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Abstract: From June 1991 through August 1993, the Cheetah Conservation Fund (CCF) conducted a survey of the Namibian commercial farmlands. The results, including historical information and details about methods used and interpretation of data, are provided in the full document entitled "Survey of Livestock and Predator Issues on the Namibian Farmlands to Assess Problems and Strategies for Cheetah Survival". The objectives of the document are: (1) to identify the important components of farmland ecosystems necessary to sustain a healthy cheetah population; (2) to identify farm management practices that reduce livestock losses from predators; (3) to suggest conservation management plans which are beneficial to both the cheetah and farmers.

SUMMARY SHEETS ON DATA PRESENTED IN THE "SURVEY OF LIVESTOCK AND PREDATOR ISSUES ON THE NAMIBIAN FARMLANDS TO ASSESS PROBLEMS AND STRATEGIES FOR CHEETAH (*Acinonyx jubatus*) SURVIVAL"

Cheetah Conservation Fund
L. Marker-Kraus, D. Kraus, D. Barnett, S. Hurlbut

From June 1991 through August 1993, the Cheetah Conservation Fund (CCF) conducted a survey of the Namibian commercial farmlands. The results, including historical information and details about methods used and interpretation of data, are provided in the full document entitled "Survey of Livestock and Predator Issues on the Namibian Farmlands to Assess Problems and Strategies for Cheetah Survival." The objectives of the document are: (1) to identify the important components of farmland ecosystems necessary to sustain a healthy cheetah population; (2) to identify farm management practices that reduce livestock loss from predators; (3) to suggest conservation management plans which are beneficial to both the cheetah and farmers.

The following summary provides farmers with key information from the full document. If individuals are interested in the full document, it is available upon request from CCF.

INTRODUCTION AND BACKGROUND

A. INTRODUCTION

1. The stage has been reached where the world population of cheetah, estimated to be 100 000 in 1900, has been catastrophically reduced to between 12 000 and 15 000, of which 2 000 to 3 000 occur in Namibia. Namibia is home to between 20% and 30% of all living cheetah, making it the "Cheetah Capital of the World." Namibia's cheetah are an important genetic resource to ensure survival of the species, therefore the Namibian farmers play a key role in the cheetah's survival.

2. Wild cheetah populations are jeopardised by: (1) the loss of habitat to rising human populations, (2) a decline in the abundance of prey species, and (3) the conversion of land to agriculture and livestock farming. Furthermore, few reserves support viable populations to help ensure survival of the species.

3. Maintaining habitat and developing strategies for maintaining free-ranging cheetah populations outside protected reserves are critical for long-term survival of the species.

4. Ten percent of the world's cheetah population lives in captivity and is unable to sustain the survival of the species due to poor reproductive success and high infant mortality. The wild population supports the captive population through imports, but the wild population is declining.

5. According to CITES (Convention of International Trade of Endangered Species) records, from 1980 through 1991, a total of 6 818 cheetah were removed from Namibia (for protection of livestock, trophy hunting or live export), however, this is believed to be an underestimate.

B. BACKGROUND OF THE NAMIBIAN FARMLAND ECOSYSTEM

1. Namibia's harsh farming conditions are underscored by the fact that 16% of the country's total area is hyper-arid (true desert), where agriculture of any kind is excluded. Furthermore, 49% of Namibia's land is classified as arid, 32% as semi-arid and only 3% as sub-humid.

2. Droughts are frequent and unpredictable in Namibia. The recent drought cycle has lasted over 15 years.

3. Commercial livestock is kept on more than 7 200 fenced farms, of which 51% are cattle farms covering 49% of Namibia's total area.

4. As much as 70% of the huntable game species and 90% of the cheetah occur on commercial farms.

5. Europeans began farming livestock commercially in 1884, and during the past 100 years cheetah numbers have been affected by farming practices and natural disasters such as droughts and disease.

6. Nature's diversity ("biodiversity") on farms has been drastically altered by excessive removal of game and predators, over-grazing by livestock, extensive fencing, constant water points, and natural disasters, which all have encouraged severe bush encroachment. The bush encroachment over the last 30 years has significantly decreased the productivity of nearly one-third of Namibia's livestock farmlands.

C. HISTORICAL STATUS OF THE CHEETAH ON COMMERCIAL FARMLANDS IN NAMIBIA

1. Namibia's cheetah have adapted well to living on farms because competitive predators like lion and spotted hyaena are mostly absent, natural prey is abundant, and drinking water is relatively easy to obtain at permanent water points for both the game and cheetah. However, the cheetah has been in constant conflict with farming interests.

2. The cheetah's conflict with man in Namibia has evolved over many years and has been affected by drought conditions, economic considerations, farming practices and environmental regulations. None of these is solely responsible for the cheetah's present status on the farmlands, but their combined and cumulative effects have altered the population. The cheetah's plight can be used as a reflection of the overall status of the ecosystem.

3. The world's cheetah population had declined so severely since the early 1900's that in 1975 the World Conservation Union (IUCN) placed cheetah on the list of Endangered Species (CITES Appendix I). This law prohibited the sale of live cheetahs and skins.

4. Namibia's cheetah population decreased from at the most 6 000 in the 1970's to the present ±2 500.

5. In 1975 a SWA/Namibian Nature Conservation Ordinance classified the cheetah as a "protected animal," and allowed for its removal from the farmlands only in the case of specific livestock predation. Most of the removals though, have been indiscriminate and not related to livestock predation.

6. Early records of removal of cheetah on farmlands indicate that commercial demand for cheetah encourages indiscriminate capture without regard for law as stated in the 1975 ordinance.

7. Two natural disasters occurred simultaneously in the early 1980's, negatively affecting the cheetah population: the "drought of the century" and a rabies epidemic in kudu (a primary prey for the cheetah). Due to the denuded pastures from the drought, farmers reduced game populations by 60% to save the pastures for livestock. This in turn also reduced the natural prey for the cheetah.

8. The farmers' negative perception of the cheetah peaked during this time and approximately 800 cheetah were removed from the farmlands per year, even though a large percentage of livestock loss was due to natural causes and farm management practices.

9. Additional pressure on cheetah developed in the early 1980's with game farming, when game-proof fences were erected and exotic wild herbivores were introduced.

10. In 1983, due to the conflict between farmers and cheetahs, the Directorate of Nature Conservation and Tourism initiated an intensive research project to investigate the causes of conflict. This three-year project concluded the following:

(1) the farmers had strong opinions and attitudes about the cheetah;
(2) the cheetah was perceived by farmers as the worst problem animal, allegedly responsible for large financial losses;

(3) the sighting of cheetah or spoor (tracks) led to a natural reaction ascribing livestock loss to cheetah predation;
(4) a large percentage of calf loss was due to natural causes (i.e. disease, poor nutrition, stillbirths, etc.) and not cheetahs; and
(5) further research was necessary.

11. In 1992, CITES allowed limited trade in Namibian cheetah (annual quota of 150) in an attempt to reduce indiscriminate removal of cheetah.

12. In 1994, the Namibian Professional Hunters Association (NAPHA) developed a special sub-committee called RASPECO (Rare Species Committee) to develop guidelines and programs which will support the sustainable utilization of rare species such as the cheetah, to the enhancement of the species. As a part of RASPECO, NAPHA members were asked to sign a COMPACT for the management of cheetah on their farms.

DEPARTMENT OF AGRICULTURE'S STATISTICS RELATING TO NAMIBIAN CHEETAH

NOTE: The following information is published with the permission of the Ministry of Agriculture, Directorate of Veterinary Services (DVS). DVS Animal Health Inspectors collect information from farmers on a biannual basis. An average of 5 771 out of 7 251 commercial farms (80%) in Namibia were inspected annually by DVS during a 6-year period (1986-91). 10. No general survey of wildlife on farms is available from the Ministry of Environment and Tourism since 1983, therefore the Department of Agriculture DVS figures for 1989 - 1991 are the most current available from the government.

1. In this period 3% of the country's farms reported cattle loss and 9% reported smallstock loss to predators. Of the number of livestock lost due to predators, 39% of the cattle loss (1 993 out of 5 105) and 4% of the smallstock loss (2 593 out of 71 127) were attributed to cheetah.

2. In comparison, 66 059 predators were destroyed on these farms (1986 - 1991), of which 931 (1,4%) were cheetah.

3. However, the number of cheetah reportedly killed by farmers during this period decreased by 81% (390 killed in 1986 to 76 killed in 1991).

4. There are discrepancies in the official number of cheetah removals as reported by CITES and DVS. The number of cheetah killed according to DVS is 1 266 fewer than reported by CITES during the same period (1986 - 1991). Because of these discrepancies, farmers are encouraged to accurately report data, as it will aid in the development of management strategies.

5. Between 1989 and 1991, 20% of the farmers were questioned on their protective management techniques. Only 50% of the cattle farmers used calving camps, and only 41% corralled ("kraaled") their cattle. In the case of smallstock farmers, 66% used lambing camps, 75% used corrals, and 65% used a herder.

6. Using averages of wildlife density reported to DVS by farmers, 1 438 out of 7 251 farms (20%) provided the following estimates of wildlife numbers during 1986-91: 54 219 gemsbok, 40 669 springbok, 40 016 kudu and 11 192 steenbok.

7. Because the farms were surveyed throughout Namibia, it was possible to extrapolate total numbers for these species as follows: 271 000 gemsbok, 203 000 springbok, 200 000 kudu and 56 000 steenbok. These estimates are approximations only; however, they represent the best available data on these species.

CHEETAH CONSERVATION FUND'S FARM SURVEY RESULTS

NOTE: The following information was collected by CCF during its Farm Survey. Two hundred forty one farmers in the north-central commercial farmland district were surveyed to gain an understanding of livestock/predator issues as they relate to cheetah in Namibia. The following points refer to the survey area only and are derived from the comments of survey participants.

A. SURVEY AREA

1. An area of 113 750 km^2, representing 14,5% of Namibia's commercial cattle farms, was surveyed in the districts of Gobabis, Windhoek, Okahandja, Otjiwarango and Grootfontein.

2. Livestock numbers (243 972) accounted for 66% and game numbers (132 534) accounted for 34% of animals on surveyed farms. Eighty-eight percent of the game was free-ranging, and 15% of the game in game-fenced areas was exotic.

B. CHEETAH PROBLEMS

1. Farms were classified as small (less that 7 000 ha), medium (7 000 to 15 000 ha) and large (more than 15 000 ha). Larger farms reported more cheetah problems, primarily due to less intensive farm practices.

2. Nine percent of the area surveyed was game fenced. These farms did not have more problems with cheetah, yet they removed high numbers of cheetah.

3. It is difficult to define a "cheetah problem," because livestock loss specifically due to cheetah may be unknown and farmers' perceptions of predation may differ. Many farmers accept losing one or two calves a year, while others find any loss an economic hardship.

4. Seventy-five percent of the farmers in the survey were not having cheetah problems at the time of the survey.

5. Farms that reported problems with cheetah had a lower ratio of game to cattle than farms with no cheetah problems.

C. REPORTED LOSSES

1. In the survey area, loss of cattle to cheetah comprised 33% of all predation, while loss of smallstock to cheetah comprised 22%.

2. The average of the calves lost to cheetah was 4.4 months, with 51% of the total under three months of age. Few calves older than six months of age were killed by cheetah.

3. Corralled smallstock, if not sufficiently protected, can suffer high losses, as once a predator approaches, their panicked movements stimulate the predator's killing instinct.

4. Farmers said they experienced more problems with black-backed jackal, caracal (rooikat), and leopard than with cheetah. However, cheetah were blamed for more livestock loss than leopard and were removed in higher numbers.

5. Additional livestock losses were due to baboon, snake, aardvark burrows, poisonous plants, droughts, disease and stock theft.

6. Game losses to cheetah, especially loss of exotic wildlife on game-fenced farms, caused 49 game farmers to remove 1 280 cheetah, representing 45% of the total cheetah removals for the survey area during the two-year survey period.

7. The majority of loss to cheetah in game-fenced areas is exotic species.

D. MANAGEMENT TECHNIQUES

1. Many methods of stock protection have been used by the farmers. The most prevalent technique used to prevent livestock loss was a calving camp. This technique was used by 43% of the farmers surveyed.

2. Farm camp number did not appear to influence predation pressure on livestock; however, farms with more camps tended to practice more intensive livestock management, thus reducing predator conflict.

3. Calving seasons varied between farmers, but the peak calving months were November, December, and January. Heifers, which usually calve first, suffered greater calf loss than experienced cows, in particular when calving in the winter months.

4. Brahman, Brahman crosses and Afrikaner cattle are more protective of their calves and are better adapted to the Namibian environment. However, due to the differences in farm management practices and inaccurate reporting of livestock loss, it was unclear whether farmers raising particular breeds had lower rates of predator loss.

5. Donkeys were used successfully as guard animals accompanying a calving herd to deter predators. Likewise, the use of guard dogs, baboons and herders for smallstock was found to reduce loss.

6. Electric fencing was found to be worth the investment in the long-term to protect especially valuable game.

E. CHEETAH REMOVALS

1. During the past 20 years perhaps more than 10 000 cheetah may have been removed from farms.

2. Sixty-five percent (157) of the survey participants reported removing a total of 2 845 cheetah (1980 - 93) from the survey area. Yet, when removals were compared to specific losses, there was an indication that removal of cheetah was not in response to specific loss of livestock.

3. There was a large discrepancy between the reports to CCF in its farm survey and both the DVS and CITES figures on the number of cheetah removed from the farmlands. This indicates a vast variation in the number of cheetah removals reported, and questions the accuracy of official reports.

4. CCF's survey found that a few farmers removed a large number of the cheetah. An interesting point was that those farmers who removed large numbers of cheetah did not observe cheetah more frequently on their farms, again representing an attitude versus an actual problem.

5. More male than female cheetah were removed from the farmlands.

6. Farmers with cheetah "playtrees" tended to remove more cheetah than farmers without playtrees, even though they had no higher incidents of problems with cheetah, possibly due to the fact that cheetah are easily caught at playtrees.

7. When cheetah are removed from an area, the territory is opened up, which encourages new cheetah to move into the area. Cheetah activity may increase on a farm until the territory is re-established.

8. Removal of cheetah is a short-term solution. Without re-evaluation and restructuring of management techniques, the predator problem can reoccur.

F. CHEETAH OBSERVATIONS

1. Almost half of the farmers sighted cheetah at least monthly, and nearly one-fifth saw cheetah or spoor on a weekly basis.

2. The more cheetah were observed on a farm, the more they were perceived as a problem, even though they were not necessarily connected to specific livestock loss.

3. Although not previously considered social, up to 18 cheetah (adults and cubs) were seen together by the farmers. The average group size observed was five.

4. The average litter size observed by farmers was 3,4 (range of one to eight), which is an apparent decline from 1974 records of litter sizes of 4,0 to 4,1.

5. The farmers who observed kills reported that the cheetah's wild prey consisted of the following 16 species, listed in order of frequency: kudu calves, springbok, warthog piglets, steenbok, gemsbok calves, hartebeest calves, duiker, eland calves, blesbok, ostrich, smaller game birds, guinea fowl, impala, hares, dik-dik, and kori bustard.

CHEETAH BEHAVIOUR AND HABITS

1. Male and female cheetah home ranges may overlap, and individuals may move up to 26 km a day. Individual male cheetah occupy huge ranges of more than 1 500 km^2, often moving through a number of farms in the process. Their ranges may vary according to mate selection, prey availability, etc. For these reasons, it may be easy for farmers to overestimate the number of cheetah on their farm.

2. Male cheetah with overlapping ranges share playtrees, which they scratch and scent-mark with urine and faeces. Female cheetah in heat may visit these playtrees to attract male attention.

3. Cheetah hunt mostly by day and may go several days between kills. Cheetah eat rapidly to escape detection by other predators. When other predators are not around (as is the case on most Namibian farmlands), they take larger prey and may stay on their kill up to several days.

4. The cheetah is a top predator, providing food to other inhabitants of the ecosystem. Therefore, carcases are not wasted.

5. Cheetah are opportunistic hunters. They prefer game over livestock, but will prey on unprotected and vulnerable livestock such as calves, goats or sheep.

6. Leopards and baboons can be limiting factors for the cheetah population due to their more aggressive nature, as they can kill cheetah cubs and compete for food.

7. Female cheetah start breeding around two years of age, and have a gestation period of about 90 days, with a litter size ranging from one to seven. In East Africa, fewer than 5% survive to adulthood.

8. Cubs are born throughout the year and leave the den to follow their mother at approximately 6 weeks old, when they begin eating meat. The cubs are weaned at three months, and become independent of the mother between 16 and 20 months old. Cubs from the same litter will stay together when they leave and males will stay together for life, forming coalitions.

9. Captive born and/or raised animals are not recommended for release into the wild, as they have not learned survival skills from their mother and could potentially turn into problem animals.

SUGGESTED APPROACHES FOR MANAGEMENT OF THE CHEETAH ON NAMIBIAN FARMLANDS

PREAMBLE: The recommended approach is one whereby farming is done holistically and in harmony with the natural environment. Consequently, it is necessary to ensure that the maximum diversity of wildlife, including predators like cheetah, is properly managed in the longrun. Predation in

any natural system is healthy, and even necessary, in order to eliminate sick or weak animals, and to prevent an increase in the numbers of undesirable animals which can become a problem if they are not controlled by predation.

What appears to be the most practical solution for the success of both the Namibian livestock farmer and the cheetah may be a coexistence where farmers know the cheetahs that occupy territories on their farm and understand what combination of livestock protection strategies are effective deterrents for them. Implementation of an effective livestock management program could reduce loss due not only to cheetah, but also to other predators. Over 90% of all the farmers in the survey had limited knowledge about problems facing the cheetahs and their role in its long term survival. It is important that farmers realize they play an important role in controlling losses due to predation.

Seventy-five percent (180) of the survey participants proposed solutions to the cheetah conflict. Of those suggesting solutions for reducing the livestock and predator conflict, 40% commented that either game or livestock management could reduce conflict and 6% suggested both. Specifically, 16% of the farmers advocated maintaining higher concentrations of free-ranging game for cheetah prey, and 30% suggested more intensive livestock management to reduce livestock loss to the cheetah. It was additionally evident from the survey that conservation education and awareness would help the survival of the cheetah.

A. CATTLE MANAGEMENT TECHNIQUES

1. Calving camps, corralling ("kraaling") calving herds and utilising guard animals such as donkeys can reduce loss to predation.

2. Farmers should consider the possible presence of predators when planning the location of their calving camps. Farmers should avoid locating calving camps in areas of cheetah activity or where playtrees are located, as well as areas with high numbers of aardvark holes.

3. Calves are most vulnerable up to the age of three months and should be adequately protected against cheetah and other predators. Corralling calves close to homesteads or workers camps at night has proved successful.

4. Predation on cattle calves may decline if farms synchronise calving both within their herd and with other farms in the area, as well as with wildlife calving times.

5. High concentrations of cattle during calving has helped, as there is protection in numbers. This, combined with a fast rotation schedule through smaller camps, has helped several farmers.

6. Farmers are encouraged to breed Brahman, Brahman crosses and Afrikaner cattle, as they are more protective of their calves, and therefore lose fewer calves to predators.

7. Inexperienced heifers calving for the first time should be given additional protection, such as putting them with older cows or in closely observed calving camps. Calving seasons are critical, especially for heifers. It is best for them to calve in mid-summer when there are more wild young, as well as more cows and calves for protection, as the first calves born during the start of a calving season are the most likely to be killed.

8. A cow that fails to reproduce or loses its calf to predation should be culled from the herd.

9. Calving camps that are watched closely have additional benefits besides deterring predation, including:

(1) increasing delivery success rates, because cows and heifers can be assisted if they have problems, i.e., big calves can be pulled if the cow is small;

(2) detecting sickness;

(3) 36-hour weaning for re-breeding of females;
(4) feeding calves during a drought;
(5) taming calves; and
(6) rescuing calves that have fallen into holes.

10. Farmers are encouraged to consult veterinarians to help increase herd fertility and improve overall reproductive management.

B. SMALLSTOCK MANAGEMENT TECHNIQUES

1. Lambing camps, corralling ("kraaling") herds or employing herders or guard animals such as specialised livestock guarding dogs can reduce loss. The use of both a herder and a dog together is most effective.

2. Personnel and herders could be trained to assist with herd management. Additionally, a bonus system could be implemented to reward employees for well-attended stock. This would raise the level of respect for the herder and improve protection of the flock by giving the herder a stake in its protection.

3. Corralled smallstock need to be well-managed and protected to prevent loss: well-maintained thornbush barriers, lighted corrals, and locations near human habitation or settlement are helpful.

C. GAME MANAGEMENT TECHNIQUES

1. Introduction of exotic game species like blesbok and common impala, as well as native springbok into heavily bushed areas, may attract cheetah and cause predator conflict to increase, so these animals require additional protection.

2. Electric game-fencing has proven to be an effective, long-term investment, but it requires sound management and maintenance, such as continually checking voltage, covering warthog holes, etc.

3. The use of barbed wire as the bottom wire on game fencing is an effective deterrent for warthogs, especially if it is electrified.

D. GENERAL MANAGEMENT CONCEPTS

1. A healthy balance of wildlife on farmland includes both prey species and their attendant predators. The greater the natural diversity ("biodiversity") of wild plants and wild animals on a farm, the better the farmer will be able to cope with unfavourable conditions such as drought, disease and bush encroachment.

2. Predators such as the cheetah are opportunistic, therefore, farmers should protect vulnerable livestock to discourage predation.

3. Cheetah have been observed by farmers to prey on at least 16 species of wild animals and birds. Therefore, the greater the variety of natural prey available on the farmlands, the less likely it is that cheetah will kill livestock.

4. Wildlife-friendly farmers suggested four wires for interior livestock fencing and passageways for highly travelled game paths (allowing game to travel more easily inside farms, thereby reducing fence breakage).

5. Indiscriminate removal of cheetah is not an effective predator control strategy.

6. When individual cheetah are removed, farmers should understand that this creates vacant territories which attract other cheetah. These "immigrants" may cause more problems than the cheetah which has been removed.

7. Additionally, more male than female cheetah are removed, primarily because they are easier to trap at playtrees. This "vacuum" will soon be filled by incoming males which are trying to establish territories. Consequently, trapping and removal of male cheetah may cause greater problems.

8. Farmers must thoroughly investigate stock loss to determine the actual cause of loss. The presence of predator tracks is not sufficient evidence.

9. CCF encourages farmers to join conservancies to help integrate sound management practices sensitive to the environment and wildlife.

10. Compensation for loss specifically due to cheetah could be incorporated into conservancy programs. However, compensation would work only if farmers employed non-lethal predator control methods within conservation-oriented livestock and wildlife management plans.

11. Sustainable use of the cheetah can only be achieved through sound management practices which are supported by research on the entire ecosystem by all those involved.

12. In order for trophy hunting to have a positive effect, it must be done ethically. Farmers and professional hunters are encouraged to sign the NAPHA COMPACT for management of cheetah on their farms.

13. CCF recommends that farmers use a variety of integrated management techniques and strategies for predator control and overall farm management.

14. Farm sizes, features and issues differ among farmers. Therefore, farmers should evaluate their individual situation in order to develop specific strategies most effective for their farm.

15. Farmers should realize that the farmlands are a dynamic, constantly changing system. They as farmers must be flexible in their management approaches in accordance with changing farm and environmental needs, as well as predator issues.

16. The farming community overall is a valuable resource, and CCF encourages farmer participation in both governmental and non-governmental programs aimed at reducing predation and predator conflict through non-lethal management strategies.

17. CCF strongly recommends that farmers keep and report accurate records to officials. Inaccurate numbers potentially hamper effective management techniques for livestock protection and predator control. It is only from accurate record-keeping that management strategies can be developed to assist both the farmer and the cheetah.

This summary in outline form serves as a quick reference for key information from the main text.