

The increasing isolation of Tarangire National Park

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In Tanzania, in the dry season, Tarangire National Park is second only to Ngorongoro in the concentrations of wildlife to be seen there. But there is a bleak outlook for the species that traditionally migrate to pastures outside the park in the rainy season. Over the last 10 years many of their routes out of the park have been blocked by farms and ranches, and further expansion of agricultural schemes could threaten the remainder. Part of the zebra and wildebeest populations that migrate north have already been lost. The author, who has been carrying out wildlife surveys in Tanzania for the Frankfurt Zoological Society for seven years, proposes some remedies to prevent the park from becoming the domain of only a few resident species.

Visitors to Tarangire National Park in northern Tanzania in the dry season can see spectacular herds of wildebeest, zebra, elephant, eland, buffalo, hartebeest and oryx (gemsbok) along the perennial Tarangire river. During the wet season these migratory species leave the park to disperse all over the Tarangire–Simanjiro–Lolkisale–Mtu wa Mbu ecosystem: only a few resident species stay behind. However, the increase of human population in the Mtu wa Mbu area and, more importantly, the large farming and ranching schemes to the north and east of the park have led to more and more of the traditional migration routes being cut off, and Tarangire is in danger of becoming an isolated 'island' park in which only the resident species will survive.

This report is mainly based on literature but also on my own surveys, carried out for the Frankfurt

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Zoological Society in co-operation with the warden of Tarangire Park.

The Tarangire area

The Tarangire Game Reserve was gazetted in 1957 and together with part of the Mkungunero Game Controlled Area (GCA) it was declared a national park in 1970. It covers approximately 2600 sq km and is situated about 110 km south of Arusha town. It is bordered by the Mkungunero GCA in the south, the Simanjiro GCA in the east, the Lolkisale GCA in the north-east and the Mtu wa Mbu GCA in the north (Figure 1).

The park is situated at about 1200 m above sea-level, and has a mean rainfall of 529 mm and a mean annual evaporation of 1500–2500 mm (Peterson, 1978). The area is classified as Eco-climatic Zone V, semi-arid rangeland (Pratt and Gwynne, 1977). Lamprey (1964) distinguished seven main vegetation types within the park: grassland and floodplains; *Acacia tortilis* parkland; tall *Acacia* woodland; drainage line woodland; *Acacia-Commiphora* woodland; *Combretum-Dalbergia* woodland; and rocky hills. Peterson (1976) described *Acacia-Themeda* scattered tree grassland for the Lolkisale GCA, mainly *Themeda-Hyparrhenia* grassland for the Simanjiro plains and desert grass bush type for the southern zone.

The migration routes

Most animals leave the concentration area near the Tarangire river at the beginning of the short rainy season in October/November. The first to move are the numerous wildebeest and zebra,

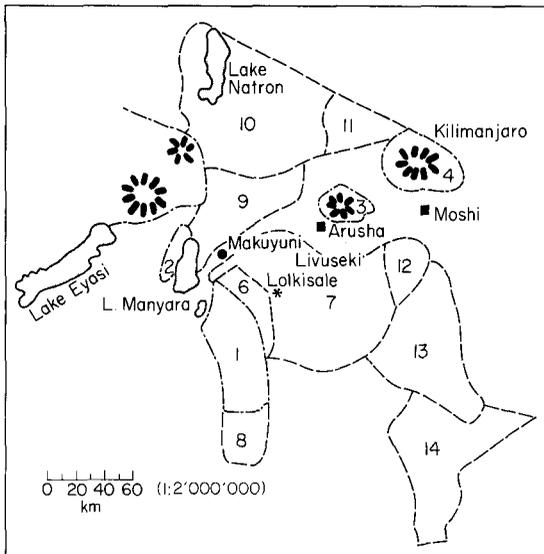


Figure 1. National Parks and game controlled areas in Arusha region.

National parks:	Game controlled areas:	
1. Tarangire	6. Lolkisale	11. Longido
2. Manyara	7. Simanjiro	12. Sanya Plains
3. Kilimanjaro	8. Mkuungunero	13. Ruvu River
4. Ngorongoro	9. Mtu wa Mbu	14. Kitwai
	10. Lake Natron	

soon followed by Grant's gazelle, buffalo, eland, elephant, oryx (gemsbok) and hartebeest. Only the resident species, which include waterbuck, impala, wart hog, dik-dik, giraffe, rhino and lesser kudu, stay behind. The second rainy season begins in March and at the peak of the rainy season, the Tarangire animals are spread over an area of more than 20,500 sq km of Maasai country. At the beginning of June the long rains end, the Maasai steppe dries up rapidly and the migratory species return to the Tarangire river. The wet season dispersal routes of Tarangire's wildlife are shown in Figures 2 and 3.

Northern routes

Route 1 leads from the north of the park towards the eastern and northern shores of Lake Manyara and is mainly used by wildebeest and zebra. Route 2 leads further on along the escarpment of the rift valley towards Lengai and Lake Natron. Route 3 leads to a dispersal zone in the Mtu wa Mbu GCA while Route 4 leads to the north-east to a dispersal area in Livuseki, and towards Arusha

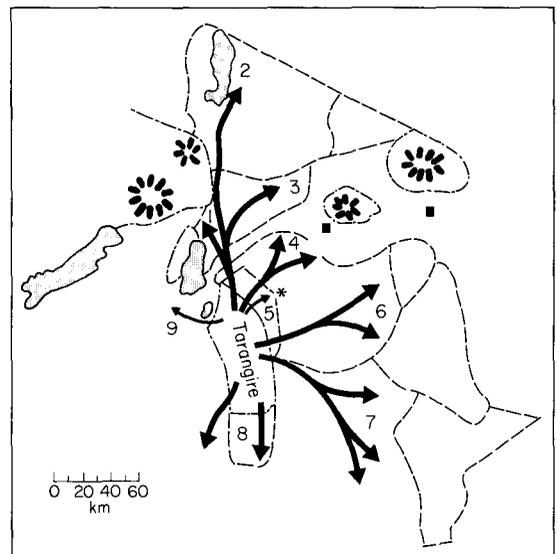


Figure 2. Original routes of wet season dispersal from Tarangire (after Lamprey, 1964). Description—see text.

town. Large seed-bean farms north of the park and extensive subsistence agriculture to the north-west have reduced the northbound wildlife migration from Tarangire to a trickle. However, the area east of Lake Manyara seems still to be important during the early rainy season, when several thousand wildebeest and zebra move there. Despite increasing obstacles quite a number of animals still reach their wet season dispersal area in the Mtu wa Mbu GCA (routes 1 and 3, Figure 3). The north-eastern migration (route 4, Figure 3) towards Livuseki is seriously hampered by seed-bean farming north of Lolkisale Mountain and will be blocked completely in the near future.

Eastern routes

The main bulk of wildlife, including elephant, buffalo, Thomson's and Grant's gazelles, hartebeest, eland and oryx (gemsbok), moves east along routes 5, 6 and 7 to the Lolkisale and Simanjiro GCAs and most of the zebra and wildebeest concentrate in the Simanjiro flood plains during the rainy season. Lolkisale and Simanjiro are undoubtedly the most important wet season areas for the Tarangire animals. The migrations between the dry season range in

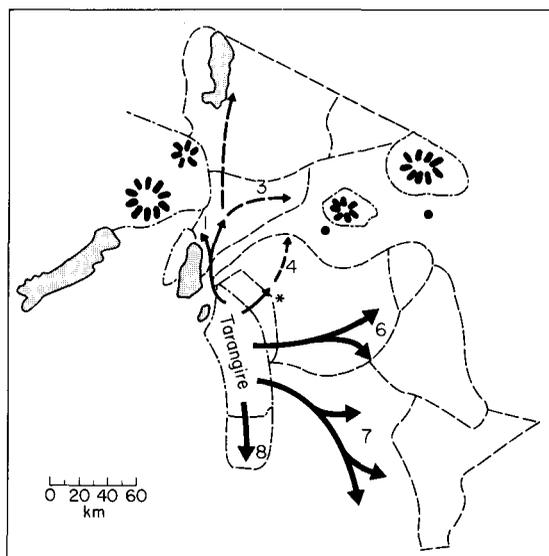


Figure 3. Present-day wet season dispersal routes. Description—see text.

Table 1. Wildlife densities and populations in the Tarangire National Park. Wet season

Species	Density	Numbers
Wildebeest	0.3	397
Zebra	0.0	0
Thomson's gazelle	0.4	593
Grant's gazelle	0.6	936
Oryx	0.0	40
Hartebeest	0.7	1092
Buffalo	0.1	101
Elephant	1.8	2891
Elephant—dead	0.2	339
Giraffe	0.5	819
Eland	0.6	936
Impala	4.1	6422
Lesser kudu	0.1	162
Warthog	0.6	1014

After EcoSystems (1980b).

Tarangire and the wet season range in Lolkisale/Simanjiro consist of some 55,000 animals (Figure 3 and Tables 1, 2 and 3). Fortunately the migration routes to these areas are still open.

Minor migration routes

One minor route (8, Figure 2) leads south to the Mkungunero GCA and involves wildebeest, zebra, buffalo and eland. Another route (9, Figure 2) leads west to the south of Lake Manyara. The

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Table 2. Wildlife densities and populations in the Lolkisale G.C. area. Wet season

Species	Density	Numbers
Zebra	1.1	1005
Grant's gazelle	0.6	579
Oryx	0.5	443
Hartebeest	2.5	2242
Buffalo	0.5	450
Giraffe	0.1	115
Eland	0.2	193
Impala	8.7	7869
Warthog	0.3	309

After EcoSystems (1980b).

Table 3. Wildlife densities and populations in the Simanjiro G.C. area. Wet season

Species	Density	Numbers
Wildebeest	3.7	24,066
Zebra	4.7	30,839
Thomson's gazelle	0.5	3035
Grant's gazelle	0.3	1736
Oryx	0.1	551
Hartebeest	0.5	3359
Buffalo	0.8	5477
Giraffe	0.3	1736
Eland	0.7	4378
Impala	2.5	16,455
Gerenuk	0.0	39
Greater kudu	0.0	39
Lesser kudu	0.0	157
Reedbuck	0.0	157
Warthog	0.1	603

After EcoSystems (1980b).

The census resulting in Tables 1, 2 and 3 was carried out by EcoSystems Ltd in wet season when the Tarangire animals were spread over their wet season dispersal range. The tables show clearly how few animals actually remain within the Park boundaries and how important the Simanjiro plains are for the Tarangire wildlife.

only species involved are buffalo and elephant and although these routes are still open they are not now of major importance.

Present obstacles to the traditional migration routes

Large farming schemes

Large farms, mainly for seed beans, were started in 1971 in the vicinity of Lolkisale, and have

expanded to over 6500 ha (1976) in the north and north-east of Tarangire Park (Figure 4). To the immediate north of the park towards Makuyuni, and to the north-east, large bean farms cover 25–55 per cent of the land area. These farms and the disturbances accompanying mechanical farming effectively block any animal migration through this area. Another seed-bean farm area with crop cover of up to 100 per cent is situated north and east of Lolkisale Hill, in the Simanjiro GCA. This farming area excludes all wildlife and brings considerable disturbance to the main wet season dispersal area of the wildebeest and zebra in the Simanjiro plains.

Ranching schemes

A state-owned ranching scheme is located between Makuyuni and Lake Manyara. Only part of the area is fenced and wild animals moving through on their migration northwards are tolerated. As long as the wildlife is tolerated, the Tarangire migrants might even profit from the existence of this ranch as it effectively stops encroachment by subsistence farmers. Rift Valley Seed Ltd has been granted the whole Lolkisale GCA to the immediate east of Tarangire National Park (154,190 ha) to be developed as a ranching and farming scheme. This would cut right through the eastward migration routes and would have disastrous effects on Tarangire's wildlife. To date no ranching has started in this area, and only a relatively small portion has been cleared for bean farming. The Tanzanian Government has stopped all developments and is currently reviewing the project.

Subsistence farming

Subsistence farming is spreading from the north-western end of Tarangire Park towards Mto wa Mbu and is rapidly threatening to block the last migration routes to the north. With the trend of the pastoralist Maasai to become settled, subsistence farming is also increasing in the Simanjiro plains. Only about 1 per cent of the plains was under cultivation in 1979 (Kahurananga, 1979), but pressure for farm land is mounting.

The Maasai and wildlife

Most of the Simanjiro plains, which harbour the

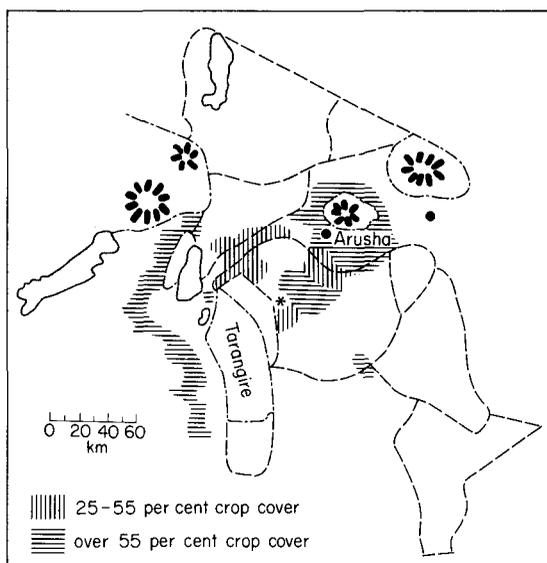


Figure 4. Agricultural area around Tarangire Park. After EcoSystems Ltd (1980b).

main wildlife population from Tarangire in the wet season, are also used by Maasai and their livestock. Unlike the wildlife, the Maasai cattle remain within the livestock pastures of Simanjiro throughout the year. The Maasai face problems similar to those of the wildlife. The area available for livestock is limited by large bean-farming projects in the north of Simanjiro, which hinder the Maasai's movements, and by the risk of diseases such as trypanosomiasis and east coast fever. The Maasai are also excluded from Tarangire National Park. These restrictions, and a traditional value system which emphasises growing numbers of livestock, combined with better veterinary services, dips and water supplies, have resulted in over-use and deterioration of the livestock pastures. Mean bare ground at the end of the dry season is 87 per cent in the cattle area compared with 56 per cent within the park (Peterson, 1978). Cattle quotas and grazing management will have to be implemented if erosion and soil degradation are to be prevented in the Simanjiro plains.

Wildlife and livestock only occupy the same areas in Simanjiro during the wet season, when forage is plentiful. Wildebeest might even facilitate grass growth for the cattle; McNaughton (1976)

showed that wildebeest grazing on flowering grass in the Serengeti plains promotes new growth from which other species can benefit. Sinclair and Norton-Griffiths (1982) showed that this process can be overridden by interspecific competition. It is therefore not clear whether wildlife is competing with livestock for food during the wet season in the Simanjiro plains. However, it seems certain that if competition exists it is minimal. As most wildlife species retreat to Tarangire Park in the dry season, competition for food and water between wildlife and livestock is negligible in Simanjiro at that time.

Although the Maasai in Simanjiro suffer from the occasional attack on their livestock by lions or from elephants damaging their wells, they experience no forage conflict and they still favour the coexistence of game and livestock. There seems to be no serious objection to a dual use of the Simanjiro plains and the Lolkisale GCA for livestock and wildlife.

Conclusions

Agricultural development has nearly blocked the northern migration routes of Tarangire's wildlife. Part of the population which used to migrate north has already been lost and it is inevitable that more will vanish. Fortunately, Tarangire National Park is still connected with the Lolkisale GCA and the Simanjiro plains in the east. This area comprises the wet and dry season habitats of some 55,000 migratory animals, which represent about 25 per cent of all the wildlife of the Arusha Region (EcoSystems, 1980a). The Lolkisale GCA and the Simanjiro plains are used by pastoralists and wildlife, but this dual land use is threatened by expanding agriculture and large ranching schemes.

Ecological consideration (low rainfall, high evaporation rate and the danger of soil degradation by agriculture) indicate that emphasis should be given to a land use which involves wildlife and livestock. Large-scale mechanised agriculture and fenced-in cattle ranches are not compatible with dual pastoralist/wildlife land-use and could contribute to the desertification of the area.

The migration routes of the Tarangire animals

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have evolved over many thousands of years whereas the agricultural development around Tarangire has taken place only during the past decade. Although the animals are able to make small deviations from their original migration routes, they cannot learn to use completely new routes or different wet season dispersal areas. For Tarangire's wildlife it is therefore of great importance that the eastern migration routes should be kept intact.

Recommendations

(1) Creation of a multiple-land-use authority in the Lolkisale-Simanjiro area. The whole of Lolkisale GCA and the Simanjiro plains (which are part of the Simanjiro GCA), the Mkungunero GCA and an open area in the south of Tarangire Park should be united under a new land-use authority modelled after the Ngorongoro Conservation Area Authority. This area would cover approximately 6000 sq km, and land use would be aimed mainly at dual use by Maasai pastoralists and wildlife (Figure 5).

Grazing grounds for the Maasai cattle are becoming increasingly restricted. To prevent soil erosion and degradation of the habitat, it is imperative that some of the Maasai grazing practices be changed by introducing cattle quotas and grazing management. Such moves will be unpopular, but

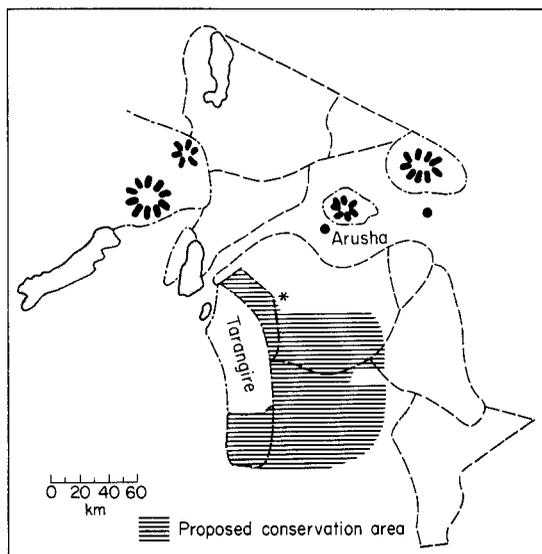


Figure 5. Proposed conservation area.

would ultimately benefit the Maasai and a central authority, in which the Maasai participate, would be the ideal body to implement such measures.

The wildlife in the combined areas of the park and the proposed conservation area is, next to Ngorongoro, the most important in the Arusha Region and must be preserved if the tourist value of Tanzania is to be maintained. This new conservation area would also provide the Tanzania Wildlife Corporation with the most important and attractive hunting area in the region.

A system should be devised to divide the income of the national park and of the new conservation area between the two authorities. Some of the income generated by wildlife should be channelled directly to the Maasai involved.

(2) Creation of a small corridor in the north of Tarangire Park. A small corridor should be kept open to ensure that the remaining northern migrants can still reach the Manyara lake shores and the Mto wa Mbu GCA (Figure 6). All agriculture should be excluded from this corridor, but other activities such as cattle herding could be allowed. Such a corridor needs only a small amount of land but is of paramount importance for the survival of Tarangire's northern migrants.

(3) Southern corridor to lake Manyara. A corridor between Tarangire National Park and Manyara National Park round the southern end of the lake has been proposed. As the animals of Tarangire cannot be forced to use this new migration route it is only of minor ecological importance.

Acknowledgments

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References

- EcoSystems Ltd 1980a. *The status and utilisation of wildlife in the Arusha Region, Tanzania*. EcoSystems Ltd, Box 30239, Nairobi.
- EcoSystems Ltd 1980b. *Livestock, wildlife and land use survey Arusha region Tanzania*. Vol. I: text, Vol. II: fig. and tables. EcoSystems Ltd, Box 30239, Nairobi.

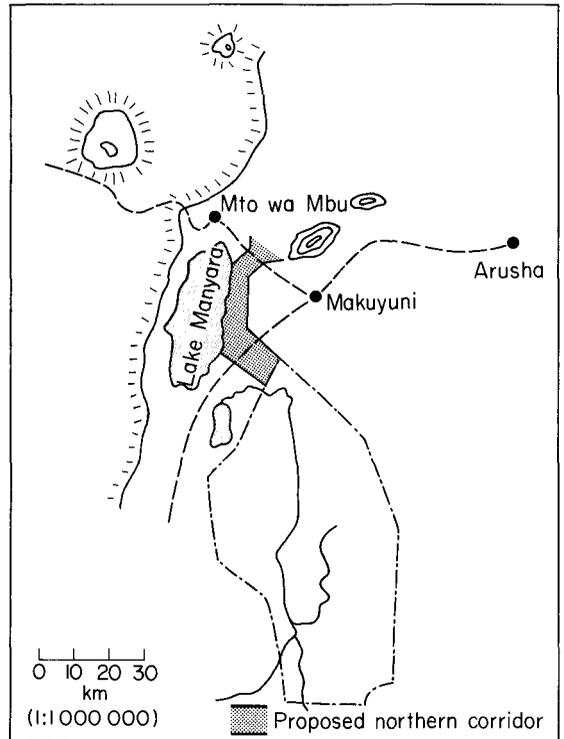


Figure 6. Proposed northern corridor.

- Kahurananga, J. 1979. The vegetation of the Simanjiro plains, northern Tanzania. *Afr. J. Ecol.* **17**, 65–83.
- Lamprey, H.F. 1964. Estimation of the large mammal densities, biomass and energy exchange in the Tarangire Game Reserve and the Masai Steppe in Tanzania. *E. Afr. Wildl. J.* **2**, 1–46.
- McNaughton, S.J. 1976. Serengeti migratory wildebeest: facilitation of energy flow by grazing. *Science*, **191**, 92–94.
- Peterson, D. 1976. *Survey of livestock and wildlife. Seasonal distribution in areas of Masailand adjacent to Tarangire Park*. Final report to regional livestock development Department and the Masai range development project. Mimeo.
- Peterson, D. 1978. Seasonal distribution and interactions of cattle and wild ungulates in Masailand, Tanzania. *MSc thesis*, Virginia Polytechnic Institute.
- Pratt, D.J. and Gwynne, M.D. 1977. *Rangeland Management and Ecology in East Africa*. Hodder and Stoughton Ltd, London.
- Sinclair, A.R.E. and Norton-Griffiths, M. 1982. Do competition or facilitation regulate migrant ungulate populations in the Serengeti? A test of hypotheses.
- Markus Borner, Frankfurt Zoological Society, PO Box 154, Mwanza, Tanzania.