"Commercial Strategies, Drought and Monetary Pressure: Wo'daa'be Nomads of Tanout Arrondissement, Niger"

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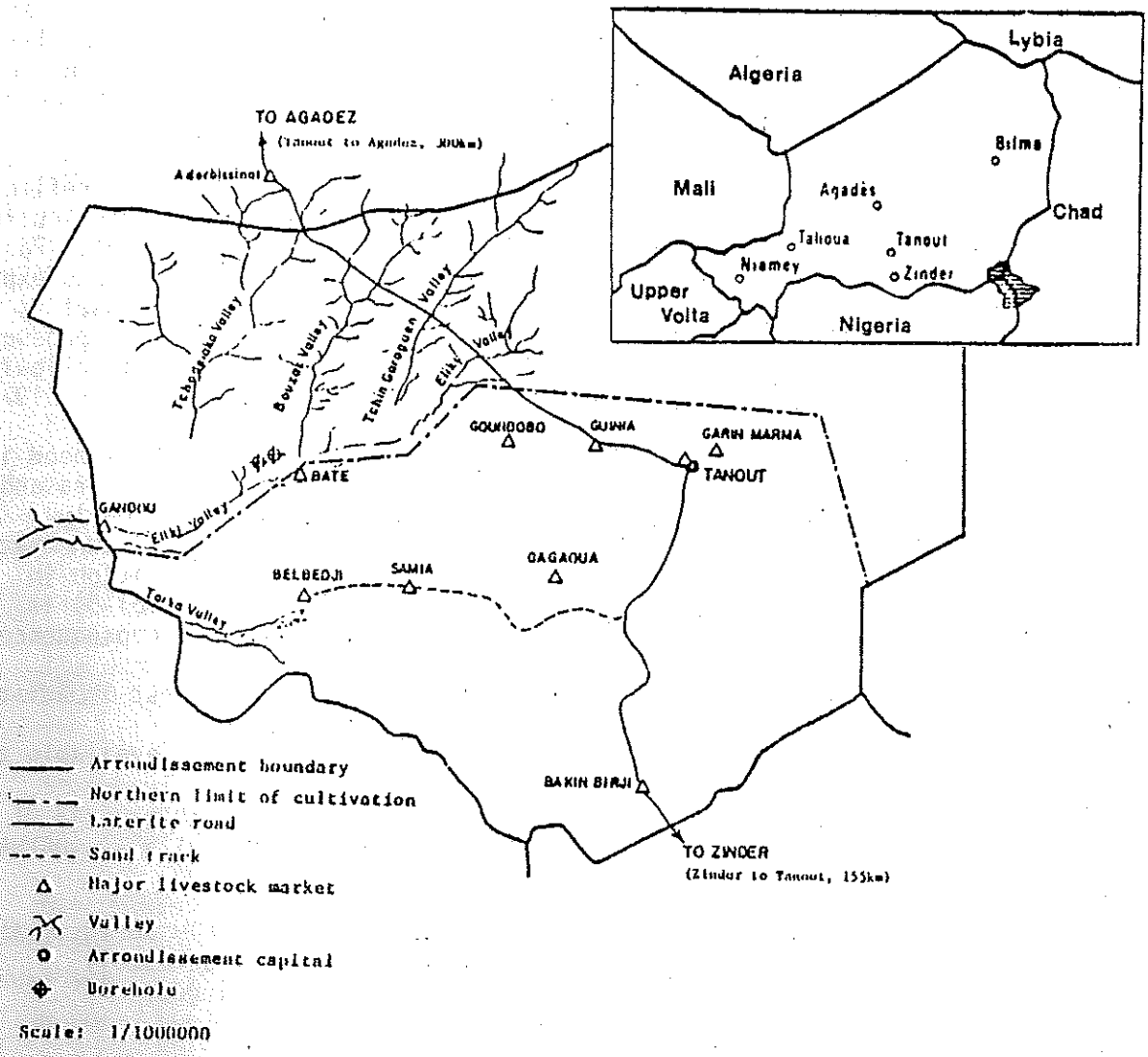
FIGURE 1 : Tanout Arrondissement



precipitation varies considerably from year to year in quantity, and in spatial and temporal distribution. During the period 1936-1978 rainfall at the Tanout station averaged 259 mm with an average of 24.3 days of rain per year (Figure 2). The median starting and ending dates were July 1 and September 13 respecti

The Arrondissement was severely hit by the 1972-73 drought. Rainfall during 1972 was 147 mm (16 days of rain) and 208 mm in 1973 (14 days of rain). The government estimates that of the 76000 dispossessed nomads that the 1972-73 drought produced, over one-third were from the Arrondissements of Tanout and Gouré alone (Direction des Programmes et du Plan, 1978:4). For an estimate of animal losses, see Table 1.

Many of the present characteristics of Tanout Arrondissement reflect th fact that it lies at the spatial interesection of the pastoral and agricultural zones and that these two zones are linked by strong currents of trade. Pastora zones and desert peoples have traditionally supplied salt and dates and experie in trade and craft production; today their most important trading asset is live animals. From the agricultural zone in turn comes grain, craftmans' products, and quite importantly, a haven for pastoralists in times of drought, allowing them to slough off excess population during periods of scarcity (Baier, 1976:3)

One of the major concerns of those pursuing a pastoral livelihood in Tanout Arrondissement, and a frequent point of friction between herders and cultivators, is the extension of crop cultivation into areas previously reserved for herders. The encroachment is continuing every year, such that the «northern limit of cultivation» set by the colonial administration in 1954 and revised by the government in 1961 (law of 26 May 1961, #61-5) is today largely ignored.[3] This situation has a number of serious consequences:

- the clearing of these northern lands leads to an almost immediate environmental degradation
- herders' best dry season grazing lands are no longer available to them
- both herders and cultivators who have been pushed into areas of low and erratic rainfall are bound to experience drought with increasing frequency.

In April 1978 a large area of grazing land considerably north of the «legal limit» was cleared for cultivation, a situation that seriously exacerbated tensions between peasants and herders at the fringe.

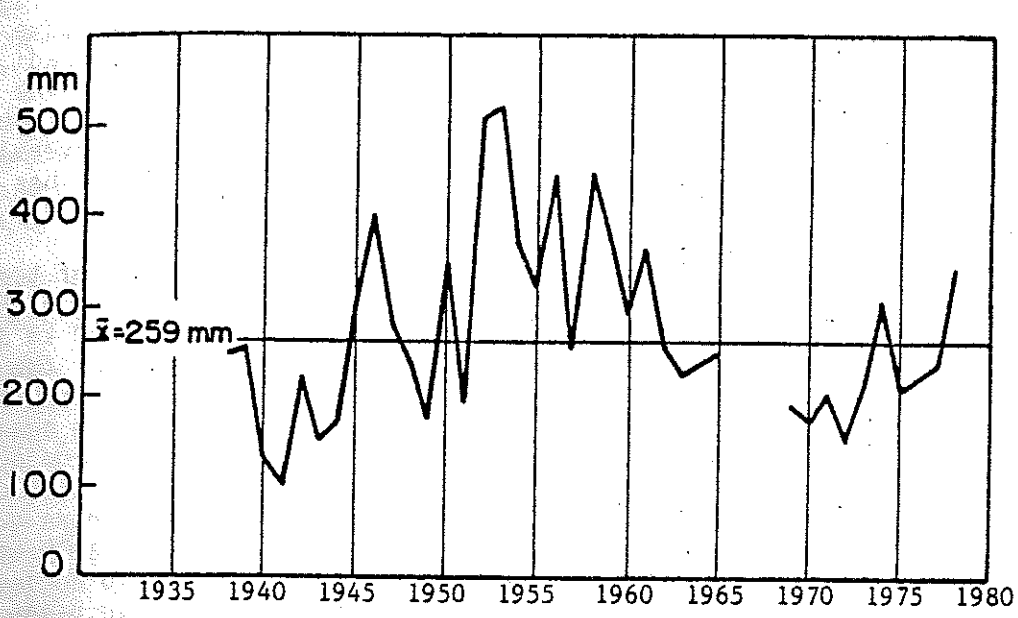
Tano

Zind

The Wo'daa'be

The term Wo'daa'be can be considered the most exact term to designate the subject people of this article, in as far as they refer to themselves as Wo'daa'be in Fulfuldé. However, the group is more generally known to other tribes and outsiders as the Bororo, although to Wo'daa'be the term Bororo designates another group of nomadic Fulani (the KeKeetáwa) who are not Wo'daa'be. The terms Fulani (in Hausa) and Peuls (in French) designates the same ethnic group spread across West Africa of which the Wo'daa'be, who are almost all nomadic, represent only a very small part (about 2% of all the Fulani who are considered «semi-sedentary,» according to one estimate [Riesman 1978]).

FIGURE 2 : Magnitude and Variability of Rainfall in Tanout: yearly averages in mm.



Sources: Mainguet et Chemin (1979)
Arid Lands Natural Resources Committee (1979)
Service de l'Agriculture, Rapports Annuels

TABLE 1: Official Estimates of Pre and Post Drought Animal Population

Unit: 1000 animals

	CATTLE			SHEEP			GOATS			CAMELS[b]		
	1972	1976	%	1972	1976	%	1972	1976	%	1972	1976	%
Tanout Arr.[a]	159	73	46	97	80	82	242	100	41	19.4	25	129
Zinder Dept.	935	533	57	660	677	103	1400	1516	108	50	69.5	139
Niger	4200	2672	64	2850	2354	83	6300	5946	94	345	283	82

a. These animal estimates are for Tanout as a whole and thus underestimate nomadic animal losses. Sedentary cattle losses were estimated between 10 and 50%, while nomad losses were from 40-80% (Direction des Programmes et du Plan, 1978).

b. The increase in camel population from 1972 to 1976 is probably due to an inflow of Tuareg from other areas.

Source: SEDES (1978).

The Wo'daa'be of Tanout are relative newcomers to the region, having arrived within the last 50 years into an area long dominated by the Tuareg. About a third of the herders that we encountered mentioned having come from the Tahoua region; most of the rest mentioned Dakoro, Tessaoua, Maradi, and various areas of northern Nigeria, the most common being Sokoto.[4] The 50 or s Wo'daa'be families visited in the course of this study were mostly from the Yamanko'en, Jijiru, Bagel'en, Bi'ute'en, and Kasausawa tribes. Several other semi-sedentarized Fulani families from the Uda'en and Katsinewa tribes were also encountered.

The Wo'daa'be of Tanout Arrondissement practice a system of transhuman in which the whole family moves during the rainy season to the regions surrounding Aberbissinat and to areas as far north as Marandet (90 km SW of Agadez). The trek to northern grazing lands rarely exceed 200 km, the length of the voyage for most families being between 50 and 125 km. As the rains taper off in September and as temperatures increase they turn once again towar the sedentary zone, finding water in the larger and deeper ponds and occasiona digging shallow wells in low lying areas. When this surface and shallow water dries up (from September to November, depending on the year) herders go either to the deep cemented wells, open to everyone, where users inevitably become more and more numerous as the dry season wears on; or they go to an indigenous built «private» well, either their own or one to which they have usage rights.

Unlike the majority of the Fulani of Zinder Département, who practice a mixed economy based on a combination of agriculture and pastoralism, the Wo' of Tanout maintain themselves exclusively by livestock herding and trade. The engage in few if any of the multiple roles and exchanges of the more sedentari Fulani (cereals cultivation, milk-millet exchange, serving as herd managers fo peasants, manure contracts, etc.). None of the Wo'daa'be encountered had any fields whatsoever,[5] were guarding or had guarded any peasant animals, or had ever entered into a manure contract.[6] Many of the Wo'daa'be never even enter the agricultural zone (except to attend markets or as a response to drought) thus reducing the potential points of contract with peasants.

The Wo'daa'be are thus far from being participants in a common culture and social system with surrounding cultivators. They maintain strong notions of ethnic separateness, made explicit through facial markings, language, cloth settlement patterns, ceremonies, and psycholigical bearing.[7] However, their involvement in the greater society occurs primarily as the result of a crucial economic fundament of their system and that is that their economy does not allow them to be self-sufficient. The extent, and recent evolution, of their dependence on the market economy will be examined in the following sections.

SECTION II

The Structure of Household Budgets: Introduction

The need to procure an adequate amount of food and a few other basic necessities is fundamental to the herder decision-making process and explains in large part the herder's motivations for raising, keeping, and selling anima This section will examine, through an analysis of herder household budgets, th ways in which herders in 1977-78 went about providing the material resources needed to maintain and bring up their members.

Relatively little is known about the consumption and other expenses of Sahelian herding populations. Of specific relevance to Niger, Dupire has described the family budget of a Fulani chief based on work done in 1947 (Dupire, 1962:133). A major demographic, budget and food consumption study was conducted among a large sample of Fulani and Tuareg groups between 1962 and 1964 in the region north of Tahoua (SEDES/INSEE, 1966). Edmond Bernus provides budget information for six Tuareg households based on work done in 1967-68 (Bernus, 1974). Besides a few other general references to herder consumption and expenditure patterns, recent, especially post drought information, is either non-existence or as yet non-published.

Scope and Methodology

The research area of the present study extended the length of the Eliki valley (Eliki campment to Gandou) in the Arrondissement of Tanout.[8] Most of the herders interviewed were found in the Eliki, Tchin-Garaguen, Boy, Bouzak, and Tchadelaka valleys, as well as the region immediately surrounding Aberbissinat (see Figure 1).

Not knowing in advance the number or location of herders in the region, and not having any reliable sampling frame from which to draw a statistical random sample,[9] our sample consisted of those Wo'daa'be households that we came across:
a) at wells or ponds during watering hours
b) at the local livestock markets (Gourbobo, Batē, Aberbissinat, and Gandou) on market days
c) in herder camps.

A number of problems arose in attempting to put together household budgets for our «sample» of herders. Consumption, expenses, and revenues are inherently «flow data» ideally collected using frequent interview techniques (every few days to every few weeks). Due to time and resource limitations, we were able to conduct our interviews on only four occasions during the survey year. Moreover, although efforts were made to recontact the same families on successive field trips, we were able to meet up again with only about 25% of our original sample due to their seasonal movements and large dispersal. As a result, the majority of our sample was interviewed only once.

A major limitation of the «single interview technique» thus employed is that one is forced to rely totally on the memory recall of informants. As our reference period during interviews covered the preceeding twelve months, it is inevitable over such a long period that our informants forgot or even confused a number of expenditures.

Another major limitation of the methodology employed is that we were unable to obtain estimates on how much milk and butter was sold and when. It is the woman who milks the cows and prepares butter, and according to Fulani ideals, she is the full owner of this milk and can dispose of it and the income from it in any way that she pleases. Some of this milk and butter may be sold or bartered for grain, and although individual transactions are usually quite small, the yearly income generated may, in some cases, be quite important. Revenue and expenditure estimates relying on twelve month memory recall inevitably underestimate these small everyday transactions and barter exchanges and tend to overestimate the exceptional bulky expenditures (clothing and equipment, for example).

Probably the greatest limitation regarding the methodology employed in collecting the family budgets was that a single point of contact with a herder family does not allow the informant to build up confidence in the interviewer (and vice-versa). Although we explained in great detail the innocuousness of our survey, particularly the fact that any results would be anonymous and that we had nothing to do with tax collection, the old nomad fears (cenus reverification, fines, school or military recruitment, etc.) are never far from the surface.[10]

Efforts were made to conduct all interviews in private with the herder and/or his immediate family, although this wasn't always possible especially in the livestock markets. All interviews were in Fulfuldé, and were structured around a questionnaire covering such areas as yearly food and other expenses, animal commercialization and other household revenues, transhumance patterns, well use and watering rights, and responses to drought.

Estimation of Expenditures

Our basic sampling unit was the independent household (or tent unit) with its herds and flocks. The majority of these households consisted of simpl units (a man, his wife or wives, and their children), although more complex units, containing two or more male adults and their respective families, were not uncommon. The composition of some of these units varied seasonally, certai households joining together during the rainy season. The sample analyzed consisted of 33 Wo'daa'be households -- the average household size was 7.83 (3.83 adults and four children). The average yearly monetary expenditures for our sample are presented in Table 2.

In order to get an idea of the evolution of Wo'daa'be monetary expendit over the past thirty years, Table 3 presents household budget data collected i 1947 and 1962-64. alongside the present study's 1977-78 Tanout data.

The data in Table 3 aren't strictly comparable: the household size in the Dupire study was 8 persons, vs. 4.6 in the SEDES/INSEE study and 7.8 in the present Tanout study. The sample sizes range from 1 Fulani chief (Dupire) to 1133 (SEDES/INSEE) to 33 (present study); the methodologies employed in collecting the data were quite different. However, in spite of the rough natu of the data and the assumptions and approximations necessary in its collectio and analysis, the comparison of the budget reveals a number of striking tendenc

-- Between 1964 and 1978 there has been over a 4 fold increase in per capita expenditure. The extent to which this increase in expenditure is real (i.e., the average herding family is actually purchasing more goods on the mar or due to inflation will be discussed shortly.

-- Another striking tendency in the 14 year period is the sharp increase, relative to other expenditures, of the food component of the budget (in 1964 food expenditures represented 43% of total monetary outlay compared with 66% in 1978). Once again, it is important to determine the role of cereal price inflation to this increase, and the extent to which herders are actually buyin more cereals in 1978 than 1964, if at all.

-- A third major change in the three budgets is the immense relative decrease in the tax expenditure in 1978, due to the suppression by the governm

TABLE 2: Wo'daa'be Yearly Monetary Expenditures (June 1977 to May 1978).

Unit = CFA[a]

Expense	By Household	Per Capita	Percentage
I FOOD (Total)	94500	12100	66
cereals	75200	9600	
tea and sugar	13300	1700	
condiments	6000	800	
II CLOTHING	22500	2900	16
III EQUIPMENT (Total)	9100	1100	7
Water hauling sacks	2600	300	
Mats	2400	300	
Ropes	1900	200	
Calebashes	2200	300	
IV MINERAL SALTS + "NATRON"	6200	800	4
V TAXES	1040	130	1
VI MISCELLANEOUS[b]	9000	1200	6
TOTAL	142340	18230	100

a. One dollar averaged approximately 230 FCFA during the survev year which translates into per capita and per household cash expenditures of $79 and $619 respectively.

b. Cooking and household utensils, animals, water fees, field damages, flashlights, swords, camel saddles and harnesses, jewelry, etc.

TABLE 3: Evolution of Wo'daa'be Monetary Expenses

Unit = CFA Franc

EXPENSES	1947 DUPIRE[a]		1962-1964 SEDES/INSEE[b]		1977-1978 TANOUT STUDY	
	Per capita	%	Per capita	%	Per capita	%
Food[c]	430	20	1750	43	12100	66
Clothing	745	35	700	17	2900	16
Equipment	205	10	275	7	1100	7
Mineral Salts[d]	240	11	...		800	4
Taxes	315	15	850	21	130	1
Miscellaneous	200	9	500	12	1200	6
Annual Total in CFA	2135	100	4075	100	18230	100

a) Adapted from Dupire (1962a:133). In Dupire's budget some food and clothing was obtained through barter. For the purposes of this analysis we have given the barter transactions the monetary value that prevailed at that time.

b) SEDES/INSEE (1966:157)

c) The SEDES/INSEE study also differentiates between food bought and food obtained through barter. The two have been combined in this table.

d) The SEDES/INSEE study does not present the salt expense in a separate category.

in 1974 of taxes on animals and in 1977 of the head tax (Impôt de Minimum Fiscal). In 1978 the only taxes levied were the arrondissement tax (350 CFA per person 15-64 years old) and small market taxes.

The Role of Inflation

In order to determine the real changes in expenditures on various items over the years, the 1962-64 SEDES/INSEE data have been calculated at 1977-78 prices using various price indices for the different budget components. (We have not included the Dupire data in the comparison as her sample consisted of only one Fulani chief.) Table 4 presents the 1962-64 data at 1977-78 prices alongside the present Tanout data.

As can be seen in Table 4 there has been a 60% increase in real terms, in the amount of cash spent on consumer items during the 14 year period. Of this increased per capita expenditure of 6760 CFA, 2400 CFA (36%) is due to an increase in the money spent on cereals, and the remainder is more or less evenly divided between increases in tea and sugar, clothing, and miscellaneous expenditures. Such a jump in the monetary outlay for consumer items is curious in light of what we know about the severe setback that the pastoral economy suffered as a result of the 1969-73 drought. Livestock capital was drastically reduced during the same period that herders and their families have become increasingly enmeshed in the market economy for the satisfaction of their basic economic needs. A closer examination of the items comprising household expenditure is helpful in throwing some light on the nature of this increased involvement in the market economy.

Grain Purchases

Nomad economy does not allow, and probably never did allow, the Wo'daa'be to be self-sufficient. In a recent study on herd economy, Dahl and Hjort (1976) provide some interesting and surprising estimates on the minimum herd necessary for a nomadic unit of six people to subsist entirely off the produce of their herds. Assuming a cattle herd with a typical age and sex composition, and making several other necessary assumptions relevant to nomadic herds, they calculate that, during the rainy season the total herd necessary to have sufficient lactating cows to provide for the requirements of the household would be 73 animals. In the dry season, as only four percent of the total herd is lactating and as individual yields are low, the required size would need to consist of 593 animals (Dahl and Hjort, 1976:158).

It is obvious that such conditions make it virtually impossible for nomadic families to subsist, throughout the entire year, on their herds. It may be possible for some well-off families with very large herds to subsist solely on milk during the rainy season and in fact our sample included 2 families who claimed they bought no millet during the rainy season.[11] The rest of our sample, however, was buying millet all year around; the overall ratio for the 33 household sample of dry season cereal purchases to rainy season purchases was approximately 3:1.

From the information collected on cereal purchases, we have calculated that the average household bought during the survey year 1253 kg of millet. Given the average household size of 7.83 persons, this produces a yearly per capita consumption figure of 160 kg (438 grams per day). As a point of contrast,

TABLE 4: Evolution of Wo'daa'be per capita Expenditures in Constant 1977-78 Prices

ITEMS	SEDES/INSEE 1962-1964 (CFA / per capita)	TANOUT 1977-1978 (CFA / per capita)	Absolute Change (CFA)	Percentage Change
Cereals	7200[a]	9600	+2400	+ 33%
Tea/Sugar	140[b]	1700	+1560	+1115%
Clothing	1700[c]	2900	+1200	+ 71%
Other	2300[d]	3900	+1600	+ 70%
Total Consumer Items	11340	18100	+6760	+ 60%
Taxes	2500[d]	130	-2370	- 95%
Total Expenditure	13840	18230	+4390	+ 32%

a) The SEDES/INSEE study presents cereals bought in CFA and also in kilogram According to that study (1966:159) the total amount of cereals acquired per capita in 1963 was 135 kg, of which 32 kg was obtained through barter at a slightly higher price than the remainder of cereals which were purchased. As the cereal price in 1963 was 12 CFA/kg, and had risen to 53.3 CFA/kg during the 1977-78 survey year, the cereal price index for 1977-78 is 444 (1963=100). For the calculation of the 1977-78 price, we have assumed that all the 135 kg would have been bought at the market price.

b) Price index used for tea and sugar is 342 (1963=100), which is the food index for the first trimester of 1978 given in Banque Centrale des Etats de l'Afrique de l'Ouest (1978, no. 263:20). The index covers many more items than just tea and sugar; sugar alone has a slightly higher index (374). We were unable to locate 1963 price data for the type of tea that nomads drink. However, a price index relevant only to tea and sugar would make very little difference in this context considering the fact that tea and sugar consumption was so low in 1963.

c) The following indices were calculated for different clothing items (1963=100): "pagnes" (254); plastic shoes (187); "boubous" (190); turbans (375); local cotton items (260). The overall clothing index, weighted according to the proportions of different items purchased by Wo'daa'be was 245. 1978 prices were obtained through market observation and BCEAO. (1963 prices are from Direction de la Statistique, Annuaire Statistique: Années 1969 et Antérieures.)

d) General index is 294 (1963=100). All other expenses have been grouped i one category as the separate component categories did not always overla

various estimates of yearly per capita cereals consumption for the sedentary population are 192 kg (FAO), 220 kg (most donor organizations), and 250 kg (Niger government). Again, it is interesting to compare this 1977-78 estimate of grain consumption with that of the earlier 1962-64 SEDES/INSEE study (see Table 5).

Table 5 shows that daily per capita millet consumption increased from 340 grams in 1964 to 438 grams in 1978 (+20). As already stated, we were not able to obtain a reliable estimate of milk consumption or availability.[12] If it is assumed that milk consumption has remained constant since 1963, it must be concluded that total food consumption and the intake of calories have increased. It seems more reasonable, however, to assume that milk consumption has decreased due to the drastic reduction in the size of nomad herds during the 1969-73 droughts, and that overall caloric intake has remained roughly the same, or even decreased. Although the data are quite rough, they do indicate an important shift in the consumption habits of herders: millet has been substituted for milk and the herders have replaced a product that they produced themselves by a product they have to buy on the market. This shift away from the subsistence economy and towards the market economy is a process that has been going on for some time but has surely been intensified by the 1969-73 droughts. The question of the impact of those droughts on the pastoral economy will be further discussed in the section on terms of trade.

TABLE 5: Food Consumption Per Person Per Day

	SEDES/INSEE[a] 1962-64			TANOUT 1977-78		
ITEM	Qty in grams	Calories	Calories in %	Qty in grams	Calories	Calories in %
Cereals	340.4[b]	1176	63	438	1511[c]	
Milk	837.	662	36	?		
Other	--	17	1			
Total	—	1855	100			

a) SEDES/INSEE (1966:186).

b) This figure (340.4 grams/person/day) is equivalent to 124 kg/person/year, which differs from the 135 kg figure used in the SEDES/INSEE budget study, some of which appears in Table 3 of this paper. The SEDES/INSEE report acknowledges that this difference exist between their budget and their food consumption study, and explains that it is probably due to the different sample sizes of the two studies (1033 for the budget study vs. 100 for the food consumption study). They also state that the difference between the amount of cereals bought per person per year (135 kg) and the amount consumed (124 kg) also may be due to the removal of the millet bran during preparation (which is then fed to animals).

c) 100 grams of millet without bran = 345 calories.

Tea and Sugar Expenditures

Tea and sugar appear as the most striking new item of expense in the Wo'daa'be budget, accounting in 1977-78 for 9% of yearly household expenditure. The expense does not even appear in Dupire's 1947 budget; in the 1963 SEDES/INSEE study tea and sugar accounted for 1% of Fulani expenditures (see Table 4). If these data are accurate, the Wo'daa'be are now buying 11 to 12 times more tea and sugar than they did 15 years ago. Tea drinking has become part of the Wo'daa'be everyday life, as we were able to experience it, and is one of those things, like camel racing, that the Wo'daa'be have picked up from the Tuareg. In light of the price of these items (in 1978 sugar was 700 CFA for a «pain» of 2 kg and tea was 1250-2000 CFA/kg, depending on the quality), the Wo'daa'be have recently adopted a quite expensive habit. It is, however, one of those expenditures that differentiates richer from poor herders. Unlike millet, which everyone consumes, tea and sugar consumption was spread quite unevenly among the sample. Seven out of 33 families claimed they never bought any, and 6 families consumed over 30000 FCFA/year.[13] Each family was spending, on the average, 325 FCFA/month for tea and buying just over one «pain» of sugar per month.

Clothing Expenses

Our data on clothing expenditures, like all the other monetary outlays discussed so far with the exception of taxes, indicate that the Wo'daa'be have become increasingly more integrated in the market economy for the procure of their basic economic needs. Clothing can be considered a «discretionary» expense in that the herder has some capacity to delay or move forward his time of purchase throughout a given season. Prices in the Gourbobo market for some items commonly purchased by Fulani were the following in April 78 (in CFA fran

sandals: 400-500 for «Fulani variety»; 250-700 plastic types.
hat: 150.
turban: 375 for 5 «coudes»; up to 3000 for longer turbans.
long gown: («boubou») for men: 1200-2500; «grand boubou»: 3500-6000
leather breechers: 2000 (small)
3000 (large).
cloth pants: 300-1500.
two yards of cloth («pagne») for women: 2000-3200.
«pagne» for girl: 1500 (very small 500).
blankets: 600 (cotton); 5000 (wool).
camel sanddles: 7000-15000.
camel harnesses + «brodure»: 5000-7000.

The average yearly expense for clothing a woman came to 4050 CFA (1 to 2 «pagnes» a year; 1 to 2 pairs of sandals). The yearly average for a man was slightly higher (4250 CFA, divided between hats, pants, turbans, occasion boubous, sandals or plastic shoes, an occasional blanket). The average for children was 1650 CFA (leather breeches for boys and men, which often last up to two years; small blue cotton «pagnes» for girls; hats; shirts; sandals; et

Estimation of Revenues

There is a convergence of views, in several of the landmark Fulani studies, on the ways in which the pastoral Funali go about procuring those it

(like grain) that are outside of their productive system. The authors of the three most intensive studies of the nomadic Fulani (one in Niger, two in northern Nigeria) offer the following comments:

> «Fresh, or more often sour, milk and butter are the base of the system of exchange, and their primary use is for the acquisition of grain.» (Dupire, 1962b:345).

> «The diverse pastoral skills of herdowners and their sons are directed towards the achievement or maintenance of a state in which the family can subsist on the herd's milk and the cereal foods for which it is exchanged...The Pastoral Fulani family is a herdowning and milk-selling enterprise.» (Stenning, 1962:100).

> «They (FulBe) rely on the sale of milk to the HaaBe for their staple food, which is corn, not milk.» (Hopen, 1958:152).

According to these studies, all of which were carried out in the 1950's, the primary means for generating revenues was the sale, or barter, of milk and milk products. Cattle were of course sold from time to time, but such sales were regarded as irregular and emergency measures made generally in response to large financial needs above and beyond subsistence (primarily ceremonies and taxes).

It is very possible that the exchange of milk products for grain and consumer goods occupied a predominant position in the generation of revenues in the 1950's as the authors just quoted point out. However, in the post-drought context, only the very richest herders (and maybe not even them) can even come near the pastoral ideal of being able to satisfy all subsistence needs on the revenues of milk products alone. Other ways of earning revenue have taken precedence.

Interesting enough, although Dupire speaks of dairy products as being the basis of Wo'daa'be exchange, the revenues in the household budget that she presents come from the sale of 4 cows, 2 heifers, and 1 bartered bull (Dupire, 1962a:133). The SEDES/INSEE Study of 1962-64, completed only a short period after the fieldwork of Dupire, Stenning and Hopen, points to the predominance not of barter, but of animal sales, and cattle at that, in the generation of revenues.

> «The estimated cash value of barter transactions was surprisingly small, although observers have assumed that most of the Fulani's economic exchanges were made in this way. In fact the estimated value of barter was about 13% of all exchanges.» (Ganon, 1975:700).

The above barter transactions that the SEDES/INSEE study refers to concern in large part animal-cereal transactions rather than milk-cereal transactions, which even further minimizes the exchange and sale of milk products as a percentage of total revenues.[15] In fact, in striking opposition to the 1950's studies' emphasis on milk product exchange and sale, the SEDES/INSEE study found that the principal source of income (97%) was from animal sales, primarily cattle (2 or 3 head on average sold annually by each household). Besides this statement on the overwhelming importance of commercial offtake, the study unfortunately provides no additional information on the characteristics of these sales.

For our Tanout study, after enumerating yearly expenditures, each herder was then asked how he went about providing for these expenses. Questio asked pertaining to the commercialization or barter of animals concerned the species sold or exchanged, date and place of animal sale, price received, and reasons for parting with the animal. In addition, for all cattle sold or bartered, information was collected on the animal's sex and age.

As previously discussed (see Table 2) mean annual expenses by family were 142000 CFA. As can be seen in Table 6 the average herder family earned 136000 CFA from the sale of animals alone, which by itself covers over 95% of average yearly expenses. The difference between expenses and revenues, surprisingly small for a study of this type, is probably due to one or more of the following:

-- the herder's not divulging, or more likely forgetting, the number of animals sold in a one year period. This under-reporting probably applies more to goats and sheep sold than to cattle.

-- over-reporting of expenses. In a study relying on memory recall over a 12 month period, the larger, bulky expenditures (cereals, clothing, equipmen tend to be overestimated, while the smaller everyday expenses are frequently underestimated.

-- receipts from sale of dairy products. The period of peak milk availability, sometimes resulting in a considerable milk surplus, occurs duri the rainy season, followed by dry season deficits. Often, however, this milk cannot be sold during the rainy season as most herds are in northern pastures usually quite a distance from markets and sedentary populations. The milk, however, is sometimes made into butter and stored to be sold later.[16] As previously mentioned, we were not able to determine how much milk or butter wa sold and when, but in any case it is believed that the revenues earned would not be a significant percentage of total earnings, given the existing human and calf demands on the milk and the fact that the total quantity of milk has been considerably reduced due to substantial animal losses during the 1969-19 droughts.[17]

-- receipts from non-herding activities. The Wo'daa'be are not renowned for their artisanship talents, but we did encounter some instances of herders earning money selling herbs, medicines, and ropes. One herder, who says he lost almost all his animals during the drought, told us that his two sons were in Kano working as houseguards, but he confided he was ashamed they had to do so.

As these alternate sources of income (in addition to animal sales) are generally believed to be quite limited, it is quite probable that the difference between average expenses and revenues (142000 and 136000 CFA respectively) is due to an underestimation of the animals sold. Table 6 shows the breakdown of livestock sales and revenue from the 33 herder sample.

A household's animal offtake, of course, consists not only of commerc offtake, as evidence in Table 6, but of all other animals that are disposed o in non-market transactions (habba'nai, nanga'nai,[18] bridewealth, ceremonial slaughter, etc.). Concerning only commercial offtake, the average family had to sell, or dispose of in some other fashion,[19] a minimum of 15-16 animals to

meet their yearly expenses. As can be seen, cattle account for less than a quarter of the total number of sales, but 64% of total livestock revenues. The small ruminants account for over three quarters of all sales; their lower price reduces their share of revenues to 34%. Almost three times as many sheep as goats were sold.

TABLE 6: Animal Sales During Survey Year (June 1977 to May 1978)

Species of animal sold	mean no. sold by family during year	Average Price (CFA)	Total Revenue by Animal (CFA)	% of Total Revenue
Cattle	3.55	24600	87330	64
Sheep	8.95	4000	35800	26
Goats	3.15	3200	10080	8
Camels	0.09	25700	2300	2
Donkeys	0.06	6500	390	-
Total	15.8	--	135900	100

Worthy of note is the fact that the Fulani, long considered cattle specialists, are increasingly raising and selling small stock, especially sheep. As a good amount of their cattle stock was destroyed or sold during the 1969-73 droughts, only a limited number of herders have the capital resources necessary to reconstitute a herd of cattle. Sheep and goats represent only a small value compared with a camel or a cow, their high rate of reproduction offers the possibility of rapid herd growth, and they constitute a source of exchange value more readily realizable than cattle for current expenses. Such characteristics make investing in small stock a classic herd reconstitution strategy in post-drought periods; at a later date the goat and sheep offtake can be used for the acquisition of larger stock.

Characteristics of Marketed Cattle

The herder's decision of which animal in his herd is to be marketed depends primarily on the magnitude of the cash need to be satisfied, and the structure of the herd. For small, frequent expenses the sale of a goat or a sheep will usually prove adequate. Large cash needs (for example, replenishment of grain stocks and ceremonies) often necessitate the sale of cattle.

Confronted with this unpleasant necessity of selling cattle, a herder prefers to restrict such offtake to the nonproductive elements of his herd (unfertile females and males not needed to maintain the reproduction of the herd). The marketing of productive females is more complex, as most herders try to keep as many female cattle as possible to maintain milk production and secure reproduction of the herd. The sale of such animals implies a loss of capital and future investment in the herd, and therefore less security.

The age and sex characteristics of the 113 cattle sold by our Wo'daa'be sample is shown in Table 7.

TABLE 7: Cattle Sales During Survey Year for Wo'daa'be Sample

	No. of Sales	% of Total Cattle Sales	Average Price (CFA)	Cattle Revenues (CFA)	% of Total Revenu
MALES					
Calves (0-12 months)	5	4	8600	43000	2
Immature Males (12-36 months)	40	36	18500	740000	27
Bulls (3-8 years)	16	14	38900	622400	22
Total Males	61	54	23100	1405400	51
FEMALES					
Calves (0-12 months)	0	0	0	0	0
Heifers (12-48 months)	17	15	20300	345100	12
Producing Cows (4-11 years)	30	27	29500	885000	32
Cull Cows (11+ years)	5	4	27000	135000	5
Total Females	52	46	26300	1365100	49
TOTAL CATTLE	113	100	24500	2770500	100

As can be seen in Table 7, males provided just over half of all cattle sold (54%) and were commercialized at relatively young ages. Almost three-quarters of all males sold were three years old or younger. The average price of the bulls sold by the sample (38900 CFA) is also well under the price of an average «export bull» (58900) as given in the local livestock service monthly reports, which leads one to believe that even these animals were sold at relati young ages. As cattle appreciate in value by approximately 5-6000 CFA a year according to a recent analysis of cattle prices in Upper Volta (Herman, 1977: 43-45), the economic loss suffered as a result of selling cattle at less than their optimum age is readily apparent.

Extremely disturbing from a herder point of view are the number and typ of female animals sold. Female cattle represented almost half (46%) of total cattle sold, and 90% of the females sold were heifers and reproducing cows. Cull cows, which in normal times represent a relatively good share of cattle revenues, accounted for only 4% of all animals sold and 5% of cattle earnings. Of all cattle sold, producing cows were the biggest revenue earner, comprising 32% of all cattle earnings. The selling of productive females was not limited to a few very poor herders (or very rich ones for that matter). 20 families, out of our sample of 33, acknowledged having had to sell heifers or cows durin the previous 12 month period.

This age and sex distribution of commercialized cattle can best be explained by two major factors: the acute monetary pressure to which herders were subject during 1978 and the impact of the recent droughts on Sahelian he

structure. We have attempted to document the former in our discussion of household budgets; the particular circumstances of 1978 that caused herders to substantially increase offtake rates will be discussed in Section 3 of this paper dealing with the terms of trade for pastoral products.

As far as the latter is concerned, the long term effects of droughts on pastoral herds have been simulated by Dahl and Hjort (1976). Apart from the immediate reduction of herd sizes after a disaster, they show how the number of female animals continues to fluctuate for many years, affecting herd reproduction and milk production. As the younger elements of the herd suffer major losses during drought, the number of older animals available to a herder five years after the drought is considerably reduced. A reduction in the number of calves born during the drought will reduce the proportion of reproducing cows four years later, which in turn affects the number of animals born.

Thus, given the general reduction in herd size as a result of the drought, and the diminished numbers of animals that in more normal times are the preferred sale animals (cull cows, sterile heifers, and non-breeding males), many herders have been forced to turn to the productive elements in their herds to meet their subsistence needs. It is not difficult to see how the sale of productive females can throw the post-drought pastoral economy into a downward spiral of disinvestment. To buy food that their drought-reduced herds cannot provide, herders are forced to further reduce their herds through sales, which in turn decreases the milk contribution to subsistence while further pushing up the grain requirements of the household unit. The vicious cycle is thus set into motion.

The forced commercialization of a large number of cows and heifers by Wo'daa'be nomads in 1977-78 is a survival reaction created by necessity and scarcity, and, aside from the increased uncertainty that it has already created in securing a pastoral livelihood, will obviously have a negative impact on the long term productivity of nomadic herds.

SECTION III

The Terms of Trade for Pastoral Products

The previous discussion of household budgets has pointed to the fact that the Wo'daa'be are increasingly relying on the marketplace for the satisfaction of their subsistence and commodity needs. As their economy thus becomes drawn into the national and international economy, the issue of the terms of trade between pastoral products and other goods becomes central to an understanding of herder subsistence strategies, and, as will be discussed, the impact of drought on those strategies.

Insofar as herders sell their animals in large part to pay for their grain needs, it is obvious that animal and grain prices cannot be considered in isolation. For example, low grain prices relative to animal prices enable herders to obtain much more grain for an animal sold. Herders can then reach their «target incomes» (Swift, 1975:449, 451) through the sale of fewer animals.

Variations in the terms of trade can affect various major features of Fulani pastoral adaptation: for example, the movement in and out of agriculture.[20] Baier (1974:123), in his study of Damagaram trade, describes how cattle-grain price ratios, which were favorable to herders at the turn of this century, were

an important factor that encouraged the northward migration of the FulBe:

> «These semi sedentary FulBe grew some of the grain they required, and they traded animal and animal products for the rest. They also traded for cloth and iron tools, but millet was the principal item in their budgets. When the price ratio of cattle and millet shifted in their favor, they were suddenly able to buy all the millet they needed with less outlay in animals and animal products. Those who once had a partial reliance on farming were no longer under this constraint, and they were free to pursue the kind of nomadic life which most FulBe preferred.»

Thus, offtake rates, the stocking level of the range, and the minimum herd needed for household subsistence are all intricately related to relative prices (or barter rates) between pastoral products and other goods.

One of the widely held beliefs found in the literature is that the terms of trade for pastoral products are not in the favor of pastoralists. The strength and persistence of this belief is surprising in view of the flimsiness of the evidence to support it. The information on terms of trade and relative prices occurs often unsystematically and frequently ambiguously in the literature,[21] especially as regards three important aspects of the issue:

-- What products and exchanges are involved (cattle-grain, camel-grain, milk-grain, cattle-clothing, etc.)?

-- What region is being referred to? The regional dimension can be critical due to often substantial price variation between regions and even markets.[22]

-- To what period in time is the analysis directed? As will shortly be shown, the terms of trade between pastoral and agricultural products can abruptly shift from one year to the next. General statements about these shifts, without specifying the time frame involved, are liable to be misleading.

Relative Price Series

The terms of trade data presented in this section concern the price evolution of pastoral products (cattle, sheep, and goats) in relation to the price evolution of the most important nomad expenditure, millet. The inquiry has been limited, except where noted, to one geographic area -- Tanout Arrondissement -- in an attempt to throw some light on the economic relationship and their evolution over time, between the pastoral and the agricultural economy of a zone that is the home base of an important number of nomadic herders, both Tuareg and Fulani. As the terms of trade can abruptly shift from one year to the next, it is important to examine over as long a period as possible the evolution of the various price ratios. Our analysis examines those years from 1945 to 1978 for which we were able to locate both animal and millet price data.

A Note on the Price Data: Animal price data are relatively abundant and were found in various sources. Animal prices from 1956 on were calculated from the mercuriales section of the monthly reports of the Tanout livestock service. Information on pre 1956 animal prices was found in colonial economic and administrative reports located in the Zinder and Niamey archives.[25]

Regional (i.e., Tanout Arrondissement) price series data for millet is more difficult to find, as grain prices are mentioned considerably less frequently than animal prices in colonial economic reports. Millet prices have been drawn from the monthly and annual reports of the agriculture service, and, for the early years, from archival research. Millet price data have been included only for those years where the month or season have been identified, enabling us to calculate a yearly average.

As the demand for millet is relatively inelastic, prices can vary considerably from year to year based on the year's harvest, the percentage of the harvest that is commercialized, and the resulting interplay of supply and demand forces. There are at least seven periods from 1945-1978 that are remembered as drought years or otherwise bad harvest years, all of which, with the exception of the 1968-69 drought, provoked a sharp upward swing in the millet price[26] (see Table 8).

Terms of trade: Animals for Millet

Although the price data are incomplete (entire years and blocks of years were not found) and subject to all the caution necessary with historical information of this sort, they do reveal some regular features which permit an analysis of broad economic trends. Table 9 and Figure 3 show the quantity of millet in kilograms obtained from the sale of an export bull, a sheep, and a goat for selected year 1945-1978.

A notable feature regarding the terms of trade evolution is the high degree of variation, from year to year, in the quantity of millet received from the animal sales. For cattle, the range is 360 kg (1949) to 1940 kg (1977), with sharp fluctuations occurring every 1 to 3 years. These fluctuations are in great measure dependent on the millet price (i.e., the degree of success of the millet harvest). This can be seen quite clearly by noting that the five major low points on the cattle-millet equivalent graph (Figure 3), which indicate that for those years the terms of trade are in the favor of agricultural and against pastoral products, all occur the year after the «bad harvest years» presented in Table 8. Compounding the precarious situation of herders during these bad harvest (and usually low rainfall) years as a result of the increase in grain prices, is the fact that milk production is lower in a dry year, thus forcing herders to purchase more grain on the market than they would in a more normal year. Thus, an unsuccessful millet harvest, obviously something outside of the control of nomadic herders, profoundly affects herders' commercial decisions by forcing them to sell a relatively greater number of animals in order to meet their grain needs.

A second point concerns the long run terms of trade of cattle for millet during the period 1945-1978. We have estimated the slope of the cattle-millet equivalent curve (Figure 3) for the period considered using the method of least squares,[27] and although the slope is slightly positive over the 33 year period (indicating that the cattle-millet terms of trade are slightly in the favor of herders), the trend is of no practical importance given the abrupt and often considerable yearly fluctuations in the terms of trade relationship.

The great Sahelian drought of 1972-73 offers a clear case study of the impact of drought on terms of trade relationships. During the drought millet prices more than tripled in Tanout markets while animal prices fell, as herders were forced to rapidly destock (through sales and slaughter) if they wanted to

receive anything at all for their dying animals. Herders had to bear the burden of these two price changes, as is evidenced by the difference in the amount of millet obtained from a cattle sale in the year immediately preceding the drought (1971:1480kg of millet) and two years into the drought (1973:420 kg). In fact the millet equivalent obtained during the drought years was even worse for herders than these numbers indicate, as the cattle prices used for these calculations refer to «export bulls», as these are the prices most frequently and reliably noted in the monthly livestock service reports. Most herders in 1973 probably sold a number of different types of cattle in addition to export bulls (if they had any export bulls to sell in the first place). The average price of all the cattle sold by herders in 1973 would thus have been substantially less than the 16300 CFA export bull price used in our calculations. One 1973 source reported that the average price of a bovin in the Zinder market was 6500 CFA, and that it was far from uncommon to find drought affected cattle selling for 1000-2000 CFA during the critical April to June 1973 period.[28]

An extremely important factor in the recovery of the pastoral economy after drought is a shift in the terms of trade in favor of pastoral products (Baier, 1976:6).[29] During the post drought period 1974-1977, the millet equivalent of an export bull increased from 480 kg to 1940 kg (the highest level in the 33 year period treated here) primarily due to the scarcity of animals in the post drought period and their subsequent increase in price. This shift in the terms of trade has enabled herders to sell fewer animals as animal prices increase, and, by thus acting «perversely» in the economic sense of the term, to begin the reconstruction of their herds. However, the quadrupling of cattle prices from 1973 to 1977 has also had the effect of making it very expensive (and in many cases impossible) for herders to buy cattle on the market as part of their herd reconstitution strategies, thus underlining the importance of traditional modes of response to and recovery from drought (investing in small stock, animal gifts and loans, exchange of services and other relationships of reciprocity).

The extraordinary millet price increase of 1978[30] (see Table 10) has brought about the most abrupt fall in the terms of trade for animals in the 33 year period (i.e., the millet equivalent of an export bull fell from 1940 kg in 1977 to 680 kg in 1978). We have already seen, in our discussion of Wo'daa'be household budgets, that a major impact of this fall in the terms of trade for animals was to force herders to increase the number of animals sold in 1978 in order to pay for the increased cost of cereals, and that this resulted in many herders having to invade their productive capital and sell heifers and cows. As might be expected, this increased 1978 offtake has put downward pressure on cattle prices during the same period: according to the Livestock Service statistics, the price of an export bull dropped 21% from 1977 to 1978.[31]

As previously discussed, the 1978 terms of trade shift has been a severe blow to herders who in many ways are still in the early stages of reconstituting their cattle herds as a result of the back to back droughts of 1968-69 and 1972-73. As herders have become increasingly dependent on the market for their basic food requirements, they have, at the same time, become more vulnerable to these unfavorable shifts in the relative prices of pastoral and non-pastoral products. The 1978 situation, however, is only the most recent manifestation of the often large short term fluctuations to which the pastoral economy is subject. In fact, the 1979 terms of trade are expected to swing once again in favor of pastoral products, based on a good 1978 harvest and an effective government price stabilization program.

TABLE 8: Droughts or Otherwise Bad Harvest Years, 1945-78

Year	Description	Millet Price Change
1948-49[a]	Low and irregular rainfall; abrupt ceasing of rain at crucial moment in growing cycle (Rains stopped on Aug. 24, 1949 only to rain one more time on Sept. 3).	+ 57% (1948-50)
1955[b]	Drought, grasshopper damage	NA
1965[c]	Irregular rainfall; cereals production down 20% from 1964 (on national level)	+ 144% (1965-66)
1968-69[d]	Uneven temporal distribution of rains over two year period; high animal mortality	- 4% (1968-69)
1972-73[e]	The Great Sahelian Drought. 1973 Tanout millet harvest less than 1/3 of 1971 harvest (6000 tons compared to 21000 tons)	+ 56% (1972-74)
1975[f]	Poor rains in Zinder Departement although Niger rains generally good. Tanout millet production down 48% from 1974.	+ 45% (1975-76)
1977[g]	Short rainy season, severe grasshopper attacks. ineffective government price stabilization program, suppression of head tax.	+ 124% (1977-78)

Sources: Interviews with peasants and herders, archival research, selected government documents.

a - Zinder archives,"Rapport Annuel d'Ensemble-Rapport Economique," Colonie du Niger, Cercle de Zinder, 1949.

b - This drought, and all others listed here, is mentioned in A. Sidikou (1977:11). We were not able to find the Tanout millet price for 1955.

c - See Service de l'Agriculture, Rapport Annuel, Tome II, 1968.

d - The 1968-69 drought had a very uneven impact on millet prices in the different regions of Niger. In Tanout prices held relatively steady, but increased sharply in other regions (+126% in Niamey, +44% in Tahoua from 1969-1970). Niamey data from Service de la Statistique, Bulletin de Statistique, Nos. 45, 49. Tahoua data from SEDES (1976:354).

e - Service Départemental du Plan - Zinder (1978:57)

f - Ibid.

g - In 1978 OPVN, the government grain monopoly, was able to purchase, as part of their price stabilization program, only 500 MT of millet (1% of their goal), primarily due to an official buying price in no way competitive with prices in the local markets.

TABLE 9: The Millet Equivalent of Cattle, Sheep, and Goats: Selected Years 1945-1978, Tanout Markets

Year	Price of Millet (CFA/Kg)	Animal Prices (CFA)[a]			Millet Equivalent (Kg) of:		
		Cattle	Sheep	Goats	Cattle	Sheep	Goats
1945	1.2	1600	140	100	1330	120	80
1947	2.4	3500	360	250	1460	150	100
1948[b]	7.2	3700	580	380	510	80	50
1949[b]	11.8	4300			360		
1950		3500	520	260			
1951	6.5	5900	820	440	910	130	70
1952	8.0	8500	1640	1150	1060	205	140
1956	10.0	5700	800	500	570	80	50
1957	14.0	9800			700		
1959	14.0	11000	1100	1080	790	80	80
1960	6.5	10400	1940	850	1600	300	130
1961	9.0	13800			1530		
1962	7.5	14000			1870		
1963	10.5	11500			1100		
1964		12300	2090	710			
1965	9.0	13200	2750	780	1470	310	90
1966	22.0	14300			650		
1967	19.0	13800			730		
1968	13.5	8700	2090	710	640	150	50
1969	13.0	9600	1530	770	740	120	60
1970	10.0	14500	1400	820	1450	140	80
1971	11.0	16300	2700	1220	1480	250	110
1972	24.0	19000	3330	1230	790	140	50
1973	39.0	16300	3160	1260	420	80	30
1974	37.5	18100	4020	1500	480	110	40
1975	23.5	37100	6480	2530	1580	280	110
1976	34.0	58100	7800	4000	1710	230	120
1977	34.0	66000	8400	4170	1940	250	120
1978	76.0	51900	8160	4490	680	110	60
				Average	1055	165	80

NOTES:

a) Categories of animals are boeuf gras, bélier, and bouc from the Mercuriales section of the monthly livestock reports from Tanout Arrondissement.

b) data from Zinder market

SOURCES:

Rapports mensuels, Service de l'Elevage
Rapports mensuels, Service de l'Agriculture
Rapports annuels, Service de l'Agriculture
Zinder and Niamey archives

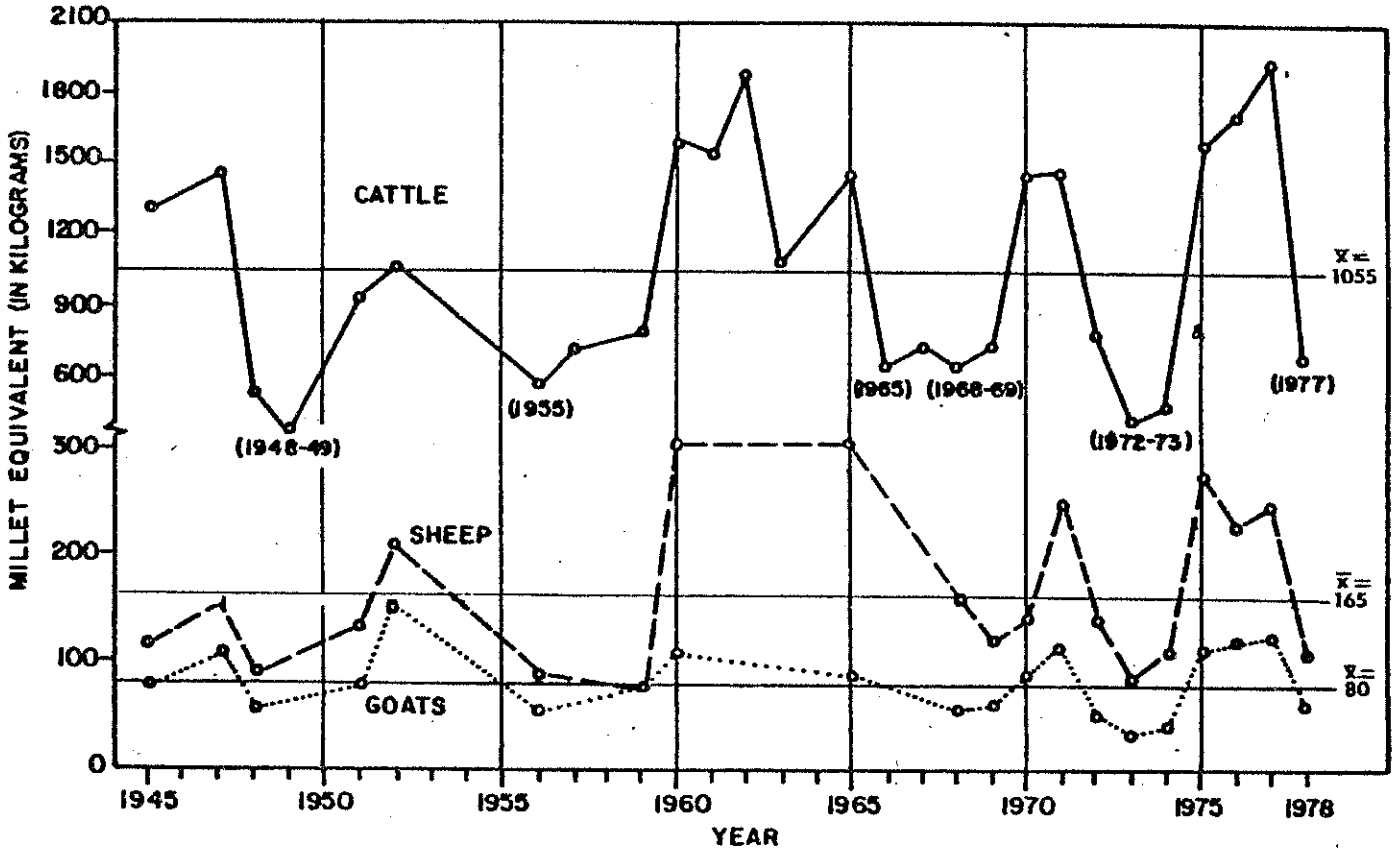


FIGURE 3 : Terms of Trade of Animals for Millet (Dates in parentheses indicate the impact of bad harvest years)

TABLE 10: Millet Price per Kilogram, 1973-78, Tanout Markets

unit=CFA

	1973[a]	1974	1975	1976	1977	1978
January	26			28	30	60
February	29			31	29	74
March	34			34	30	77
April	34				35	90
May	45			38	34	85
June	41			38	33	93
July	56	63	30	45	36	108
August	49			39	43	99
September	42			39	46	82
October	22		17	25	25	56
November	25			25	30	41
December	28	12			40	43
Average	36	37.5	23.5	34	34	76

NOTES:

a) Millet prices for 1973 are lower than those used for terms of trade calculations (Table 9) as the 1973 monthly data in this table are from the southern markets of Tanout Arrondissement, where prices are generally 5-15% less than the northern markets of the Arrondissement frequented by herders.

SOURCES:

1973: Bakin Birji market. Rapports Mensuels du Service de l'Agriculture, Département de Zinder.

1974-1975: Minima/maxima figures from Rapports Annuels du Service de l'Agriculture, 1974, 1975.

1976-July 1977: Rapports Mensuels du Service de l'Agriculture, Département de Zinder.

August 1977 to August 1978: semi-monthly market price survey conducted by author in Sabonkafi market, approximately 35 km south of Tanout.

Sept. 1978 to Dec. 1978: market price survey, Arid Lands Natural Resource Committee (1979: Appendix 10).

SECTION IV

Terms of Trade and Aggregate Market Activity

Quan (1978:68) has commented, based on his analysis of Karimojong economy, that the point of articulation at which the modern economy in Karamoja and the indigenous economy come closest to forming a single economic system is in the monthly livestock markets. The markets are weekly in Tanout, but the statement is no less relevant to Wo'daa'be economy. The commercial strategies of nomadic herders that emerge under the various terms of trade, circumstances discussed above have important macro level implications, particularly on the aggregate supply of animals that enter into marketing channels.

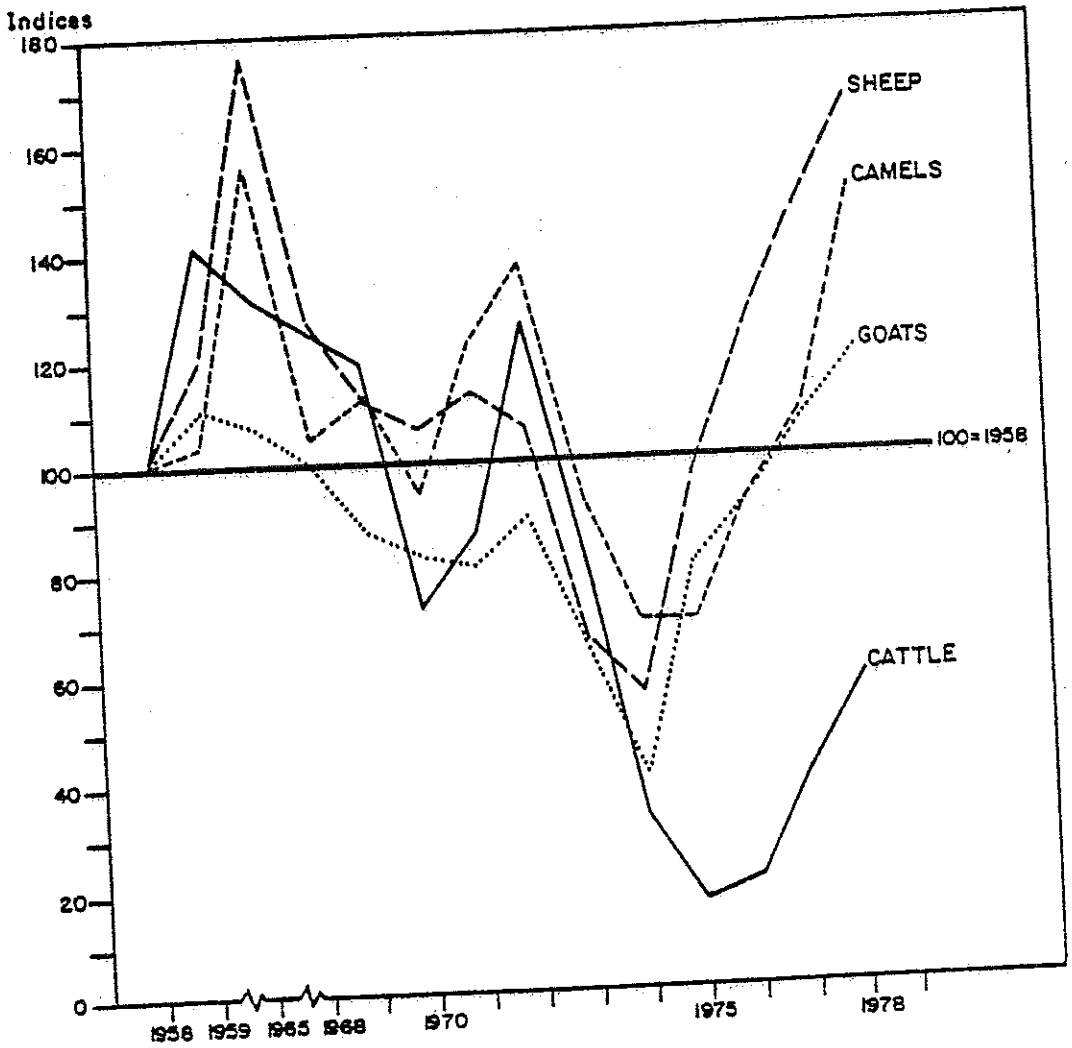
Figure 4 contains yearly indices of the number of cattle, sheep, goats, and camels presented in Tanout's livestock markets from 1958-1978.[32] In spite of the incomplete and rough nature of these data, the various curves give an idea of the impact of bad harvests and drought on the number of animals brought to market, and the extent to which the various herds have been reconstituted following the droughts of 1968-69 and 1972-73. Common to both droughts is a period of elevated commercialization during the drought years themselves, followed by a period of elevated commercialization during the drought years themselves, followed by a period of relatively little commercialization activity, as there are simply fewer animals to sell, probably fewer nomads, and, as previously discussed, the terms of trade swing in favor of pastoral products enabling herders to sell fewer animals to satisfy consumption needs.

By 1977, goats and sheep were being presented in the Tanout markets in numbers exceeding the 1958 figures used as a base for calculation, indicating the rapid recovery of the region's small ruminant herds and their important role in post drought herd reconstitution and commercial strategies. The reconstitution of the cattle herd necessitates withholding productive females from sale, a situation that was possible in the favorable terms of trade environment from 1974 to 1977 but extremely difficult, as we have seen, for many of Tanout's herders following the 1978 shift in the terms of trade against pastoral products.[33]

SUMMARY AND CONCLUSION

Through an analysis of herder household budgets, and their recent (30 year) evolution, we have shown that the Wo'daa'be are dependent for a great and ever increasing amount of their needs on goods that are not produced in the pastoral economy (cereals, clothing, tea and sugar, manufactured goods, craftsman's products, etc.). Whereas in the past herders may have been able to procure these outside necessities primarily through the barter of dairy products, in most areas today, the overwhelming majority of these consumer goods are purchased in the weekly livestock markets with cash from animal sales. Herders have thus become increasingly tied into relations of dependence and reciprocity with the sedentary communities of the area, each needing access to the other's products. As far as the economic structure of the area is concerned, one can thus regard nomadic herders and peasants as participants in a single economic system (Barth 1964:70).

FIGURE 4: Animals Presented in Tanout's Livestock Markets[a] (Index : 1958=100)



a) Markets usually included in Livestock Service reports are Garin Marma, Gourbobo, Gandou, Samia, Belbedji, Bakin Birgi, Guinia, Gagawa, and Tanout.

SOURCE: Rapports mensuels du Service de l'Elevage.

As the pastoral economy thus becomes drawn into an economic system of a much larger scale (the national and international economy) it is evident that factors external to herders -- primarily beef demand and prices, and the success of the millet harvest -- will exercise a great deal of influence on herders' commercial strategies. For example, a major determinant of offtake rates can be explained by the relative prices of pastoral products for other goods. We have shown that the terms of trade of the most important herder-sedentary exchange (cattle for millet) fluctuate within wide margins. When the terms of trade shift to their disadvantage, as they regularly do, herders have little choice but to bring more animals (or more valuable animals) to market, given that such an important part of their life necessities is acquired through commercial transactions. For a pastoral household then, it is necessary to keep a sufficient number of animals not only to provide a regular supply of food and to provide security against droughts and disease, but also to ensure that the household will be able to weather those years when animal offtake rates must be increased as a result of unfavorable shifts in the terms of trade.

The issue of pastoral capital and market transactions has been succinctly summarized by Gunnar Haaland (1977:181):

> «There is however a peculiar feature of pastoral capital which makes this investment different from investment in other economic sectors, namely the fact that a significant fraction of the income derived from this form of capital is capital gains (animals produce animals). While growth in other forms of enterprise depends on increasing involvement in market transactions (selling the products and buying the factors of production), growth in the pastoral enterprise depends on decreasing involvement in market transactions (keeping the sales of productive animals at a minimum)...»

An examination of the commercial transactions of Wo'daa'be herders following the abrupt 1978 shift in the terms of trade against pastoral products suggests that herders in the post drought context are more vulnerable to the vagaries of the market system than in times of larger herd size. Due to the severe reduction in herd size from 1968 to 1973 and the subsequent change in herd structure, many herders in 1978 had no choice but to sell their cows and heifers to meet the increased costs of their consumption needs. Before the recent droughts, these herders (having more animals) would have been in a better position to meet such increased commercial demands on their herds without having to market their productive capital.

Little if any of the cash obtained from these recent animal sales, however, has been invested in any manner as to increase production (such as buying a cow or heifer); instead most of the cash was used to satisfy immediate consumption needs. The 1978 increase in market transactions thus had the aggregate effect of decapitalizing the pastoral economy and transferring that capital to other participants in the market system who profit from more animals entering the marketing circuit (for example, livestock traders and exporters, peasants involved in southern cattle fattening programs, butchers, brokers, urban meat consumers, etc.).[34]

The partial incorporation of Wo'daa'be economy into the capitalist economy has made herders vulnerable to capitalist crises, as an increasing

part of their economic behavior has become mediated by the price system; at the same time this partial incorporation has maintained the herder's vulnerability to pre-capitalist crises (i.e., drought). The 1968-73 droughts accelerated the incorporation process by forcing herders to increasingly substitute grain for the diminished supply of milk. The consequences of this increased economic articulation with the national and international economy are pervasive, structuring, among other things, the commercial strategies and herd reconstruction possibilities of individual nomadic households. One major effect of this increased commercialization of the pastoral economy has been to limit the various strategies open to herders, as factors outside of herder's control gain more and more influence over their livestock production system. It is to the nature of this interaction between the pastoral niche and the expanding national and international economy that we must look for an understanding of many of the factors that will influence the future of pastoralism.

NOTES

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1. Based on the National Census of 1977 (provisional results released in August 1978) the population of Tanout Arrondissement is 144,000 people, of which 19,000 are Tuareg and 12,000 Peul (Service Départemental du Plan, 1978:47). A similar situation of ethnic complexity and ecologic commitment in the Mainé-Soroa region of Niger (about 400 km S.E. of Tanout) has been described by Horowitz (1972;1975).

2. Rainfall data is from Mainguet and Chemin (1979) and the Rapports Annuels du Service de l'Agriculture.

3. See Bernus (1977). A recent study of the Zinder Département, making use of satellite and aerial photos and ground level surveys (Urry et al, 1979) calculated that there were 192 km² of cultivated fields in the Zinder Département north of the legal limit during 1975-76.

4. For historical information on the Peuls of Niger, see Kintz (1977), and Dupire (1962a; 1962c; 1970). Dupire (personal communication, Dec. 1979) claims that as early as 1951 the Wo'daa'be of Riah's Iamidat already constituted a Wo'daa'be subgroup, being more islamized and economically more occidentalized than other Wo'daa'be fractions.

5. We did encounter one old Wo'daa'be who recounted how the year after the drought he tried cultivating a field but that he couldn't convince his sons to continue the following year and he had to abandon the project.

6. Peasants in the northern zones of Tanout Arrondissement do not want their fields manured. The feel that manuring fields can do some good in a good year but can cause outright harm in a low rainfall year («it burns the millet»); the large majority of peasants prefer to avoid the risk. This situation is very different in the regions where average rainfall is greater than 500 mm, as peasants in these regions diligently manure their fields.

7. See Riesman (1977) and Dupire (1962a:2-3).

8. The team first visited the area in May 1977, and made the acquaintance of Riah, the chef du groupement (Lamiido) of the Wo'daa'be who resides in Gourbobo. The goals and particulars of the research were discussed with Riah on several occasions between May and September 1977. Actual field-work took place in September and November of 1977 and April and August of 1978, and was enormously facilitated, if not make possible, by the participation of one of Riah's aides, who served as guide and presented us to the herders in different camps. The team also benefited from the presence of an experienced French-Hausa-Fulfuldé interpreter, a Peul Farfarou who had served as an enumerator in the 1962-1964 SEDES/INSEE study previously mentioned, and who worked, at one time or another, for M. Dupire, N. Echard, and P. Bonte.

9. Government census data on nomadic populations are notoriously underestimated, due to tax evasion. Even if an accurate sampling frame did exist enabling one to randomly select a sample, such a method would be extremely time consuming as one would then have to go find those households thus selected.

10. The government suppression in 1974 of taxes on animals has probably lessened the traditional Wo'daa'be fears on seeing strangers approach. The presence of our guide, a well known and popular Wo'daa'be long associated with the major Fulani chief of the region, we believe also considerably allayed suspicions that our unaccompanied presence surely would have aroused.

11. The head of one of these families was a Fulani chief (Ardo) with a herd of 30 cattle, over 100 small stock, and 13 camels. We visited him on three occasions throughout the survey year, and were able to verify that at the height of the rainy season all meals consisted entirely of fresh and curdled milk.

12. To accurately estimate the quantity of dairy resources seasonally available to the herding unit requires, of course, information on the size, age, and sex structure of the herd. The Wo'daa'be are certainly not atypical among nomadic herdsmen in their unwillingness to talk quantitatively about their animals. In the interest of maintaining as non threatening a presence as possible with our herder informants, no efforts were made to enumerate herds.

13. Two of these 6 large tea consumers were Fulani chiefs (Ardo 'en) whose status calls for certain expenditures on hospitality and general appearance, serving tea being among these.

14. It goes without saying that weddings, births, and other ceremonies can call for often large out-of-the-ordinary clothing expenses. For example, in dancing the gereol mean wear their large long pair of leather breeches, wear fancy shirts, and often carry golf umbrellas.

15. The authors of the SEDES/INSEE study acknowledge that studies, including their own, based on memory recall tend to underestimate small everyday expenses and barter transactions (SEDES/INSEE, 1966:153). However, they also state that given that most large expenses (such as food, clothing,

taxes, and equipment) can only be taken care of through a monetary transaction, and that barter transactions concern only small exchanges of generally less than 50 CFA, their surprisingly low estimate on the total value of barter (13%) is normal.

16. The women questioned in the sample all reported making butter; none however made cheese, and several said that they didn't know how to make it. The cheese available in the region was mostly made by Tuareg and non-Wo'daa'be Fulani women.

17. The SEDES/INSEE study did enumerate earnings from butter and milk sales and barter and found that they represented only 2.7% of total income, and that at 1963 herd sizes.

18. For a description of habba'nai and nanga'nai and other Wo'daa'be relationships of reciprocity, see Dupire (1962b:342-346).

19. We did encounter a few herders who had bartered animals, primarily goats and sheep for millet and other merchandise, but the number of such transactions was quite limited (although probably underestimated). A number of herders told us they prefer to trade only in the markets as they felt that animal and commodity prices were more advantageous than those offered by itinerant bush traders, and that they periodically have to go to the markets anyway.

20. For a description of this pendulum type movement in and out of agriculture, see Dupire (1962c:32-34).

21. For exceptions to his, see Baier (1974; 1976), SEDES (1976), and Swift (1979).

22. Some examples of the extent and magnitude of spatial price variation in Niger can be found in SEDES (1977:350-363) and Center for Research Economic Development (1977).

23. Nigerian terms of trade information for years prior to 1945 can be found in Baier (1974; 1976) and SEDES (1977).

24. The Service d'Elevage sends monitors to selected livestock markets of the arrondissement each week to collect data on animal slaughter, prices, and the number of animals presented for sale. The price data collected usually includes minima/maxima figures for various categories of animals (boeuf gras, boeuf 6 ans, taureau, génisse, vache stérile, vache laitière, sheep, goats, etc). For the purposes of our analysis the mean for a boeuf gras, bélier, and bouc was calculated for each month, and then the twelve months averaged. Each yearly figure then is the average of the sales prices of from 40 to 100 animals in that category.

25. Niamey archives price data from Collion (1980).

26. Such price swings are often discernable during the calendar year of the deficit harvest, as October to December prices fall relatively less than in a normal to abundant year. The major price impact of a bad harvest, however, is the following year (from January to the next harvest).

27. The trend line equation is:

$\hat{Y} = 922 + 7x$ where x = no. of years since 1944.
$n = 27$
$r^2 = .02$

28. Service Vétérinaire Département de Zinder, «Rapport Départemental sur la Sécheresse 1972-73» Lettre No. 272/SVD/Z, 22 octobre 1973.

29. Baier, comparing relative prices before and after the Niger drought of 1913, found that by selling desert products herders could obtain from five to twenty times as much millet as they were able to buy before the drought.

30. In July 1978 the millet price soared to 125 FCFA/kg in the Gourbobo market, the most important «nomad» market in Tanout Arrondissement in 1978.

31. Other factors possibly accounting for this fall in the offical «export bull» price are the decreasing age (and therefore price) of cattle presented in the markets and the mediocre dry season pastures of various parts of Zinder Département in 1978.

32. These market data should be treated with caution as the surveyed markets aren't always visited each week and as the markets that are visited can differ from year to year. Furthermore several of the markets surveyed deal predominantly in the sedentary animal trade (only the northern markets being predominantly nomad markets). The cattle count is more accurate than the goat and sheep count as there are fewer cattle to count, they're easier to see, and they usually stay in the market all day long.

33. The 1978 sharp increase in camels brought to market for sale is an indication of the 1978 offtake pressure put on the other major herding group of the region, the Tuareg.

34. For a similar assessment relevant to the Karimojong pastoralists of East Africa see Quam (1978).

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