did not consequently cause an increase in the stock loss.

It must be pointed out that this calculation of stock-loss is an average figure - there are certainly farms outside the study area which have lost up to 8% and more of their total 'calf-growth' (lambing %) to cheetah predation.

On average farmers agree that over the cheetah distribution area the average calf loss as a result of cheetah predation amounts to more or less 3% of the total number of calves born.

From personal observations and after discussions with

Farmers, it is also important to consider the farmers' emotional viewpoint and perception (awareness) over the cheetah.

There have always been a lot of cheetah in the area (a total of 80 in one year on 13 farms), the farmers and their labourers see spoor, and sometimes a fleeting direct observation of the animal. The farmers often see the remains of a carcass, in most cases a wild animal and in a few cases his own cattle. Thus if a calf goes missing the natural reaction is to 'write it off' as a cheetah predation.

The cheetah's feeding habits, - of catching only live prey, - of feeding off only a part of its prey, that the animal does not return to the prey and that cheetah catch sometimes every 2-3 days - hardens the attitude of the farmers towards this animal. Cheetah also sometimes catch abandoned calves, ageing from 1-3 months (sometimes up to 6 months and older).

On account of this emotional view over

cheetah, it could be said that on average, for every one calf that is caught by a cheetah the farmer loses ~~or~~ 4 or 5 by 'natural causes'.

When seen in this light, the only possible option for the conserving of a nucleus population on farm areas in this country, is to give the cheetah an 'economic value'. Through the cheetah - a strong control on numbers by means of quotas: live translocation (movement) - (there is large worldwide request for the cheetah from zoos, game parks and breeding stations) - the cheetah as a trophy for overseas hunters (again there is a large request for this)

In this manner the farmer - and not the game trader - must receive the greatest share of the transaction.

A detailed 'Control Strategy' with recommended quotas and other regulations will be drawn up and outlined with the finishing

of this project.

INFORMING AND COMMUNICATION

Informing is done on a continuous basis by means of regular weekly visits to the farms and farmers, both in and around the study area. A newsletter with a summary of all information gathered is compiled in January, and distributed to all farms in the study area and all other interested parties.

Discussions over the goal (purpose) and progress with the project are given to 6 farming unions (associations) and to 3 relevant organisations by the management of game.

Co-operative work with other organisations and researchers :

Seeing as S.W.A is the only remaining source of material on cheetah in the wild,

there lies a great responsibility of all relevant researchers in areas such as reproduction (breeding) of the cheetah, for material on the cheetah which is still 'natural'

During the past time period, attempts have as far as possible been made in and around the study area to collect material from dead cheetah, and to send the material to different researchers and organisations.

For example blood samples and organs which were not used for this study were sent to: Wits medical school for biochemical research on protein structure. For a zoo in New York, America, where the well-known Dr. O. Wildt is researching reproduction and its success for animals in captivity, and also for Dr. Worley doing parasitology work on cheetah diseases in captivity. All the relevant researchers pay for the necessary transport costs.

PLANNING FOR 1986

As already mentioned plans must be arranged for the outstanding data on: hunting grounds, prey composition - age, etc. of prey animals, hunting frequency and to monitor activity periods, and since this data can only be obtained through 'direct observations', it is thus essential to spend an intensive UNBROKEN time period of at best 5 months in the field. Should a technical assistant become available the faecal samples and stomach contents could be analyzed simultaneously as the fieldwork is carried out.

If all goes according to plan, the processing and writing up of all the information can proceed in the second half of the year.

A detailed motivational report has already been drafted for the necessary approval by the IUCN in 1987 for the transferring (movement) of cheetah to appendix 2, and thus the creation of the limited handling of cheetah and its products.

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Kristin -

We have translated as literally as possible, since there seems to be a lot of ambiguity in the original text.

We asked Werner about the following words since it is not clear what the writer's translation is!

1. bewegingsarea - home range ('movement area')
2. loopgebied - home range ('walking area')
3. tuisarea - territory ('home area')