
REVIEW AND OPINION

Entrepôts for Rhino Horn in Khartoum and Cairo Threaten Garamba's White Rhino Population

Esmond Martin¹ and Kes Hiliman Smith²

¹PO Box 15510, Nairobi, Kenya, ²Garamba National Park Project, PO Box 15024, Nairobi, Kenya

THE DECLINE IN RHINOS IN EASTERN AND CENTRAL AFRICA

Traders in Omdurman and Khartoum in Sudan have been buying and selling rhino horns for decades and continue to do so. From the 1960s until the early 1980s most of the horns came from the thousands of rhinos killed in southern Sudan, eastern Africa, the Central African Republic (CAR) and in and around Garamba National Park in Zaire (renamed the Democratic Republic of Congo, DRC in mid-1998). In Omdurman in Sudan, some of the horns were crafted into items such as boxes, cups, walking stick handles and rings (Ian Parker, pers. comm., 1997) and sold to Sudanese people. The majority of the horns, however, were exported from Khartoum and Port Sudan to Yemen for the making of traditional dagger (*jambiya*) handles (Martin et al., 1997).

By 1985, both black (*Diceros bicornis*) and white (*Ceratotherium simum*) rhinos had been probably eliminated from the CAR, Somalia and Uganda and numbers were low in Kenya, Tanzania, Ethiopia, Zaire, Chad and Sudan. As a result, significantly less rhino horn was available for the workshops in Omdurman or was being exported from Sudan to Yemen from the mid-1980s.

From 1985 to the mid-1990s, even less new horn was reaching northern Sudan due to further declines in rhino numbers. Also, in Garamba, the poaching of northern white rhinos (*Ceratotherium simum cottoni*) had been stopped, and in Kenya there was very little rhino poaching. A few black rhinos were illegally

killed in Tanzania's Ngorongoro Crater and perhaps in the Selous Game Reserve. Traders probably sent the horns directly from East Africa to Yemen where they could receive a higher price than via Sudan. A few horns could have been taken from rhinos which had died of natural causes in Kenya and Tanzania. Other horns were stolen from government stockpiles in eastern Africa or from private displays or collections. Some of these may have reached northern Sudan, and perhaps also Egypt, for sale. Figure 1 shows protected areas and markets in the region.

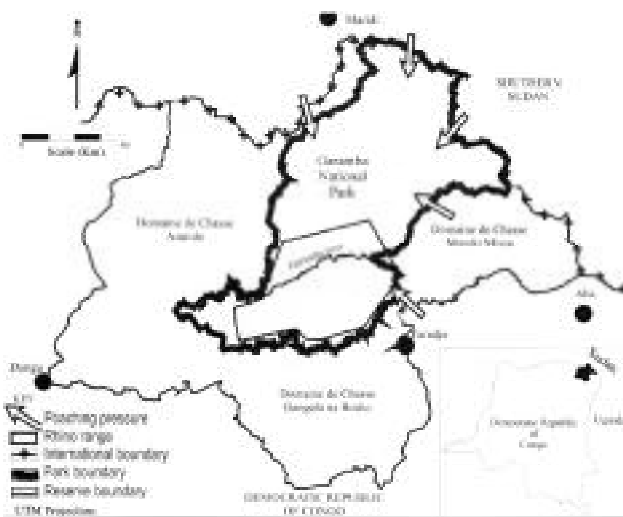
Recent poaching of Garamba's rhinos

In the 1970s and early 1980s the heaviest commercial poaching of rhinos in Garamba (DRC) and elsewhere in eastern and central Africa occurred (see Figure 2). In 1984 several international conservation organizations established the Garamba Project to rehabilitate Garamba National Park and to conserve the northern white rhino. Until 1991 Park staff greatly reduced poaching in general; only a small number of animals were killed for their meat in the north of the Park. This concentrated the elephants and rhinos in the better-protected southern sector, close to the headquarters at Nagero. In 1991 the civil war in adjacent Sudan moved to the south of that country. The Sudanese Peoples' Liberation Army (SPLA) took the town of Maridi in April 1991 and government forces and families fled across the border into Zaire, bringing several hundred weapons with them. The Park staff recovered over 600 weapons from people who

Figure 1. Map of protected areas and markets mentioned in the text.



Figure 2. Directions of main poaching pressure.



passed through Garamba (which is on the Sudanese border), but some weapons remained in the area and ammunition was readily available from across the border in Sudan. Between 1991 and 1998, some 80,000 Sudanese refugees were settled in areas bordering the Domaines de Chasse (hunting blocks) that surround the Park. Sudanese, carrying their weapons, moved across the border into Garamba relatively unconstrained. Zairian/Congolese military units who were stationed in the area also increased the number of arms. During this time civil unrest and economic decline in Zaire worsened which further de-stabilised the area.

After 1991, the killing of large mammals increased as there were more people armed with automatic weapons and more ammunition. Poaching gangs increased in size, and since 1994, the gangs also used hand grenades against guards. Results of the monitoring of law enforcement show that in 1995, 1996 and 1997, 71%, 77% and 81% respectively of the poaching gangs were Sudanese. The principal reason for poaching was for meat from the large mammals, especially buffaloes, which is smoked and sold. The front line of this poaching progressively moved south through the Park as animals were virtually eliminated in the north. This movement towards and into the southern sector of Garamba led to increased opportunities for shooting elephants and rhinos. Elephant poaching continued to be for meat as well as ivory, except for a brief period in early 1996, when nearby Zairian military personnel carried out elephant poaching for ivory alone until stopped by diplomatic pressure in March of that year. In January 1996 Park guards recovered 41 fresh tusks from a Zairian military gang in the south of the Park.

The first known confirmed rhino killing since 1984, the start of the Garamba project, was in February 1996. He was a prime adult male, M5 "Bawesi". Meat as well as horn was taken from him. On 23

March 1996 a young, pregnant female, 3aF “Juillet” ran into poachers and was killed. They only had time to take the horn before escaping from an anti-poaching unit. Not long afterwards, a report was received of rhino horn offered for sale in Maridi.

The Liberation War, from October 1996 to April 1997, which removed President Mobutu’s regime, most affected Garamba from February 1997 onwards. In February, the Park guards were disarmed for re-training and 90% of the Park’s equipment was looted. Anti-poaching coverage, measured in patrol days, was reduced between February and June 1997 to 14% of that during the same period in the preceding year. Poachers took advantage of the situation and moved south to and beyond the Garamba river. Most of the hippos in the river were massacred by automatic fire, even though it was impractical to take the meat from all of them. A few hippo teeth were taken for their ivory (G. Panziama, a Guard inspector in Garamba, pers. comm., 1997). Data from aerial surveys of the Park made in 1995 and 1998 by the Garamba Monitoring Unit showed declines of elephants from $11,175 \pm 3,679$ to $5,487 \pm 1,339$, buffaloes from $25,242 \pm 8,299$ to $7,772 \pm 2,063$ and hippos from $3,601 \pm 1,294$ to 786 ± 207 . These were losses of roughly a half, two-thirds and three-quarters of the populations (Hillman Smith et al., unpubl.).

Two rhinos were confirmed killed during and following the Liberation War. In March 1997 a

young adult male, 1a/4aM “Channel 2” was killed and his horns were taken. Two guards were accused and arrested. In November 1997, when Park guards attacked a Sudanese poachers’ camp, they found the posterior horn of the adult female, F4 “Boletina”. The anterior horn was not recovered and was probably taken by the poachers. A further three sub-adult rhinos may have been lost during the war, but four rhinos were born, taking the population from a minimum of 27 in December 1996 to a minimum of 26 in May 1998. It is thanks to the diligence of the Park guards and continued support from international donors that rhino losses were not more. During the current war, which started in August 1998, anti-poaching efforts are continuing, but one rhino was killed in late 1998. However, the period under examination in this paper ends in late 1997 with the northern Sudan rhino horn survey.

Besides the four previously mentioned poached rhinos and the three lost sub-adults, three adult rhinos disappeared during the 1990s and could potentially have been the source of horns on the market. One adult and one sub-adult were found dead of natural causes in 1993 and 1995 and their four horns were put in the ivory store at the Park headquarters. These rhino horns were temporarily hidden with other valuables in the west of the Park when the senior staff had to evacuate the headquar-

Photo credit: Esmond Martin



Photo 1. Muslim Sudanese live in the traditional town of Omdurman, a town well known for its wildlife traders and craftsmen.

ters in February 1997 because of the war. A little later, when the horns were returned to Nagero, an occupying army officer requisitioned one of the horns. The other three rhino horns and most of the ivory remained untouched. In October 1997 the three horns were moved to the central store of the Institut Congolais pour la Conservation de la Nature, ICCN (the wildlife department), in Kinshasa. In November 1997 the posterior horn of F4 "Boletina", recovered from the poaching camp, was put into Garamba's ivory store at Nagero.

RHINO HORN TRADE SURVEY IN KHARTOUM AND OMDURMAN

In November 1997 one of the authors (Esmond Martin) carried out the first survey of souvenir stores and workshops for rhino horn and ivory in the Omdurman-Khartoum area of northern Sudan (Martin, 1998) and was offered for sale five rhino horns (three of which we saw). This section of the paper reports the results of the survey and examines available information to attempt to answer questions as to where the horns came from, what were the trade routes, and which rhino species were they from.

Rhino horns for sale

The first horn seen was from a white rhino (Table 1). According to the Omdurman broker who brought it to be seen at a souvenir shop in Khartoum, it had been obtained about a year earlier from Nimule town in southern Sudan. (The nearby Nimule National Park has had no rhinos since about 1972). This horn was in very good condition as, according to the broker, it had been taken from the animal while still just alive. Another Sudanese wildlife trader also had said that a horn from a still living rhino was more valuable, claiming that when a rhino is agitated, more blood rises to its head and horn, adding some red colouring to the horn. When the rhino is dead, however, the horn goes blacker, reducing its value in Sudan. The broker claimed he had never tried to sell a rhino horn before. The souvenir shop owner was very nervous that someone might see it, as the sale of rhino horn has been illegal for many years in Sudan.

The second horn was seen in a prominent souvenir shop in Omdurman. The horn was very dry

and probably old and could have been either from a black or white rhino (see Table 1). The broker who brought the horn to the shop said it was eight years old. A European visitor then entered the shop and saw the horn on the counter and strongly criticized the shopkeeper, yet the shopkeeper was unperturbed and eventually put the horn in his safe to reduce attention to the incident.

As the shopkeeper spread the word that a western foreigner was interested in rhino horns, the next morning an army officer, acting as a broker, appeared in the shop saying he too could bring a horn, but due to security reasons only at noon. He returned on schedule with a white rhino horn (see Table 1). There were tiny holes at the top and bottom and on the base probably made by horn borers. The horn had probably been found in the bush. Unlike the other two horns, the broker for this one refused photographs to be taken of it in case the authorities found out. The shopkeeper said that most buyers of the rhino horns brought to his shop were South Koreans and Chinese. Later in the day in the same shop, another broker offered to bring the next day two horns weighing 4.5 kilos in total. Apparently, one had been obtained eight months ago and the other a year ago. The shop owner said afterwards that this broker and the army officer were offering their horns on behalf of the same owner.

Besides these three horns seen in 1997, another westerner interested in wildlife conservation and a collector of Sudanese artefacts was shown earlier in 1997 two other rhino horns for sale. One of them was weighed: it was 450 grams. Neither species could be identified.

Prices for rhino horn

The asking price for the 450-gram horn seen in early 1997 was \$ 1,960 per kilo. The prices quoted for the three horns seen in late 1997 (Table 1), and the two others offered but not seen, may imply some collusion among the traders at that time as their original prices were the same. Only the first broker was willing to reduce his price slightly. This broker wrongly stated that its price in Yemen was \$5,000 a kilo, when in fact it is about \$1,200 a kilo. The two other horns that were not seen were, as expected by this stage,

\$3,500 a kilo. All horns immediately on receipt so they need to sell them fairly quickly to re-coup their costs. The main poaching gang leader also has to pay off his men, and other relevant expenses, so he too wants his money as soon as possible. Neither is there evidence of businessmen in tropical Africa speculating on a price increase for rhino horn by holding back significant quantities from the market. This has been fortunate for traders since the mid-1980s as the import price for rhino horn in Yemen prices were given in US dollars, never Sudanese pounds nor

Photo credit: Esmond Martin



Photo 2. This rhino horn, weighing 0.23kg, was for sale in late 1997 in Omdurman, the village where most of Sudan's ivory carvers work.

Sudanese dinars. There are several reasons why the price was so high. First, the prospective buyer was a westerner. Second, all negotiations were conducted by a broker visiting a shop who had to give a commission to the shopkeeper and take a percentage for himself before giving the rest to the owner. Third, the brokers were not familiar with the Yemeni and eastern Asian markets. The price for an excellent condition and very large horn in Yemen might reach \$1,400 a kilo. Prices in South Korea and China may be slightly higher than in Yemen, but not over \$2,500 a kilo. Thus, it seems that the Sudanese brokers had been over-pricing the horns and therefore had not sold them after several months.

African traders try to sell rhino horns quickly. There has been no tradition in tropical Africa for businessmen to stockpile rhino horns. The merchants have

TABLE 1. Prices for rhino horn in Khartoum and Omdurman in November 1997.

Horn type in order seen	Weight	Price per kilo
White rhino	3.25 kg	\$3,200
Black/white rhino?	0.23 kg	\$3,500
White rhino	2.54 kg	\$3,500

Photo credit: Esmond Martin

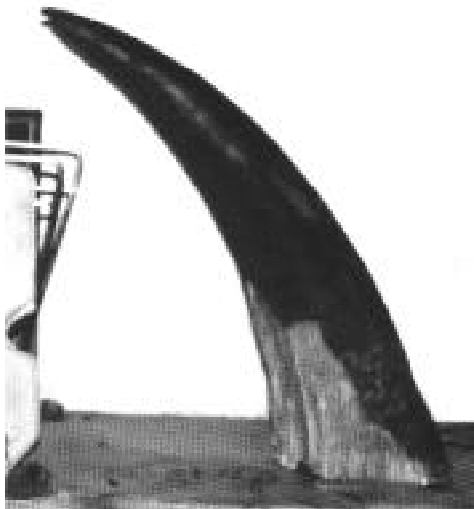


Photo 3. This white rhino horn, recognisable from black rhino horn by its more rectangular-shaped base, was offered for sale in Khartoum in late 1997.

to pay a poacher or his agent for the price has remained the same in US dollars since 1985 and in eastern Asia the price peaked in 1990 and actually fell in the early 1990s. Thus, a Sudanese businessman speculating on the price of rhino horn in Yemen from 1985 to the present would have lost in hard currency by delaying his sale. He needed to sell the horn as quickly as possible to maximize his financial returns.

Rhino horn by-products for sale

Besides the three raw horns seen, two rhino horn by-products were offered for sale in Omdurman/Khartoum in late 1997: finger rings and powder (from ground up horn). There were four very thin rings seen, weighing less than 10 grams each. They had been crafted in Omdurman probably over 20 years ago, according to the shopkeepers. One souvenir store in Omdurman had three of the rings for \$17 each, and a shop in Khartoum offered the other ring for \$23. Curiously, both shopkeepers wore

rhino horn rings as well. The store in Omdurman also sold rhino horn powder for \$0.37 a gram. The main customers for this are northern Sudanese who mix the powder with water, which they drink to cure snakebite poisoning.

THE RHINO HORN TRADE IN CAIRO

In neighbouring Egypt, the main dealer in rhino horn, who has an ivory shop in Cairo's largest market, the Khan al-Khalili, knows the price for rhino horn in Yemen. During an investigation of the markets carried out by the first author in 1998, the dealer showed an old black rhino horn weighing two kilos. He had bought it a month earlier from a formerly wealthy Cairo family who had the horn displayed as a trophy on their wall. It had come from an animal sport-hunted in 1937 in East Africa. The price was LE 5,000 (\$1,465) for the whole horn (working out as \$733 per kilo). He said he also received horns from Egyptian dealers. Many of these horns probably have come via Khartoum/Omdurman as does most of the raw ivory reaching Egypt (Martin, 1999). His main buyers are Yemenis and Omanis, and one Kuwaiti who regularly purchases small pieces of horn to make into worry beads in Egypt for export to Kuwait for sale.

Another shop owner sells rhino horns in Cairo, but he often overprices them and thus sells his horns slowly. Traditional medicine shops in the Khan al-Khalili claim to sell rhino horn powder to Egyptians. They consume it with milk to cure blood poisoning and snakebites, as in Sudan. The shop assistants correctly did not mention the use of rhino horn as an aphrodisiac, but instead named crocodile penises (\$1.17 a gram), ambergris (\$8.05 a gram) and various plants as sexual stimulants. One of the oldest and largest traditional medicine shops in Cairo, established over 100 years ago, has a drawer labelled in both Arabic and English "Rhinoceros Horn". However, the drawer contained only pieces of antelope horn that were priced at \$1.47 a gram; the shop manager said he had no rhino horn any more.

POSSIBLE ORIGINS OF RHINO HORNS ON THE MARKET IN SUDAN AND EGYPT

From the hundreds of northern white rhino horns, largely from Sudan, CAR and Zaire which were put onto the market up to the early 1980s, supplies dried up quickly as the decade continued. The fresh white rhino horn seen for sale in Sudan in late 1997 and possibly the two others not seen probably orig-



Photo 5. In a shop in Cairo's Khan al-Khalili, the medicine drawer labelled "rhinoceros horn" actually contained antelope horns as a substitute

Photo credit: Esmond Martin

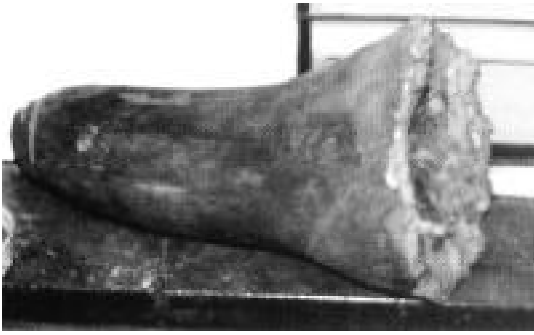


Photo 4. This black rhino horn weighing about 2 kg was for sale in late 1998 in the famous Cairo market called the Khan al Khalili.

inated from the northern white rhinos in Garamba National Park in the Democratic Republic of Congo. It is also possible that horns still sometimes might appear from the few white rhinos that previously existed or may still exist in southern Sudan, especially in the case of found horn. It is probable that some of these horns have filtered through to Egypt for the small demand in Cairo.

In 1980 there were estimated to be under 400 northern white rhinos and considerably less than 300 black rhinos in southern Sudan (Cumming and Jackson, 1984). By 1983 the world population of northern white rhinos was well under 100, of which

13-20 were in Garamba National Park in Zaire, one or two in Uganda and 12 in zoos. There were doubts whether any remained in the CAR and numbers in Sudan were estimated in the low tens (Hillman and Smith, unpubl.; Hillman Smith et al., 1986). Nine years later, the population in Garamba had doubled, the zoo animals had dropped to nine, they were extinct in Uganda and C.A.R., and there were doubts about the continued existence of any in southern Sudan, although occasional reports of sightings or spoor are still received (Hillman Smith et al., unpubl.). One rhino was seen in the Shambe area around August 1997, according to the Wildlife Conservation Administration in Khartoum. Until 1997, there were regular reports too of white rhinos surviving in the Southern National Park in southern Sudan (Philip Winter, Operation Lifeline Sudan, 1990-1995, pers. comm., 1999). In Kenya, none of the white rhinos (all of the southern subspecies, *Cerarotherium simum simum*) was poached from 1989 through 1997 and no horns were stolen from white rhinos dying of natural causes. A pair of white rhino horns were stolen from the Nairobi Museum in the mid-1990s and never traced. The source of northern white rhino horn was very limited by this time.

Photo credit: Kes Hillman Smith



Photo 6. Young adult male northern white rhino M9 "Notch" In Garamba National Park.

No white rhinos were known to have been poached in Garamba between 1985 and 1995. Rhino numbers rose over this period from 15 to 31 due to good protection. The first confirmed poaching of rhinos there since 1984 occurred in February and March 1996 when two were killed and there were other losses later. Of the horn seen on the market in 1997, it is probable that old horn, such as that found in the bush with horn borer holes, could have come from southern Sudan, but fresh horn is likely to have originated from Garamba National Park.

Movements of horn from Garamba

Trade routes for rhino horn northwards across the Zaire border, such as through Doruma, to Sudan were well established in the 1970s and early 1980s. The start of increased protection of Garamba in 1984 coincided with the beginning of the second Sudanese

civil war. This war probably had a positive effect on rhinos in one way by disrupting the trade routes into southern Sudan as far east as the Garamba area, although poaching for large mammals in eastern CAR has continued and trade routes through this country to northern Sudan are still in use.

There are reports of relatively recent movements of rhino horn and ivory, such as the horn offered for sale in Maridi in 1996 (C. Moore, a road contractor for Terra Firma, pers. comm., 1996) plus a later report in the Maridi area given to Philip Winter in 1998. There are also occasional movements of ivory from Maridi on aid vehicles (Garamba Park guards, pers. comm.). A rhino horn apparently was moved across the border from Aru to Arua in Uganda in 1997 (G. Malamas, Garamba Project, pers. comm., 1997.). Some small pieces of rhino horn were offered to an officer of the ICCN in Kinshasa in 1996. They had apparently come via a businesswoman from the Bunia area in the north-east of the country (A. Mbayma, Conservateur Principal, Garamba National Park, pers. comm., 1996).

Potential trade routes for rhino horn from Garamba to Khartoum/Omdurman could operate directly across the border to southern Sudan or across the border into Uganda. There are no flights from Uganda to Khartoum for political reasons; therefore, horns brought to Uganda could then be taken to Kenya for schedule flights to Khartoum. Garamba horns taken to Maridi in southern Sudan could reach Omdurman/Khartoum via three routes. One is northwards overland; the second is on aid flights to Kenya; and the third is north-west overland through neighbouring eastern CAR where Sudanese poachers and traders are active.

Sudanese have been travelling to eastern CAR at least since the mid-1970s to poach rhinos, elephants and other large animals. More recently, they could have obtained rhino horns from poachers who bring them north from Garamba. A veterinarian, Richard Kock, who was working in this part of CAR in March and April 1999, reports that large numbers of well-armed hunting gangs of about six men each with camels, horses and donkeys are still entering CAR. Most of them are Baggaras from northern Sudan who are traditionally aggressive raiders, but there are also



Photo credit: Kes Hillman Smith

Photo 7. Posterior horn from an adult female northern white rhino F4 "Boletina", recovered from poachers November 1998, Garamba National Park

some gangs from southern Sudan. They come into the south-east part of CAR because much wildlife is still abundant there while most of the large animals on the Sudan side have been eliminated. Once inside CAR, the gangs seek out elephants for their tusks and meat, but also poach kob, buffalo, bongo, roan, eland and hippo with their automatic rifles. The meat is dried or smoked and is sold mostly in western Sudan, while ivory and probably sometimes rhino horns are brought to Omdurman and Khartoum for sale. Richard Kock saw a different poaching gang every day (while he was surveying animals from the air). He also saw over 20 recently poached elephants, all with their tusks removed, in six different areas. He estimates that 30 to 40 elephants are killed each week. There are very few resident people in this large area and almost no government presence due to the insecurity brought about by the heavily armed and aggressive Sudanese poaching gangs (R. Kock, pers. comm., 1999).

CONCLUSION

It is probable that some of the fresh white rhino horns for sale in Khartoum, Omdurman and possibly in Egypt in the mid-1990s have come

from Garamba National Park's white rhino population in the Democratic Republic of Congo. Since civil disturbances continue in the Garamba area, as well as civil war in neighbouring southern Sudan, Park officials find it difficult to protect the minimum 25 white rhinos counted in April/May 1998. Although the poachers' main purpose is to kill for meat, they also destroy elephants and rhinos for their tusks and horns due to the relatively high price they can obtain for them. Even if prices halved, poachers would still continue to kill rhinos and elephants, along with other large animals, for the sale of meat, as the Congolese and Sudanese in the area are so poor. The protection of Garamba National Park from this heavy poaching pressure thus remains a difficult challenge.

The high prices and therefore slow sales of horns in Khartoum and Omdurman and the continued focus on meat poaching in Garamba National Park indicate that rhino killings in Garamba are still largely a by-product of meat poaching rather than a trade-driven extermination of this species for the horns. If sales of Garamba's rhino horns in entrepôts such as Khartoum/Omdurman and Cairo could be decreased significantly, and if the demand for rhino horn in Yemen would further decline with improved law enforcement and the help of substitutes, then the threat of serious future commercial poaching on the rhinos could be reduced. Meanwhile, adequate anti-

Photo credit: Kes Hillman Smith



Photo 8. Adult female northern white rhino F5 "Mama Giningamba" found dead of natural causes in Garamba National Park; dead of natural causes in January 1995.

poaching work for Garamba's rhinos remains essential. Only if civil unrest in the area ends soon and sufficient support is received, so that the Park can be protected properly once more, can the rare northern white rhino, the last viable population in Africa, be saved.

ACKNOWLEDGEMENTS

The authors would like to thank an anonymous donor for supporting the fieldwork in northern Sudan in November 1997. We also wish to thank Global Communications for Conservation, the Columbus Zoological Park Association and Friends of Howletts and Port Lympne for funding the survey in Egypt in November and December 1998. We are indebted to the Institut Congolais pour la Conservation de la Nature, the World Wide Fund for Nature, International Rhino Foundation, Frankfurt Zoological Society, Wildlife Conservation Fund, Wildlife Conservation Society, UNESCO, US Fish and Wildlife Service and others for supporting different aspects of the work in Garamba National Park.

REFERENCES

- Cumming, D.H.M. and Jackson, P. (1984) *The Status and Conservation of Africa's Elephants and Rhinos*. Gland, Switzerland, 23pp.
- Hillman Smith, K. and Smith, F. (unpubl.) Survey of the status of the northern white rhino (*Ceratotherium simum cottoni* Lydekker). Report to IUCN/WWF/GEMS of UNEP and FZS, 1983.
- Hillman Smith, K., Mankoto ma Oyisenzo and Smith, F. (1986) A last chance to save the northern white rhino? *Oryx* 20(1), 20-26.
- Hillman Smith, K., Mbayma, A., Likango, M., Smith, F., Ndey, Amube and Panzaiama, G. (unpubl.) Parc national de la Garamba et Domaines de Chasse, General Aerial Count 1995 and Evaluation of the Status and Trends of the Ecosystem. Recensement general et evaluation du statut et tendances de l'ecosysteme. WWF/FZS/IZCN, 1995.
- Martin, E.B., Vigne, L. and Allan, C. (1997) *On a Knife's Edge: The Rhinoceros Horn Trade in Yemen*. A TRAFFIC Network Report, Cambridge, UK.
- Martin, E.B. (1998) New buyers of ivory in Sudan threaten elephants. *Oryx* 32(3), 166-169.
- Martin, E.B. (1999) Tusk trade booming. Thousands of illegal ivory pieces for sale, fuelling poaching in Central Africa. *BBC Wildlife* 17(3), 20-21.
- Smith, K., Smith, F., Foose, T. and Dublin, H. (unpubl.) Background document for the development of a strategy for the metapopulation management of the Northern White Rhinoceros (*Ceratotherium simum cottoni*). Document prepared for workshop at White Oaks, Florida, October 1995.