Small ruminant production in tropical Africa

Tropical Africa contains almost one tenth of the world's sheep and over a quarter of its goats. Small ruminant production throughout this area takes place entirely under traditional systems, and since the meat produced is mostly for home consumption, a great deal of it escapes official marketing channels. As a result there is an undeniable lack of knowledge as to the part played by sheep and goat production, coupled with the belief that these animals are to blame for the decline of the environment. Consequently, despite its sizeable contribution to meat supplies for local populations, this subsector has been continually omitted from development projects and policies.

Livestock numbers and production systems

As in the case of cattle, the small ruminant flock of tropical Africa is for the most part found in the Sahel countries and in eastern Africa[1]. However, its geographical distribution is evidently somewhat different to that of cattle. Sixty per cent of goats and over 50% of sheep are apparently raised in West and central Africa, whereas for cattle the corresponding figure does not exceed 40% (FAO estimates). As regards the rest of tropical Africa, small ruminants are mostly found in the Horn of Africa (Ethiopia and Spmali2), which is thought to contain one third of the sheep and 27% of the goats found in. tropical Africa (as against 220/0 of the cattle herd). The remaining countries of East Africa, which raise 29% of its cattle, probably possess only 11 % of all the goats and sheep raised in tropical Africa. Outside Ethiopia, relatively few small ruminants are thus found in the highlands of East Africa. Numbers are also low in southern tropical Africa. On the other hand, they increase again in the countries of non-tropical southern Africa (Namibia and South Africa).

1. However, flock numbers are even less accurately known for small ruminants than herd numbers are for cattle, and breakdowns between sheep and goats are frequently only approximate.

Owing to their considerable ability to adapt, small ruminants, and especially goats, manage to survive and flourish in extremely hostile environments, including not only the arid zones but also the humid areas of West and central Africa, where their adaptive powers are traditionally ascribed to their reduced size. The weight and size of small ruminants in tropical Africa, which, like those of its cattle, are very much lower than in temperate countries, tend to reduce steadily from the traditional, arid production areas towards the humid zones in which dwarf breeds have developed.

Goats generally have a lower weight than sheep but are more prolific. Their feeding habits are quite distinct: goats browse mostly on leaves and are reputed to have a high digestibility coefficient for fibrous plants, whereas sheep feed mostly on grasses. Sheep and goat production are thus complementary to one another, and generally also to cattle production. Their browsing habit makes goats less susceptible to intestinal diseases than sheep, but on the other hand they are more inclined to suffer from protracted diseases.

Three main types of small ruminants may be distinguished in tropical Africa, although it is not always easy to identify the different original breeds owing to the extent of uncontrolled crossbreeding. The three categories are as follows: the Sahel and desert breeds found in he

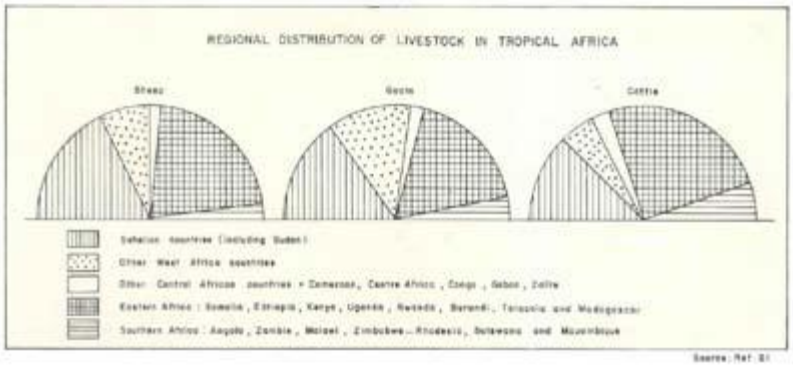
arid and semiarid zones, the dwarf breeds of the humid and subhumid zones, and the sheep raised in the highland areas of East Africa. The sheep and goat breeds of the Sahel and desert areas, including the Blackhead Persian and Somali sheep of East Africa and the Nubian goats of Sudan, are adapted to very arid environments. Generally, they are large-sized animals, relatively heavy by African standards, although the size may vary considerably: an adult sheep weighs, on average, 40 to 50 kg in Sudan but usually under 40 kg in the Sahel. They are raised under transhumant or sedentary systems, often in association with cattle production. In the semi-arid zones small ruminants are raised for meat and also for milk production, particularly where goats belonging to transhumant pastoralists are concerned. Goat milk production in local breeds is low when compared with many exotic breeds, often leaving less than 0.5 kg/day for human consumption, although it is, in relative terms, considerably higher than that of indigenous cows raised under similar conditions. Some local goat breeds are, however, very productive. The Nubian goat produces two litres of milk per day, while the Red Sokoto or Maradi, which is a smaller animal, is also a good milker, yielding 1–1.5 kg/day.

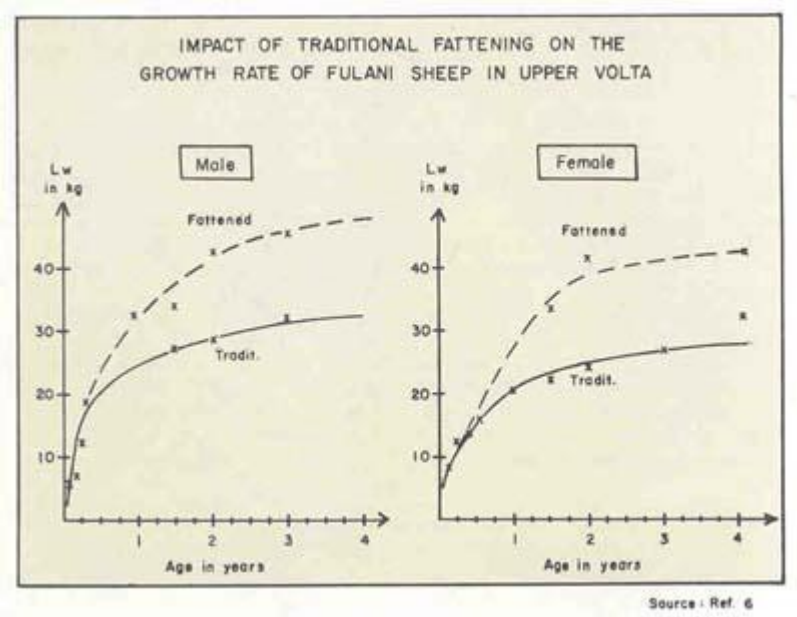
Digestibility of dietary constituents by ruminants.

			—in%—
Constituent	Goat	Sheep	Cattle
Dry matter	59.7	59.9	53.5
Organic matter	64.0	62.6	56.4
Crude protein	66.4	64.1	49.4
Crude fibre	66.9	64.3	61.6

a. In India, according to Jong and Majumbar, 1962
Source: Ref. 15

Some fattening practices are found in sedentary systems; usually these involve wethers, which are tethered in the family compound and fed intensively on forages and crop residues (moutons de case). According to a survey in Upper Volta (ref. 6), which took place in an intermediate zone and thus involved both Sahel breeds (notably Fulani) and those of the south (Mossi), fattening practices sometimes assume a substantial role, involving nearly 90% of males under one year and virtually 100% of those in higher age-classes. They enable weights equal to those of adult animals to be obtained in both males and females by the end of the first year. Nevertheless, the fattening period was generally found to be fairly long, lasting over a year in many cases. It also emerged that the fattening performance of Sahel sheep was better than that of breeds from the south. Similarly, the few data collected during the survey on Fulani sheep in Niger (the Bali Bali breed) showed average fattening weights which were very much higher than those of Fulani sheep in Upper Volta. Fattening performance thus appears to vary according to the breed.





The skins are processed by small-scale local tanners and are also sold on the export markets, where some varieties, such as Maradi goat skins, fetch high prices. Wool production, on the other hand, is virtually zero, since the sheep raised in the arid and semi-arid zones are almost entirely of the coarse hair type. One wool-producing breed, the Macina, is nevertheless found in Mali, but yields are very poor in terms of both quantity and quality.

A wide variety of sheep and goats are found in the subhurnid and humid zones. Their weights and heights diminish steadily towards the more humid climate zones. Varieties found include the Nilotic goat in southern Sudan, the dwarf goat of East Africa (notably the Mubende variety in Uganda), and the dwarf sheep and goats of West Africa, which are found from the mouth of the Senegal river to central and southern Africa (Angola). The latter breeds appear sufficiently similar to allow a simple classification : the Djallonké sheep, also known as the Fouta Djallon, which belongs to the southern Guinean or forest zone, constitutes the only group of sheep, while the dwarf goat of West and central However, the sheep and goats of the forest zone are smaller than those of the savannah, although Africa, or Guinea goat, again known as the Djallonke or Fouta Djallon goat, is the only type of goat. the latter are nonetheless still dwarf breeds.

The small ruminants of subhumid and humid tropical Africa are generally raised on smallholdings. The animals are occasionally led out to graze, but usually they are allowed to roam freely over any uncultivated land round the farm to browse and scavenge. During the cropping season, however, they are generally tethered during the day to avoid crop damage. Although they may partly be fed on residues to supplement their basic ration, especially during the dry season, they do not receive any improved feeding in the proper sense.

These animals are primarily raised for meat production. The small amount of milk produced is used entirely for feeding the young and is not taken for human consumption. Apart from a few breeds, such as the Mubende goats in Uganda, which produce skins which are highly sought after, the goat and sheep skins of the subhumid and humid areas are not used for tanning. Instead they are often consumed with the meat.

Many of the sheep and goats raised in the East African highlands are to be found on small mixed holdings in the Ethiopian highlands (especially in the area north of Addis Ababa), which contain 75% of the sheep produced in the country and 20% of the total sheep population of tropical Africa. The sheep found in the Ethiopian highlands are small in height and are thought to belong to a fertile breed which is slow to reach maturity but has a long life expectancy.

Their conformation is mediocre and average liveweight does not normally exceed 25 to 35 kg. They are raised for meat and skins and the latter, highly sought after on the export markets, account for a substantial share of the earnings derived from these animals. The milk performance of the ewes is poor. Most of the sheep of the Ethiopian highlands are of the coarse hair type. However, there are a number of wool-producing breeds, giving a product of inferior quality and poor yield which may be used for carpet making. There has been some crossbreeding with wool production breeds (Corriedale and Merino), but in Ethiopia this has been on a very limited scale. In Kenya, however, crossbreeding with Corriedales has been carried out on a larger scale, with the aim of producing both wool and meat. A few experiments in commercial fattening have also been launched by the private sector in Kenya, with the aim of producing prime quality lamb. However, the part played by the commercial fattening sector remains a minor one, given the background role of small ruminant production in general within the livestock sector.

Adult body weight and production purpose of small ruminants in tropical Africa.

Zones/breeds	Countries	Adult weight (kg)	Age (months)	Speciality	References
Sheep					
Semi-arid zone					
Desert x Nilotic	Sudan	42–55	36	Meat	2
Blackhead Somali	Ethiopia	35–40	–	Meat/milk/skin	1
Fulani (Sahel)	Upper Volta	35–40	36	Meat/skin	6
Fulani x Macina x Djall	Mali	30–35	36	Meat/skin	3

Peul Oudah	Chad	48–58	54	Meat/skin	–7
Arabe	Chad	40–48	54	Meat/skin	7
Humid zone[a]					
Mossi	Upper Volta	20–30	36	Meat/skin	6
Djallonke	Ivory Coast	25	–	Meat	9
Mayo Kebbi	Chad	33	54	Meat	7
Kirdi	Chad	27	54	Meat	7
West African Dwarf	Nigeria	20	2,5/4 year	Meat	11
Highlands					
Ethiopian type	Ethiopia	25–30	–	Meat/skin/fibre	1
Goats					
Semi-arid zone					
Nubian	Sudan	up to 60	–	Milk	18
Desert X Nubian	Sudan	43–40	36	Meat/milk/skin	2
Sahel	Upper Volta	25–30	42	Meat/milk/skin	6
Sahel	Mali	31–35	36/42	Meat/milk/skin	3
Sahel	Chad	32–42	54	Meat/milk/skin	7
Maradi (Red Sokoto)	Niger, North Nigeria	23–30	–	Meat/milk/skin	18
Humid zone[a]					
Mossi Goat	Upper Volta	18–20	3/7 Year	Meat/skin	6
Southern Goat	Chad	26	54	Meat/skin	7
E. African (Mubende)	Uganda	30	–	Meat/skin	18
W. African Dwarf	Nigeria	20–30		Meat	12

a. Subhumid zone included

To sum up, small ruminant production as practised in tropical Africa is an extensive production system, sometimes complemented by traditional fattening practices carried out on smallholdings. However, it is in no way integrated with other agricultural activities. The animals are raised for meat, as well as for milk in pastoral areas. Skins are usually processed by local tanners or sold on the export market, although in the humid zones of West Africa they are consumed together with the meat. Finally, as almost all the small ruminants raised in tropical Africa belong to coarse hair breeds, wool production is virtually nil.

For the African stockowner small ruminants are chiefly a form of investment for petty cash. These animals have a relatively low market value, thus representing a lesser investment than the purchase of cattle, with the result that they are more widely distributed amongst the poorest households. This situation, together with the ability of local breeds to adapt to the harshest environments, has evidently promoted the widespread distribution of small ruminants throughout the rural community. Whereas the cattle population is normally concentrated, remaining in the hands of a restricted number of producers (the percentage of farmers owning cattle is estimated at under 20% in the semi-arid areas of northern Nigeria), ownership of small ruminants is almost always more extensive, generally involving over 50% of smallholdings in the livestock raising areas.

Underexploited potential

Little is known about the productivity of small ruminants. There are few estimates on production parameters and these in any case are apparently highly variable, owing to the fact that slaughterings for the most part escape the statistical records, the bulk of available output being absorbed by home consumption. Even when production is marketed, it still remains largely unrecorded owing to the considerable part played by private slaughterings.

Field surveys and on-station research both indicate that the sheep and goat breeds raised in tropical Africa may well have considerable development potential owing to their relative precocity and high fertility, resulting from their year-round breeding season. Average age at first parturition is estimated at 11–12 months for many breeds. First parturition thus occurs well before the females have reached their full adult weight at two to three years. It has also been shown, notably in the case of the dwarf breeds of West Africa, that 11–12 months in fact represents an optimum age, at which all the females mated were able to give birth to lambs or kids with a good survival rate. Unlike cows, in which maturity is traditionally retarded by difficult environments, does and ewes in tropical Africa thus reach sexual maturity at about the same age as, or even earlier than, exotic breeds[2].

2. Average age at first lambing which is generally 12 months in British breeds, frequently reaches 18 or even 24 motns, in Mediterranean breeds and in Merinos, which are raised mostly in Australia. Age at first lambing is also 18 months for a number of tropical African breeds belonging to the arid zones (Somali and Persian Blackheads) and to the Ethiopian highlands.

First pregnancy and live birth rate for West African ewes.

Age in months	Number exposed	%	% live births

		pregnant	
8	12	42	17
9	13	77	54
10	8	75	38
11	9	100	100
12	9	100	100

Source: Ref. 9.23

Reproductive traits of small ruminants in tropical Africa.

Zones/breeds	Countries	Source of observ.	First parturition (in months)	Reproductive parameters[a]			References
				Prolificacy[b]	Fertility[c]	Fecundity[d]	
Sheep							
Semi-arid Zone							
Desert x Nilotic	Sudan	Village	10	1.14	1.30	1.48	2
Masai	Kenya	Village	–	1.05	1.18	1.27	8
Blackhead Somali	Ethiopia	Village	18	1.05	0.70c	0.75	1
Ful. x Mac. x Di.	Mali	Village	–	1.06	–	–	3
Fulani	Mali	Herd	18	1.10	0.90e	1.00[f]	4
Fulani	Upper Volta	Village	12	–	–	1.06	6
Oudah Fulani	Chad	Village	13	1.07	0.98e	1.05	7
Arab	Chad	Village	14.5	1.01	0.85c	0.86	7
Humid Zone[g]							
Mossi	Upper Volta	Village	12	–	–	1.12	6
Djallonke	Ivory Coast	Station	–	1.10	1.50	1.75	9
Mayo Kebbi	Chad	Village	15	1.64	0.95e	1.56	7
Kirdi	Chad	Village	17	1.42	0.99e	1.41	7
West Af. Dwarf	Ghana	Station	–	1.44	–	–	9
West Af. Dwarf	Nigeria	Station	15/20	1.45	1.50	2.18	11

West Af. Dwarf	Nigeria	Village.	–	1.15	–	–	12
West Af. Dwarf	Cameroon	Station	–	–	1.50	–	9
Highlands							
Ethiopia type	Ethiopia	Village	–	1.10	2.00	2.20[e]	1
Goats							
Semi-arid Zone							
Sudan Desert	Sudan	Village	10	1.57	1.32	2.08	2
Masai	Kenya	Village	–	1.25	1.25	1.55	8
Sahel	Upper Volta	Village	12	1.27	1.11	1.41	6
Sahel x Guinean	Mali	Village	9/15	1.24	–	_	3
Sahel	Chad	Station	–	1.50	1.14	1.71	5
Sahel	Chad	Village	14/16	1.20	0.82e	0.98	7
Massakory	Chad	Village	–	1.55	–	–	5
Maradi	Chad	Village	–	1.51	1.15e	1.74	5
Humid Zone[g]							
Mossi	Upper Volta	Village	12	1.19	1.02e	1.21	6
Southern Goat	Chad	Village	15.5	1.58	1.04e	1.64	7
West Af. Dwarf	Ghana	Station	12	1.84	1.40	2.60	9/14
West Af. Dwarf	Nigeria	Village	12	1.54	–	–	12
West Af. Dwarf	Nigeria	Village	12	1.46	1.14e	1.66	8
Sheep/goats							
Humid Zone							

West Af. Dwarf	Ghana	Station	–	1.84	1.54	2.93	9
West Af. Dwarf	Nigeria	Village	12	1.61	0.70[e]	1.11	8

a. Underlined data correspond to village observations.
b. Percentage of lambs/kids born alive per parturition.
c. Percentage of parturitions per ewe/doe and per year.
d. Percentage of lambs/kids born alive per ewe/doe and per year.
e. . Derived estimates.
f. Estimated on the basis of herd structure.
g. Subhumid zone included.

Prolificacy would also appear to be relatively high. The prolificacy rate, which is expressed as the average number of young per parturition, apparently varies between 110% and 140% for ewes. It is probably still higher in goats, frequently reaching 150%, owing to the considerable number of twin or triplet births, and as much as 180% in the dwarf goats of West Africa, according to the results of experiments conducted in Ghana. For the most part these high rates were observed on research stations, but various experts believe them to be linked to genetic factors, so that they would not be influenced by the relatively favourable conditions under which they were achieved (ref. 5). Prolificacy rates observed in goats compare favourably with those currently achieved by different breeds of small ruminants raised in other parts of the world. On the other hand, those observed for sheep appear comparable only to the rates achieved by the least successful breeds.

A second major advantage in terms of fecundity is that potential fertility in indigenous females is relatively high, since their heat periods are not usually subject to seasonality, unlike most breeds raised in temperate zones[3]. As a result they are theoretically able to give birth every six to eight months, giving a fertility rate of 150–200%. In point of fact a rate of 150% (three parturitions every two years) is considered by experts to be the optimum rate. On this basis indigenous females, especially in the dwarf breeds of West Africa which are renowned for their prolificacy, could achieve a fecundity rate (expressed in terms of the average annual number of young per breeding female) of 165–180% for sheep and 225–250% for goats.

3. In almost all females raised in temperate zones, heat occurs during the months in which day-length decreases (July to September in the Northern hemisphere)., leading to a single parturition per year. However, there are some exceptions to this rule, for example the British Dorset breed.

Fecundity rates of over 250% for goats and 200% for sheep have actually been achieved for dwarf breeds on several research stations in West Africa (see table opposite). In Southern Darfur, rates were 208% and 148% respectively for seven herds of goats and ten flocks of sheep which were monitored for a period of 15 months. According to estimates used by the FAO in a study on livestock production in Ethiopia (ref. 1), fecundity rates are also higher than 200% for sheep in the Ethiopian highlands, which normally give birth twice a year, 10–15% on average being twin births. However, although few data are available, so that it is difficult to draw definite conclusions, the fecundity rates normally achieved at village or farm level appear to be much lower than these estimates, standing on average at 140–150% for goats and 110–120% for sheep. Analysis of flock composition leads to similar conclusions. Particularly in the case of females, all of which are assumed to be retained in the flock for breeding purposes, the

proportion of young in the age-class 0–1 year is frequently far lower than the level which it should in theory reach on the basis of production parameters.

The fecundity rates observed on research stations thus appear not to be achieved at village level, where environmental and management conditions are less favourable, leading to reduced fertility in females. Inadequate management doubtless leads in many cases to a situation in which too large a number of unproductive females are kept in the flock. Similarly, the lack of control over mating is conducive to an excessively rapid series of pregnancies, resulting in abortions and prenatal mortality. Unfortunately the data required to quantify these different factors with a fair degree of accuracy are not available. Available information, however, tallies with the theory that mortality rates are particularly high for small ruminants in tropical Africa. On different occasions mortality rates for lambs and kids have been estimated at between 15 and 20% during the first month of life and are evidently even higher in cases of multiple births. They are frequently estimated at 15–20% for the flock as a whole, which is a very high figure. Moreover, rates appear to fluctuate widely, reaching 40–50% in extreme cases. Despite their considerable adaptability small ruminants thus appear to be very prone to disease.

Impact of parturition interval on survival rate of lambs.

—In %—		
Deaths	Lambing interval	
	Under 7 months	Above 7 months
Abortions, prenatal	22	0
up to 1 month	30	20
1–6 months	41	40
Surviving at 6 months	7	40

Source: Ref. 9–22

Mortality rates of small ruminants in tropical Africa.

Zones/breeds	Countries	Source of observ.	Mortality rate[a]			References
			Before Weaning	0–1 year	Herd (Yearly aver)	
Sheep						
Semi-arid zone						
Masai	Kenya	Village	–	6.5[b]	11	8
Desert x Nilotic	Sudan	Village	–	30.5[b]	23	3
Fulani	Upper Volta	Village	–	44.0[c]	21	6
East Af. Blackhead	Uganda	Station	20.1	–	–	17
Oudah Fulani	Chad	Village	–	23.0	14.2	7
Arab	Chad	Village	–	25.0	15.3	7
Humid zone[c]						
Mossi	Upper Volta	Village	–	23.0	17	6
Djallonke	Ivory Coast	Station	–	–	10	9
Mayo Kebbi	Chad	Village	–	37.0	24.7	7
Kirdi	Chad	Village	–	36.0	23.5	7
West Af. Dwarf	Nigeria	Village	15	–	13	12
West Af. Dwarf		Station	–	20.0	–	11
West Af. Dwarf		Village	–	–	21	9
West Af. Dwarf	Cameroon	Station	–	–	32	9
Goats						

Semi-arid zone						
Masai	Kenya	Village	–	7.613	13	8
Desert	Sudan	Village	–	29.513	18	3
Sahel	Upper Volta	Village	–	37.Oc	23	6
Sahel	Chad	Village	–	32.0	19.1	7
Humid zone[c]						
Mossi	Upper Volta	Village	–	29.0	13	6
Mubende	Uganda	Station	30	–	–	16
Southern Goat	Chad	Village	–	35.0	22.8	7
West Af. Dwarf	Nigeria	Village	15	–	14	12
West Af. Dwarf	Ghana	Station	22	–	–	9
West Af. Dwarf	Nigeria	Village	29	45.0	20d	8
Sheep/goats						
Humid zone						
West Af. Dwarf	Nigeria	Village	20	47.0	20d	8

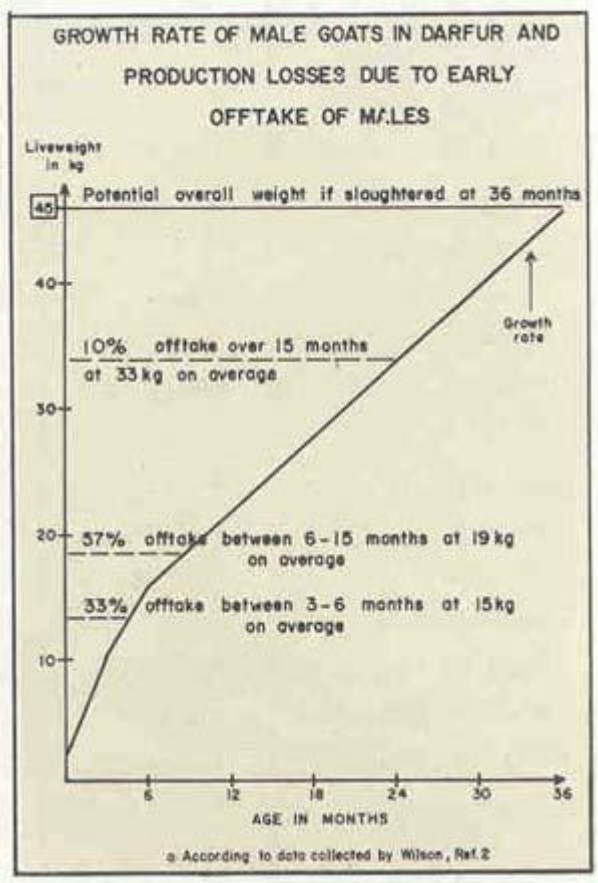
a. Percentage deaths of livestock in same age class.
b. Age class 0 to 6 months.
c. As the survey was conducted in. 1974, mortality rates may have been inflated by the impact of the Sahel drought.
d. Adjusted on an annual basis for flocks monitored by ILCA for 9 months in Nigeria. e. Subhumid zone included.

The lack of information on mortality prevents it from being clearly linked with specific diseases. Generally speaking, however, the diseases to which small ruminants in tropical Africa are subject consist mainly of respiratory diseases, such as pneumonia, and intestinal parasites, with the seasons playing a decisive part in their occurrence. It was noted in Ghana that mortality increased during the second part of the rainy season and hence during the time of greater humidity, which is generally held to be a favourable factor in the development of parasitic gastroenteritis. Similarly, it was shown in a survey carried out in Upper Volta (ref. 6) that the

frequency of intestinal parasites, which accounted for over 50% of diseases diagnosed in small ruminants, fell considerably in the drier northern areas. Hence the impact of peste des petits ruminants (PPR) is thought to be important. It is also probable that morbidity caused by chronic diseases has adverse effects on animal productivity which are just as important as those caused by mortality, but here again the Information available is rudimentary.

Generally speaking, a proportion of potential output is lost at the outset owing to inadequate management and environmental constraints. An additional loss factor is associated with the premature offtake of young males, which in many cases apparently begins at three or four months. It emerged from a survey conducted in two villages in the humid zone of Nigeria (ref 12) that 95% of males were sold after weaning, i.e. at three or four months. This was probably an exceptional case, but most surveys carried out in this field nevertheless show that the marketing of males at under one year old reaches considerable proportions.

Marketing apparently begins at about the age of six months in flocks investigated in Southern Darfur (Sudan), in the Niger delta in Mali (ref. 3), in Upper Volta (ref. 6) and in the humid zones of West Africa (Nigeria), where nearly half the young males are sold before they reach 15 months. These observations are confirmed by the analysis of flock composition, which shows there are a lower number of males than females in the age-class 0–1 year. Most of the sheep raised in the Ethiopian highlands are also sold before reaching maturity. According to a 1974 survey on 13 urban and rural markets in the highlands, 82% of the sheep sold had no permanent teeth, or in other words they were under 14–15 months old. The reasons for this premature offtake are not clear. They are probably connected with the pressure of demand (cash requirements, festivities requiring the consumption of meat) and not with any specific policy on the part of stockowners. Several experts have also come to the conclusion, from surveys carried out over the last ten years, particularly in West Africa, that sheep/ goat flocks are not only marketed prematurely, but that offtake exceeds replacement rate. There is a risk that the number of livestock will decline, although this does not emerge from the time series data published by the FAO. On the other hand, many estimates point to a stagnating trend, if not an actual decline, in the ownership of small ruminants on smallholdings throughout tropical Africa.



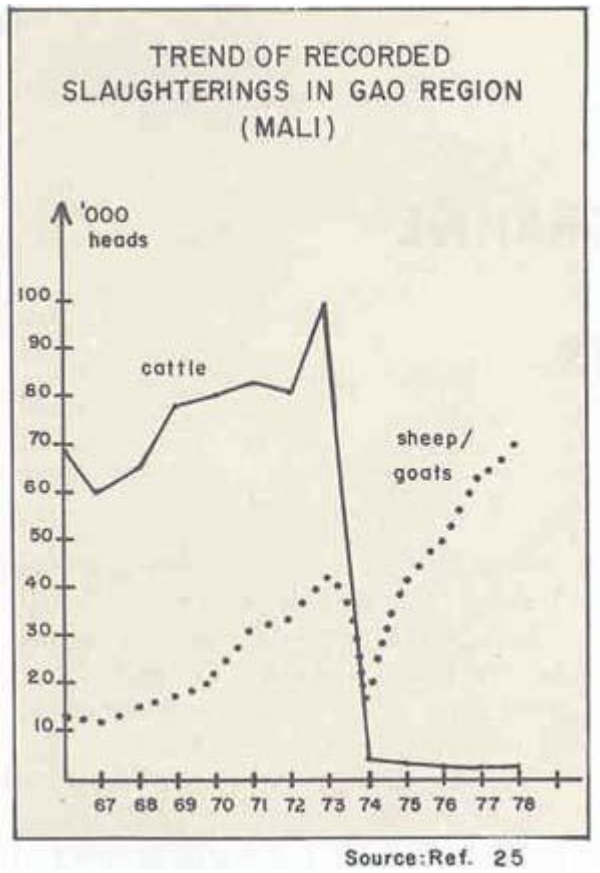
Prospects

In many respects very little is known about small ruminant production, which has not received a degree of attention from governments commensurate with its actual significance in real life. The contribution made by goats and sheep to meat supplies in tropical Africa is fairly large. According to FAO estimates it represents 45%, approximately the same as that of beef, i.e. some 780,000 tonnes in 1977, on the basis of an annual offtake rate of 29% for sheep and 30% for goats, with a yield per flock unit of approximately 4 kg of carcass weight (c.w.) far sheep and 3 kg for goats[4]. Moreover, it is possible that this contribution has been underestimated, since we have already seen that not enough information is available on production figures.

4. In the rest of the world, offtake rates are about 36% for sheep and 39% for goats, with yields per flock unit standing at 5.6 and 4.6 kg c.w. respectively (FAO estimates).

Consumption of sheep and goat meat plays an important part in rural areas, especially in the humid and subhumid zones, where sheep and goats frequently make up the bulk of domestic livestock. Owing to their better adaptation to hostile environments, small ruminants are also better able to resist drought, and it has been estimated that during the Sahel drought in the early 1970s sheep and goat losses were substantially fewer than those of cattle (Bulletin No. 3), thus providing disaster areas with some relief in terms of meat supplies. In northeast Mali, for example, where cattle losses were estimated at 80% in 1973–74, leading to a subsequent collapse in cattle slaughterings, sheep and goat slaughterings would appear to have risen substantially, according to the official figures. Small ruminants thus appear to play a reserve role

during difficult periods. Sheep and goat meat also seems to be preferred by local populations. It has been observed that in most tropical African countries the price of sheep or goat meat is substantially higher than that of beef. Mutton is usually preferred to goat meat, although available statistics rarely distinguish between the two categories.



Source:Ref. 25

However, in some countries, Ghana for example, the preference is probably for goat meat. In Nigeria, on the other hand, the prices of sheep and goat meat are roughly equal, but always lower than that of beef.

Moreover, small ruminant production under existing systems is, like that of cattle, characterized by low costs and minimal inputs. In arid zones it uses marginal land where opportunity costs are almost nil, while in the humid zones it utilizes fallow land or household refuse which would otherwise be wasted.

Price differences between mutton or goat meat and beef in tropical Africa.

	—number of countries—	
Price differences[a]	Beef with bone	Boneless Beef
Over 50%	6	2
25–50%	5	0
0–25%	3	7
Same price	2	3
Cheaper	1	2
Average price difference	+ 35%	+ 8%

a. Price ratio of mutton or goat meat/beef.
Source: Ref. 18–19

Compared to cattle production[5] it has the added advantage of greater productivity, expressed in terms of meat production per 100 kg of breeding female or per 100 kg of total flock liveweight. This is especially true in terms of potential. The needs of sheep and , goats are also often considered lower than those of cattle, since in relation to small ruminants the latter have been shown to be less efficient converters of the nutritive elements contained in their feed.

5. In ILCA's report on trypanotolerant livestock in West and central Africa, a productivity index is given using the weight of progeny (and, for cows, the liveweight equivalent of milk produced) per 100 kg of female maintained per year. According to this index, productivity was estimated at 40.9 kg/100 kg of cow, as against 45 and 41 kg respectively per 100 kg of ewe/doe maintained per year. The index of productivity appeared to be still higher for trypanotolerant small ruminants: respectively 64 and 69 kg/ 100 kg of ewe/doe maintained, as against 37.1 kg/100 kg of trypanotolerant cow maintained.

However, there are two conflicting schools of thought as to the possible advantages of developing small ruminant production. Those who argue against it acknowledge the ability of these animals, and especially goats, to digest coarse forages and their resulting higher productivity in certain environments, but maintain that they are only advantageous under extensive systems and that the cost involved in any search for improvements is not justified by their productivity. To this argument is added their reputation for destroying the environment. Owing to their ability to survive in degenerate areas small ruminants are often considered as a cause of deforestation and soil erosion. Their notoriety in this respect has in many cases evidently been a factor in their exclusion from livestock development strategies.

However, this notoriety is disputed. The devastating effects attributed to sheep and goats may in fact be largely the result of poor management of the rangelands, which they inherit after these

have been overgrazed by cattle. According to this school of thought, small ruminants may even play a positive part in the protection of the environment. Goats, in particular, are thought to be instrumental in controlling bush encroachment in humid' zones[6]. Furthermore, small ruminant production would appear to be complementary to cattle production, since sheep and goats graze herbage which is left untouched by cattle. Finally, many experts believe that there is a place for intensive fattening systems, basing their arguments on the digestive efficiency of small ruminants and on the apparent response of local breeds to traditional fattening methods. Development possibilities in this field are considered all the greater to the extent that the present level of offtake causes considerable losses which could be recovered immediately by merely postponing the marketing of young animals. Theories such as this, however, are based on results obtained from a limited number of samples and which are not necessarily universally transferable, taking into account the wide range of small ruminants raised in the differing ecological zones of tropical Africa.

6. According to the conclusions of an FAO report on the decline of Mediterranean sheep breeds, the sharp drop in the number of sheep may have contributed in some areas (for example, the Pyrenees) to undesirable ecological changes amongst which bush encroachment in areas previously covered by pasture grazed by sheep.

To sum up, despite a potential based on the apparent fecundity of indigenous animals and on the possible suitability of certain breeds for fattening, small ruminant production has until now been relatively little studied, so that the constraints to its development are all too often poorly understood. Future research on their potential performance under improved systems will therefore have to be accompanied by in-depth investigations to assess the results currently obtained by stockowners in existing production systems.