3. Indigenous Cattle Breeds of Nigeria

3.1 General

Individual breeds and races of cattle in Nigeria have been characterised, but overviews of the country as a whole are rare. The most important of these is Gates (1952). Standard references such as Doutressoulle (1947), Epstein (1971) and Mason (1988) constitute useful reviews of the general literature on West Africa but do not cover the specific situation in Nigeria.

A specific study of the breeds of cattle recognised by indigenous producers was undertaken as part of the NNLRS in 1990. Using the locally named categories, village survey data using the grid square method (see previous section) was plotted to map the presence or absence of individual breeds. The maps accompanying this working paper are based on this data.

All types of cattle interbreed and can therefore be regarded as a single species. However, lower levels of subclassification remain confused, conflating biological cultural and linguistic differentiation. Standard texts such as Mason (1988) or FAO (1987) tend to confound different levels of variation; thus Rahaji (=Red Bororo), West African Dwarf shorthorns and Kuri are all regarded as ‘breeds’. This makes them almost useless for interpreting local understanding of breeds.

This working paper attempts to develop a hierarchical classification which is at least coherent, although it runs counter to some established usages. The primary distinction is taken to be that between the broad categories of zebu and taurine, here called subspecies. Within West Africa there are three categories of taurines: West African Dwarf Shorthorn (henceforth muturu), n’dama and kuri. The n’dama, a humpless longhorn, is not indigenous to Nigeria but was imported from Senegambia during the twentieth century and is now established in some rural areas, albeit crossbred. Table 1 provides an overview of these with vernacular names and alternatives recorded in the literature.

Although there is a long history of introductions of European breeds, very few have passed into village production and these have not persisted.

3.2 Cattle and their distribution in 1990

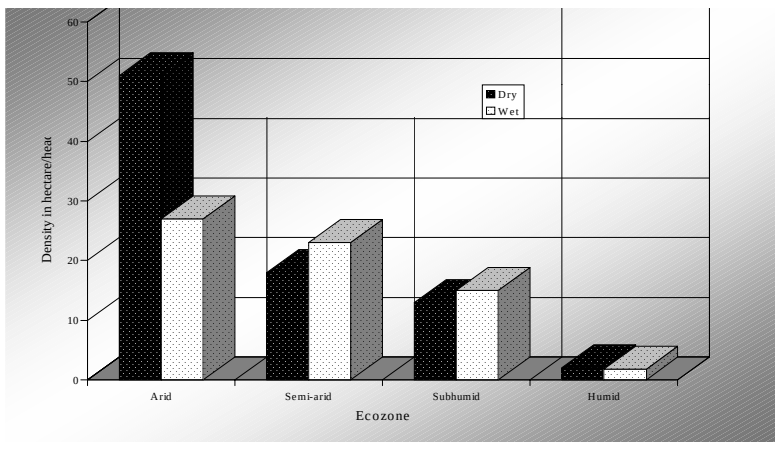
Nigeria had a mean (i.e. averaged between wet and dry seasons) cattle population of some 13.9 million in 1990, of which 11.5 million were kept in pastoral systems and 2.4 million in villages. These were predominantly zebu, but included 115,000 muturu, some keteku, n'dama and kuri. Country-wide, the mean density of cattle is approximately 15/km^2, or 6.6 hectare/head. Cattle numbers increase steadily with declining rainfall, so that much of the south has low cattle densities and most of the population is in the north. This trend is illustrated in Figure 1 which shows the densities by ecozone in both wet and dry seasons.

There is some seasonal change in the relative proportions of cattle in the various ecozones. Approximately 45% of the national herd stays within the subhumid zone throughout the year, with almost all of the remainder in the semi-arid or arid zones. In both seasons, there are several hundred thousand cattle in and around Lake Chad.

Table 1 Cattle subspecies and breeds in Nigeria

Status	Nigerian Reference Name	Other Names	Fulfulde
Zebu Types			
Resident:	Bunaji	White Fulani	Daneeji, Yakanaaji, Akuji
	Rahaji	Red Bororo, Abore	Bodeeji, WoDaaBe
	Sokoto Gudali		Bokolooji
	Adamawa Gudali		
	Azawak	Tagama	Azawa
	Wadara	Shuwa, Choa	
Not Resident:	Jali (=Diali)		Jaleeji
	Ambala	Arab, Bahr el Ghazal	
Taurines	West African Dwarf shorthorn	muturu	
	Keteku (shorthorn x zebu	Borgu	Kataku, Ketari, Kaiama
	Keteku (n'dama x muturu)		
	N'dama (humpless longhorn)		
	kuri (humpless longhorn)		
Doubtful breed status:	Daleeji? = Azawa		
	Buzaye? = Azawak x Sokoto Gudali cross		
	Noori? = colour name and not race		

Figure 1 Densities of cattle by ecozone



The great majority of the cattle in Nigeria are owned by pastoralists, and even those owned by settled farmers are often managed by pastoralists for part of the year.

This explains the considerable intra- and inter-annual fluctuations in numbers and distribution. Herders respond to the various constraints on production such as disease, pasture and political developments extremely rapidly, moving their stock and largely ignoring international borders, control posts and veterinary regulations (Blench, 1996).

Although there is a variety of pastoral groups, especially in the northeast, throughout most of Nigeria the pastoralists belong to a single ethnic group, the Ful≡e (FulBe), or Fulani. The Ful≡e are the best known and most numerous of all the pastoral groups in West Africa (Blench, 1999). They are also the major suppliers of cattle to settled farmers. As a consequence, to a large extent, their breeding strategies and choice of livestock breeds define the situation in the country as a whole.

3.3 Zebu types

3.3.1 Overview

As shown in Table 1, zebu are divided into six distinct resident breeds as well as animals that are of doubtful breed status or are only seen as trade stock. These breeds are of uneven numerical importance, with three breeds constituting 90% of the zebu. Zebu, in turn represent the great majority of cattle with perhaps 115,000 muturu and statistically insignificant numbers of other breeds.

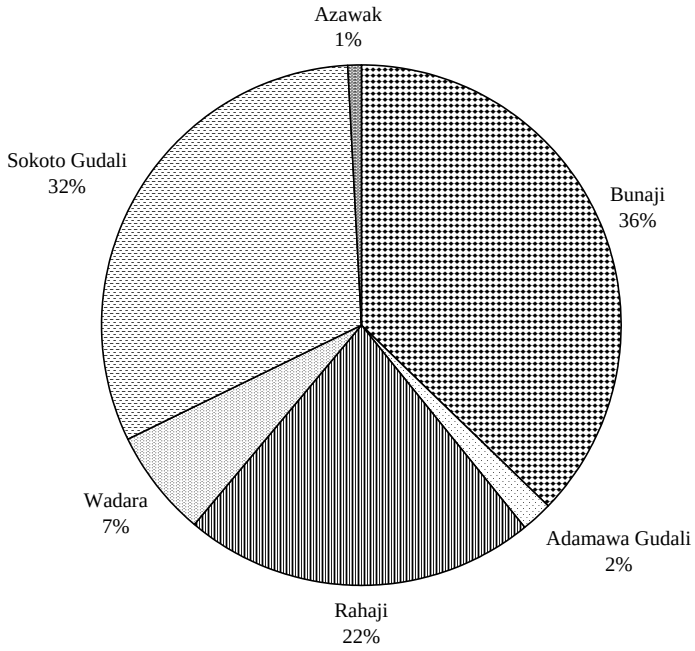
By combining densities noted from aerial survey with distributional data, it was possible to calculate approximate percentages of individual breeds in relation to the national herd. These are shown in Table 2 and Figure 2:

Table 2 Estimated percentages of different zebu breeds in the Nigerian National Cattle Herd

Breed	Proportion of Cattle Population (%)	Calculated Number of Each Breed
Bunaji	37.2	5,118,547
Sokoto Gudali	31.6	4,351,523
Rahaji	22.0	3,029,541
Wadara	6.6	904,731
Adamawa Gudali	1.9	263,019
Azawak	0.7	103,280
Total	100.0	13,770,641

Source: RIM, 1992, II:436

Figure 2 Contribution of zebu breeds to Nigerian National Herd



3.3.2 Bunaji

Bunaji or White Fulani cattle is a white, black-eared and medium-horned breed, and is the most numerous and widespread of all Nigerian cattle breeds. The NNLRS estimated that they represent some 37% of the national herd. They are found from Lagos to Sokoto, Katsina and Kano States and spread across the Nigerian Middle Belt. The only areas from which they are significantly absent are Borno, where Rahaji and Wadara predominate, and in the south-east, where there are no resident zebu. The movement into the derived savannah and to the edge of the humid zone has largely been of Bunaji and pastoralists generally agree that they are superior to all other breeds of zebu in resisting disease. Map 3 shows the distribution of Bunaji and indicates the approximate variation in their seasonal movement.

3.3.3 Sokoto Gudali

There are two quite distinct types of Gudali in Nigeria – the Sokoto Gudali (or Bokolooji) and the Adamawa Gudali (see below). The Sokoto Gudali is a uniform cream, light grey or dun, the dewlap and skin folds are highly developed and the horns almost absent. Although the Sokoto Gudali stereotypically occurs mainly in the northwest of Nigeria, in reality it is now distributed widely throughout the country (Map 4). The NNLRS estimated that they represent some 32% of the national herd.

3.3.4 Rahaji

The Rahaji is one of the largest zebu breeds and is distinguished by its deep burgundy-coloured coat, pendulous ears and long, thick horns. It is the third most numerous breed of cattle in Nigeria, some 22% of the national herd. The Rahaji is adapted to arid and semi-arid regions and rarely goes

further south than Kaduna in the wet season, except for the isolated population on the Mambila Plateau in the south-east (Map 5).

Ful≡e pastoralists consider the Rahaji an extremely prestigious breed and many herds of 'white' cattle include a few Rahaji for crossbreeding. Nonetheless, it tolerates neither humidity-related diseases nor poor nutrition. Strikingly, a Ful≡e clan, the Rahaji, named for the breed they traditionally herded, has been obliged to exchange their stock for Bunaji as they have moved south into the Middle Belt because of high mortality among the 'red' animals.

3.3.5 Wadara

Wadara cattle are medium-sized, lightly built cattle, and are usually dark red, black, pied or brown. They are shorthorned and have a small erect hump, representing some 6.6% of the national herd. Their present-day distribution is shown on Map 6. Wadara cattle are the 'indigenous' cattle of Borno and are referred to by the Koyam and related pastoralists as 'our' cattle. They are frequently called 'Shuwa' in the literature, after the Shuwa Arabs who also herd them. A related breed with a white coat, the Ambala, is often traded into Nigeria from Chad.

3.3.6 Adamawa Gudali

The Adamawa Gudali resembles the Bunaji in conformation. It is medium to large sized, with medium-length horns, and usually pied, or with a white, black, red or brown coat. It has thick, crescent-shaped horns, a pendulous hump, and a short head and muzzle. The pendulous hump is the feature that most reliably distinguishes it from the Bunaji. The NNLRS estimated that Adamawa Gudali represent some 2% of the national herd. At least two local types were originally recognised in Nigeria: the Banyo, with Rahaji blood and rather large horns, often with a white face and red eye patches, and the Yola, which had an admixture of muturu (Gates, 1952). The muturu element has been progressively diluted since the 1950s and the Yola breed is no longer recognised as a distinct variety by local herders. The Adamawa Gudali, as its name implies, is restricted to Adamawa (Map 7).

Both Kanuri and Ful≡e pastoralists own Adamawa Gudali cattle. It is rare for them to have complete herds of Adamawa Gudali, and often they are mixed with Wadara, Bunaji or Rahaji. Adamawa Gudali is regarded by many farmers as the indigenous race of the region and they are common in villages. Adamawa Gudali are favoured for ploughing, but when they become too large to pull a plough effectively they are further fattened in the compound and sent to market.

3.3.7 Azawak

The Azawak is said to be native to the Azawak Valley north-east of Nigeria and is distributed along its north-western border. It is lightly built with medium-length horns. Although Azawak in Niger are commonly described as red, the Azawak that enter Nigeria are usually a light fawn colour, though they can also be white, brown, pied and black. The NNLRS estimated that they represent just 0.7% of the national herd.

A small population of Azawak cattle exists in Nigeria throughout the year, but the majority are seasonal transhumants. Azawak are generally only found on the border north and west of Sokoto (Map 7) but there were also some in the north-west of Borgu and dotted along the frontier from Sokoto to Katsina.

3.4 Taurines

This section covers animals usually described as 'trypanotolerant' (e.g. ILCA, 1979), the West African dwarf shorthorn or *muturu* and the various types of Keteku, zebu x *muturu* and zebu x n'dama crosses. No judgement is offered on their powers to resist disease.

3.4.1 West African Dwarf Shorthorn

The West African dwarf shorthorn or muturu is small bodied, and blocky in conformation with short, fine-boned limbs. It has a compact body, no hump, a straight back, and a broad head. The face is slightly dished, and the horns are very short. In south-central Nigeria, the muturu is generally black, or black and white. Animals on the Jos Plateau itself are usually black and white but are distinctly larger than lowland animals. There are more variations in the northern populations; brown, red or tawny animals were recorded.

Within Nigeria, muturu cattle have a very disjunct distribution suggesting the gradual retreat of a once more widespread population (Map 8). The dotted line represents the speculative distribution of muturu prior to the rinderpest epidemics of the 1880s. The history, distribution, management and productivity of muturu have recently been reviewed in Blench et al. (1998a). Numerical estimates of the numbers of muturu have been seriously marred by inadequate maps of their distribution. Muturu are widely dispersed and often stall-fed, and so are less visible than zebu. As a result, published population figures are little more than informed guesses. Moreover, since northern muturu are barely known and their trypanotolerance is unmeasured, they have usually been excluded from estimates of 'trypanotolerant' cattle. ILCA's (1979) estimate of 120,000 muturu should be contrasted with that of Ngere (1983) who gave a figure of 60,000 or 0.7% of the national herd. Akinwumi and Ikpi (1985) surveying five states in the south, give 85,000. The NNLRS, the first survey to take all the population islands into account, gave an estimate of some 115,000 for 1990 (RIM, 1992, I:7).

Northern
There are isolated populations of muturu along the Republic of Cameroon frontier up as far as south-eastern Borno, adjoining the Michika-Mubi area of Adamawa. Small clusters exist in the Atlantika mountains, south-east of Yola and near Cham east of Bauchi. Muturu are still relatively common south-east of the Jos Plateau in the dry savannah. There is another nucleus of muturu north

of Tegina in the north-west, with diverse coat-colours suggesting a link with the north-eastern populations.

Southern
Muturu were probably once kept throughout the whole of southern Nigeria and that their disappearance from many areas is relatively recent. West of the river Niger, muturu were once widespread but are now uncommon. They have either been replaced by keteku and zebu, or communities have ceased keeping them. At present, the major concentrations of muturu are in the south-east, in the Cross River area and among the Tiv people in and around Makurdi. Muturu are kept throughout the Igbo areas but in very low densities.

The division of muturu into different populations is somewhat controversial. The research defined four subsets; northern savannah/montane, plateau, derived savannah and forest. Only the first group is distinctive in physical appearance; the further north they are found, the larger in stature they are. Muturu in the derived savannah and forest are similar in colour, conformation and management and contrast with those in the northern savannah/montane environments.

3.4.2 Keteku (taurine x zebu crosses)

Apart from the muturu there are essentially three cattle types that fall under the broad rubric of trypanotolerant:

- crosses of the West African Dwarf Shorthorn (=muturu)
  with zebu
  with n'dama
- b) pure-bred n'dama.

The first two are known as Keteku within Nigeria, although they are very different in conformation. In this working paper, the muturu x zebu cross is called the Borgu Keteku and the muturu x n'dama the Lagos Keteku. The n'dama, unlike the zebu and muturu, are not indigenous to Nigeria but have been imported from the Senegambia during the twentieth century. The distribution and productivity of Keteku have been studied in more detail in Blench et al. (1998b).

The definition of keteku has become more problematic in recent years with an increasing proportion of zebu blood in 'keteku' herds. As Ful≡e pastoral herds push ever further south and increasingly inhabit regions previously restricted to trypanotolerant stock, more zebu are bought in for village herds. For example, the 'Biu', a zebu x savannah muturu cross found near Biu in southern Borno and described in the literature (Gates, 1952), has effectively become submerged in the local zebu gene pool. The application of the name keteku to an individual animal may reflect as much the owner's cultural background as its actual genetic composition.

Map 9 shows the distribution of the various keteku crossbreeds established in 1990. The population size given by ILCA (1979, II:204) was 180,000 keteku in Nigeria, a figure almost certainly inflated by a distorted map of keteku distribution (see their Figure 2). Keteku are significantly less common than previously thought and their distribution quite different. It is unlikely that there as many as 100,000 of all types.

Borgu Keteku
The Borgu Keteku also Kataku, Ketari, Borgu, Borgawa and Kaiama, is a trypanotolerant, stabilised muturu x zebu cross (Gates, 1952). It combines muturu and Bunaji features with white, grey and black types predominating, and more occasionally red and brown. The horns are long compared with a muturu, but the hump smaller, and the legs shorter than a Bunaji. In Nigeria, keteku in herds are restricted to a narrow band along the Benin Republic border in the region usually known as 'Borgu'.

Further east, keteku are occasionally kept adjacent to villages in northern Yorubaland. West African dwarf shorthorn were once common through this region and the keteku fills the same niche. Keteku are sometimes bought as investment stock in the Ondo area by farmers who value their combination of size and trypanotolerance. Keteku were formerly distributed from breeding farms as part of livestock extension programmes and the Government Livestock Centre in Ado-Ekiti still keeps a stock of keteku.

In contrast to other West African countries, there has been very little 'new' crossing of zebu and muturu in southern Nigeria. In some ways, it is surprising that the crossbreeding of zebu and muturu did not take place all along the line where the two types came into contact. Further east, among the Igbo, farmers tend to assume that the two breeds are incompatible; attempts at cross-breeding would conflict with religious strictures. The continuing genetic separation on the Jos Plateau probably reflects ethnic competition between the owners as much as animal production considerations.

N'dama
N'dama cattle are native to Senegambia and adjacent parts in the west of West Africa (Starkey, 1984; Blench et al. 1998b). They were first brought in to Nigeria from Guinea in 1939 on an experimental basis, because they were trypanotolerant and yet were larger than muturu. The n'dama has a medium-sized compact body with lyre-shaped black-tipped horns and no hump. There is a small dewlap in the male, but a fairly large head. Although those imported into Nigeria are generally light brown, there are black and pied animals in Guinea.

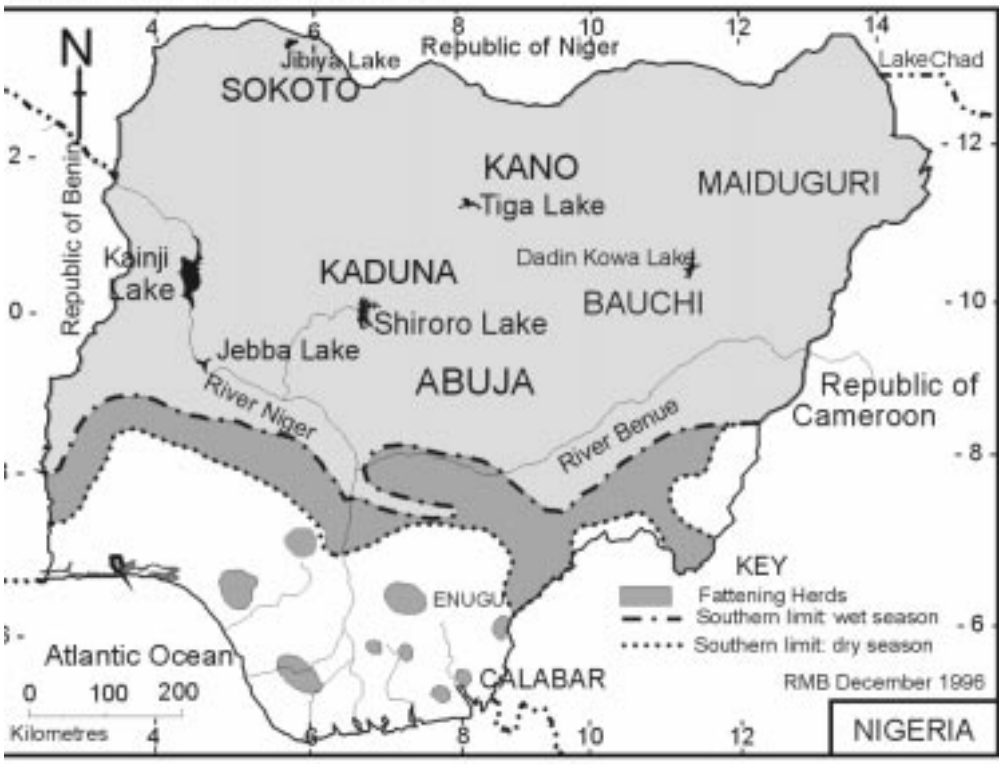
N'dama cattle have been sold to farmers and pastoralists with a view to improving the resistance of local herds to trypanosomiasis. In most cases, herders cross them with zebu and there are now few pure n'dama outside institutions, although some were recorded in northern Yorubaland.

3.5 Kuri

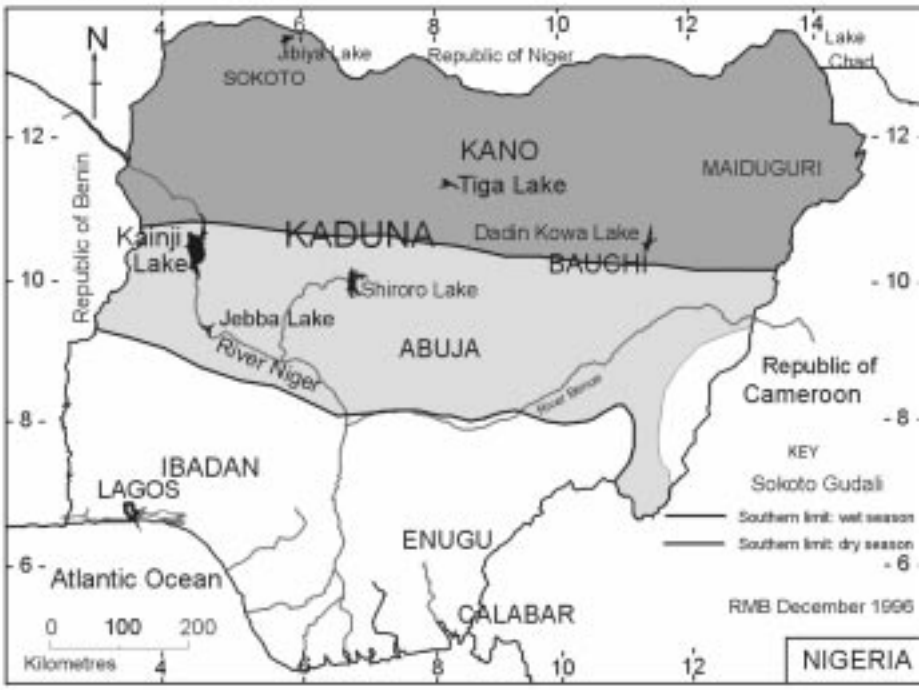
The kuri is a large-bodied humpless longhorn whose exact historical origin is unknown (Blench, 1993; Meghen et al., 1999). The kuri has distinctive, inflated, spongy horns unknown in any other breed and with a mean height of 1.5 m, and weight of some 550 kg, is one of the largest breeds of African cattle. Kuri are noted for their extremely variable colours and their ability to thrive in semi-aquatic conditions.

The nucleus of the kuri cattle population is within the region of the former Lake Chad, and along its eastern shores. In Nigeria, kuri are found not only on the Lake but on its shores and along the Yobe valley, as far west as Gashagar. There is also a restricted export of kuri as traction animals to the region north-east of Kano. The breeds along the Komadugu Yobe are crossed with zebu and are generally referred to as Jetkoram in the literature.

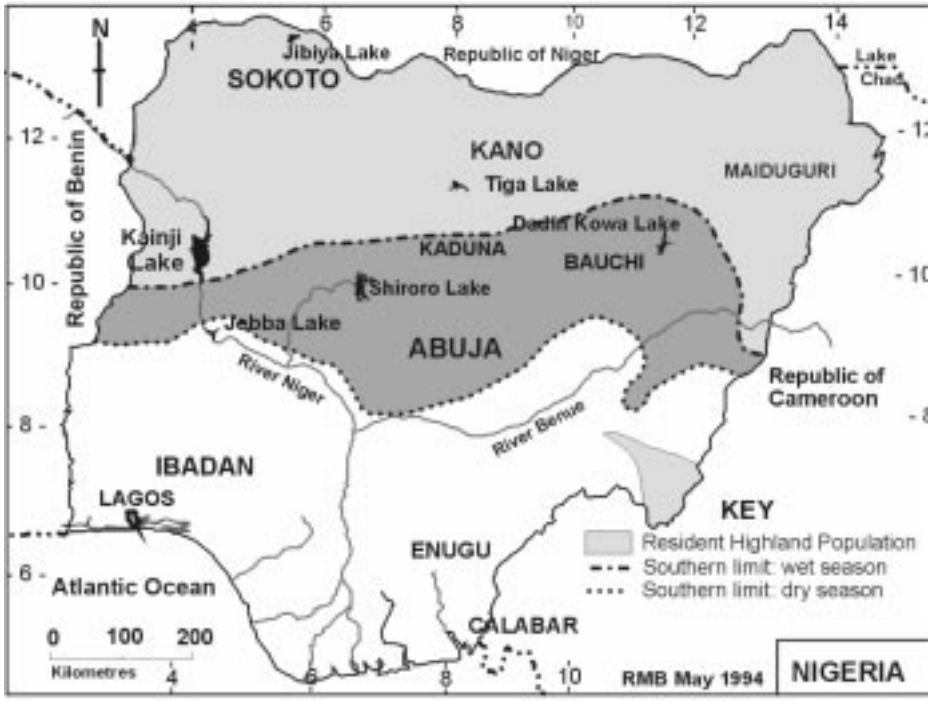
ap 3 Distribution of Bunaji cattle in Nigeria - 1900



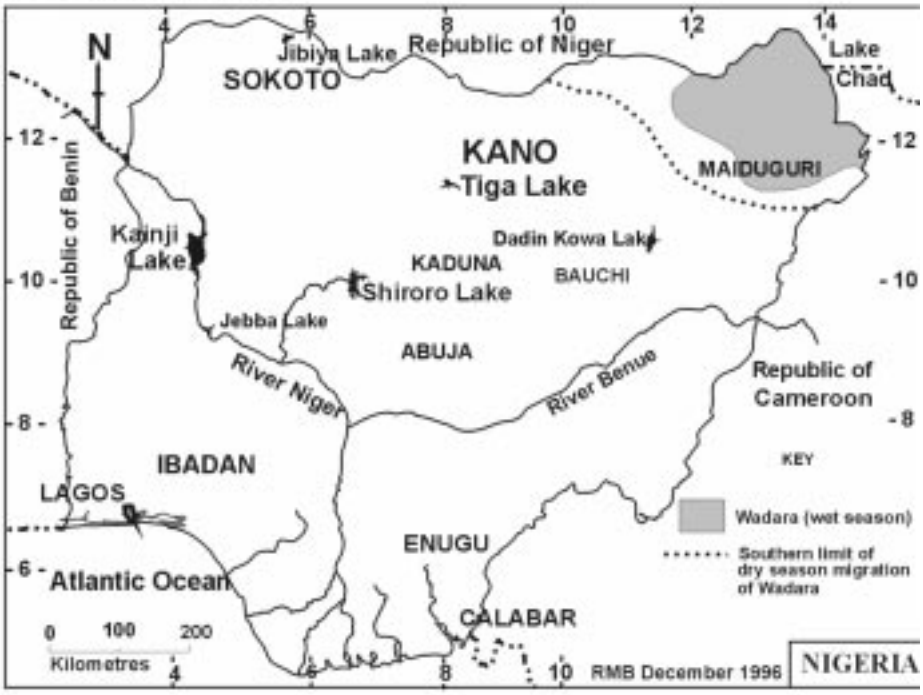
Map 4 Sokoto Gudali cattle in Nigeria



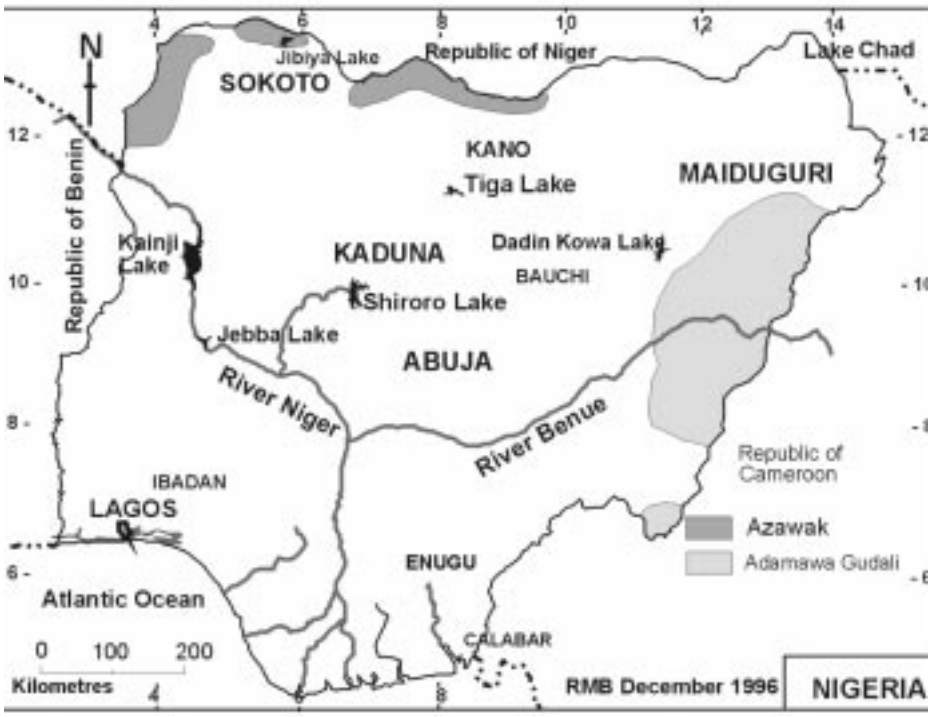
Map 5 Rahaji cattle in Nigeria



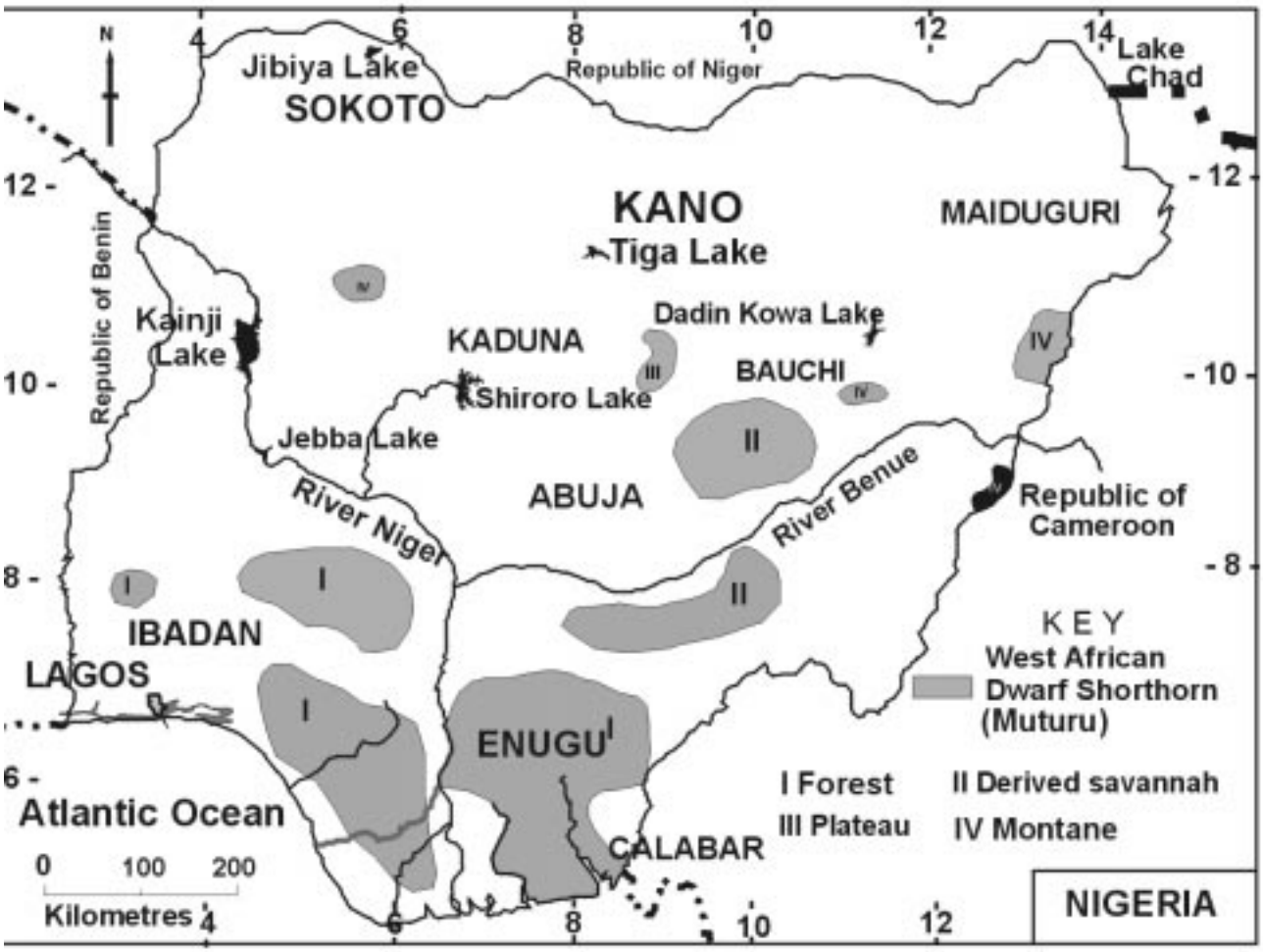
Map 6 Wadara cattle in Nigeria



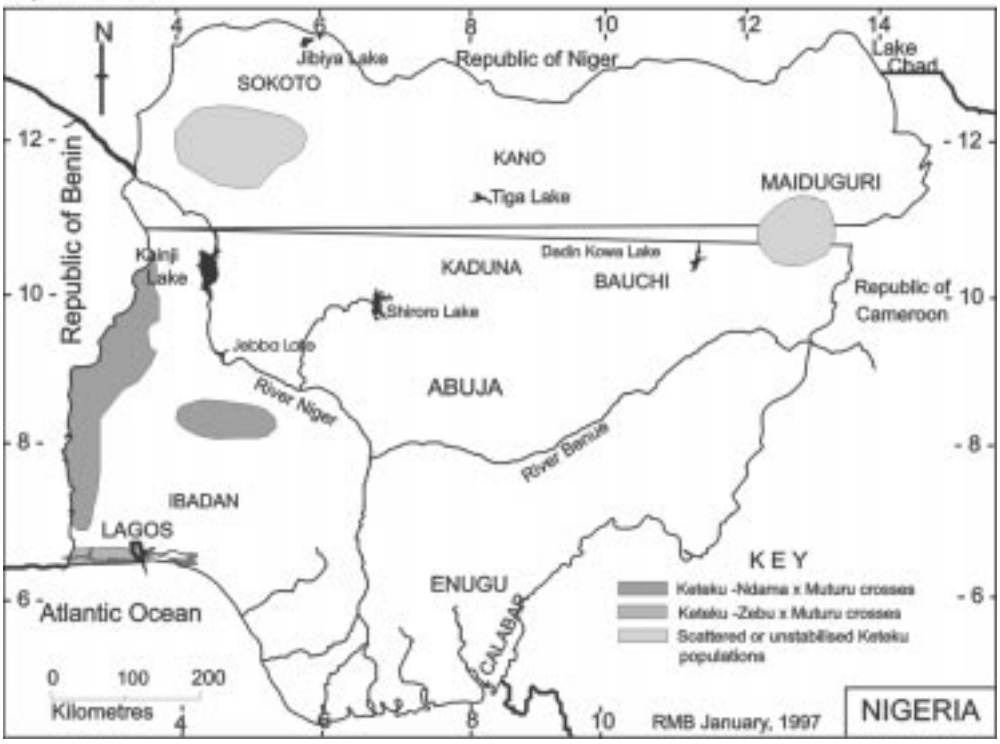
Map 7 Adamawa Gudali and Azawak



Iap 8 West African dwarf shorthorn cattle



Map 9 Keteku cattle



4. Sheep and Goat Breeds

4.1 Sheep

Sheep are kept everywhere in Nigeria, with a broad distinction between their importance and ubiquity in the north, and the more dispersed populations of the humid zone. Sheep and goats are seen as having secondary importance in relation to crops. There are generally considered to be four breeds or races of sheep native to Nigeria, the Balami, Uda, Yankasa and West African Dwarf (WAD) (Adu and Ngere, 1979).

4.1.1 Balami

The Balami is the largest bodied native sheep in Nigeria. As a pastoral animal it is confined to the semi-arid north, but it is favoured as a stall-fed breed by Muslims throughout the Nigerian Middle Belt. Map 10 shows its distribution in pastoral herds. It is white and hairy with pendulous ears and a long thin tail; rams have a throat ruff and are horned but ewes are normally polled. Another feature that makes the Balami distinctly recognisable is its Roman nose, a large bulbous nose that distinguishes it from the Yankasa.

4.1.2 Uda

The Uda is slightly smaller-bodied than the Balami, although their size ranges overlap. It is easily recognised by a distinctive coat colour pattern; entirely brown or black forequarters and white behind. Uda sheep give their name to a Ful≡e clan, the Uda'en, who herd large flocks of this breed between Niger and the northern reaches of the Nigerian Middle Belt. Studies on Nigerian Uda are lacking. Haumesser and Gerbaldi (1980) studied traditionally-managed Uda flocks in Niger Republic; Wilson and Durkin (1983a,b) and Wilson and Light (1986) report on related sheep production systems in central Mali.

Map 11 shows its distribution in Nigeria;

4.1.3 Yankasa

The Yankasa breed has been the most extensively studied in Nigeria. The body colour is white with black patches around the eyes and sometimes on the feet. The muzzle and ears are usually black too. Rams have curved horns and a hairy white mane, and ewes are polled. Yankasa sheep have been recorded in all parts of Nigeria, though the populations attenuate towards the northern border and the sea-coast. Map 12 shows the approximate range of the Yankasa. Some tentative studies have been made of its ecological adaptations. Yankasa sheep do not need daily watering in the wet season and watering once a day suffices in the dry season (Aganga et al., 1988).

4.1.4 West African Dwarf

The West African Dwarf is a small-bodied, compact breed which may be all white, black, brown, or spotted black or brown on a white coat. Its variation in colour and patchy distribution make it difficult to distinguish clearly from the Yankasa. Adu and Ngere (1979) say that different types exist, mentioning the 'Pagan' variety on the Jos Plateau, and the 'Umuahia' variety near the Confluence, but there is no published account of such varieties. Devendra and McLeroy (1982) argue that the WAD breed cannot be subcategorised on the basis of appearance, and no performance data is available.

Map 13 shows its approximate range.

4.2 Goats

The only published characterisation of the traditional varieties of goat in Nigeria is Ngere et al. (1984). Three main varieties of goat are recognised in Nigeria, the Sahel, Desert or West African long-legged goat, the Sokoto Red and the West African Dwarf.

4.2.1 Sahel or Desert goat

The Sahelian or Desert goat is found along the northern border of Nigeria, particularly in Borno, where it is often known as 'Balami', although this name has not been adopted as it would lead to confusion with the better-known sheep race, Balami. Mason (1988) uses 'Sahel', which seems appropriate, as this race is distributed from Senegal to Sudan. In Nigeria, the Sahel goat is generally the variety preferred by pastoralists. The distribution of Sahel goats in Nigeria is shown in Map 14.

Sahel goats are very similar in appearance to the sheep with which they are often herded. The coat is white or dappled, the ears are pendulous and the legs are notably longer than other breeds. Wilson et al. (1984) studied the productivity of goats and traditional management in the Republic of Niger and also included a valuable table of comparative data from other studies. Wilson and colleagues also studied the productivity of Sahel goats in the Republic of Mali (Wilson, 1987; Wilson and Durkin, 1983a,b; Wilson and Sayers, 1987). Dumas' (1980) description of the *chèvre Arabe* of Chad, corresponding to the Nigerian Sahel goat, quotes growth curves and fecundity data.

4.2.2 Sokoto Red goat

The Sokoto Red, Kano Brown or Maradi goat (Maradi is a *Département* of the Niger Republic) is probably the most widespread and well-known type in Nigeria (Haumesser, 1975). It is the usual village goat in the northern two-thirds of the country although it is less common with transhumant pastoralists. The distribution of Sokoto Red goats in Nigeria is shown in Map 15. Ngere et al. (1984) argue that populations of the Sokoto Red spread south and east from Sokoto through the savanna belts giving rise to the Kano Brown and, further east, to the Sahel types of Borno State. This type of historical speculation is difficult to accept without more detailed evidence.

The most complete overview of the breed is Robinet's (1967) comprehensive survey which integrates data from Nigeria and Niger. The Sokoto Red is the only Nigerian breed for which there

is a record of systematic attempts to stabilise a particular type. Henderson (1929), reviewing the work of the Veterinary Service in Sokoto Province, described how, in 5 years, 219,688 non-red[2] male goats were castrated resulting in the replacement of non-red skins by the more valuable red in the local markets.

The Sokoto Red goat was the source of 'Morocco leather' known in Europe from the medieval period onwards. It acquired this name because it was transported across the Sahara by caravans controlled by Moroccan merchants. The Sokoto Red is still known for its suitability for fine leather. Burns (1965) observes that the skins have coarse, thinly-spaced outer hairs and small sweat and wax glands and that they lacked fat. Alaku and Moruppa (1983) found that Sokoto Red goats slaughtered in the driest months suffered a 55% reduction in skin weight, making it 4.9% of the total body weight.

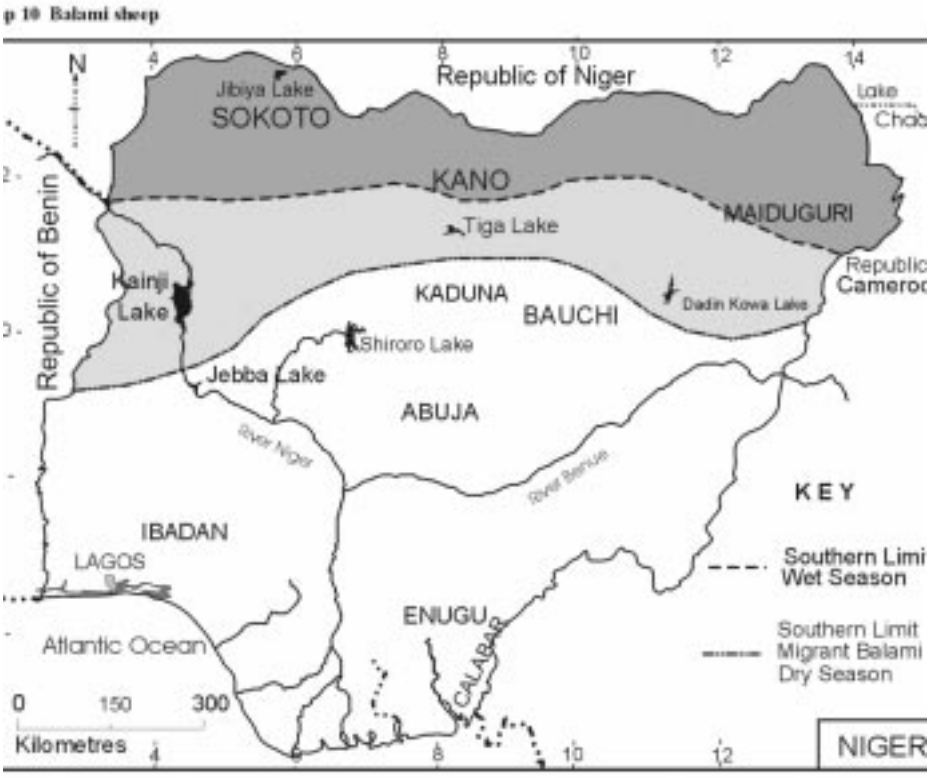
4.2.3 West African Dwarf goat

Although the West African Dwarf (WAD) goat is found in 'many local types' (Ngere et al., 1984) no published account differentiates them. Although they are stereotypically said to be native to the forest belts, their presence in Borno State and in adjacent Republics of Cameroon and Chad suggests that they were far more widespread until recently. They correspond the West African Grassland Dwarf described for Cameroon by Ndamukong et al. (1989). Indeed, like muturu cattle, they may once have been the main race of goat over most of Nigeria. Just as the zebu has replaced the muturu, so WAD goats have been driven to remoter areas in the savannahs. There is a strong association between the diffusion of the Red Sokoto goat and Islam, so for example, in southern Sokoto State, the non-Islamised populations still retain WAD goats while most Hausa villages have exclusively Sokoto Red. The distribution of WAD goats in Nigeria is shown in Map 16.

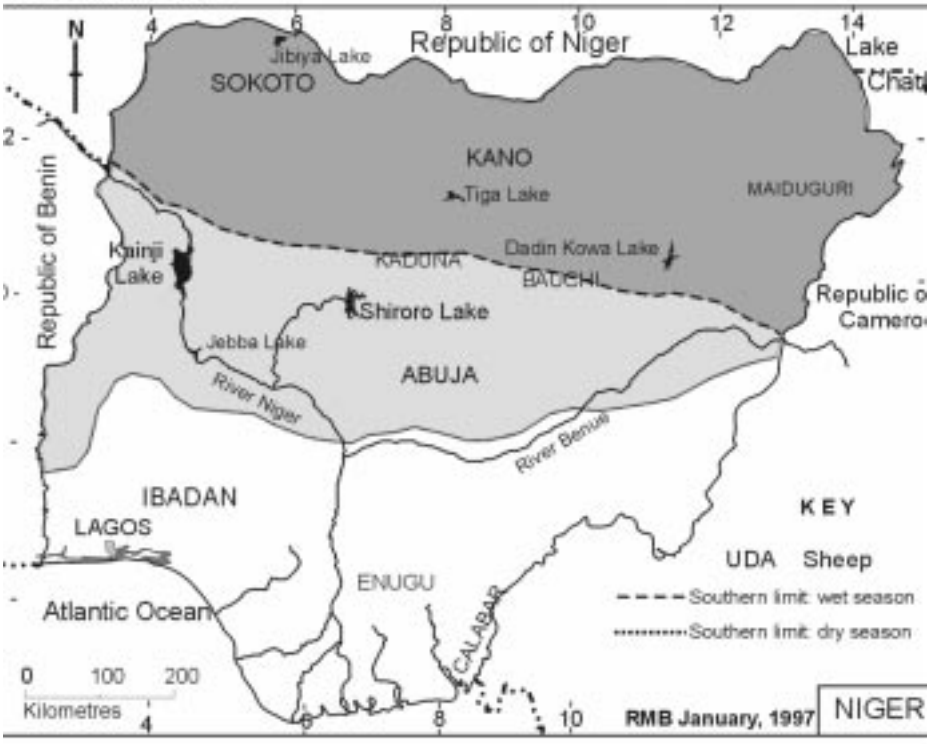
Goats are not native to West Africa, so the WAD goat must originally have evolved from a long-legged type, probably ancestral to today's Sahel goat. The WAD is usually black, although patched, pied, and occasionally all-white animals can be seen, even on the coast. Although Chang and Landauer (1950) argue that the WAD is a proportionate dwarf, Epstein (1971) points out that the distorted forms and extremely short legs do suggest achondroplasy. This small size is probably an adaptation to the goats' environment though the nature of the selective force is unknown. The WAD goats in the semi-arid zone resemble Sokoto Red goats in their body proportions.

Paradoxically, physiological experiments have shown that the WAD goat is not particularly adapted to high ambient temperatures (Montsma et al., 1985). High temperatures and relative humidities, e.g. 30°C and 60% relative humidity, cause a reduction in food intake. The WAD goat is believed to be trypanotolerant because it thrives in tsetse areas, but there have been no critical studies of this belief.

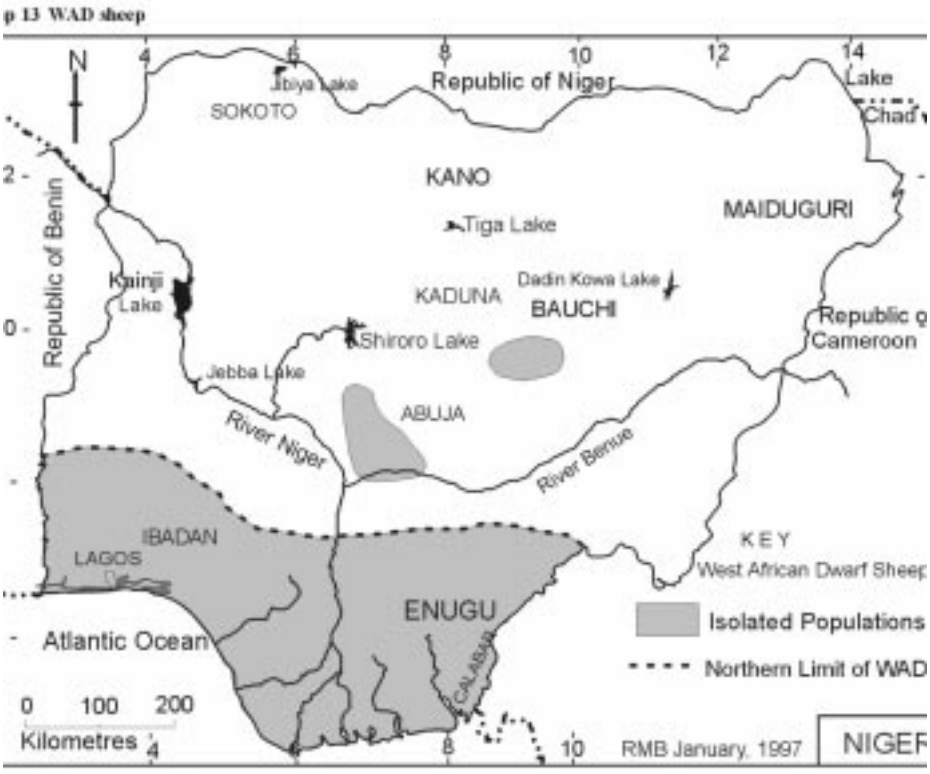
2 It is unfortunate that there is no direct record of the breeds castrated, but presumably they were a mixture of Sahel types, WAD types and their crosses.

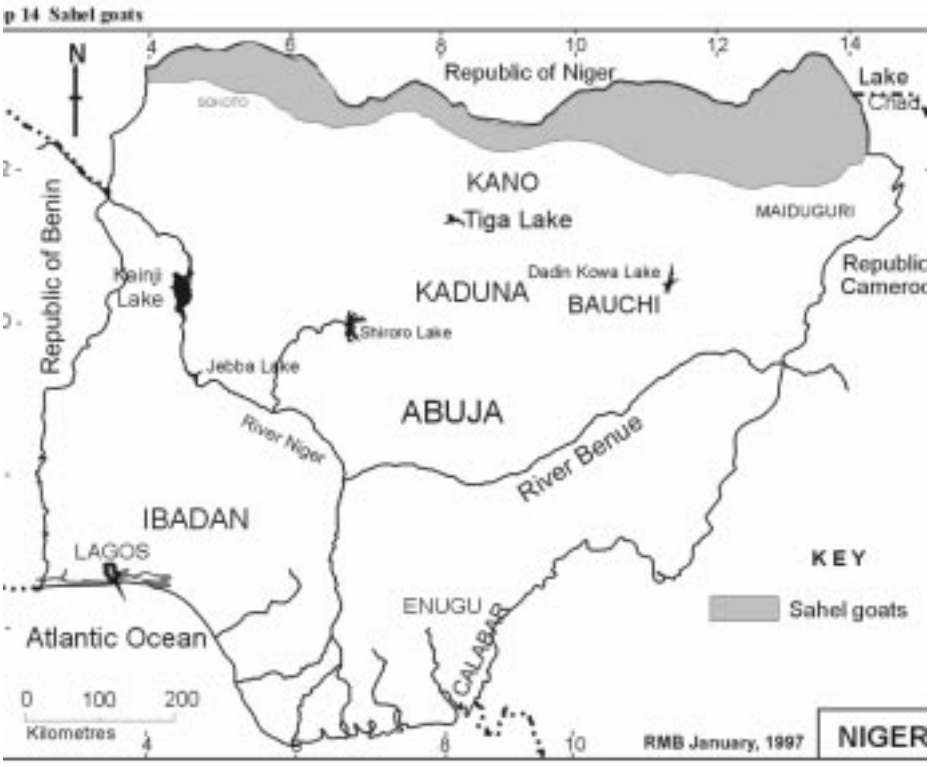

p 10 Balami sheep
N
Republic of Niger
Jibiya Lake
SOKOTO
KANO
MAIDUGURI
Tiga Lake
Republic of Benin
Kainji Lake
KADUNA
BAUCHI
Dadin Kowa Lake
Shiroro Lake
Jebba Lake
ABUJA
River Niger
River Benue
KEY
IBADAN
LAGOS
Southern Limi
Wet Season
ENUGU
CALABAR
Atlantic Ocean
Southern Limit
Migrant Balami
Dry Season
0 150 300
Kilometres
NIGER

p 11 Uda sheep in Nigeria

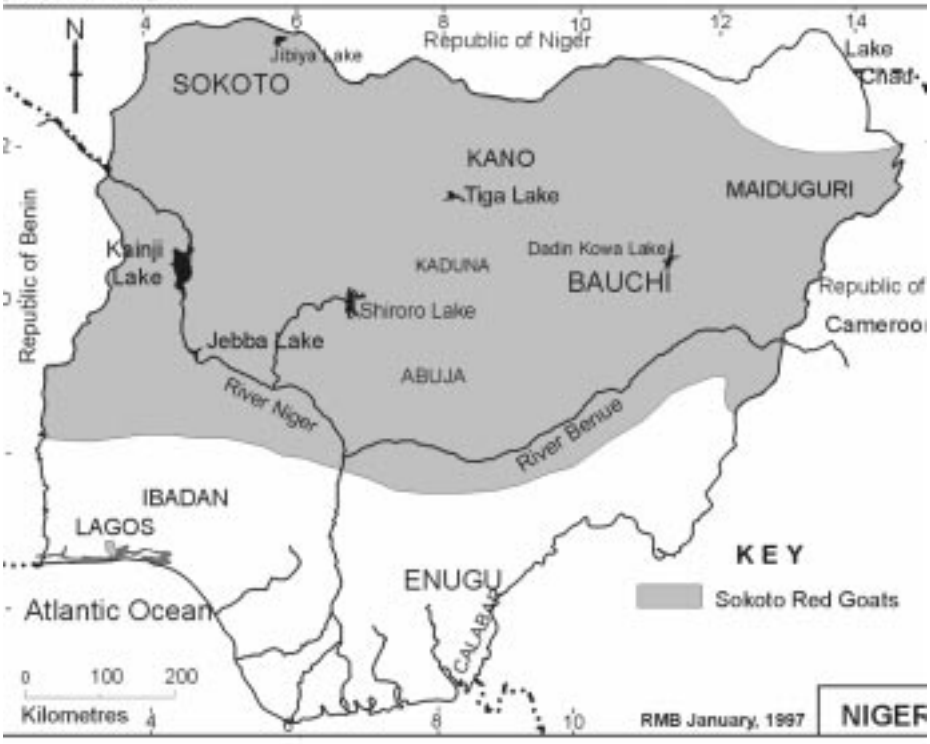


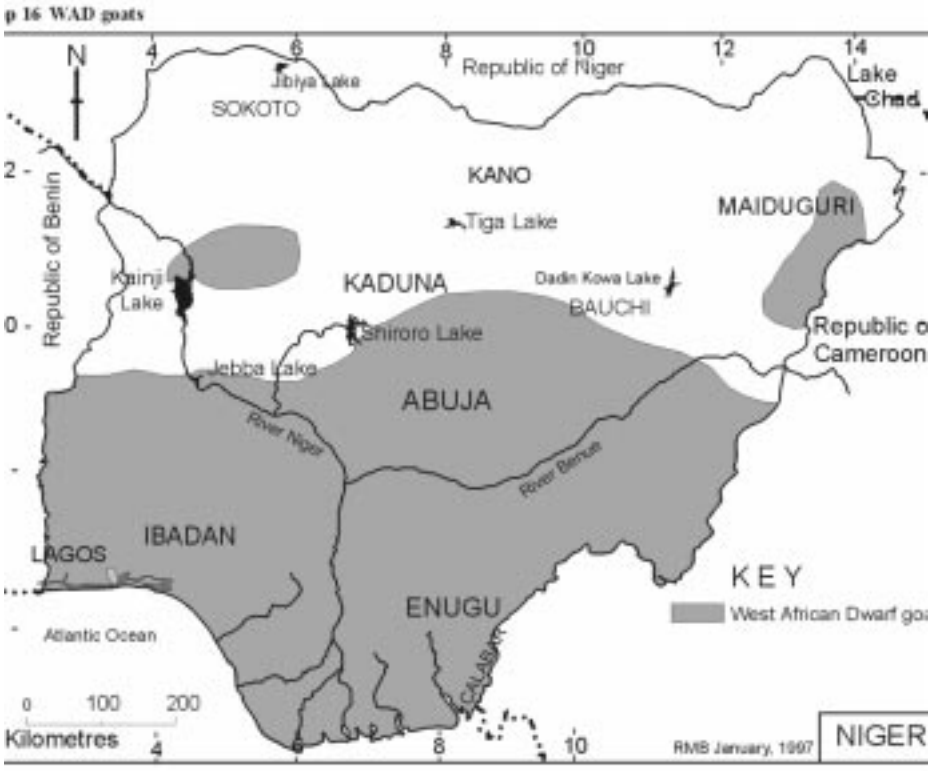

p 12 Yanaksa sheep
N
Republic of Niger
Jibiya Lake
SOKOTO
KANO
Tiga Lake
MAIDUGURI
Republic of Benin
Kainji Lake
KADUNA
Dadin Kowa Lake
BAUCHI
Republic of Cameroon
Shiroro Lake
Jebba Lake
ABUJA
River Niger
River Benue
IBADAN
LAGOS
ENUGU
CALABAR
Atlantic Ocean
KEY
Yankasa sheep
0 100 200
Kilometres
RMB January, 1997
NIGER


p 13 WAD sheep
N
Republic of Niger
SOKOTO
KANO
MAIDUGURI
Tiga Lake
Kainji Lake
KADUNA
Dadin Kowa Lake
BAUCHI
Shiroro Lake
Jebba Lake
ABUJA
River Niger
River Benue
Republic of Benin
IBADAN
LAGOS
ENUGU
Atlantic Ocean
KEY
West African Dwarf Sheep
Isolated Populations
Northern Limit of WAD
0 100 200
Kilometres
RMB January, 1997
NIGER


p 14 Sahel goats
N
Republic of Niger
Lake Chad
SOKOTO
KANO
Tiga Lake
MAIDUGURI
Republic of Benin
Kainji Lake
KADUNA
Dadin Kowa Lake
BAUCHI
Shiroro Lake
Jebba Lake
ABUJA
River Niger
River Benue
IBADAN
LAGOS
KEY
Sahel goats
ENUGU
CALABAR
Atlantic Ocean
0 100 200
Kilometres
RMB January, 1997
NIGER

p 15 Sokoto Red goats




p 16 WAD goats
N
Republic of Niger
Jibiya Lake
SOKOTO
KANO
Tiga Lake
MAIDUGURI
Republic of Benin
Kainji Lake
KADUNA
Dadin Kowa Lake
BAUCHI
Shiroro Lake
Jebba Lake
ABUJA
River Niger
River Benue
IBADAN
LAGOS
ENUGU
KEY
West African Dwarf goa
Atlantic Ocean
0 100 200
Kilometres
RMB January, 1997
NIGER