

The state of African cattle genetic resources I. Classification framework and identification of threatened and extinct breeds

J.E.O. Rege

International Livestock Research Institute (ILRI), P.O. Box 5689, Addis Ababa, Ethiopia

Summary

A field and literature survey was conducted to determine the status of cattle genetic resources of sub-Saharan Africa and to identify cattle breeds at risk and those which may have become extinct over the last century. This paper - in two parts - summarises preliminary results of the survey. The survey revealed that sub-Saharan Africa is home to a total of 145 cattle breeds/strains comprising two taurine Longhorns, 15 taurine Shorthorns, 75 zebu (*Bos indicus*), 30 sanga, eight zenga (zebu-sanga), nine breeds derived from interbreeding of indigenous breeds/strains located in close proximity to each other, and six systematically created composite breeds. Out of the 145 breeds identified from the survey, 47 (about 32%) were considered to be at risk of extinction. Risk categories used were: Critical (most severe), Endangered, Vulnerable, and Rare (least severe). Of the breeds identified to be at risk of extinction, six were in the "Rare" category, 10 were "Vulnerable", another 10 were "Endangered" and 15 were in the "Critical" category. A total of 22 breeds (about 13%) previously recognised in the continent have become extinct in the last century. This number excludes some populations which have lost their individual identity due to admixtures involving two or more originally distinct breeds.

Resumen

Se llevó a cabo un estudio bibliográfico y de campo para determinar cuál era el estado de los recursos genéticos ganaderos del Africa subsahariana y para identificar las razas ganaderas en peligro así como aquellas que se hayan podido extinguir durante el último siglo. Este artículo, dividido en dos partes, resume los resultados preliminares del estudio. El estudio reveló que el Africa subsahariana alberga un total de 145 razas bovinas/estirpes, comprendiendo dos razas taurinas Longhorn, 15 Shorthorn, 75 zebu (*Bos indicus*), 30 sanga, 8 zenga (zebu-sanga), 9 razas derivadas de cruzamientos entre razas autóctonas y estirpes estrechamente relacionados y 6 razas compuestas creadas de forma sistemática.

De los 145 razas identificadas en el estudio, 47 (alrededor del 32%) se consideraron en peligro de extinción, las categorías de riesgo utilizadas siendo las siguientes: crítica (más severa), en peligro, vulnerable, y rara (menos severa). De las razas identificadas como en peligro de extinción, seis se encontraban en la categoría "rara", 10 eran "vulnerables", otras 10 estaban "amenazadas" y 15 estaban en la categoría "crítica". Un total de 22 razas (alrededor del 13%) previamente reconocidas en el continente se han extinguido en el último siglo. Esta cifra excluye algunas poblaciones que han perdido su identidad individual debido a mezclas entre dos razas originalmente distintas.

Key Words: *Breed classification, Cattle, Endangered breeds, Extinct breeds, Phenotypic diversity, Sub-Saharan Africa.*

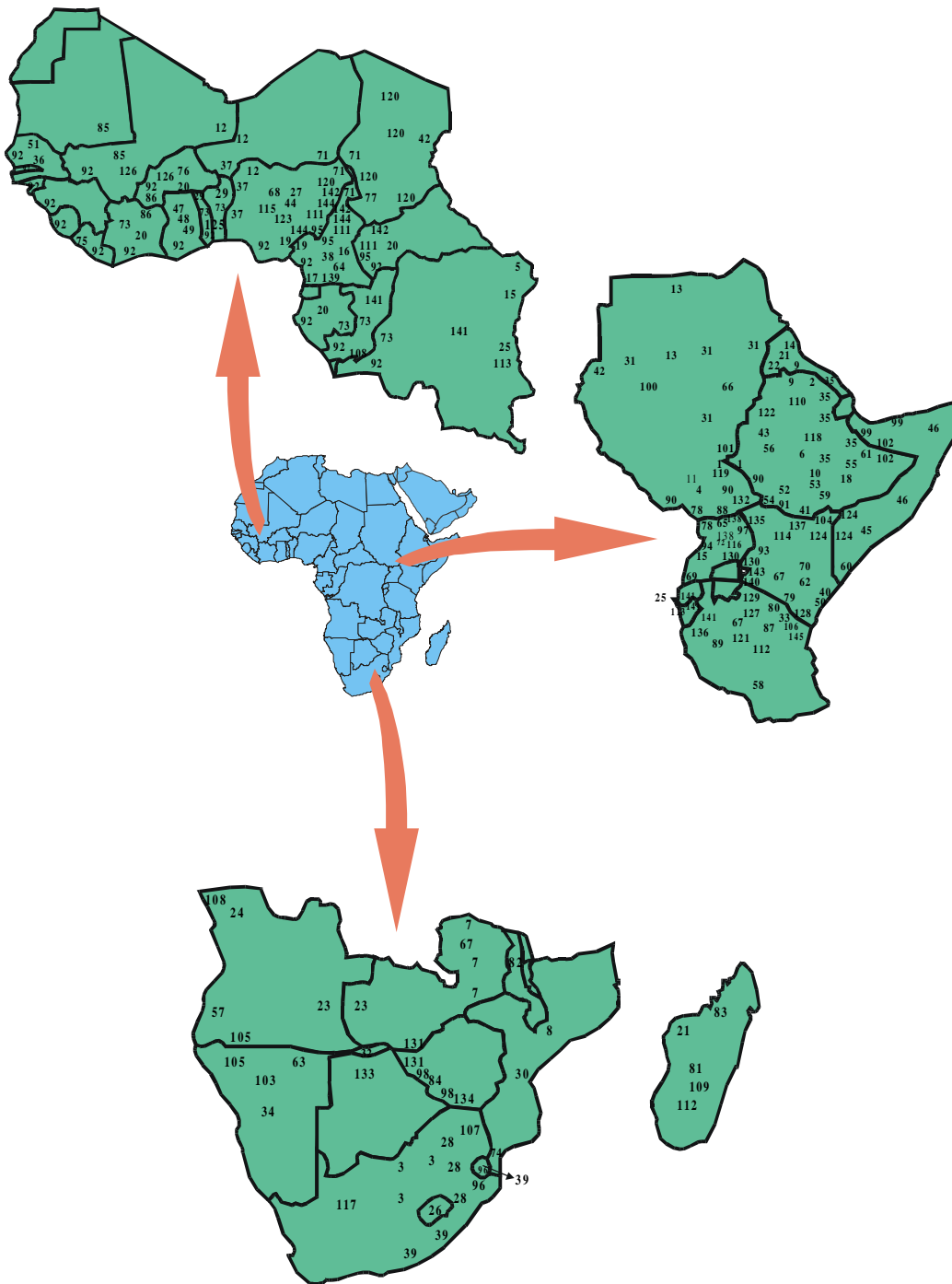


Figure 1. Distribution of cattle breeds in some African countries

Introduction

The origins of indigenous cattle of Africa still remain uncertain despite available archaeological, anthropological and historical evidence (Epstein and Mason, 1984; Blench,

1993). It is generally accepted that the African cattle populations arose from three main phases of introduction from Asia through the Nile valley in Egypt or via the Horn of Africa.

Subsequent migrations led to dense populations of cattle in the East African highlands, around the present-day Ethiopia

List of breed codes reported in figure 1		
1.Abigar	48.Ghana Dwarf Muturu	98.Nkone
2.Adwa	49.Ghana Shorthorn	99.North Somali Zebu
3.Afrikaner	50.Giriama	100.Nuba Mountain Zebu
4.Aliab Dinka	51.Gobra	101.Nuer
5.Alur (Nioka, Blukwa)	52.Goffa	102.Ogaden
6.Ambo	53.Guraghe	103.Okavango
7.Angoni	54.Hammer	104.Orma Boran
8.Angonia (Angone)	55.Harar	105.Ovambo
9.Arado	56.Horro	106.Pare
10.Arsi	57.Humbi	107.Pedi
11.Aweli Dinka	58.Iringa Red	108.Porto-Amboim
12.Azaouak (Tuareg)	59.Jem-Jem	109.Rana (Omby Rana)
13.Baggara	60.Jiddu	110.Raya-Azebo
14.Baherie	61.Jijiga	111.Red Fulani
15.Bahima	62.Kamba	112.Renitelo
16.Bakosi	63.Kaokoveld	113.Ruzizi
17.Bakweri	64.Kapsiki	114.Sabmuru
18.Bale	65.Karamajong zebu	115.Savanna Muturu
19.Banyo	66.Kenana	116.Serere
20.Baoulé	67.Kenya (Improved) Boran	117.Shangan
21.Baria	68.Keteku	118.Sheko
22.Barka	69.Kigezi	119.Shilluk
23.Barotse	70.Kikuyu	120.Shuwa
24.Barra do Cuanzo	71.Kuri	121.Singida White
25.Bashi	72.Kyoga	122.Smada
26.Basuto	73.Lagune	123.Sokoto
27.Biu	74.Landim	124.Somali Boran
28.Bonsmara	75.Liberia Dwarf Muturu	125.Somba
29.Borgou	76.Lobi	126.Sudanese Fulani (Peul Zebu)
30.Bovines of Tete	77.Logone	127.Sukuma (Tinde)
31.Butana	78.Lugware	128.Taita
32.Caprivi	79.Maasai (Kenya)	129.Tarime (Shashi)
33.Chagga (Wachagga)	80.Maasai (Tanzania)	130.Teso
34.Damara (Herero)	81.Madagascar zebu	131.Tonga
35.Danakil	82.Malawi Zebu	132.Toposa
36.Djakore	83.Manjan'i Boina	133.Tswana
37.Djelli (Diali)	84.Mashona	134.Tuli
38.Doayo (Namichi)	85.Maure	135.Turkana
39.Drakensberger	86.Méré	136.Ugogo Grey
40.Duruma	87.Mkalama Dun	137.Unimproved Boran (Borana)
41.Ethiopian Boran (Borana)	88.Mongolla	138.Usuk
42.Fellata (Bororo)	89.Mpwapwa	139.Wakwa
43.Fogera	90.Murle	140.Watende
44.Forest Muturu	91.Mursi	141.Watusi
45.Garre (Gherra)	92.N'Dama	142.White Fulani
46.Gasara	93.Nandi	143.Winam (Kavirondo)
47.Ghana "sanga"	94.Nganda	144.Yola
	95.Ngaundere	145.Zanzibar Zebu
	96.Nguni	
	97.Nkedi	

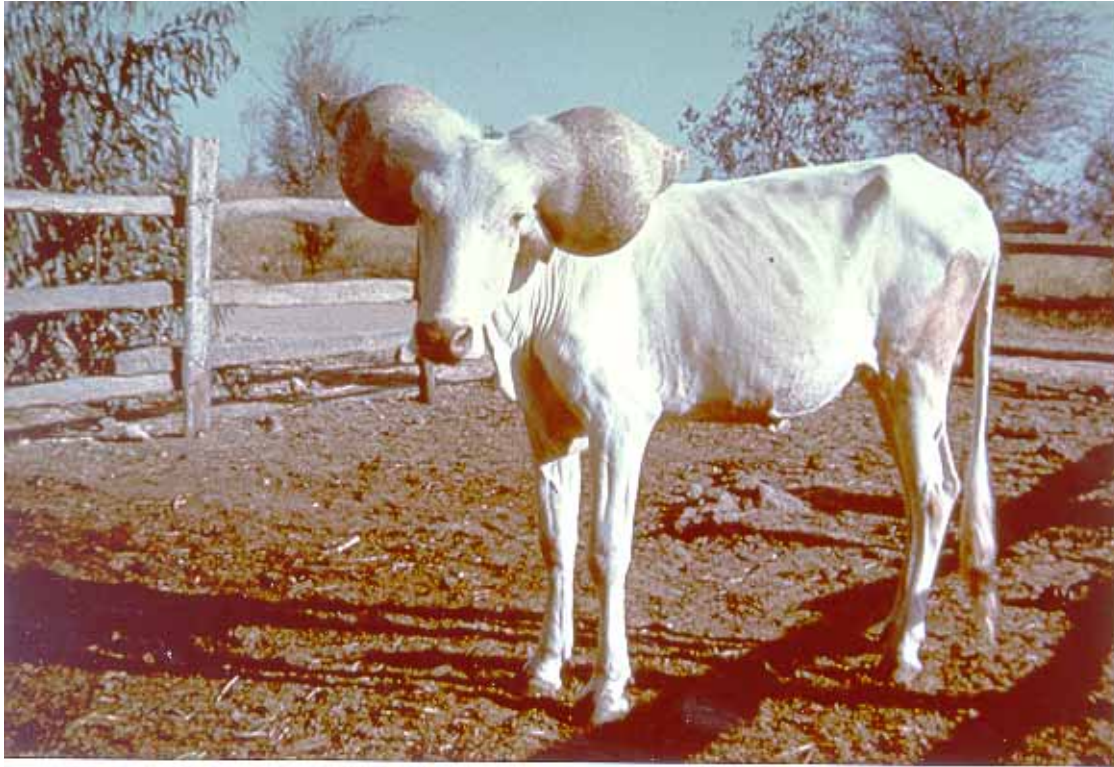


Figure 2. Kuri cattle.

and Kenya. The humpless Longhorns arrived in the continent approximately 5000 BC, followed by the humpless Shorthorns around 2500 BC. Humpless Shorthorn cattle were historically distributed in almost all ecological zones. Isolated populations were recorded in Sudan and Central Tanzania in historical times and remnant populations still exist in Ethiopia. The humped zebu first arrived about 1500 BC and later in large numbers around 670 AD (Eptsein, 1971). The first zebu cattle in Ethiopia are thought to have been brought through Somalia by Semitic people from Arabia, and their subsequent interbreeding with the taurine Longhorns are considered to have produced the present-day sanga cattle, although recent (unpublished) evidence from ILRI work questions the "crossbred origin" of the sanga. The second introduction of zebu cattle led to a major replacement of sanga cattle from most parts of eastern Africa, emergence of intermediate zebu-sanga breeds in some cases, and separate evolution into different strains in the diverse ecological zones. The zebu cattle further spread

westwards and southwards to become the major group of cattle in the region bordered by latitude 20°N in northern Sudan, in the north, the western rain-forest barrier in the west and the Zambezi river, latitude 15°S, in the south.

Present-day African cattle can be classified into four broad categories: the humpless *Bos taurus*, widely distributed in West and Central Africa; the humped *Bos indicus* (zebu), distributed widely in eastern and the dry parts of West Africa; the sanga, found mainly in eastern and southern Africa; and sanga x zebu types ("zenga") found in eastern Africa. The taurine (humpless) type has two groups, Longhorns (*B. taurus longifrons*) and Shorthorns (*B. taurus brachyceros*), both of which are restricted to West and Central Africa.

In addition to the four broad groups of African cattle, there are more recent derivatives that have resulted either as a consequence of close proximity of two or more indigenous populations, sometimes accelerated by deliberate crossing (e.g. the Borgou, Méré and Ghana Sanga of West

Africa), or as a product of efforts to create composite commercial breeds (e.g. the Bonsmara of South Africa and the Mpwapwa of Tanzania).

There is very little information on the diversity in indigenous African livestock populations, both at phenotypic and genetic levels. Indeed, not even the number of breeds of the various species is known. Working estimates are: 100-150 indigenous cattle, 50-60 sheep and 45-50 goat breeds in sub Saharan Africa (Rege, 1998). Additionally, with very few exceptions, there is no data on the population sizes of the different breeds and their status, i.e. whether their numbers are decreasing, increasing or stable.

About the Survey

Starting in 1992, the International Livestock Centre for Africa (ILCA), now the International Livestock Research Institute (ILRI), initiated activities aimed at determining the status of, and compiling information on characteristics of, indigenous African domestic ruminant livestock, specifically cattle, sheep and goats. These activities consisted of:

- 1) sending out mail questionnaires to scientists in national programmes;
- 2) field visits to assess the status of individual breeds/populations identified from questionnaires;
- 3) requests for specific information from collaborating scientists;
- 4) conduct of rapid surveys in selected countries or of selected breeds/populations within a country; and
- 5) review of literature, especially the non-conventional (grey) publications such as annual reports, proceedings of national meetings (conferences, seminars), research project reports, etc.

In addition to these sources, a substantial amount of information was obtained from field expeditions conducted during a continent-wide exercise to collect blood samples for molecular characterisation, to quantify between- and within-population genetic diversity at the DNA level, which is part of ILRI's overall programme on animal

genetic resources. Field visits included interviews with government officials, national scientists and farmers. The aim of the interviews was to obtain, for each breed/population, indications of:

- 1) major uses;
- 2) trends (decreasing, increasing or stable) as perceived by local communities, extension personnel and scientists;
- 3) possible reasons for the perceived trends;
- 4) phenotypic description of the breed; and
- 5) levels of performance, where available.

Whereas the information on uses, trends and determinants of trends, as well as breed description, was mainly obtained from field visits and, to a lesser extent, mail questionnaires, most of the quantitative data on performance was obtained from comprehensive reviews of literature. Data on physical measurements (e.g. withers height) were, in a few cases, obtained by measuring representative animals on-farm or on-station during the field visits or through collaboration with national scientists.

This survey represents a first attempt to assess the status of the ruminant genetic resources of sub-Saharan Africa. It does not constitute the level of assessment required to make decisions on conservation and use. However, it provides a basis for additional, targeted surveys. As this was a very broad-brush survey, the information is incomplete, and may even contradict facts unknown to us. We are aware of this but feel the publication of these results will provoke action, particularly at national levels, that will help improve the information base on domestic African breeds/strains. In the meantime, efforts are underway to conduct in-depth breed surveys in pilot countries. One such survey, in Ghana, is already completed and will be published shortly. Additionally, activities on molecular characterisation of African cattle are well underway. Similar studies have also been initiated for sheep and goats.

Figure 1 shows the geographic distribution of cattle breeds in some African countries

Breed Groups and Clusters

As has been alluded to, the survey recognised four broad categories of African cattle: the humpless *Bos taurus*; the humped *Bos indicus* or zebu; the sanga; the zenga (sanga x zebu derivatives). Fifth and sixth categories included were the “recent derivatives” created from interbreeding amongst indigenous breeds, and the composite breeds developed from systematic crossing of two or more breeds for specific purposes. The taurine category was further subdivided into two groups – the Longhorns and the Shorthorns - while the zebu and the sanga were divided into several groups and clusters. A group is defined here as a collection of breeds or strains considered to have a common ancestry but not necessarily inhabiting the same geographical area. Cluster, on the other hand, is used to refer to a collection of breeds or strains which belong to the same category and, usually, group, and occupy the same geographical area e.g. a country and/or a defined ecozone within one or more countries. Thus, the sub-category “Small East African Zebu” was divided into groups represented by the Abyssinian Shorthorned Zebu, The Somali Zebu, The Teso Zebu, etc. Examples of clusters were the Kenya cluster of zebus, the Tanzania cluster of zebus and the Ovambo and southwestern cluster of sangas. Although the motivation behind the “clustering” was purely presentational convenience, an attempt was made to lump together only those breeds and strains which, because of geographical proximity have had a high likelihood of interbreeding and hence may have more common genetic background than other populations with similar evolutionary history but which have been more isolated. The term group is also used to refer to such broad categories as the humpless Longhorn and the humpless Shorthorn, members of which are considered to be genetically closely related and have not undergone the same differentiation as seen in the zebu or, to some extent, the sanga.

This paper, the first in a two-part series, provides a framework for the classification of African cattle breeds/strains on the bases of historical evidence, phenotypic appearance and geographical location, and identifies populations that may be threatened with extinction and those which may have become extinct in the last 100 years or so. The second paper (Rege and Tawah, 1999) describes the physical characteristics and status of each of the existing breeds in terms of breed development as well as their distribution, main uses and known or speculated evolutionary relationships among breeds.

Figures from 2 to 5 show some cattle breeds.

Classification of Breeds

The taurine cattle

The humpless Shorthorns and Longhorns of West and Central Africa have lived in their present niches for several millenia. The stringency of this environment has supposedly contributed to their small size and to the “low productivity” of these breeds compared to most zebus found in the more arid areas of the tropics. Nonetheless, they have acquired a hardiness to the harsh climatic conditions and resistance to the various diseases endemic to their environments. Notable among these adaptations is their tolerance to trypanosomosis, the major disease limiting introduction of non-native livestock into the vast humid and sub-humid areas of West and Central Africa. Aboagye *et al.* (1994) and Rege *et al.* (1994a; b; c) have reviewed the distribution and important characteristics of the Shorthorn cattle while ILCA (1979) summarised the attributes of the major trypanotolerant populations of West and Central Africa.

Table 1 summarises the classification of the humpless cattle of Africa. There are two humpless Longhorn breeds, the N'Dama and the Kuri, both found in West Africa and 14 humpless Shorthorn breeds widely distributed in the humid and sub-humid zones

Table 1. *Humpless cattle breeds of sub-Saharan Africa.*

Group and Breed /Strain	Location/Country	Estimated ^a Population	Mature weight (kg)		Withers height (cm)		Main uses (In order of importance)
			Male	Female	Male	Female	
1. Humpless Longhorns							
1. N'Dama	All coastal countries of West and Central Africa, plus Mali, B. Faso and C.A. Republic	4 863 000	220-360	180-300	95-120	90-115	Meat; Work; Manure
2. Kuri	Chad; Niger; Nigeria; Cameroon	110 000	500-750	360-450	140-180	126-145	Meat; Milk; Work
2. Humpless Shorthorns (West and Central Africa)							
3. Ghana Shorthorn	Central African Republic; Ivory Coast, Gabon, B. Faso	738 000	190-395	163-280	105-117	99-110	Meat; Work; Milk
4. Baoulé	Burkina Faso	1 082 000	160-300	150-240	100-106	90-103	Milk; Meat
5. Lobi	Nigeria	490 000					Meat; Milk
6. Savanna Muturu	Liberia	58 000		150-225			Meat
7. Liberia Dwarf Muturu	Cameroon	5 500			86-95	82-94	Meat
8. Bakweri	Benin; Togo	1 300					Meat; Rituals
9. Somba	Cameroon	216 000	150-215	115-185	89-106	85-103	Meat; Milk; Rituals
10. Doayo (Namchi)	Cameroon	7 000			100-110	97-106	Meat; Rituals
11. Kapsiki	Ghana	3 300			105-117	100-109	Meat; Rituals
12. Ghana Dwarf Muturu	Cameroon	100					Meat
13. Bakosi	Benin; Congo; Ivory Coast, Gabon; Togo; Zaire	1 300					Meat; Rituals
14. Lagune	Chad	65 700	180-280	165-262	89-106	85-103	Meat; Manure
15. Logone	Nigeria	NA					Meat
16. Forest Muturu	Ethiopia	40 000			85-95	83-93	Meat; Rituals
3. Humpless Shorthorns (Eastern Africa)							
17. Sheko	Ethiopia	31 000					Meat; Work

^aLatest available estimate; if multiple in same year, highest estimate used; combines estimates from different countries, if applicable.

Table 2. Zebu cattle breeds of sub-Saharan Africa.

Group and Breed/Strain	Location/Country	Estimated ^{a)} population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
1. Large East African Zebu							
1. Ethiopian Boran (Borana)	Ethiopia	1 896 000	300-385	300-350			Milk; Meat
2. Kenya (Improved) Boran	Kenya, Tanzania, Zambia	580 570	550-850	400-550			Meat; Milk; Work
3. Unimproved Boran (Borana)	Kenya	1 882 000	255-395	250-355			Milk; Meat
4. Orma Boran	Kenya	547 000					Milk; Meat
5. Somali Boran	Somalia	NA	295-410	230-355			Milk; Meat
6. Karamajong zebu	Uganda	510 000	320-490	300-410			Milk; Meat
7. Toposa	Sudan	398 000	350-600	250-390	130-147	120-133	Milk; Meat; Work
8. Murle	Sudan, Ethiopia	NA	300-410	220-320	128-134	100-122	Milk; Meat; Work
9. Butana	Sudan	258 000	395-600	300-440	131-149	123-139	Milk; Meat
10. Kenana	Sudan	1 670 000	400-610	300-435	132-148	124-138	Milk; Meat
11. Baggara	Sudan	3 270 000	300-600	230-450			Meat; Milk; Work
12. Barka	Eritrea	850 000	335-490	295-415	122-138	120-133	Milk; Meat
13. Turkana	Kenya	621 750					Milk; Meat
2. Small East-African Zebu							
2.1 Abyssinian Shorthorned Zebu							
14. Arsi	Ethiopia	2 012 000					Work; Meat; Milk
15. Adwa	Ethiopia	NA					Work; Meat; Milk
16. Ambo	Ethiopia	NA					Work; Meat; Milk
17. Bale	Ethiopia	738 000					Work; Meat; Milk
18. Goffa	Ethiopia	NA					Work; Milk; Meat

Continued

.... Table 2.

Group and Breed/Strain	Location/Country	Estimated ^{a)} population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
19. Guraghe	Ethiopia	NA					Work; Meat; Milk
20. Harar	Ethiopia	NA					Work; Meat; Milk
21. Jem-Jem	Ethiopia	434 000					Work; Meat; Milk
22. Smada	Ethiopia	NA					Work; Meat; Milk
23. Mursi	Ethiopia	NA					Milk; Meat; Work
24. Hammer	Ethiopia	NA					Milk; Work; Meat
25. Jijiga	Ethiopia	100 000					Work; Milk; Meat
26. Ogaden	Ethiopia; Somalia	NA					Milk; Meat; Work
2.2 The cluster of southern Sudan and Vicinity							
27. Lugware	Uganda, D.R. Congo	196 200	295-355	230-260	102-111	98-109	Work; Meat; Milk
28. Mongolla	Sudan	240 000		130-225	101-110	100-105	Milk; Meat
29. Nkedi	Uganda	752 000	240-450	270-325	102-121	99-107	Work; Milk; Meat
30. Nuba Mountain Zebu	Sudan	44 000	200-225	175-225			Meat (for ceremonies)
2.3 The «Somali» group							
31. Garre (Ghera)	Somalia	NA	290-340	265-305	115-133	100-120	Milk; Meat
32. Gasara	Somalia	NA	205-295	200-230	102-129	101-115	Milk; Meat
33. North Somali Zebu	Somalia	NA					Milk; Work
34. Baherie	Eritrea	10 000	190-285	170-220	109-124	98-120	Milk; Meat
2.4 The Kenya cluster							
35. Kikuyu	Kenya	89 500					Meat
36. Taita	Kenya	NA	194-405	125-360	90-130	94-122	Meat; Milk; Work
37. Giriama	Kenya	NA					Meat; Milk; Work
38. Duruma	Kenya	NA					Meat; Milk; Work

Continued

.... Table 2.

Group and Breed/Strain	Location/Country	Estimated ^{a)} population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
39. Kamba	Kenya	897 000					Meat; Milk; Work
40. Maasai	Kenya	1 398 000	300-445	275-385	118-140	110-135	Milk; Meat
41. Winam (Kavironondo)	Kenya	2 110 000	215-410	195-365	95-132	94-125	Milk; Work; Meat
42. Nandi	Kenya	389 000	215-420	200-320	118-122	110-119	Milk; Work; Meat
43. Samburu	Kenya	19 000					Milk; Meat
44. Watende	Kenya	NA					Milk; Meat; Work
2.5 The Teso group							
45. Teso	Kenya, Uganda	NA					Milk; Meat; Work
46. Usuk	Uganda	NA					Milk; Meat; Work
47. Kyoga	Uganda	NA					Milk; Meat; Work
48. Serere	Uganda	NA					Milk; Meat; Work
2.6 The Tanzania cluster							
2.6.1 Tanganyika							
Shorthorned group							
49. Iringa Red	Tanzania (Mainland)	NA					Milk; Meat
50. Maasai	Tanzania (Mainland)	100 000					Milk; Meat
51. Ugogo Grey	Tanzania (Mainland)	100 000					Milk; Meat
52. Mkalama Dun	Tanzania (Mainland)	1 000					Milk; Meat; Work
53. Singida White	Tanzania (Mainland)	5 000					Milk; Meat; Work
54. Pare	Tanzania (Mainland)	1 000					Milk; Meat; Work

Continued

.... Table 2.

Group and Breed/Strain	Location/Country	Estimated ^{a)} population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
55. Tarime (Shashi)	Tanzania (Mainland)	100 000	160-210	150-190			Milk; Meat; Work
56. Chagga (Wachagga)	Tanzania (Mainland)	1 000	170-240	155-190			Milk; Meat; Work
2.6.2 Zanzibar group							
57. Zanzibar Zebu	Tanzania (Zanzibar & Pemba)		250-350	190-300			Milk; Work; Meat
2.7 The Angoni group							
58. Angoni	Zambia	300 000	270-730	180-480	122-127	119-122	Meat; Work; Milk
59. Malawi Zebu	Malawi	796 700		265-280			Meat; Work; Milk
60. Angonia (Angone)	Mozambique	64 400	265-730	175-470	121-125	110-120	Meat; Work; Milk
2.8 The Madagascar group							
61. Madagascar zebu	Madagascar	7 000 000	350-450	250-350	117-140	110-135	Meat; Milk; Work
62. Baria	Madagascar	500					Not used (wild)
3. West African Zebu							
3.1 Gudali Group							
3.1.1 The Sokoto sub-group							
63. Sokoto	Nigeria	4 352 000	495-660	240-355	130-138	116-132	Milk; Meat; Work
3.1.2 The Adamawa sub-group							
64. Ngaundere	Cameroon; Nigeria;	999 000	400-565	330-410	132-136		Milk; Meat; Work
65. Banyo	C. Africa Republic Cameroon; Nigeria	NA	300-410	350-365			Milk; Meat; Work

Continued

.... *Tablew 2.*

Group and Breed/Strain	Location/Country	Estimated ^{a)} Population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
66. Yola	Cameroon; Nigeria	NA	350-355	315-340			Milk; Meat; Work
3.2 Fulani Group							
67. Gobra	Senegal	1 300 000	300-350	250-300	130-144	124-140	Milk; Meat; Work
68. Sudanese Fulani (Peul Zebu)	Mali, B. Faso	5 616 000	280-345	248-300	120-138	115-126	Milk; Work; Meat
69. White Fulani	Nigeria; Cameroon;	9 645 000	425-665	250-380	130-152	1180138	Milk; Meat; Work; Manure
70. Red Fulani	C. Africa Republic Nigeria, Cameroon;	4 924 000					Milk; Meat; Work; Manure
71. Fellata (Bororo)	C. Africa. Rep. Chad; Sudan	50 000 in Sudan	400-450	255-410			Milk; Meat; Work
72. Djelli (Diali)	Niger; Nigeria	NA					Milk; Meat; Work
3.3 Other West African Zebu							
73. Azaouak (Tuareg)	Mali; Nigeria; Niger	506 000	350-500	300-410	128-135	122-130	Meat; Work; Milk
74. Shuwa	Chad; Nigeria; Cameroon	4 554 000	350-475	250-300	135-140	125-128	Work; Milk; Meat;
75. Maure	Mauritania; Mali	673 000	250-700	250-350	125-140	110-128	Milk; Meat; Work

NA = Not available.

^{a)}Latest available estimate; if multiple in same year, highest estimate used; combines estimates from different countries, if applicable.



Figure 3. Raya Azebo cattle.

of West and Central Africa. In addition there is one humpless Shorthorn breed in eastern Africa: The Sheko of Ethiopia.

The zebu cattle

Although zebu cattle are trypano-susceptible, in the absence of tsetse fly the large size and high production levels of many zebu breeds give them a competitive advantage over the trypanotolerant N'Dama Longhorn and Shorthorns (Rege *et al.*, 1994a;b). The zebu breeds or strains are abundant in the continent and exhibit a high level of resistance to harsh environmental conditions, making them the only type of cattle that can survive over a large part of Africa.

The zebu is the largest single cattle type in Africa. It is represented by some 75 breeds (Table 2). The highest concentration of the zebu is in eastern Africa and neighbouring countries in south-central Africa which, together, have 61 breeds. West Africa has only

13 zebu breeds, principally inhabiting the dry savanna and sahelian belts. The East African Zebu can be divided into two major sub-groups - the "Large" and the "Small" East African Zebu. The former has some 13 breeds, all restricted to the relatively drier parts of Sudan, Eritrea, Ethiopia, Somalia, Kenya, Tanzania and Uganda. The 49 Small East African zebu breeds are also principally found in the same countries as their "Large" counterparts. However, a small number inhabit south-central Africa (Zambia, Malawi, Mozambique) and Madagascar. Other than Zaire, the eastern border of which is inhabited by "spill-over" zebu from eastern Africa, the humid zone of Central Africa is devoid of zebu.

The Small East African zebu is further sub-divided into several *groups* or *clusters*: The Abyssinian Shorthorned Zebu (represented by 13 breeds/strains); the Cluster of southern Sudan and vicinity (4); the Somali group (4); the Kenya cluster (10); the Teso group (4); the Tanzania cluster consisting of the Tanganyika

Table 3. The sanga cattle breeds of sub-Saharan Africa.

Group and Breed/Strain	Location/Country	Estimated ^{a)} Population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
1. The sanga of eastern Africa							
1.1 The Nilotic group							
1. Abigar	Ethiopia	548 600					Milk; Meat; Work
2. Aliab Dinka	Sudan	NA					Milk; Meat
3. Aweil Dinka	Sudan	NA					Milk; Meat
4. Nuer	Sudan	NA					Milk; Meat
5. Shilluk	Sudan	NA					Milk; Meat
1.2 The Abyssinian sanga							
6. Danakil	Ethiopia, Eritrea	680 500	250-380	200-305	130-145	120-125	Milk; Meat; Work
7. Raya-Azebo	Ethiopia	521 000					Work; Milk; Meat
1.3 The Ankole group							
8. Watusi	Uganda; Rwanda; Burundi; Tanzania; D.R.C	1 600 000	350-425	290-350	132-135	110-127	Milk; Meat; Work
9. Bahima	Uganda; D.R.C.	*					Milk; Meat; Work
10. Kigezi	Uganda	*	220-380	200-330	112-132	108-120	Milk; Meat; Work
11. Bashi	D.R.C.	*	235-400	220-340	115-135	110-124	Milk; Meat; Work
12. Ruzizi	DRC; Rwanda; Burundi	*					Milk; Meat; Work
2. The sanga of southern Africa							
2.1 The Shona group							
13. Mashona	Zimbabwe	500 000	350-635	260-410			Meat; Work
2.2 The Nguni group							
14. Nguni	S. Africa; Swaziland	2 156 000	400-680	225-450			Meat; Work; Milk

.... Continued...

.... Table 3.

Group and Breed/Strain	Location/Country	Estimated ^{a)} Population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
15. Nkone	Zimbabwe	400		300-450			Meat; Milk
16. Pedi	S. Africa	400					Meat; Work; Milk
17. Shangan	S. Africa	600					Meat; Work; Milk
18. Landim	Mozambique	536 400					Meat; Work; Milk
2.3 The Zambia/Angola cluster							
19. Tonga	Zambia	993 000	485-530	310-495	118-130		Milk; Meat; Work
20. Porto-Amboim	Angola	NA	400-530	350-425	120-140	118-129	Meat
2.4 Ovambo and southern western cluster							
21. Ovambo	Namibia	NA					Meat; Work; Milk
22. Kaokoveld	Namibia	NA					Meat; Work; Milk
23. Okavango	Namibia	NA					Meat; Work; Milk
24. Caprivi	Namibia	NA					Meat; Work; Milk
25. Humbi	Angola	NA					Meat; Work; Milk
2.5 The Setswana group							
26. Barotse	Zambia; Angola	793 000	255-700	240-455	120-137	114-129	Milk; Meat; Work
27. Damara (Herero)	Namibia	NA					Milk; Work; Meat
28. Tswana	Botswana	1 395 000	310-520	290-420	140	131	Meat; Work; Milk
29. Tuli	Zimbabwe	3 300	450-820	360-570			Meat
2.6 The Afrikaner group							
30. Afrikaner	South Africa	302 000	450-950	360-555	130-150	128-140	Meat; Work

NA = Not available.

^{a)}Possibly included in Watusi population figure.^{b)}Latest available estimate; if multiple in same year, highest estimate used; combines estimates from different countries, if applicable.

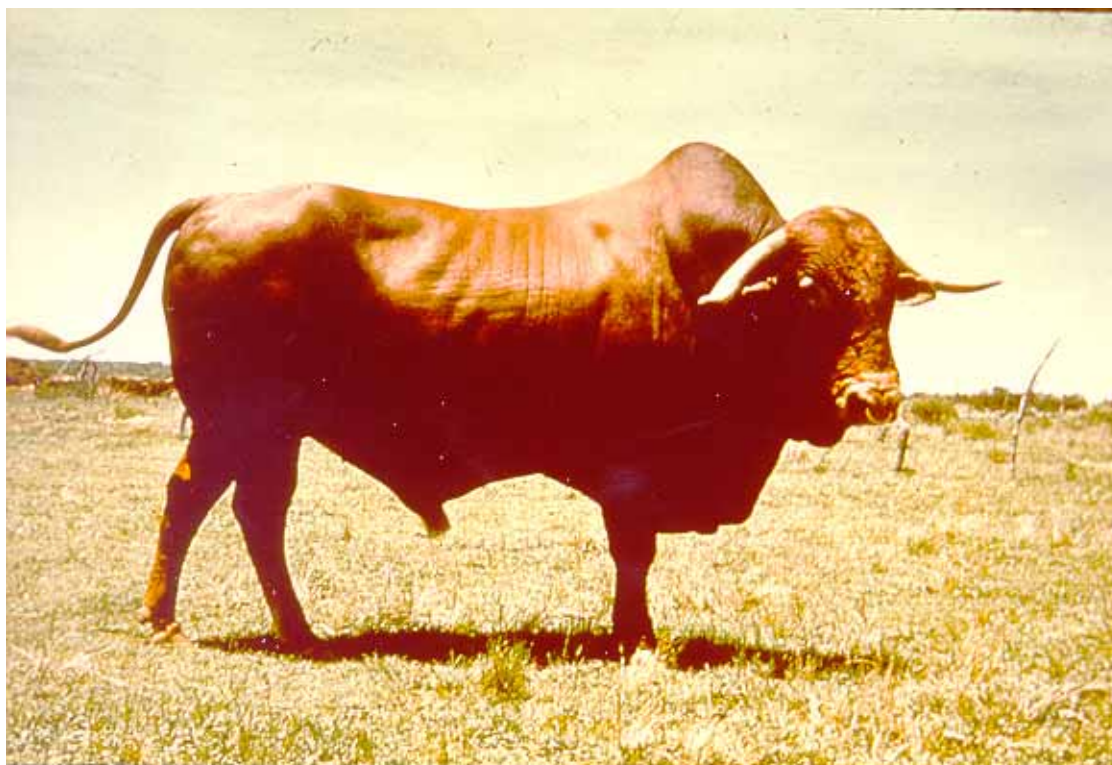


Figure 4. Afrikaner cattle.

group (8) and the Zanzibar Zebu (1); the Angoni group (3); and the Madagascar group (2).

The West African zebu consists of two main groups: The Gudali group represented by two sub-groups (Sokoto with only one breed, and Adamawa with 3 breeds/strains); and the Fulani group (with 6 breeds/strains). In addition, there are three other zebu breeds in West Africa, the Azoauak, Shuwa and Maure, which do not belong to either the Gudali or the Fulani groups.

The sanga cattle

Table 3 summarises the sanga cattle breeds/strains of Africa. There are 30 sanga breeds/strains sub-divided on the basis of location into the sanga of eastern (12 breeds/strains) and sanga of southern (18) Africa. The sanga of eastern Africa consist of three groups: Nilotic sanga of southern Sudan and south-western Ethiopia; the Abyssinian sanga of Ethiopia and Eritrea; and

the Ankole group with representatives in Uganda, Rwanda, Burundi, Tanzania and Democratic Republic of Congo (former Zaire).

The sanga of southern Africa are represented by six groups or clusters: the Shona represented by the *Mashona* of Zimbabwe; the Nguni group (5 breeds/strains); the Zambia/ Angola cluster (2); the Ovambo and south-western cluster (5); the Setswana group (4); and the Afrikaner group represented only by the *Afrikaner* breed.

The zenga cattle

Several breeds have supposedly resulted from crossbreeding between the zebu and sanga populations in the East African highlands where large concentrations of zebu (arriving from Asia) initially occurred, providing opportunity for admixture with sanga cattle, then already resident there. The resulting breeds have been classified into a separate category. The name "zenga" is suggested for this category. Exclusively located in eastern

Africa, some members are found in predominantly zebu habitat, others in sanga habitat. Indeed, the location of the zenga forms a natural division between the "zebu country" in the north and the predominantly "sanga country" in the south. Members of the zenga - a total of eight - are: the *Arado*, *Fogera*, and *Horro* (of Ethiopia); *Jiddu* (southern Somalia); *Alur*, also called *Nioka* (*Nyoka*) or *Blukwa* cattle (Democratic Republic of Congo); *Nganda* (Uganda); *Sukuma* (Tanzania); and *Bovines of Tete* (Mozambique). The zenga cattle are summarised in Table 4.

Recent derivatives

There are several cattle breeds which have been formed as a result of the coexistence of two or more breeds in close proximity to each other. In most cases this has been facilitated by

increased interaction among tribal groups and, sometimes, deliberate but non-systematic attempts to improve specific attributes. A good example of the process, but one which has not produced a recognised, distinct breed or strain, is the crossbreeding between the Kuri and zebu of the Lake Chad Basin (see Tawah *et al*, 1997) to produce a draught animal. Table 4 summarises breeds/strains in this category.

Commercial composites

Sub-Saharan Africa is home to, at least, six commercial composite breeds with varying proportions of exotic blood. Unfortunately, only two of them - the *Drakensberger* and the *Bonsmara*, both of South Africa - are secure in terms of numbers and existence of



Figure 5. Ankole cattle.

Table 4. Zenga (zebu-sanga) cattle, recent derivatives and synthetic breeds.

Group and Breed/Strain	Location/Country	Estimated ^{a)} Population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
1. Zenga (zebu x sanga) cattle							
1. Arado	Eritrea; Ethiopia	510 000	205-430	192-350	117-144	93-126	Work; Milk; Meat
2. Fogera	Ethiopia	86 800			110-145	100-121	Work; Milk; Meat
3. Horro	Ethiopia	3 286 000	320-480	210-400			Work; Milk; Meat
4. Jiddu	Somalia	NA	340-590	325-430	109-133	108-124	Milk; Meat
5. Alur (Nioka, Blukwa)	D.R.C.	NA	290-550	225-380	110-131	108-122	Milk; Meat; Work
6. Nganda	Uganda	1 365 000	280-420	200-340	115-124	115-122	Milk; Meat; Work
7. Sukuma (Tinde)	Tanzania	100 000	230-410	210-370	94-132	93-127	Milk; Meat
8. Bovines of Tete	Mozambique	NA					Meat; Milk; Work
2. Recent derivatives							
1. Borgou	Benin; Togo	428 000	190-330	180-295			Meat; Work; Manure
2. Méré	B. Faso; Cote d'Ivoire	693 000					Meat; Work; Manure
3. Ghana «sanga»	Ghana	124 000					Milk; Meat; Work; Manure
4. Keteku	Nigeria	293 000					Meat; Work; Manure
5. Djakore	Senegal	350 000					Milk; Meat; Work; Manure
6. Biu	Nigeria	NA					Meat; Work; Manure
7. Basuto	Lesotho	NA					Work; Meat; Milk
8. Barra do Cuanzo	Angola	NA	370-620	360-500			Meat; Work; Milk
9. Rana (Omby Rana)	Madagascar	40 000-85 000					Milk; Meat

.... Continued

... Table 4.

Group and Breed/Strain	Location/Country	Estimated ^{a)} Population	Mature weight (kg)		Withers height (cm)		Main uses (in order of importance)
			Male	Female	Male	Female	
3. Systematic synthetics/composites							
1. Drakensberger	South Africa; Swaziland	149 000					Meat; Work; Milk
2. Bonsmara	South Africa	143 000					Meat
3. Renitelo	Madagascar	2 000-3 000	420-655	305-450			Meat; Work
4. Manjan'i Boina	Madagascar	200					Milk
5. Mpwapwa	Tanzania	1 500	360-620	290-455			Milk
6. Wakwa	Cameroon	NA					Meat

NA = Not available.

^{a)}Latest available estimate; if multiple in same year, highest estimate used; combines estimates from different countries, if applicable.

programmes for genetic improvement. The other four are the *Mangan'i Boina* of Madagascar (a synthetic dairy breed), the *Renitelo*, also of Madagascar (beef), the *Mpwapwa* of Tanzania (dairy) and the *Wakwa* of Cameroon (beef). Details of these breeds are discussed in the second paper (Rege and Tawah, 1999).

Breeds at Risk

As has been alluded to, one of the objectives of the survey was to establish the status of sub-Saharan African cattle breeds and to identify those which are at risk as well as those which may have become extinct in the recent past. In the absence of time-trend census data, it was not possible to provide quantitative information on trends. However, the study results, mainly qualitative, together with an assessment of pressures currently affecting breeds, were used to draw conclusions regarding possible threat categories of different breeds considered to be at risk. A total of 47 (32%) breeds/strains were identified to be at risk (Table 5). Four risk categories were defined according to FAO (1992): Critical (most threatened), Endangered, Vulnerable, and Rare (least threatened). Out of the 47 breeds at risk, 15 (Pare, Mkalama Dun and Chagga of Tanzania; Bakweri, Kapsiki, Bakosi and Wakwa of Cameroon; Ghana Dwarf Muturu or Shorthorn; Nkone of Zimbabwe; Pedi and Shangan of South Africa; Renitelo and Baria of Madagascar; and Sengologa and Seshaga of Botswana) were classified in the "Critical" category, 10 were "Endangered", another 10 were "Vulnerable" and six were "Rare" (Table 5). The remaining six could not be definitively classified: Five were classified as lying somewhere between "Rare" and "Vulnerable" and one between "Endangered" and "Vulnerable".

Extinct Breeds

Starting with the 145 breeds identified in this survey and working backwards, a review of old literature dating as far back as 1902 was

Table 5. Breeds of sub-Saharan African cattle considered at risk.

Risk status	Breed/strain	Principal location	Main causes of threat*
Rare	Sekgatla	Botswana	Interbreeding with "Tswana"; Crossbreeding with Afrikaner
	Basuto	Lesotho	Crossbreeding
	Jiddu	Somalia	Neglect; Conflict
	Bovines of Tete	Mozambique	Conflict; Crossbreeding
	Biu	Nigeria	Interbreeding
Rare/Vulnerable	6. Manjan'i Boina	Madagascar	Early stage of breed development
	Dongola	Northern Sudan	Interbreeding with Red Butana
	Shendi	Northern Sudan	Interbreeding with Red Butana
	Bambawa	Sudan (near Eritrea border)	Interbreeding with Red Butana
	Ingessana	Sudan-Ethiopia border	Conflict; interbreeding
Vulnerable	Kuri	Lake Chad Basin	Reduction in habitat; Crossbreeding; Conflict
	Kyoga	Uganda	Conflict; interbreeding
	Usuk	Uganda	Conflict; interbreeding
	Singida White	Tanzania	Interbreeding with neighbouring breeds
	Tarime (Shashi)	Tanzania	Interbreeding with neighbouring breeds
	Watusi	Rwanda, Burundi	Conflict, crossbreeding/interbreeding
	Bahima	Uganda	Conflict, crossbreeding/interbreeding
	Bashi	D.R. Congo	Conflict, crossbreeding/interbreeding
	Ruzizi	Burundi	Conflict, crossbreeding/interbreeding
	Landim	Mozambique	Conflict, Crossbreeding, Replacement
	Rana	Madagascar	Continued, unsystematic crossbreeding
	Vulnerable/Endangered	Nigerian Forest Muturu	Nigeria

.... Continued

.... Table 5.

Risk status	Breed/strain	Principal location	Main causes of threat*
Endangered	Serere	Uganda	Conflict; interbreeding
	Watende	Kenya	Interbreeding with neighbouring breeds/strains
	Iringa Red	Tanzania	Interbreeding with Ugogo Grey
	Sheko	Ethiopia	Interbreeding with zebus
	Kikuyu Zebu	Kenya	Neglect; Crossbreeding
	Liberian Dwarf	Liberia	Neglect; Replacement; Conflict
	Muturu	Chad	Neglect
	Logone	Cameroon	Neglect
	Doayo (Namchi)	Cameroon	Neglect
	Damara (Herero)	Namibia	Neglect; Crossbreeding, Replacement
	Mpwapwa	Tanzania	Absence of sustained dev. Programme
	Pare	Tanzania	Interbreeding
	Mklama Dun	Tanzania	Interbreeding
	Chagga (Wachagga)	Tanzania	Crossbreeding and interbreeding
	Bakweri	Cameroon	Neglect
	Kapsiki	Cameroon	Neglect
	Bakosi	Cameroon	Neglect
Critical	Ghana Dwarf	Ghana	Neglect
	Muturu/Shorthorn		
	Nkone	Zimbabwe	Neglect
	Pedi	S. Africa	Interbreeding; Replacement
	Shangan	S. Africa	Interbreeding; Replacement
	Sengologa	Botswana	Interbreeding with "Tswana"; Neglect
	Seshaga	Botswana	Interbreeding with "Tswana"; Neglect
	Renitelo	Madagascar	Interbreeding; Dermatophilosis
	Baria	Madagascar	Neglect; Lives in the wild
	Wakwa	Cameroon	Absence of sustained dev. programme

*Crossbreeding as used here involves exotics; interbreeding involves other (neighbouring) indigenous breeds.

Table 6. Breeds of sub-Saharan African cattle considered to be extinct.

Breed/strain	Class	Location	Last Report	Reference
1. Nuba (Delami or Koalib) Shorthorn	Humpless shorthorn	Sudan	1900s	Epstein (1971)
2. Gimira («Kuri»)	Humpless Longhorn	Ethiopia	1929	Encyclopædia Britannica (1929)
3. Karagwe Shorthorn	Humpless Shorthorn	Uganda?	1927	Stuhlmann (1927)
4. Sesse Shorthorn	Humpless Shorthorn	Sesse Islands, L. Victoria	1909	Epstein (1971)
5. Kigezi Shorthorn	Humpless Shorthorn	Uganda	1920s	Ford and Hall (1947)
6. Socotra Shorthorn	Humpless Shorthorn	Socotra Islands, Off Horn of Africa	1960s	Payne (1964)
7. Unguja (Pemba or Mafia) Shorthorn	Humpless Shorthorn	Pemba, Mafia Islands	1920s	Payne (1964)
8. Manjaca	Humpless Shorthorn	Guinea Bissau	1980s	ILCA (1992)
9. Bimal	Zebu	Somalia	1955	Rosetti and Congiu (1955)
10. Singhi	Zebu	Somalia	1953	Bozzi and Triulzi (1953)
11. Baria (not Madagascar Baria)	Zebu (zenga?)	Eritrea	1929	Marchi (1929)
12. Ugogo	Zebu	Tanzania	1920s	McCall (1928)
13. Senegambia Shorthorn	Humpless Shorthorn	The Gambia; Southern Senegal (Casamance)	1950s	Mason (1951); Epstein (1971)
14. Arussi-Galla	Sanga	Ethiopia	1900s	Lydekker (1912)
15. Ugoi	Sanga	Tanzania	1850s	Burton (1961)
16. Ngami (Botswana)	Sanga	Botswana	1900s	Lydekker (1912), Curson (1934)
17. Nama	Sanga	Botswana	1906	Groenewald and Curson (1933)
18. Bolowana	Sanga (?)	South Africa	Late 1890s	Thompson (1932)
19. Sakalava	Sanga (?)	Madagascar	Late 1890s	Keller (1898); Lydekker (1912); Murdock (1959)
20. Hottentot	Sanga (?)	S. Africa	Late 1800s/Early 1900s	Kolb (1719); Smith (1827); Jones (1955); Martinho (1955)
21. Wadai Dinka	Sanga	D.R. Congo	1936	Curson and Thornton (1936)
22. Mbulu	Zebu	Tanzania	1953	Jeffreys (1953)

done. Each breed or population appearing in the old literature was followed progressively in subsequent publications. Of the breeds that could not be found in more recent literature, a large number was due to change in breed names over the years. However, some breeds which existed previously could not be found in recent literature under any name. To determine what may have happened to these "missing" breeds or strains, clarification was sought from the locations at which they were last reported. This process resolved some of the anomalies and helped to identify those populations which, on the basis of information available, had ceased to exist. Some of these were on record in the countries concerned as officially extinct while the rest could only be considered to be extinct because local officials and communities could not recall their previous existence or were certain that they had, through the years, disappeared as a result of one reason or another. A total of 22 breeds which existed at some point during this (20th) century could not be located and were considered extinct (Table 6). Of the extinct breeds, only one (*Gimira* of Ethiopia) was a humpless Longhorn, eight were humpless Shorthorns, four were zebu (one of them – the Baria of Eritrea – may have been a zenga), while the remaining seven were sanga, although the classification of three of these, Bolowana, Sakalava and Hottentot, as sanga was not certain.

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