RIM

LIVESTOCK AND LAND USE

IN

SOUTHERN GONGOLA STATE, NIGERIA

Final Report, Volume III: Appendices

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IN MEMORIAM

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TABLE OF CONTENTS

APPENDIX I: METHODS 4

1.1 Aerial Survey Methods 4
1.1.1 General Technique 4
1.1.2 Evaluation of Accuracy of Aerial Counts 5
1.1.3 Calculation of the Vegetation and Land Suitability Indices 6
1.1.4 Calculation of Goat Numbers 6

1.2 Ground Survey Methods 7
1.2.1 Cattle Production: Quantitative Studies 7
1.2.2 Sociological Methods 8

1.3 Computer Analysis and Mapping 12

APPENDIX II : TABLES 13

2.1 Stratification Tables 14

2.2 LECs net benefit analyses 41

APPENDIX III : CATTLE DISEASE 46

APPENDIX IV : ITINERARY OF GROUND SURVEY TEAM 48

APPENDIX V : FULBE GROUPS ENCOUNTERED 67

APPENDIX VI: ADDITIONAL MAPS 77

I. AGRICULTURAL TRADE ROUTES: ARABLE PRODUCE AND FISH

II. EARLY COLONIAL TRADE-ROUTES

III. EXPANSION OF TIV FARMERS

IV. VEGETATION DENSITY INDEX

V. EROSION

VI. WHITE CATTLE: WET SEASON 1983

VII. WHITE CATTLE: DRY SEASON 1984

VIII. RED CATTLE: WET SEASON 1983

IX. RED CATTLE: DRY SEASON 1984

BIBLIOGRAPHY

TABLES IN APPENDICES

		On or Following Page Nos.
1.	Parameters measured by Aerial survey	4
2.	Livestock Populations Assuming Undercounting	5
3A,B.	Wet and Dry Season Cattle Populations in Principal Land Systems	14
4A,B.	Wet and Dry Season Cattle Populations in Regional Land Systems	16
5A,B.	Wet and Dry Season Cattle Populations by Vegetation and Land Use Types	18
6A,B.	Wet and Dry Season Cattle Populations by Altitude	20
7A,B.	Wet and Dry Season Cattle Populations by River Catchments	22
8A,B.	Wet and Dry Season Cattle Populations by LGAs	24
9A,B.	Wet and Dry Season Cattle Populations in relation to Roads	26
10A,B.	Wet and Dry Season Cattle Populations in relation to Towns	28
11A,B.	Wet and Dry Season Cattle Populations in relation to Major Rivers	30
12.	Goat Numbers and Densities in relation to Roads, Towns and Rivers	32
13.	Goat Numbers and Densities in relation to Altitude	33
14.	Goat Numbers and Densities by LGAs	34
15.	Goat Numbers and Densities by Land Systems	35
16.	Goat Numbers and Densities by Regional Land Systems	36
17.	Goat Numbers and Densities in relation to Vegetation and Land Use	37
18.	Livestock Density in Relation to Vegetation	38
19.	Livestock Density in Relation to Cultivation	39
20.	Livestock Density in Relation to Land Suitability	40
21A,B.	Costs and Capacities of LEC modules	41
22.	Settled Pastoralist Model: Operating Costs	43
23.	Mixed Farmer Model: Operating Costs	44
24.	Smallholder Fattening Scheme: Operating Costs	45
25.	Pastoralist Conceptions of Disease	47

Introduction to Appendices

The appendices present data, generally relevant, but either too bulky or too specialised for the Main Report (Volume II). Appendix I deals with the techniques of data collection for the aerial survey, the animal production study and the sociological work. Appendices II and VI contain additional Tables and Maps. Appendix III is a guide for development workers and animal production researchers to the identification of cattle diseases through the use of local names. The purpose of Appendices IV and V is to assist development workers in making contact with the principal pastoralists in the Toungo Block, the FulBe. Appendix IV lists the entire itinerary of the ground survey, including both government officials, traditional rulers, and the leaders of the FulBe, the ArDos. ArDos usually have authority over a specific clan, rather than a geographically defined group. Appendix V is an outline of the elaborate clan divisions of the FulBe in southern Gongola State. In some cases, for example among the WoDaaBe and Bokolooji, these clans have a specific mode of production, in other cases the divisions are merely social. However, to communicate to a broad spectrum of the pastoral population, clans form part of an essential information network.

ACRONYMS

ILCA. International Livestock Centre for Africa

LEC. Livestock Extension Centre

LGA. Local Government Area

NLPU. National Livestock Production Unit

UTM. Universal Transverse Mercator

APPENDIX I

METHODS

1.1 Aerial Survey Methods

1.1.1 General Technique

The air survey technique followed standard procedures for livestock and land use assessment described by Norton-Grifiths (1978); Milligan et al. (1979); and Milligan and de Leeuw (1983). Conceptually, the survey zone was divided into a regular 5 x 5 kilometer UTM sampling grid, with a total of 1,755 constituent cells. This grid pattern then formed the basis for a systematic pattern of low level aerial sampling by a team of experienced observers, flying in a light aircraft along the centre line of each cell.

This sampling strategy, based upon a systematic unstratified flight pattern, was considered more valuable than a random stratified pattern for two main reasons. Firstly, because each part of the survey area is covered uniformly; the data collected is immediately mappable and relatively easy to interpret; and the presentation and analysis of overall distribution patterns was considered to be of primary importance. Secondly, after the survey, the data could be analysed and stratified in a wide range of different categories or strata, for example: land regions; vegetation types; catchment zones; administrative areas; or strata identified as relevant after the survey was completed. Such flexibility in analysis and interpretation would have been greatly reduced if the sample design had been locked into a specific predetermined type of stratifiction.

The four man aircraft survey team consisted of the pilot; two observers seated behind the pilot, each responsible for recording livestock and human habitation seen to the left or right of the aircraft; and a front seat observer who navigated and recorded land use, vegetation and environmental conditions. Table 1 presents a list of all parameters recorded.

The ground area sampled was restricted to two strips, one on each side of the aircraft, which were demarcated by an externally mounted, adjustable viewing frame. The spacing of these viewing frames was set to give a total ground strip width of 710 meters in the wet season, and 515 meters in the dry season, when flying at a height of 700 feet (213 meters) above ground level. The ground sample strip width depended on the actual flying height. This was monitored by radar altimeter, and any deviations from the desired altitude recorded so that appropriate corrections could be made to the data collected. The overall sampling intensity was 14.2% of the land area in the wet season, and 10.3% in the dry.

This ratio estimate assumes that the larger the sample unit (line of grids), the more reliable the figures obtained from it. The calculation thus weights the overall variance in favour of longer flight lines, by

taking into account the co-variance between the individual sample areas and the animals counted in them. Estimates of the cattle population and the number of grazing units within the survey zone were computed using these formulae;

Population Total: $Y = Z \cdot R$

Population Variance: $Var(Y) = \frac{N(N-n)}{n} \cdot (s_y^2 - 2.Rs_{yz} + R^2 \cdot s_z^2)$

Where

N = the potential number of sample units in the survey region.
n = the actual number of sample units surveyed.
Z = the area of the survey zone.
z = the area of any one sample unit.
Y = the number of animals counted in that unit.
R = the ratio of the animals counted to the area searched.

and

s_y^2 the variance of the animals counted between the sample units.

s_z^2 the variance of the sampled area between sampled units.

s_{yz} the covariance between counts and areas of each unit.

1.1.2 Evaluation of the Accuracy of Aerial Counts

The validity of aerial counts of livestock in regions of dense vegetation has always been the subject of debate. To assess the accuracy of the figures presented in this report the overall populations figures for cattle and goats were recalculated building in assumptions as to degrees of undercounting in densely forested land.

The grid squares with dense cover were those identified with a vegetation density score of >300 (Appendix Map IV). representing the interface between open canopy and savannah woodland. Table 2 shows the amounts by which cattle populations should be revised upwards assuming that various proportions of those observed were missed because of the tree-cover. If half the population were missed the cattle totals would rise by only 1%, whereas if 90% were missed, which is almost inconceivable, overall figures would only constitute an underestimate of 10%. The calculations thus indicate that the results of the surveys, which were undertaken by experienced observers, show that dense vegetation affected only marginally the cattle population figures.

Table 2 also shows the necessary revisions if cattle were undercounted in heavily dissected land. The degree of error is likely to be less than in canopy forest because dissection per se does little to obscure

TABLE 1. PARAMETERS ESTIMATED FROM THE AIR.

WITHIN THE SAMPLE BAND	
NUMBERS	
Animals	Red Cattle, White cattle, Pastoralist Sheep, Horses and Donkeys, Wild animals
Habitations and Settlements	Arable, Agropastoral, Settled/Transhumant Pastoralist, Settled/transhumant Pastoralist with associated crops, Nomadic Pastoralist, Fishermen's Tin and Grass roofs
Other	Deserted Coraals, Tar Roads, All Weather Roads, Tracks Deserted settlements and Habitations, Rivers and Open Water
WITHIN EACH GRID	
	Presence/absence of open water, % Cultivation, % Burned Ground, Gully and Sheet Erosion (each 0-5) % Closed Canopy Forest, % Open Canopy Woodland, % Savanna Woodland, % Grassland, Flying altitude, Grass cover (0-5)

Table 2. ESTIMATED CATTLE POPULATIONS IN SOUTHERN GONGOLA STATE ASSUMING DIFFERENT LEVELS OF UNDERCOUNTING DUE TO LAND DISSECTION AND THICK VEGETATION COVER. (Percentage increase over actual estimate in brackets).

		Season	
		Wet	Dry
Actual Estimate		686,700	596,700
Proportion observed	Land Type		
0.5	Dense Cover*	692,563 (0.9)	601,616 (0.8)
0.25	"	698,426 (1.7)	606,532 (1.7)
0.1	"	745,330 (8.5)	645,860 (8.2)
0.5	Dissected**	750,908 (9.3)	617,524 (3.5)
0.25	"	815,116 (18.7)	638,348 (7.0)
0.1	"	1,328,780 (93.5)	804,940 (34.9)

* Dense cover taken as areas with vegetation density index 300.

** Dissected land identified from Bawden and Tuley (1966).

cattle. Indeed, the opposite may be true, as deviations from the horizontal can act to increase the effective sample strip width and thus the linear dimensions of the area passing through the sample band.

1.1.3 Calculation of Vegetation Index and Suitability Index

The indices were designed to provide estimates of overall vegetation density and suitability of land for cattle for each individual grid cell, for rapid comparison with actual cattle distributions.

For each 5 x 5 kilometre square, the front seat observer recorded the percentage of forest, open canopy woodland, woodland savanna and grassland. The back seat observers provided distribution maps and from these the distance from each grid centre from open (dry season) water was estimated and the density of arable dwellings calculated. From existing cartographic information each cell was categorised as to the degree of dissection and whether it was located within the boundaries of a Game Reserve.

To calculate the vegetation density index the recorded proportions of each vegetation type were multiplied by 500, 333, 167 and 0 for forest, open canopy woodland, savanna woodland and grassland respectively. The resulting figures were then summed for each grid.

To calculate the land suitability index, grids identified as either steeply dissected, within a Game Reserve or further than 15 kilometres (i.e. a day's march) from open dry season water were assigned a value of 500, on the grounds that any of these features would immediately eliminate them as suitable for cattle. The vegetation density score was then added to these grid values and any cell with a value >500 was taken to be unsuitable.

1.1.4 Calculation of Goat Numbers

An estimate of the numbers of goats in the survey zone was calculated as follows; in each inhabited region the principal ethnic group was recorded, and the presence or absence of goats. It was found that all ethnic groups except professional traders and the FulBe wuro kept goats. Local stockowners were then asked to give examples of the numbers of goats kept by individual compounds, and from these an average number of goats per compound was calculated. The dwellings counted by the aerial survey (Map 16) were then divided by 6.5 to give the number of compounds; on the gridded map certain squares were defined as inhabited by a specific ethnic group. The number of compounds for each group could then be calculated, and this number multiplied by the average figure of goats per compound.

The assumption on which this calculation is based, that goat populations did not vary with the season, was amply confirmed by the groundwork. None of the nomadic or transhumant FulBe keep goats at all, and peoples such as the Samba and Mambila, who keep both goats and cattle, do not move their goats long distances from their permanent homestead. The

reliability of these estimates could be improved by more detailed groundwork that concentrated on censuses of compounds. This would produce more geographically specific figures for the numbers of dwellings per compound and average goats per compound. The method could be applied to other types of livestock if certain conditions are met. In the case of pigs, kept only by specific ethnic groups, their housetype has to be clearly distinguishable from the air. Sheep proved impossible to estimate in the same way, in the Toungo Block, since, with the exception of the grasslands, it is a marginal area for sheep. As a result, management patterns even within small geographical areas are too inconsistent to be subjected to statistical treatment. In the arid zone, where there is both greater ethnic homogeneity and uniformity of housetype, a similar method might be applied with more success.

1.2 Ground Survey Methods

1.2.1 Cattle Production: Quantitative Studies

Cattle-owners were contacted with the assistance of Gongola State Veterinary Officials, who also acted as interpreters. When owners were previously known to officials their herds could be examined by appointment, but to obtain a more representative sample, the examination of herds in more remote areas was left to chance encounters. Interviews were conducted in the early morning or late evening, so that the cattle would be corraled in one place. The herder and herd-owner were usually present, so that their joint views could be recorded.

In the Ganye Region twenty-eight herds were studied, on the Mambila Plateau, thirty. Herds were selected to reflect the variety and distribution of local production systems in each area. A total of 565 cows of breeding age were examined -between 8 and 18 animals were chosen at random in each herd by the investigator. The stockowners were questioned individually on the age of each cow and the sex, age and fate of her offspring. Offspring that had remained in the herd were subsequently examined. If offspring had died, the herder's or owner's diagnosis of the cause of death, and their age was recorded. If offspring had been sold, their age at the time of sale and reason for selling was recorded.

The overall age-sex distribution of the herds was recorded, and animals were assigned classes of 0-1, 1-2, 2-3 and over 3 years old. Moreover, adult males were divided into breeding bulls and castrates. The owners were also asked to estimate the numbers of pregnant cows in the herd and the numbers of females estimated as past reproductive age. Apart from this, details of deaths, sales and purchases over the preceding twelve months. Transhumance patterns, purchase and storage of dry season supplementary feeds and vaccination and additional livestock were also recorded. Calves attached to the **danngol**, calf-rope, were examined individually, age and sex were recorded to establish birth seasonality.

1.2.2 Sociological Methods

The researchers first introduced themselves to to the relevant authorities within the study areas, explained the purpose of the study, and gained permission for further work. A series of group interviews were then conducted through the medium of Village Heads in market towns. Local government and private individuals were interviewed separately, in order to construct a rounded picture of the production system and its problems.

a) Interpretation. In southern Adamawa, the principal languages spoken by cattle-rearers are Fulfulde, Hausa, Samba and Mambila. Fulfulde is used as a lingua franca throughout most of this part of southeastern Gongola State, and was usually satisfactory in communicating with stock-rearers. Farmers and local government officials were more likely to be familiar with Hausa and English, and interviews were therefore conducted in these languages.

The interpreters were Mr. Mohamed Settima and Mallam Babuwa Tubra, who are officers of the Federal Department of Pest Control Services. Both are fluent in Fulfulde, Hausa and English, and moreover, have worked and travelled widely in the study area. In view of this, no major problems were experienced with translation during the course of the study.

b) Recording the Interviews. Notes were made at the time of the interviews. All public discussions were also recorded with a stereo tape-recorder, with microphones oriented so that both questions and audience responses were clearly audible. The recordings were later used to check points of detail where notes on the interview were unclear or incomplete. These tapes are lodged in the **RIM** Archive, and copies can be made available to NLPU on request.

c) Bias in Interview Samples. A major problem in collecting the interview material on stock-raising was the relative articulacy of certain sectors of society. Men were consistently more articulate than women, and within the context of male/female relations in FulBe culture, women are unlikely to make their case strongly to male interviewers. Women's views are nevertheless important, both because they are in charge of most aspects of dairying, and because some are substantial stock-owners in their own right. Some attempt to counteract this bias was made in the dry season ground survey by seeking out female informants, in particular to discuss the history of dairy prices.

Apart from sexual divisions, another major source of bias is ethnic divisions. Meetings held for stock-rearers in the Ganye region were usually attended by FulBe, and only occasionally by Samba men, unless we requested the Village Head to specifically send for individual Samba stock-rearers. Even when Samba attended meetings, they tended to remain at the back. It was partly possible to counteract this by holding individual interviews, but Samba opinion probably remains under-represented in our present data.

In the Mambila region the problem was somewhat different. Mutual antagonism between FulBe and Mambila stock-rearers is so intense that it was rarely possible to hold joint meetings. Participants usually consisted of one group or another and it was thus possible for the expression of intemperate opinions. A less balanced picture may have been obtained in consequence.

Another element of bias is introduced by the operation of the traditional status system. Samba, Mambila and settled FulBe publicly defer to their traditional rulers, and for an ordinary individual to disagree openly with someone more senior than himself is difficult, whatever his private opinion. This does not hold for the nomadic FulBe, whose leaders, the Ardos, are elected and may be deposed by popular vote. As an example of the significance of this type of bias, it was generally found that elder or richer stock-owners would tend to over-estimate the size of the average herd, giving a figure of 500, when interviews with individual pastoralists gave a result of slightly more than 200 (Text Table 12). Equally, they might assume a facility with legal and official procedures not borne out in reality for the majority of herders. Individual interviews can act as a counterweight to this, although a stratified sampling of interviews was impractical within the time constraints of the present study. The correspondences between the results of the two independently conducted ground surveys (see Section IV) argue that the figures are reliable.

Pastoralists and arable farmers were interviewed according to the system outlined in Section 5.5. Cattle-owners were asked to suggest spontaneously the problems they experienced with livestock development. They raised a total of fourteen problems, although no more than eleven were brought up at any individual meeting. In order to assess their overall significance, both throughout the whole survey zone and in the Development Regions, interviews were 'scored', so that eleven points were given to the first choice, ten to the the second etc. This allows variations in the absolute numbers of problems raised to be directly compared. Text Table 20 collates the figures 'unweighted', that is, giving each interview equal status, not taking into account the numbers present. Text Table 21 shows weighted results; that is, multiplying the number of those present at each interview by the scores for their preferences; -a very similar ranking of preferences is obtained.

A defect of this method is that it assumes a homogeneity of opinion in a given interview location. To assess the degree of dissent on the significance of various problems, non-senior pastoralists were regularly asked spontaneously for their views, rather than relying on the ArDo or other spokesmen. As regards the problems of livestock, individual opinion was rarely found to be out of line with those of the senior FulBe, largely because they have the position they do only because they have been found to represent the opinions of their people accurately.

Two subjects regularly appeared as a source of disagreement between

herders; the qualities and advantages of different breeds of cattle and the authority of the ArDos. Although of general interest, neither of these are within the province of a livestock agency.

The different numbers of problems raised by the cattle-owners interviewed,make some suggestive points about the relation of various groups to state and Federal Agencies. Text Table 22 shows the numbers of problems raised by the categories of pastoralist, and the numbers raised by those in towns as opposed to rural locations. Several conclusions can be drawn from these figures. First, that pastoralists operating from larger towns are more aware of the inputs that might be available to them from livestock agencies and are thus more articulate about their problems in the hope that some solution will be available. This correlates with the distinction between the FulBe na'i and the FulBe wuro. The sedentary groups tend to be more aware of the nature and power of government. The nomads,and those who are isolated from government have very little knowledge of its working and thus were less articulate about development problems. For example, when FulBe na'i were asked about credit terms, their suggestions essentially amounted to the proposal that the government make them a free gift of large sums of money.

After ranking their problems, cattle-owners were asked to say what they would like to see done and rank possible interventions in order of importance. Their responses were evaluated in the same way as the problems; fifteen ideas were put forward, but only 10 in any one location. Although some of their suggestions have been used as the basis for recommendations in this report, the common tenor of them, to the effect that the government should provide services for them without any corresponding outlay from them has been modified.

Arable farming communities could not be interviewed at the same sampling intensity as pastoralists within the constraints of groundwork. Apart from general background, farming communities were interviewed to find out the types and numbers of small livestock kept by them, and their relations with pastoralists. They were first asked about their relations with the FulBe, and whether they would respond positively to development inputs, such as tsetse spraying that would act to increase the number of FulBe in their area. If their attitude to the FulBe was positive then they were asked to rank the advantages they gained from their presence. Text Table 25 sets out these, assessed in same way as before. Arable farmers were also asked about the problems they experienced with small livestock. These problems were always exclusively veterinary, so further analysis of their responses was not performed, as the proposed solution was inevitably ready availability of drugs.

Livestock prices were collected systematically during groundwork in the 1984 dry season; data from the Ganye region is necessarily defective because of the constraints of time making it impossible to revisit interview sites in 1983. Two sources were used, the 'Sarkin Tike' or locally appointed chief of the market, and the sellers, that is the pastoralists themselves. Cattle-traders were not consulted, as it was

generally felt they would underestimate prices in order to minimize the appearance of making a profit. Pastoralists were normally asked to give concrete examples of recent sales in order to substantiate their statements about prices. Where it was possible to cross-check their statements, they were usually found to be accurate.

Prices in the Ganye and Benue Lowlands Regions were said to be 'normal', in the sense that rinderpest had run its course. However, there is no doubt that the stock losses incurred through rinderpest had raised the overall level of prices to above that of recent years. On Mambila, where rinderpest was only tailing off as the ground survey began in 1984, prices had to be obtained informally from the cattle-owners, as the official livestock markets were closed. However, prices should be regarded as uncharacteristically high.

1.3 Computer Analysis and Mapping.

A large quantity of raw aerial survey data, from grid survey and other sources, was thoroughly checked and corrected before generating a basic data set used to derive a substantial part of the analysis. The data set created was a matrix of values, each row representing a grid cell and each column a variable measurement for that cell; e.g. simple counts of livestock numbers, environmental conditions, or other key indicators. The data matrix for the dry season contained over 40 basic variables, and over 70,000 data items.

Several distinct types of data analysis were performed:

1. Sorting, recoding, derivation of new variables;

2. Statistical summaries, histograms and tables;

3. Calculation of population estimates and standard errors;

4. Conditional selection of subsets of grids;

5. Mapping of presence/absence indicators, or density measurements.

Data handling and analysis were performed on a VAX 11-750 system and graphic displays were produced on a HP 7221 flat-bed plotter. Three closely related but distinct software packages were used concurrently:

1. A purpose built programme for population and variance estimation using the Jolly ratio and incorporating other statistical methods;

2. The Mapics* data handling and graphics system to provide the data manipulation, selection and mapping facilities, including the proportional symbolism form of point-mapping technique widely used in this report;

3. The Minitab** software package for statistical summaries and tabulations.

   These packages are designed to be used interactively and communication between them is by means of compatible data files. Work is in progress to create a single integrated system to meet the requirements generated by this study.

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* Mapics Reference Manual (Version 2.2), Mapics Limited, (1984), London.

** Minitab Reference Manual, (1982). Minitab Project. Pennsylvania State University, Pennsylvania, USA.

APPENDIX II

TABLES

TABLE 3A: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL LAND SYSTEMS** OF SOUTHERN GONGOLA STATE.

Land Systems	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE*** Total Number	RED CATTLE*** Density /sq.km.	RED CATTLE*** GU Number	RED CATTLE*** GU Size	WHITE CATTLE*** Total Number	WHITE CATTLE*** Density /sq.km.	WHITE CATTLE*** GU Number	WHITE CATTLE*** GU Size
4 Mambila Plateau	625	62,400	99.8	1,500	42	49,000 (19)	79.8	1,200 (16)	42	12,500 (26)	20.1	300 (29)	42
5 Mambila Highland	1,425	152,400	106.9	3,900	39	134,700 (5)	94.5	3,500 (5)	38	17,700 (24)	12.4	400 (19)	44
7 Upper Donga Valley	650	50,700	78.0	1,400	36	46,000 (12)	70.8	1,300 (11)	35	4,700 (51)	7.2	100 (46)	47
8 Rugged Highland	525	4,600	8.8	140	33	1,600 (55)	3.1	60 (46)	27	3,000 (56)	5.8	80 (36)	38
9 Diss'd Rug'd High.	1,100	39,000	35.5	900	43	16,900 (32)	15.4	300 (30)	56	22,100 (18)	20.1	600 (21)	37
13 Suntai Highland	850	800	0.9	20	40	0	0	0	0	800 (64)	1.0	20 (57)	40
14 Taraba Highland	925	5,100	5.5	110	46	4,200 (62)	4.6	50 (63)	84	900 (90)	0.9	60 (89)	15
15 Dissected Escarp.	3,050	35,100	11.5	990	35	14,200 (32)	4.7	400 (37)	36	20,900 (33)	6.8	590 (28)	35
16 Dissected F/hills	6,275	16,000	4.9	420	38	1,500 (47)	0.2	50 (49)	30	14,500 (31)	2.3	370 (35)	39
17 Donga Foothills	525	200	0.4	10	20	0	0	0	0	200 (84)	0.4	10 (79)	20
19 Elevated Plains	2,250	300	0.1	20	15	0	0	0	0	300 (70)	0.1	20 (71)	15
20 Toungo Plain	1,250	6,900	5.6	210	33	1,100 (51)	0.9	30 (50)	37	5,800 (36)	4.7	180 (60)	31
23 Ini Plain	1,300	29,800	22.9	1,200	25	7,900 (25)	6.1	500 (42)	16	21,900 (14)	16.8	700 (13)	31
24 Taraba Valley	2,550	900	0.4	20	45	0	0	0	0	900 (93)	0.4	20 (90)	45
25 Benue B't Plain	11,175	123,500	11.1	1,600	77	28,700 (22)	2.6	500 (22)	57	94,800 (16)	8.4	1,100 (13)	86
26 Donga Valley	1,100	11,000	10.0	210	55	2,700 (57)	2.5	60 (67)	45	8,300 (65)	7.5	150 (58)	55
29 Benue S'st Plain	4,600	100,600	21.9	1,280	79	8,400 (32)	1.8	180 (31)	47	92,200 (16)	20.1	1,100 (14)	84
30 Benue Fl'd Plain	2,625	33,300	12.7	310	107	800 (65)	0.3	10 (57)	80	32,500 (37)	12.4	300 (33)	108

* Figures in parenthesis are % standard error.
** Bawden and Tuley (1966).

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 3B: DRY SEASON CATTLE POPULATIONS* IN THE PRINCIPAL LAND SYSTEMS** OF SOUTHERN GONGOLA STATE.

Land Systems	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE*** Total Number	RED CATTLE*** Density /sq.km.	RED CATTLE*** GU Number	RED CATTLE*** GU Size	WHITE CATTLE*** Total Number	WHITE CATTLE*** Density /sq.km.	WHITE CATTLE*** GU Number	WHITE CATTLE*** GU Size
4 Mambila Plateau	625	37,900	60.6	1,030	37	32,700 (23)	52.3	880 (13)	37	5,200 (44)	8.4	150 (40)	35
5 Mambila Highland	1,425	84,500	59.3	2,740	31	72,900 (10)	51.2	2,370 (10)	31	11,600 (29)	8.2	370 (28)	31
7 Upper Donga Valley	650	25,800	39.7	970	27	23,700 (19)	36.5	890 (10)	27	2,100 (48)	3.2	80 (42)	26
8 Rugged Highland	525	4,500	8.6	320	14	2,700 (31)	5.2	120 (28)	23	1,800 (42)	3.4	100 (32)	18
9 Diss'd Rug'd High.	1,100	13,800	12.5	640	22	11,100 (38)	10.1	470 (35)	24	2,700 (33)	2.4	170 (27)	16
13 Suntai Highland	850	5,800	6.8	450	13	300 (44)	0.3	210 (35)	1	5,500 (17)	6.5	240 (21)	23
14 Taraba Highland	925	0	0	0	0	0	0	0	0	0	0	0	0
15 Dissected Escarp.	3,050	13,400	4.4	470	29	9,800 (35)	3.2	340 (32)	29	3,600 (27)	1.2	130 (25)	28
16 Dissected F/hills	6,275	6,250	1.0	760	8	50 (58)	0	5 (58)	10	6,300 (24)	1.0	270 (27)	23
17 Donga Foothills	525	900	1.8	200	5	600 (258)	1.2	180 (27)	3	300 (94)	0.5	20 (94)	15
19 Elevated Plains	2,250	1,900	0.9	60	32	0	0	0	0	1,900 (35)	0.9	60 (37)	32
20 Toungo Plain	1,250	18,300	14.9	390	47	500 (66)	0.4	100 (66)	5	17,800 (17)	14.5	290 (15)	61
23 Ini Plain	1,300	16,700	12.8	500	33	5,800 (35)	4.5	120 (33)	48	10,900 (16)	8.4	380 (14)	29
24 Taraba Valley	2,550	1,900	0.7	80	24	800 (62)	0.3	40 (61)	20	1,100 (74)	0.4	40 (68)	28
25 Benue B't Plain	11,175	110,100	9.9	2,710	41	6,500 (25)	0.6	240 (20)	27	103,600 (17)	9.3	2,470 (12)	42
26 Donga Valley	1,100	2,700	2.5	310	9	800 (60)	1.6	290 (56)	3	900 (68)	0.8	20 (50)	45
29 Benue S'st Plain	4,600	62,600	13.6	1,140	55	3,500 (39)	0.8	100 (36)	35	59,100 (24)	12.8	1,040 (23)	57
30 Benue Fl'd Plain	2,625	184,500	70.3	2,780	66	7,500 (28)	2.8	200 (22)	38	177,800 (11)	67.4	2,580 (11)	69

* Figures in parenthesis are % standard error.
** Bawden and Tuley (1966).

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 4A: WET SEASON CATTLE POPULATION* IN REGIONAL LAND SYSTEMS OF SOUTHERN GONGOLA STATE.

Land Region	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
Mambila Highlands	5,175	310,100	59.9	7,900	39	249,100 (15)	48.1	6,400 (15)	39	61,000 (16)	11.8	1,500 (13)	41
Central Complex	17,700	82,500	4.7	2,200	38	25,700 (22)	1.5	700 (21)	37	56,800 (20)	3.2	1,500 (18)	38
Central Lowlands	15,775	224,100	14.2	3,000	75	37,100 (18)	2.4	700 (18)	53	187,000 (12)	11.9	2,300 (9)	81
Ganye Lowlands	2,600	36,700	14.1	1,390	26	9,000 (28)	3.4	500 (45)	18	27,700 (20)	10.7	890 (37)	31
Benue Floodplains	2,625	33,300	12.7	310	107	800 (65)	0.3	10 (57)	80	32,500 (37)	12.4	300 (38)	108

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 4B: DRY SEASON CATTLE POPULATION* IN REGIONAL LAND SYSTEMS OF SOUTHERN GONGOLA STATE.

Land Region	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
Mambila Highlands	5,175	172,300	33.3	5,900	29	143,400 (15)	27.7	4,800 (14)	30	28,900 (16)	5.6	1,100 (13)	26
Central Complex	17,700	32,300	1.8	1,300	25	16,100 (21)	0.9	600 (21)	29	16,200 (14)	0.9	700 (14)	24
Central Lowlands	15,775	172,700	10.9	3,300	52	10,000 (19)	0.6	300 (16)	30	162,700 (16)	10.3	3,000 (13)	46
Ganye Lowlands	2,600	35,000	13.5	800	44	6,300 (28)	2.4	100 (28)	48	28,700 (11)	11.0	700 (10)	31
Benue Floodplains	2,625	184,500	70.3	2,800	66	7,500 (28)	2.8	200 (22)	37	177,000 (11)	67.4	2,600 (10)	69

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 5A: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL VEGETATION AND LAND USE TYPES IN SOUTHERN GONGOLA STATE.

Vegetation/ Land Use Type	Area sq.km.	ALL CATTLE				RED CATTLE**				WHITE CATTLE**			
		Total Number	Density /sq.km.	GU Number	Mean GU Size	Total Number	Density /sq.km.	GU Number	GU Size	Total Number	Density /sq.km.	GU Number	GU Size
Grassland	9,700	366,600	37.8	9,000	41	263,000 (19)	27.1	6,800 (19)	39	103,600 (15)	10.7	2,200 (13)	47
W-S-G / W** Transition	13,775	142,100	10.3	2,060	69	28,700 (20)	2.1	560 (21)	51	113,400 (15)	8.2	1,500 (12)	76
Woodland	13,425	52,000	3.9	1,170	44	12,600 (41)	0.9	270 (38)	47	39,400 (25)	2.9	900 (22)	44
Forest	1,175	1,500	1.3	20	75	300 (92)	0.3	10 (91)	43	1,200 (90)	1.0	10 (86)	120
30 - 60% Cultivation	5,725	122,800	21.4	3,500	35	16,800 (20)	2.9	700 (40)	24	106,000 (12)	18.5	2,800 (26)	38

* Figures in parenthesis are % standard error.
** Wooded Shrub Grassland / Woodland.

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 5B: DRY SEASON CATTLE POPULATIONS* IN THE PRINCIPAL VEGETATION AND LAND USE TYPES IN SOUTHERN GONGOLA STATE.

Vegetation/ Land Use Type	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
Grassland	9,700	328,000	33.8	8,400	39	158,000 (17)	16.3	5,200 (17)	30	170,000 (26)	17.5	3,200 (17)	53
W-S-G / W** Transition	13,775	122,400	8.9	3,080	40	10,600 (18)	0.8	380 (17)	28	111,800 (14)	8.1	2,700 (11)	41
Woodland	13,425	24,300	1.8	870	28	5,300 (23)	0.4	170 (22)	31	19,000 (29)	1.4	700 (23)	27
Forest	1,175	32,400	27.5	440	74	1,200 (60)	1.0	40 (51)	30	31,200 (36)	26.5	400 (28)	78
30 - 60% Cultivation	5,725	88,600	15.5	1,780	50	8,200 (31)	1.4	180 (30)	46	80,400 (18)	14.0	1,600 (16)	50

* Figures in parenthesis are % standard error.
** Wooded Shrub Grassland / Woodland.

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 6A: WET SEASON CATTLE POPULATIONS* IN RELATION TO ALTITUDE IN SOUTHERN GONGOLA STATE.

Altitude meters asl	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
0 - 499	21,600	267,000	12.4	3,510	76	41,000 (18)	1.9	810 (18)	51	226,000 (13)	10.5	2,700 (10)	84
500 - 999	13,325	73,600	5.5	3,250	23	13,100 (30)	1.0	650 (44)	20	60,500 (20)	4.5	2,600 (35)	23
1,000 - 1,499	6,575	161,400	24.5	4,100	39	108,200 (24)	16.4	2,700 (24)	40	53,200 (15)	8.1	1,400 (14)	38
>1,500	2,375	184,700	77.8	4,800	38	159,400 (12)	67.1	4,100 (11)	39	25,300 (22)	10.6	700 (23)	36

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 6B: DRY SEASON CATTLE POPULATIONS* IN RELATION TO ALTITUDE IN SOUTHERN GONGOLA STATE.

Altitude meters asl	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
0 - 499	21,600	355,400	16.5	6,540	54	18,600 (15)	0.9	540 (12)	34	336,800 (15)	15.6	6,000 (12)	56
500 - 999	13,325	56,800	4.3	1,730	33	11,000 (28)	0.8	330 (27)	33	45,800 (20)	3.4	1,400 (16)	33
1,000 - 1,499	6,575	81,400	12.4	3,070	27	57,800 (24)	8.8	2,170 (22)	27	23,600 (24)	3.6	900 (16)	26
>1,500	2,375	103,000	43.4	3,240	32	95,800 (14)	40.3	2,940 (12)	33	7,200 (31)	3.0	300 (23)	24

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 7A: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL RIVER CATCHMENTS OF SOUTHERN GONGOLA STATE.

Catchment	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
1 DONGA													
Upper Reaches	2,275	217,900	95.8	5,600	39	190,100 (6)	83.6	4,900 (8)	39	27,000 (11)	12.2	700 (16)	40
Mid/Lower Reaches	4,700	133,900	28.5	2,500	54	45,400 (36)	9.7	1,100 (35)	41	88,500 (18)	18.8	1,400 (16)	63
Bantaji Trib.	6,575	96,200	14.6	1,370	70	18,500 (33)	2.8	370 (33)	50	77,700 (20)	11.8	1,000 (18)	78
2 TARABA													
N. Upper Reaches	4,650	7,200	1.5	180	40	5,500 (53)	1.2	80 (50)	69	1,700 (53)	0.4	100 (54)	17
S. Upper Reaches	4,700	38,300	8.1	1,130	34	30,600 (24)	6.5	900 (26)	34	7,700 (33)	1.6	230 (36)	33
Kam Tributary	5,225	31,400	6.0	680	46	6,900 (52)	1.3	100 (44)	69	24,500 (22)	4.7	580 (25)	42
Mid/Lower Reaches	7,300	77,700	10.6	940	83	8,500 (39)	1.2	190 (45)	45	69,200 (22)	9.5	750 (19)	92
3 BENUE													
N. Tributaries	4,650	28,500	6.1	540	53	5,500 (56)	1.2	130 (53)	42	23,000 (22)	4.9	410 (14)	56
4 DEO	1,850	15,400	8.3	430	45	1,300 (50)	0.7	40 (49)	33	14,100 (34)	7.6	390 (55)	36
5 INI	1,700	35,700	21.0	1,400	26	8,500 (23)	5.0	540 (40)	16	27,200 (12)	16.0	850 (10)	32
6 BELWA	250	4,450	17.8	110	40	850 (50)	3.4	30 (68)	28	3,600 (58)	14.6	80 (68)	45

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 7B: DRY SEASON CATTLE POPULATIONS* IN THE PRINCIPAL RIVER CATCHMENTS OF SOUTHERN GONGOLA STATE.

Catchment	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE Mean GU Size	RED CATTLE Total Number	RED CATTLE Density /sq.km.	RED CATTLE GU Number	RED CATTLE GU Size	WHITE CATTLE Total Number	WHITE CATTLE Density /sq.km.	WHITE CATTLE GU Number	WHITE CATTLE GU Size
1 DONGA													
Upper Reaches	2,275	107,800	47.4	3,790	28	95,700 (9)	42.1	3,360 (9)	28	12,100 (27)	5.3	430 (22)	28
Mid/Lower Reaches	4,700	64,600	13.8	1,720	38	20,800 (47)	4.4	780 (44)	27	43,800 (44)	9.3	940 (30)	47
Bantaji Trib.	6,575	97,700	14.9	1,890	52	3,000 (48)	0.5	70 (38)	43	94,700 (17)	14.4	1,820 (17)	52
2 TARABA													
N. Upper Reaches	4,650	4,200	0.9	250	17	1,900 (50)	0.4	130 (54)	15	2,300 (57)	0.5	120 (46)	19
S. Upper Reaches	4,700	56,800	12.1	1,320	43	38,900 (27)	8.3	980 (25)	40	17,900 (120)	3.8	340 (65)	53
Kam Tributary	5,225	26,400	5.0	790	33	2,000 (32)	0.4	80 (32)	25	24,300 (28)	4.7	710 (22)	34
Mid/Lower Reaches	7,300	120,800	16.5	2,390	51	9,800 (25)	1.3	320 (20)	31	111,000 (22)	15.2	2,070 (17)	54
3 BENUE													
N. Tributaries	4,650	78,700	16.9	1350	58	3,800 (59)	0.8	90 (44)	89	75,000 (38)	16.1	1,260 (15)	59
4 DEO	1,850	19,400	10.5	340	58	800 (57)	0.4	20 (53)	40	18,600 (30)	10.0	320 (24)	58
5 INI	1,700	18,000	10.6	610	30	5,800 (38)	3.4	120 (35)	48	12,200 (16)	7.2	490 (14)	24
6 BELWA	250	2,100	8.5	70	30	800 (86)	3.0	20 (61)	40	1,400 (38)	5.4	50 (35)	28

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 8A: WET SEASON CATTLE POPULATIONS* WITHIN LOCAL GOVERNMENT AUTHORITY AREAS OF SOUTHERN GONGOLA STATE.

Local Government Authority	Area** sq.km.	ALL CATTLE				RED CATTLE***				WHITE CATTLE***			
		Total Number	Density /sq.km.	GU Number	GU Size	Total Number	Density /sq.km.	GU Number	GU Size	Total Number	Density /sq.km.	GU Number	GU Size
Mambila	15,025	339,400	22.6	8,840	38	265,600 (13)	17.7	6860 (13)	39	73,700 (18)	4.9	1980 (16)	37
Bali	15,050	157,800	10.5	2,250	70	32,200 (27)	2.1	700 (31)	46	125,600 (12)	8.3	1,600 (12)	79
Takum	2,950	55,700	18.9	670	83	5,500 (32)	1.9	110 (39)	50	50,200 (16)	17.0	560 (13)	90
Ganye	7,725	63,900	8.3	2,010	32	14,000 (29)	1.8	620 (45)	23	49,900 (18)	6.5	1,390 (18)	36
Zing	100	900	8.8	20	44	600 (38)	5.7	10 (46)	60	300 (113)	3.0	10 (113)	30
Mayo Belwa	275	5,600	20.4	150	35	500 (87)	1.8	20 (87)	25	5,100 (58)	18.6	130 (47)	39
Jalingo	1,525	4,200	2.7	90	46	600 (73)	0.4	10 (73)	60	3,600 (37)	2.3	80 (37)	45
Wukari	1,225	61,200	50.0	660	93	2,700 (39)	2.2	40 (34)	68	58,500 (20)	47.7	620 (18)	94

* Figures in parenthesis are % standard error.
** Area given is that within survey zone.

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 8B: DRY SEASON CATTLE POPULATIONS* WITHIN LOCAL GOVERNMENT AUTHORITY AREAS OF SOUTHERN GONGOLA STATE.

Local Government Authority	Area** sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE*** Total Number	RED CATTLE*** Density /sq.km.	RED CATTLE*** GU Number	RED CATTLE*** GU Size	WHITE CATTLE*** Total Number	WHITE CATTLE*** Density /sq.km.	WHITE CATTLE*** GU Number	WHITE CATTLE*** GU Size
Mambila	15,025	195,800	13.0	6,770	29	157,400 (14)	10.5	5,350 (13)	29	38,400 (15)	2.5	1,420 (14)	27
Bali	15,050	261,100	17.3	4,920	53	15,400 (17)	1.0	480 (12)	32	245,700 (13)	16.3	4,440 (11)	55
Takum	2,950	40,600	13.8	630	64	1,500 (39)	0.5	20 (39)	75	39,100 (39)	13.3	610 (29)	64
Ganye	7,725	41,400	5.4	1,140	36	7,500 (38)	1.0	180 (35)	41	34,000 (24)	4.4	960 (18)	35
Zing	100	250	2.5	5	25	0	0	0	0	250 (116)	2.5	5 (116)	50
Mayo Belwa	275	1,300	4.6	40	33	600 (109)	2.3	20 (109)	30	700 (96)	2.4	20 (67)	35
Jalingo	1,525	8,300	3.9	300	28	100 (121)	0.1	10 (121)	10	8,200 (27)	2.7	290 (19)	28
Wukari	1,225	48,100	10.5	830	58	800 (47)	0.7	30 (42)	27	47,300 (46)	38.5	800 (42)	59

* Figures in parenthesis are % standard error.
** Indicates area within survey zone.

*** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 9A: WET SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR ROADS IN SOUTHERN GONGOLA STATE.

Distance from Major Roads km	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
0 - 4	8,775	167,400	19.1	3,020	55	56,800 (31)	6.5	1,390 (30)	41	110,600 (13)	12.6	1,630 (11)	68
5 - 9	8,525	177,800	20.9	4,630	38	67,200 (24)	7.9	1,960 (25)	34	110,600 (18)	13.0	2,670 (31)	41
10 - 14	7,025	106,100	15.1	2,310	46	43,100 (25)	6.1	1,080 (26)	40	63,000 (17)	9.0	1,230 (15)	51
15 - 19	6,000	82,500	13.8	1,880	44	49,100 (26)	8.2	1,130 (26)	43	33,400 (18)	5.6	750 (17)	46
20 - 24	4,675	63,500	13.6	1,510	42	42,400 (30)	9.1	1,000 (30)	42	21,100 (25)	4.5	510 (26)	41
25 - 29	3,275	39,300	12.0	1,010	39	24,900 (33)	7.6	760 (35)	33	14,400 (31)	4.4	250 (30)	58
30 - 34	2,725	34,800	12.8	910	38	28,700 (35)	10.5	680 (40)	42	6,100 (29)	2.2	230 (28)	27
34+	2,875	15,400	5.4	540	29	9,600 (42)	3.3	310 (45)	31	5,800 (28)	2.0	230 (41)	25

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 9B: DRY SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR ROADS IN SOUTHERN GONGOLA STATE.

Distance from Major Roads km	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
0 - 4	8,775	159,900	18.2	3,560	44	36,700 (26)	4.2	1,120 (24)	33	123,200 (21)	14.0	2,440 (15)	50
5 - 9	8,525	172,900	20.3	3,490	69	49,400 (22)	5.8	1,350 (22)	37	123,500 (19)	14.5	2,140 (14)	58
10 - 14	7,025	85,300	12.1	2,150	39	32,200 (24)	4.6	970 (21)	33	53,100 (22)	7.6	1,120 (20)	47
15 - 19	6,000	74,700	12.4	1,870	39	17,900 (22)	3.0	750 (26)	24	56,800 (31)	9.5	1,130 (22)	50
20 - 24	4,675	49,500	10.6	1,450	34	21,200 (32)	4.5	730 (28)	29	28,300 (25)	6.1	720 (21)	39
25 - 29	3,275	25,400	7.8	940	27	13,400 (39)	4.1	510 (43)	26	12,000 (37)	3.7	430 (25)	28
30 - 34	2,725	18,700	6.9	460	40	6,400 (36)	2.4	260 (32)	25	12,300 (56)	4.5	290 (37)	42
34+	2,875	10,300	3.6	500	20	5,900 (29)	2.1	300 (30)	20	4,400 (26)	1.5	210 (29)	21

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 10A: WET SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR TOWNS IN SOUTHERN GONGOLA STATE.

Distance from Major Town km	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
0 - 4	3,550	91,600	25.8	2,370	39	50,200 (25)	14.1	1,310 (25)	38	41,400 (17)	11.7	1,060 (35)	39
5 - 9	8,500	230,500	27.1	5,850	39	133,000 (20)	15.6	3,540 (18)	38	97,500 (16)	11.5	2,300 (27)	42
10 - 14	9,850	189,500	19.2	4,110	46	89,200 (20)	9.1	2,340 (20)	38	100,300 (14)	10.2	1,770 (12)	57
15 - 19	8,325	92,000	11.2	1,930	48	20,000 (28)	2.4	590 (29)	34	72,100 (17)	8.7	1,350 (15)	54
20 - 24	5,700	47,900	8.4	920	52	16,100 (32)	2.8	350 (35)	47	31,800 (31)	5.6	570 (21)	56
25 - 29	3,975	22,500	5.7	400	56	4,300 (45)	1.1	90 (41)	51	18,200 (26)	4.6	320 (27)	57
30 - 34	2,325	12,700	5.5	260	49	8,900 (48)	3.8	120 (40)	75	3,700 (37)	1.6	140 (43)	27
34+	1,650	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0

* Figures in parenthesis are % standard error.
** Indicate LGAs extending beyond area surved, and partial cattle population.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 10B: DRY SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR TOWNS IN SOUTHERN GONGOLA STATE.

Distance from Major Town km	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
0 - 4	3,550	93,400	26.3	2,150	43	31,200 (21)	8.8	960 (21)	32	62,200 (25)	17.5	1,190 (18)	52
5 - 9	8,500	173,400	20.4	4,580	38	73,700 (15)	8.7	2,440 (16)	30	99,700 (24)	11.7	2,140 (14)	47
10 - 14	9,850	160,900	16.3	3,830	42	56,300 (18)	5.7	1,740 (17)	32	104,600 (17)	10.6	2,090 (15)	50
15 - 19	8,325	105,200	12.6	2,090	50	13,900 (27)	1.7	470 (27)	30	91,300 (25)	11.0	1,620 (21)	56
20 - 24	5,700	31,700	3.5	850	37	3,900 (27)	0.7	160 (23)	24	27,800 (22)	4.9	690 (18)	40
25 - 29	3,975	14,400	3.6	540	26	1,600 (43)	0.4	80 (31)	20	12,800 (39)	3.2	460 (21)	28
30 - 34	2,325	14,000	6.0	350	39	1,400 (61)	0.6	90 (43)	16	12,600 (47)	5.4	270 (28)	47
34+	1,650	3,900	2.3	120	31	1,300 (103)	0.8	50 (66)	26	2,600 (81)	1.5	80 (70)	31

* Figures in parenthesis are % standard error.
** Indicate LGAs extending beyond area surved, and partial cattle population.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji".

TABLE 11A: WET SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR RIVERS IN SOUTHERN GONGOLA STATE.

Distance from Major Rivers km	Area sq.km.	ALL CATTLE Total Number	ALL CATTLE Density /sq.km.	ALL CATTLE GU Number	ALL CATTLE GU Size	RED CATTLE** Total Number	RED CATTLE** Density /sq.km.	RED CATTLE** GU Number	RED CATTLE** GU Size	WHITE CATTLE** Total Number	WHITE CATTLE** Density /sq.km.	WHITE CATTLE** GU Number	WHITE CATTLE** GU Size
0 - 4	10,475	130,500	12.4	2,240	58	25,100 (24)	2.4	590 (27)	42	105,500 (16)	10.1	1,650 (15)	64
5 - 9	10,475	123,700	11.8	2,930	42	43,900 (24)	4.2	1,000 (25)	44	79,800 (15)	7.6	1,930 (32)	41
10 - 14	9,000	132,900	14.8	3,150	42	56,400 (20)	6.3	1,470 (22)	39	76,600 (14)	8.5	1,680 (26)	46
15 - 19	6,300	134,100	21.3	3,120	43	77,900 (21)	12.4	2,160 (22)	36	56,200 (19)	8.9	960 (14)	59
20 - 24	3,975	101,900	25.6	2,440	42	73,800 (24)	18.6	1,780 (24)	42	28,100 (23)	7.1	660 (17)	42
25 - 29	1,700	33,200	19.5	1,040	32	27,000 (23)	15.9	800 (26)	34	6,200 (38)	3.7	240 (32)	26
30 - 34	925	21,390	23.1	610	35	11,000 (30)	11.9	310 (39)	36	10,300 (39)	11.2	300 (42)	35
34+	1,025	9,070	8.8	320	29	6,700 (49)	6.6	230 (47)	30	2,400 (52)	2.3	90 (55)	26

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 11B: DRY SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR RIVERS IN SOUTHERN GONGOLA STATE.

Distance from Major Rivers km	Area sq.km.	ALL CATTLE				RED CATTLE**				WHITE CATTLE**			
		Total Number	Density /sq.km.	GU Number	GU Size	Total Number	Density /sq.km.	GU Number	GU Size	Total Number	Density /sq.km.	GU Number	GU Size
0 - 4	10,475	249,300	23.8	4,670	53	22,800 (23)	2.2	790 (24)	29	226,500 (16)	21.6	3,880 (13)	58
5 - 9	10,475	89,400	8.5	2,410	37	27,300 (25)	2.6	860 (22)	32	62,100 (14)	5.9	1,550 (12)	40
10 - 14	9,000	92,100	10.2	2,560	36	30,500 (20)	3.4	1,140 (20)	27	61,600 (27)	6.8	1,420 (13)	43
15 - 19	6,300	53,400	8.4	1,640	32	29,500 (32)	4.7	990 (32)	30	23,900 (25)	3.8	650 (19)	37
20 - 24	3,975	59,400	14.9	1,570	37	33,700 (23)	8.5	1,020 (23)	33	25,700 (36)	6.5	550 (21)	47
25 - 29	1,700	18,800	11.0	550	34	13,200 (24)	7.8	380 (20)	35	5,600 (26)	3.3	170 (31)	33
30 - 34	925	20,600	22.3	590	35	14,800 (43)	17.0	380 (37)	40	5,860 (42)	6.3	200 (33)	29
34+	1,025	13,800	13.5	540	26	11,400 (46)	11.2	420 (34)	27	2,400 (39)	2.3	120 (37)	19

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji".
White cattle are mainly "Banaji" = "Daneeji"

TABLE 12. NUMBERS AND DENSITIES PER SQUARE KILOMETER OF GOATS AT VARIOUS DISTANCES FROM MAJOR ROADS, TOWNS AND RIVERS.

Distance (km)	Major Roads		Major Towns		Major Rivers	
	Numbers	km^{-2}	Numbers	km^{-2}	Numbers	km^{-2}
0 - 4	577,200 (25)	65.8	321,800 (30)	90.6	324,200 (21)	30.9
5 - 9	128,100 (32)	15.0	223,700 (31)	26.3	261,400 (60)	24.9
10 - 14	54,500 (27)	7.8	154,400 (20)	15.7	129,300 (38)	14.4
15 - 19	34,500 (25)	5.8	93,100 (31)	11.2	89,400 (45)	14.2
20 - 24	13,000 (24)	2.8	35,800 (24)	6.3	15,300 (22)	3.8
25 - 29	11,700 (35)	3.6	13,600 (32)	3.4	24,200 (53)	14.2
30 - 34	14,300 (64)	5.3	2,900 (31)	1.2	800 (33)	0.9
34+	12,400 (30)	4.3	400 (71)	0.2	1,200 (138)	1.1

Figures in brackets are % standard errors.

TABLE 13. NUMBERS AND DENSITIES OF GOATS IN RELATION TO ALTITUDE IN SOUTHERN GONGOLA STATE

Altitude a s l (m)	Area km^2	Total No		Density km^{-2}
0 - 499	21,600	456,800	(19)	21.2
500 - 999	13,325	278,300	(45)	20.9
1000 - 1499	6,575	53,600	(17)	8.1
1500+	2,375	57,100	(35)	24.1

Figures in brackets are % standard errors

TABLE 14. NUMBERS AND DENSITIES OF GOATS IN RELATION TO LOCAL GOVERNMENT AUTHORITY AREAS IN SOUTHERN GONGOLA STATE.

Local Government Authority	Area km^2	Total No		Density km^{-2}
Mambila	15,025	117,100	(20)	7.8
Bali	15,050	178,200	(18)	11.8
Takum	2,950	99,200	(18)	33.6
Ganye	7,725	251,600	(50)	32.6
Zing	100	6,000	(65)	59.8
Mayo Belwa	275	17,800	(24)	64.7
Jalingo	1,525	27,800	(55)	18.2
Wukari	1,225	148,200	(32)	120.9

Figures in brackets are % standard errors.

TABLE 15. NUMBERS AND DENSITIES OF GOATS IN RELATION TO LAND SYSTEMS IN SOUTHERN GONGOLA STATE.

Land system	Area km^2	Total No.		Density km^{-2}
Mambila Plateau	625	21,000	(90)	33.6
Mambila Highland	1,425	29,000	(23)	20.4
Upper Donga Valley	650	1,800	(13)	27.8
Rugged Highland	525	200	(71)	0.5
Diss'd Rug'd High.	1,100	28,300	(46)	25.7
Suntai Highland	850	400	(43)	0.5
Taraba Highland	925	60	(65)	0.1
Dissected Escarp.	3,050	13,600	(32)	4.4
Dissected F/Hills	6,275	33,100	(115)	5.3
Donga Foothills	525	1,800	(33)	3.4
Elevated Plains	2,250	1,700	(29)	0.8
Toungo Plain	1,250	27,600	(46)	22.6
Ini PLain	1,300	217,700	(41)	167.4
Taraba Valley	2,250	4,200	(33)	1.7
Benue B't PLain	11,175	161,500	(19)	14.4
Donga Valley	1,100	25,800	(93)	23.5
Benue S'st Plain	4,600	216,400	(32)	47.0
Benue Flood PLain	2,625	33,800	(42)	12.9

Figures in brackets are % standard errors
Land Systems derived from Bawden and Tuley (1966).

TABLE 16. NUMBERS AND DENSITIES OF GOATS IN RELATION TO REGIONAL LAND SYSTEMS IN SOUTHERN GONGOLA STATE.

Regional Land System	Area km^2	Total No		Density km^{-2}
Mambila Highlands	5,175	97,000	(21)	18.8
Central Complex	17,700	83,900	(23)	4.7
Central Lowlands	15,775	377,900	(21)	24.0
Ganye Lowlands	2,600	253,200	(30)	97.3
Benue Flood Plains	2,625	33,800	(42)	12.9

Figures in brackets are % standard errors.

TABLE 17. NUMBERS AND DENSITIES OF GOATS IN RELATION TO VEGETATION AND LAND USE TYPES IN SOUTHERN GONGOLA STATE

Vegetation / Land Use Type	Area km^2	Total No		Density km^{-2}
Grassland	9,700	170,900	(21)	17.6
W-S-G / W** Transition	13,775	192,400	(20)	14.0
Woodland	13,425	40,600	(18)	3.0
Forest	1,175	2,600	(46)	2.2
30 - 60% Cultivation	5,725	438,900	(25)	76.7

Figures in brackets are % standard errors.

** Wooded Shrub Grassland / Woodland.

TABLE 18. LIVESTOCK NUMBERS AND DENSITIES IN RELATION TO VEGETATION DENSITY INDEX.

		Cattle				Goats	
		Dry		Wet			
INDEX	Area (km^2)	Number	km^{-2}	Number	km^{-2}	Number	km^{-2}
0	2125	123813	58.3	197922	93.1	74722	35.2
1 - 50	1600	104199	65.1	86211	53.9	32862	20.5
51 - 100	1175	51481	43.8	23661	20.3	55743	47.4
101 - 150	2325	74988	32.3	43408	18.7	94277	40.5
151 - 200	15850	176622	11.1	252880	16.0	517468	32.7
201 - 250	12950	50901	3.9	55549	4.3	49496	3.9
251 - 300	5050	9671	1.9	24774	4.91	16376	3.2
301 - 350	1850	4063	2.2	2816	1.5	2752	1.5
350+	950	907	1.0	1260	1.3	2089	2.2

Vegetation density rises with index value. 0 = grassland, 500 = closed canopy forest.

TABLE 19. LIVESTOCK NUMBERS AND DENSITIES IN RELATION TO CULTIVATION LEVELS.

PERCENTAGE CULTIVATION	Area (km^2)	Cattle Dry Number	Cattle Dry km^{-2}	Cattle Wet Number	Cattle Wet km^{-2}	Goats Number	Goats km^{-2}
0	17125	103024	6.0	74607	4.4	1416	0.8
1 - 5	14225	204760	14.4	242718	17.1	102416	7.2
6 - 10	4425	94441	21.3	164592	37.2	84149	19.0
11 - 15	4450	105164	23.6	117176	26.3	158786	35.7
16 - 20	2000	31845	15.9	39859	19.9	119834	59.9
21 - 25	375	10347	27.6	14021	37.4	10320	27.5
26 - 30	925	29843	32.3	16915	18.3	226651	245.0
30+	350	17223	49.2	18507	52.9	129466	369.9

TABLE 20. LIVESTOCK NUMBERS AND DENSITIES IN RELATION TO LAND SUITABILITY INDEX.

		Cattle				Goats	
		Dry		Wet			
INDEX	Area (km^2)	Number	km^{-2}	Number	km^{-2}	Number	km^{-2}
0	2025	115541	57.1	190831	94.2	55902	27.6
1 - 100	2300	148386	64.5	101838	44.3	87073	37.9
101 - 200	15175	241442	15.9	260359	17.2	483665	31.9
201 - 300	9950	55571	5.6	62916	6.3	53413	5.4
301 - 400	650	3950	6.1	3345	5.4	2522	3.9
401 - 500	250	8462	33.8	7092	28.4	18836	75.3
501 - 600	525	7315	13.9	8035	15.3	1533	2.9
601 - 700	2950	10147	3.4	35930	12.2	128080	43.4
701 - 800	8050	5002	0.6	17468	2.1	12459	1.5
801 - 900	1525	327	0.2	732	0.5	314	0.2
> 900	475	503	1.1	0	0.0	1990	4.2

A rising index value implies increasing unsuitability. 500 has been taken to be the threshold between suitable and unsuitable.

TABLE 21A. CAPITAL COSTS, OPERATING COSTS AND TECHNICAL CAPACITY
LIVESTOCK EXTENSION CENTRE (LEC) MODULES. (NAIRA)

	Unit	Unit Cost	Year 1 No	Cost	Year 2 No	Cost	Year 3 No	Cost	Year 4 No	Cost	Year 5 No	Cost	TOTAL
CAPITAL													
LEC Establishment													
Store	Unit	2000	1	2000	--		--		--		--		2000
Veterinary Equipment	Set	4800	1	4800	--		--		--		--		4800
Farm Tools	Set	500	1	500	--		--		--		--		500
Refrigerator	Unit	550	1	550	--		--		--		--		550
Molasses Storage Tank	Unit	3000	1	3000	--		--		--		--		3000
											sub total		10850
LEC Module													
Motorcycle	Unit	1000	3	3000	--		--		3	3000	--		6000
Spraywell pump	Unit	750	2	1500	--		--		--		--		1500
											sub total		7500
Multi-Module Overhead													
4WD Pick-up	Unit	13000	1	13000	--		--		--		1	13000	26000
Office Furniture & Equipment	Set	7500	1	7500	--		--		--		--		7500
											sub total		33500

TOTAL Capital costs for 1 LEC Module N 18350
" " " 2 " " N 25850
" " " 3 " " N 66850

	Unit	Unit Cost	Year 1 No	Cost	Year 2 No	Cost	Year 3 No	Cost	Year 4 No	Cost	Year 5 No	Cost	TOTAL
OPERATING													
LEC Establishment													
Watchman	GL02	2050	1	2050	1	2050	1	2050	1	2050	1	2050	10250
Equipment Store	p.a	10%	-	1085	-	1085	-	1085	-	1085	-	1085	5425
											sub total		15675
LEC Module													
Vetinerary/Livestock Assistant	GL05	2800	1	2800	1	2800	1	2800	1	2800	1	2800	14000
Innoculator	Gl02	2050	1	4100	2	4100	2	4100	2	4100	2	4100	20500
Labourer	GL01	2000	1	2000	1	2000	1	2000	1	2000	1	2000	10000
Motorcycles	p.a.	500	3	1500	3	1500	3	1500	3	1500	3	1500	7500
											sub total		52000
Multi - Module													
Livestock Superintendent	GL07	4400	1	4400	1	4400	1	4400	1	4400	1	4400	22000
Driver	GL03	2200	1	2200	1	2200	1	2200	1	2200	1	2200	11000
Clerk/Typist	GL04	2400	1	2400	1	2400	1	2400	1	2400	1	2400	12000
4WD Pick-up	p.a.	5100	1	5100	1	5100	1	5100	1	5100	1	5100	25500
Equipment and Furniture	p.a	10%	-	750	-	750	-	750	-	750	-	750	3750
Office	p.a	3000	-	3000	-	3000	-	3000	-	3000	-	3000	15000
											sub total		89250

TOTAL Operating Costs for 1 LEC Module N 67675
" " " 2 " " N 119675
" " " 3 " " N 260925

TABLE 21B. TOTAL CAPITAL AND OPERATING COSTS FOR LECs (NAIRA).

TOTAL		Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Capital and Operating Costs for 1 Module		28885	13535	13535	16535	13535	86025
Capital and Operating Costs for 2 Modules		43785	23935	23935	29935	23935	145525
Capital and Operating Costs for 3 Modules		97035	52185	52185	61185	65185	327775
MAXIMUM OPERATIONAL CAPACITY FOR ONE LEC MODULE							
Settled pastoralists (Fodder Banks)	(unit)	5	10	20	20	20	75
OR							
Mixed Farming Scheme	(unit)	5	10	20	20	20	75
OR							
Smallholder Cattle Fattening Loans	(unit)	100	100	100	100	100	500

Notes:

Costs are shown in three components: Base costs for the establishment of one LEC; unit costs per LEC Module; and the overhead support costs for a site with three or more Modules. Thus costs for one Module are establishment plus one LEC Module; for two, establishment plus two LEC Modules; for three, establishment plus three LEC Modules plus the Multi-Module Overheads.

Operational Capacity per Module is shown for each intervention operated alone. Capacity with a combination of interventions will depend on the local circumstances at each LEC site.

Source: Costs and capacity figures supplied by NLPU on 12 November 1984.

TABLE 22. SETTLED PASTORALIST MODEL: INCOME, INVESTMENT AND OPERATING COSTS (NAIRA). Financing not shown

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-20
Value of Production	4273	4588	6404	6047	6555	7246	7718	7643	7643
Investment Costs	--	4689	--	--	--	--	--	--	--
Operating Expenses	60	1806.6	1170.6	1181.6	1200.6	1211.6	1211.6	1211.6	1211.6
Incremental Net Benefit		-6120.6	1020.4	652.4	1141.4	1821.4	2293.4	2218.4	2218.4
Net Present Value at 15%	3918								

Source: Model data supplied by NLPU 12 November 1984
Operating Expenses increased in line with ILCA estimates of fodder bank recurrent costs.

TABLE 23. MIXED FARMER MODEL: INCOME, INVESTMENT AND OPERATING COSTS (NAIRA). Financing not shown

	YEARS										
	0	1	2	3	4	5	6	7	8	9	10-20
Value of Production	500	4050	3590	3880	5120	3880	4900	5460	6160	5460	5440
Investment Costs		5000									
Operating Expenses	220	3384	3408	3552	3593	3637	3623	3623	3623	3623	3623
Incremental Net Benefit		-4614	-98	48	1247	-37	997	1557	2257	1557	1537
Net Present Value at 15%	1123										

Notes: Net benefits assumed to arise from an increase in crop production in the NLPU Model, amounting to N900 per annum, are excluded from this calculation

Source: Model data supplied by NLPU, 12 November 1984.

TABLE 24. SMALLHOLDER CATTLE FATTENING: COSTS AND RETURNS (NAIRA).
Financing not shown

Value of Production Cycle*	2848
Investment/ Operating Costs	2588
Incremental Net Benefit	260
Return on Total Investment	10%

* The loan cycle is computed in less than one year

Source: Model data supplied by NLPU 12 November 1984

APPENDIX III

CATTLE DISEASES; THE DESIGNATIONS AND CONCEPTIONS OF TRADITIONAL PASTORALISTS IN THE TOUNGO BLOCK

In order to ascertain cattle mortality from a variety of causes, researchers must depend on the knowledge of traditional pastoralists for the body of their statistical data. While veterinary officials are able to perform post-mortems on a limited number of cattle, most animals that die are diagnosed only by their owners. Although animals occasionally die from accidents (see Table 17), the vast majority that die before being butchered die from disease, even when rinderpest is not prevalent.

It is conventional wisdom that the FulBe have a very profound knowledge of their stock and that this enables them to diagnose diseases accurately. Maliki (1981) has a full discussion of pastoralist conceptions of disease. However, discussions with FulBe on disease suggested certain problems with their ideas relevant to planning in that they affect estimates of mortality from particular diseases These are;

1. FulBe are much better at identifying diseases with concrete external symptoms, such as skin and hoof complaints, than 'internal' diseases, such as trypanosomiases and flukes. The incidence of these latter sometimes has striking regional patterns, suggesting that the conviction that a disease is prevalent in an area can lead to systematic misdiagnosis.

2. In most cases, FulBe recognize that European drugs are better than traditional cures. However, they may also assume that all such drugs are equally valuable, and prefer Ranide to Thiazole, because one is cheaper than the other, regardless of their appropriateness for different diseases.

3. FulBe conceptions of certain diseases may take in broader categories than merely physical symptoms, and may link together a bundle of symptoms that European veterinary science would regard as evidence of different diseases.

Despite these caveats, FulBe have a broad ranging veterinary knowledge that can be made use of when assessing the causes of cattle mortality. As the only published lists of Fulfulde disease names do not show many correspondences with the names recorded in the Toungo Block, Table 25 lists these names, with common names, technical names, a comparative list of Fulfulde names and comments on the symptoms. A number of the less common diseases have proved impossible to identify from standard veterinary textbooks; this suggests that some primary veterinary research in relation to a development project would be appropriate.

Although livestock owners were regularly asked about the diseases of small ruminants, there is very little in the way of systematised

traditional knowledge in this area. Symptoms were not described with consistency from one interview to another, and informants would frequently complain that the diseases sheep and goats suffered from had no names. This is consistent with the relatively low economic value of small livestock.

TABLE 25. DISEASES AND THEIR SYMPTOMS REC(

Common Name	Scientific Name	Fulfulde	Hausa	Ascribed (
ANTHRAX BLACKQUARTER	-	piDoowu laBBa nanol daamwol	shefa harbau	Bush-spirit shooting ar at animals
BRUCELLOSIS	-	bakkale	-	-
CBPP,'asthma'	Contagious Bovine Pleuro- Pneumonia	kikoo(wu) ottu, karru, bunsuuDe	fufu	-
FOOT & MOUTH	-	mboru	-	Comes from contact wit camels
HEARTWATER	Cowdriosis	gooli, ngabbu ngunya		From ticks
LIVER-FLUKE	Fascioliasis	he(n)yre piye sakka kenya	hanta	Eating dirt overgrazed pasture.Dri infected wa
REDWATER (=TICK FEVER)	Babesiosis Pyroplasmosis	sille i''am	dauDa	Infected wa
RINDERPEST	-	pettu Boru zaagaw	būshīyā	Contact wit infected st spread by tsetse fly
SKIN DISEASES	Dermatophilosis Strepthotricosis Besnoitiosis	BaBa Bolle hunya ?piyyal	kirshi	Infection o tick sores rainy seaso
TRYPANOSOMIASES		jola samoore		Transmitted blood-suckin flies
WORMS	Parasitic Gastroenteritis	balki bolle		Drinking infected w

Appendix IV.

Itinerary and Contacts during Wet and Dry Season Ground Surveys

This itinerary provides a list of the places visited during the course of groundwork and the numbers and types of informants interviewed, to make explicit the database used for the statistical information. The full names and positions of informants are given so that they can be easily contacted should further follow-up studies are undertaken. At every interview livestock owners were asked to name the individuals who would represent their interests to outside agencies. In some cases these were unavoidably absent, so their names are recorded but they are noted as 'not present'.

WET SEASON

Date	Place	People Seen	Post or Occupation.
30/8	Yola	Dr.Adamu Zakari	Chief Livestock Officer, MAHFR
	Yola-Ganye		
31/8	Ganye	Mr.Paul Mairiga Dr.Ibrahim Gurin Mr.Saidu Maiha	Principal Control Officer, FDPCS. Zonal Veterinary Officer, MAHFR Area Livestock Officer, MAHFR.
1/9	Ganye	Alh. Yusufu Aliyu Ganye Alh. Adama Taraba Jalingo	Leader of Settled FulBe Community in Ganye. Leader of Settled FulBe Community in Ganye.
	Sugu	Aliyu Shanaka Emmanuel Babale Amajam Anudebbo Mr. Salihu Ganumweso Sugu and fifty stock-rearers summoned from the market.	District Head. Village Head. Ardo of Sugu FulBe Samba student.
2/9	Toungo	Alh. Ja'aimu Mohamudu Nanawa with ca. thirty stock-rearers.	District Head, formerly a Livestock Supervisor. Ardo of Toungo.
	Sugu	Ms. M. DeFinney	Teacher, WTC, Sugu.

	Ganye	Fr. Martin	Roman Catholic Priest.
3-4/9	Jangani. Climbed the Jangani Plateau, West of Sugu, to record patterns of stock-rearing in the high-altitude grasslands.		
5/9	Jada	Alh. Mukadas Tukur Ardo Adamu Jada Ardo Ho'odi Mayo Kelli Alh. Shanu Alh. Bala Ibrahim Mohamudu Naseru with ca. fifty stock-rearers.	Chief of Jada. Ardo of Jada Ardo of nomadic FulBe Cattle trader Cattle trader Cattle trader
		Mr. Chen	Manager of large private farm 10 km. North of Jada with 1000m. grass airstrip.
6/9	Ganye	Alh. Gure Mohamudu Surandi	Ardo of Ganye (formerly Lamido Kilba in Hong L.G.A.)
	Duksami	Abubakar Gambondi Yaro Gampe Adamu Gishilaambe Alh. Shaadu Dabo Laaminga Ngura Bello Sanjo Alh. Yusufu Gangwon with ca. 150 stock-rearers.	District Head of Yelwa Village Head of Duksami Village Head of Gurum Village Head of Tindoore Ardo for the Guram Plateau FulBe spokesman from Yelwa Samba spokesman
7/9	Mbulo	Dan Lawan Sanda Bello Adamu Sambo Alh. Umaru with ca. fifty stock-rearers.	District Head Village Head Ardo of Mbulo
8/9	Sugu	Isa Ja'amai Alh. Yaya Amadu Sugu	Ardo for the Jangani Plateau Ardo for Bakari Gusau Elder of Sugu.

9/9	Ganye	Mr.Paul Mairiga Mr. Clement Abba	Principal Control Officer, FDPCS Personnel Officer, Ministry of Education. Samba informant.
	Sugu	Mrs. Rachel Haruna	WTC, Sugu. Samba informant.
10/9	Ganye	Alh. Adamu Sanda	Chief of Ganye. Alh. Sanda was Livestock Supervisor in the Mambila-Gashaka area for many years.
	Tola	Alh. Dan Duma Ardumi Jayimu Gangwaso with ca. ten stock-rearers.	District Head Village Head
11/9	Kojoli	Alh. Hayalu Usman Kojoli Alh. Amadu Bello with fifteen local stock-rearers.	District Head Ardo of Kojoli area.
	Mapeo	Fr. Declan	Roman Catholic Priest
12/9	Yola	Dr. Iain Colquhoun	STO, LPU
13/9	Bali	Fr. Adrian Edwards Fr. Terry Casey	Roman Catholic Priests
14/9	Bali	Dr. Mohamed Danjuma Aliyu Mr. Aliyu Yahaya Jibril Bayero Abubakar Haman	Veterinary Officer Livestock Officer Sarkin Bali (newly appointed) Sarkin Shanu
15/9	Serti	Mr. Stephen Gawaisa	Wildlife Officer, Gashaka Game Reserve.

15/9	Mayo Selbe	Mr. Haggai Shuaihu Yerima Ardo Musa Mallam Baba Fika with ten local stock-rearers.	Vet. Superintendent. Sarkin Ndoro Ardo for Mayo Selbe Ministry of Works
16/9	Tungan Amadu	Mrs. Dijatu	Informant on the role of FulBe women.
17/9	Gembu	Dr. Garba Bello	RTO,LPU
18/9	Gembu	Sallah celebrations.	
19/9	Gembu	Alh. Buba Malabu	Sarkin Shanu
20/9	Gembu	Usman Ardo Alh. Mohamudu Mansur	Outgoing Veterinary Officer Sarkin Gembu
21/9	Gembu	Umaru Gaji	Ardo of Gembu
	Nguroje	Ardo Sambo Alh. Bashiru Alh. Bana with ca. forty stock-rearers.	Sarkin Nguroje Mai Unguwar
	Gembu	Mohamudu Jugari Gembu with ca. twenty stock-rearers	Jauro Gembu(Mambila)
		Also discussions with Local Government Secretary	
22/9	Zongo Ajiya	Alh. Hiroyi with ca. 150 stock-rearers. Ardo Gaji and Jauro Tukur not present.	Wakili
	Kakara	Bala Kaigamma with six stock-owners.	Jauro Kakara

23/9	Lekki Taba	Idia Kondoshi with fifteen stock-owners.	Jauro Lekki Taba
	Mayo Ndaga	Alh. Adamu Mai Unguwar. with ca. thirty stock-owners.	Wakili. [The Jauro of Mayo Ndaga had recently died.]
24/9	Gembu	Further discussions with Ardo Gaji and Alh. Malabu and ca. ten of the wealthier stock-owners.	
25/9	Kusuku	Musa Jauro Yaya with ca. thirty stock-owners. Ardos Gori and Maji not present.	Sarkin Wakili
	Mbamnga	Ardo Also (sic) Ardo Jibo Ardo Buba Ardo Buba Ardo Sale with ca. sixty stock-owners.	Ardo Mbamnga Ardo Bing Ardo Bang Ardo Bom Ardo Ba'a
26/9	Gembu	Dr. Umaru Bakai Alh. K.M. Batu Dr. Charles	Project supervisor, UBRBDA. DPO, Nigerian Police. New Veterinary Officer
27/9	Mai Samari	Ardo Mohamudu Ardo Alim Hainari with ca. sixty stock-owners Jauro Bakido Bakari and Ardo Damino of Belel not present.	Ardo of Mai Samari

28/9	Mai Samari-Serti		Descent of Escarpment
29/9	Mararaba	Bulus Ali	Rural Development Project Manager, S.U.M.
		Amadu and Umaru	Cattle-buyers.
30/9	Mararaba	Sarkin Buba Ardo Alh. Tarkoori Ardo Mai Dabo Ardo Bature with ca. forty stock-rearers.	Sarkin Mararaba Ardo of the FulBe na'i encamped near Mararaba
	Bibinu	Lamido Gidado Ardo Tumba with ca. fifty stock-rearers.	Ardo of **Bodeeji** herders. Ardo of **Daneeji** herders.
1/10	Baissa	David Eckersley Donald Twani Norman Viss	VSO, GSS Baissa. Higher Livestock Superintendent Agricultural Extension Officer, CRCN
2/10	Sabon Gida	Cattle traders	Groups of cattle-traders trekking herds along this road were interviewed.
		Case van Wyk	Agricultural extension officer, CRCN, with special responsibility for the FulBe.
3/10	Donga	Usman Nungala	Agricultural extension officer,CRCN
	Wukari	Ruth Veltcamp	Secretary, FulBe Board, CRCN.
4/10	Arufu	Ardo Nakanje Gazari Tonga with ca. fifteen stock-rearers.	Ardo Arufu Spokesman

5/10	Bantaji	Abubakar Gambo Ali	Sarkin Shanu
	Chediya	Ardo Alh. Adamu Kiri Lamido Bantaji	Ardo of Gassol.[The Ardo of Chediya had recently died]. District Head.
	Gassol	Umaru Hamayero	Spokesman.[The Ardo of Gassol was in Chediya].
6/10	Mutum Biyu	Alh. Maji Suleman Kasala	Sarkin Shanu Hakimi Mutum Biyu

DRY SEASON

Date	Place	People Seen	Post or Occupation
18/3	Zing	Bill Fitzgerald	Agricultural Missionary, SUM
	S. of Zing	Peter Dabale	Principal, Agricultural College.
	Monkin	Mr. F. Jatau	Schoolteacher
19/3	Kwonti	Hawang Madaki	Mumuye cattle-owner
	Monkin	Michael Dona Mapeo	Schoolteacher
20/3	Sambung	Umaru Sanda Goje Galadima	Village Head Mai Shanu
	Maitani	ArDo Hamja and eighteen WoDaaBe cattle-owners.	ArDo of WoDaaBe pastoralists
	Kiri	Musa Gindau Kiri and twenty-two Samba small-stock owners, and two FulBe pastoralists.	Spokesman
	Toungo	ArDo FulBe and seventeen nomadic pastoralists.	ArDo WoDaaBe
21/3	Ribaadu	Mallam Umaru	Cattle-owner
	Lando	Jauro Boboi Bello ArDo Aba Umaru Shadrach Gissah and seventy agro-pastoralists	Village Head ArDo of FulBe Police Inspector
	Dimkeni	Anthony Pyam Di Edel Sabuwa David Lamido	Spokesmen for small-stock owners

22/3	Tapare	Martin Bature and five others	Spokesman for Vere small-stock owners.
	Choncha	Ibrahim Jinba're Mr. Paul Musa	FulBe agro-pastoralist Livestock Assistant
23/3	Yola		
24/3	Dogon Yashi	Alh. Bawa Maina Belata Mahawa Aliyu Zaki Abbai Lawlo	Spokesman for Ba'en
25/3	Mayo Ranewo	Amadu and Isa Buba	WoDaaBe pastoralists
		Alh. B. M. Kambari	Kanuri cattle-trader
		Sarkin Yama Sule Alh. Idi Mamadu Lau and thirty-four cattle-owners	Sarkin Mayo Ranewo Spokesman for cattle-owners Sarkin Tike
	Shomo Petel	Alh. Bakari Ngwoba Adamu Addu Isa Adamu Isa Gamu	Spokesman for cattle-owners
		Haram Mai Idanu	Spokesman for Shomo people
26/3		Suleman Kasala Alh. ArDo Majiko Yunusa Umar and forty-six cattle-owners	Sarkin Mutum Biyu ArDo FulBe Sarkin Shanu
		Mr. B. Mutum Daya and ten others	Spokesman for Wurkum small-stock owners
		Mr. Eskena J. Elihu	Spokesman for Jenjo small-stock owners

	Tsintsiya	Mr. Ishaku Bunu and twelve others	Spokesman for Bambur small-stock owners
27/3	Sheka	ArDo Ishaku Gidado ArDo Alh. Mumuti Tamburam ArDo Ciroma Sarki ArDo Amadu Banbuma ArDo Gilmo ArDo Amar Buju ArDo Mamadu Gerema and fifty-eight cattle-owners.	ArDo Jaafun ArDo Raahaaji ArDo Ba'en ArDo Daneeji ArDo SiwalBe ArDo We'we'Be ArDo HorewalDe
28/3	Mutum Biyu	Mr. Buba Jada	Cattle-trader
	Kwatan Nanido	Adamu Shaba Inusa Adamu ArDo Isa Mala Mallam Manu Baba and seven cattle-owners.	Jauro (not present) Spokesman ArDo We'we'Be Spokesman
		Mrs. Dija Mama Egi and six FulBe women.	Spokeswoman for We'we'Be
29/3	Nanguru	Hassan Audu and five FulBe wuro and seven Hausa cattle-owners	Sarkin Nanguru
		Hassan Audu and eighteen FulBe na'i	
	Malin Yero	ArDo Kuri Katsina Mallam A. Malin Yero and twenty-eight cattle-owners	ArDo FulBe na'i Spokesman for FulBe wuro

30/3	Malin Yero	Jalo Bakundi	Spokesman for Wurbo
	Takalafiya	Adamu Yerima Gidado Buba Mutaye with twenty FulBe na'i and two FulBe wuro.	Sarkin Takalafiya Sarkin Fulani
31/3	Bali	Mr. Godwin Ako	Tiv informant
		Fr. T. Casey	Missionary
	Mai Hula	Aboki Mai Hula Alh. BandaaDo Ja'e Mai LaBBa Alh. Buba JiBBe Mallam Yahu Umaru Digare and thirty-six cattle-owners	Sarkin Mai Hula Spokesman for Bokolooji Spokesman for JaawooBe Spokesman for Daneeji Spokesman for Jaafun Spokesman for Sulebawa
	Bali	Jibril Bayero Abubakar Haman	Sarkin Bali Sarkin Shanu
1/4	Jatau	Musa Jatau and seventy cattle-owners	Sarkin Jatau
	Kungana	Mala Abubakar Yabga Galadima Adamu Mai Dawa Mohammed Bello Abayir Shindu Adamu Alkali and five others	Sarkin Kungana Galadima Kungana Madaki Kungana
2/4	Mayo Kam	Isa Mayo Kam ArDo Alh. Ruga and seven FulBe na'i	Jauro Mayo Kam ArDo Daneeji (not present)
	Zudei	Manu Dorina	FulBe na'i informant

3-4/4	Yola		
5/4	Kpasham	Wakili Kpasham and twelve livestock-owners	Spokesman for Kpasham
	Diyangwo	Jauro Mamudu and ten small-stock owners.	Jauro Diyangwo
6/4	Gassol	Mr. Anthony Adamu	Veterinary Officer
		Sule Sendirde ArDo Adamu and fifty-six cattle-owners	Wakili Gassol ArDo Gassol
7/4	Old Sabon Gida	Adamu Mohamadu and thirteen cattle-owners	Wakili Sabon Gida
	Wuro Jam	Adamu Yaya Bello Sunni and forty-seven cattle-owners	Sarkin Wuro Jam (not present) Wakili Wuro Jam
8/4	Gungunbode	Alh. Husseini and ten small-stock owners	Sarkin Gungunbode
	Sansane	Alh. Mohamed Nuhu ArDo Adamu and thirty cattle-owners	Sarkin Sansane ArDo Gassol (not present)

9/4	Kufayi	Jauro Ishaku Usuman Doka and twenty-four FulBe na'i	Jauro Kufayi Wakili Kufayi
	Gwiwan Kogi	Ciroma Sale and twenty-four FulBe	Jauro Gwiwan Kogi
10/4	Wukari	Mr. Luka Musa	Kuteb informant
		Ruth Veltcamp	CRCN, Fulani board
		Dr. A.A. Hiko	Zonal Veterinary Officer
11/4	Gidan Garba	Mr. Sambo Audu and five Samba Leeko small-stock owners.	Spokesman for Samba Leeko
	Sabon Gida (nr. Kungana)	Kadiri Bello	WoDaaBe informant
		Sule Mai Samari and eight Fam small-stock owners.	Mai Unguwar Sabon Gida
	Mai Goge	Alh. Umaru Abdu Duba Jibu Adamu Hassan Isa Mopti Amadu Usmanu and forty-three FulBe na'i	Spokesman for FulBe Spokesman for FulBe
		Ishaku Waziri and ten Icen small-stock owners.	Mai Unguwar Mai Goge
12/4	Suntai	Baba Liman	Elder of Suntai
		Bawa Adamu	Spokesman for Bogoyanko'en

12/4	Suntai	Alh. Gwoga Alh. Jayi Abubakar Jayiri Abdu Adamu Alh. Nayiri and seventy-five FulBe na'i.	Spokesmen for Daneeji Spokesman for Jalanko'en Spokesman for Nadanko'en Spokesman for SiwalBe
13/4	Suntai	Sarkin Garjila Sarkin Baka and ten Samba Leeko elders.	Gang Suntai Gang Kpansoke
14-15/4	Wukari	Ja'e Na'ango	FulBe na'i informant
16/4	Ibi	Alh. Salimu Alh. Nora and fifty-eight FulBe cattle-owners	Sarkin Ibi Wakili Ibi
17/4	Tsokundi	Ariama Deje Ja'e Shagari and forty-eight FulBe cattle-owners	ArDo Tsokundi (not present) Spokesman for FulBe
	Sarkin Kudu	Adamu Sali Jubun Alh. Ibrahim Mohamudu with thirty-eight FulBe, two Ankwe and two Jukun cattle-owners.	Sarkin Sarkin Kudu Wakili Sarkin Kudu
18/4	Wukari	Bambo Aliyu	Cattle trader from Fali Plateau
	Ibi	Kada Hassan Garba Ibrahim and six FulBe wuro.	Sarkin Fulani Spokesman
		Alh. Baba Rudu and four Hausa cattle-owners	Spokesman for Hausa butchers

	Gindin Dorowa	Madugu Mohamudu ArDo Kantu Alh. Ngabbaye and sixty FulBe cattle-owners.	ArDo of Jibu ArDo of Gindin Dorowa Wakili Gindin Dorowa
19/4	Dampar road	Ali Madugu	Bokolooji FulBe informant
	Dampar	Egi Julde Baaso Madugu and sixty-five FulBe cattle-owners	ArDo Dampar Wakili Dampar
20-21/4	Jos		
22/4	Dampar	Alh. Usman Maikele Yahaya Mohamudu and twelve Jukun small-stock owners	Sarkin Dampar Galadima Dampar
	Mala	Mr. Garba Nuhu	Hausa informant
	Gungun Sambo	Alh. Baka Alh. Diko and three other FulBe cattle-owners.	Nordanko'en spokesman Konanko'en spokesman
	Amar	Alh. Buba and fifty-three small-stock owners	Sarkin Amar
23/4	Amar	Alh. Buba and thirteen FulBe cattle-owners	Sarkin Amar

24/4	Didango	Sarkin Magaji ArDo Booji ArDo Alh. Baaso ArDo Alh. KaBe and sixty-seven FulBe na'i	Sarkin Didango
25/4	Yola		
26/4	Igo	Alh. Ibrahim	Spokesman for BooDi
27/4	Tissa	Gara Gageya and twelve Samba Leeko small- stock owners	Gara Tissa
	Donga	Gara Donga ArDo Bature ArDo KaDaDi Ciroma Yero Ibrahim and thirty-two FulBe na'i.	
28/4	Garbabi	Umaru Salihu and ten Jibu small- stock owners	Sarkin Garbabi
		LaamDo Yugudu	TaniraaBe spokesman
	Gayam	ArDo Amadu Mohamudu Sulebawa and thirty-two FulBe na'i	ArDo WodaaBe (not present) Spokesman for Sulebawa
	Jamtari	Umaru Sambo and six small- stock owners	Jauro Jamtari
	Karamti	Jauro Ibrahim and ten small- stock owners	Jauro Karamti

29/4	Serti	Sarkin Serti and twelve small-stock owners	
30/4	Gembu	Fr. Donnelly Dr. G. Bello	Missionary RTO, LPU
31/4	Yerimaru	Jauro Hambakar Wakili Sale ArDo Gori and seventy-two FulBe cattle-owners	Jauro Yerimaru Wakili Yerimaru ArDo FulBe (not present)
1/5	Warwar	Jauro Wuwar Isa Hausawa Daniel Njelma and ten Mambila cattle-owners	Jauro Warwar (not present) Wakili Warwar Pastor, Baptist church.
	Tamniya	Birdeng Tamniya Wakili Yamsa ArDo Adamu Sarkin Tike with eleven Mambila ten FulBe cattle-owners.	Jauro Tamniya Wakili Tamniya ArDo FulBe
2/5	Hainare	Adamu Umaru Useni Hainare Wakili Hassan and twenty-three FulBe cattle-owners	Jauro Hainare ArDo Hainare Wakili Hainare
	Dorofi	Jauro Barkindo Jauro Buba Wakili Ndottiijo ArDo Guduba and twenty-one cattle-owners	Jauro Dorofi Jauro Mayo SaBBere Wakili Dorofi ArDo FulBe

3/5	Maidule	ArDo Dauda ArDo Yerimaru Yahaya and twenty-three FulBe cattle-owners	ArDo Maidule
	Kabri	Hama Julde Ali Jibayro and two Mambila cattle-owners	Jauro Songbarki (not present) Spokesman for cattle-owners
4/5	Gembu	Federal Government Currency Exchange Exercise	
5/5	Titong	Alh. Jaalike	Spokesman for Gamadanko'en
6/5	Gembu	Mr. Cyprian Ngayi	Wimbum informant
		Dr. Musa Alfa Dr. Andrew Burkwa	Veterinary officials
7/5	Descent of Escarpment		
8/5	Jangon Mata	Adamu Munde Mr. A.M. Yakubu Mr. Joel Sabol and seven small- stock owners	Mai Unguwar Jangon Mata Batu informants
	Sabon Gida	Case van Wyk Pastor Nahu	CRCN Missionary Njwande informant
	Baissa	Dr. and Mrs. Grey	Medical Missionaries, CRCN
9-15/5	Yola		

16/5	Bakin Dutse (Timbong)	Sauma Ayokani Maxwell Hivi and fifteen small-stock owners	Village Head Headmaster, Primary School
	Cattle-camp south of Sunkani	Yunusa Hamadu Hamadu Amadu Amadu Adamu	Jaafun informants
	Daka (Wokji)	Gang Isu Mohamudu Burtu Usman Julde and seven Daka small-stock owners	Gang Daka Sarkin Shanu (not present) Spokesman for Daka
17/5	Garba Chede	Fr. A. Edwards Fr. P. Delgaire	Missionaries
		Toohi Kaigamma Alh. Yayayyi ArDo Gangari Alh. Ruga Alh. Manu Alh. Adudu and thirty-one FulBe na'i	Jauro Garba Chede Sarkin Shanu
18/5	Kila Gana Dere	Yakubu Gadbo and seven small-stock owners	Gang Kila Gana Dere
	Garin Baki	Gang Bowe and five small-stock owners	Gang Garin Baki (not present)
	Tonti	Yarobe Tawye and four small-stock owners	Gang Tonti

APPENDIX V.

FulBe Groups Encountered in Southern Gongola State.

[The names of FulBe subdivisions given below are exactly as cited by informants in the field. Section II sets out the names of these groups alphabetically, and attempts to establish equivalences between some of them. In some interviews informants distinguished between resident and seasonal migrant groups, and this data has been included where available.]

This information has been included for two reasons;

a) It provides a concrete illustration of the relationship between specific clans, and specific modes of production. For example, the Bokolooji clan, who herd excluively shorthorn zebus, are restricted to the west bank of the Benue and in the sparsely populated forest zones west of the Shebshi mountains. This reflects the relatively short period of their establishment in Gongola state.

b) The fragmented nature of FulBe society makes it difficult for development agencies to spread innovative livestock devlopment practices easily. Since clans or fractions are the fundamental units of cohesion within the society, using the clan network to disseminate ideas in a given geographical area is a practical method of having them easily accepted by a large number of cattle-owners.

Part I

1. The Ganye Development Region.

a) Choncha

Bokolooji, Kesu'en, WoDaaBe.

b) Duksami

Butanko'en, Jo'oDi, WoDaaBe, Jaafun (resident).
Bokolooji (seasonal migrants).

c) Ganye

Ba'el, Butanko'en, Degereeji, Pigaaji, Ve've'be, WoDaaBe Wandu (resident).

d) Jada

Ba'awa, Bo'oDi, Daneeji, Geroogi, Jawolawa, Ningawa, Rahaaji, Jaafun (resident).
Bokolooji, Kesu'en, WoDaaBe (seasonal migrants).

e) Kojoli

Isho'en, Kesu'en, Kiri, Wiiti'en (resident).
'Mbororo' come from Bornu and Bauchi in the dry season.

f) Lando

Borno'en, Kesu'en, Kilba'en, WoDaaBe.

g) Maitani

Jaafun, WoDaaBe.

h) Riba'adu

Ngara'en

i) Sugu

Daneeji, Wiiti (resident).
Butanko'en, Jaafun (seasonal migrants).

j) Toungo

Jaafun (resident).
Daneeji, WoDaaBe (migrants).

2. The Southern Uplands Region

a) Dorofi

Faranko'en, Galeeji, Gamadanko'en, Majanko'en, Rahaaji, Tukanko'en, We'we'Be.

b) Fali Plateau

Ba'en, BooDi, Daneeji, Jaafun, Kesu'en.

c) Falinga Plateau

Aku'en, Ba'en, Dauranko'en.

d) Garbabi

Bokolooji, Gerooji, Rahaaji, WoDaaBe.

e) Gayam

Fa'aBe, Galooro, Sulebawa, WoDaaBe, YilarBe.

f) Gembu

Barawanko'en, Butanko'en, Dauranko'en, Gamadanko'en, Rahaaji, (resident).

g) Hainare

Rahaaji

h) Jamtari

Ba'en, Bokolooji, Rahaaji, WoDaaBe.

i) Karamti

Bokolooji, WoDaaBe.

j) Kusuku

Ba'anko, Ba'en, Butanko'en, Kitako'en, Malle, Rahaaji, Rogooji (resident).

k) Mai Dule

FulBe na'i. Ba'en, Daneeji, Faranko'en, Gamadanko'en, Karawanko'en, Rahaaji.
FulBe wuro. Bewe'en, FulBe Bamle, Isa'en, Kesu'en, Kiri'en, Wiiti'en.

l) Mai Samari

BoDeeji, Butanko'en, Daneeji, Dauranko'en, Gamanko'en, Majanko'en (resident).

m) Mayo Ndaga

Ba'en, Dauranko'en, Faranko'en, Gamadanko'en, Hwe'en, Naatirbe,

n) Nguroje

Bawanko'en, Daneeji, Gudali

o) Serti

Bokolooji, WoDaaBe.

p) Tamniya

Gamadanko'en, Rahaaji.

q) Titong

Gamadanko'en.

r) Warwar

Dauranko'en, Gamadanko'en, Karawanko'en, Rahaaji.

s) Yerimaru

Ba'en, Butanko'en, Daneeji, Dauranko'en, Karawanko'en, Kiri'en, SisilBe.

t) Zangon Ajiya

Autanko'en, Bornawa, Butanko'en, Dabanko'en, Daneeji, Gamanko'en, Gerooji, Jaranko'en, Kilba'en, Kiri, Kitako'en, Naatirbe, Wiiti,

3. The Eastern Benue Lowlands.

a) Amar

Ba'en, FulBe Gok, Gorkanko'en, Jaafun, WoDaaBe.

b) Arufu

Ba'en, Bogoyanko'en, Daneeji, Gorkanko'en, JaawooBe, Manganko'en

c) Bali

Ba'en, Bokolooji, Manshara, Rahaaji, Taniraabe, WoDaaBe (all migrants).

d) Bibinu

Daneeji, WoDaaBe (migrants).

e) Chediya

Ba'en, Bogoyanko'en, BooDi, Daneeji Kano, Daneeji Katsina, Fikaaji, Jaranko'en, Kiri, Konanko'en, Moodanko'en, Naadanko'en, Rahaaji, Rimfanko'en, Saadamanko'en, Salanko'en, Tubanko'en, Wageeji, WoDaaBe,

f) Daka

Bokolooji, Kiri'en, Rahaaji, SiwalBe, WoDaaBe.

g) Dampar

Ba'en, Dabanko'en, Dindima'en, FulBe Gok, Gerooji, Gorkanko'en, Jaafun, Nadanko'en, Nordanko'en, Rahaaji, Rimfanko'en, Saadamanko'en, Wageeji.

h) Didango

Baen, Bokolooji, BooDi, Daneeji, Galeeji, Jaafun, Jananko'en, WoDaaBe.

i) Diyangwo

Kiri'en

j) Donga

Bogoyanko'en, Jalanko'en, Jamnanko'en, Saadamanko'en, Salanko'en, SisilBe, TorooBe.

k) Garba Chede

Bogoyanko'en, Bokolooji, BooDi, Bornanko'en, Daneeji, Danyanko'en, Gorkanko'en, Iloranko'en, Jaafun Doggaye, Jalanko'en, Kamni Boggi, Malanko'en, Silanko'en, Yaabaaji.

l) Gassol

Badumanko'en, Ba'en, BooDi, Dabanko'en, Daneeji, Jamnanko'en, Kesu'en, Kiri'en, Manganko'en, Nabaaji, Nordanko'en, Rahaaji, Siiwaalbe, Saadamanko'en, Tukanko'en, Wageeji, We'we'Be, Yaabaaji, YawooBe.

m) Gindin Dorowa (=Gareeji)

Ba'en, Bogoyanko'en, Daneeji, Fikaaji, Gerooji, Jaafun, Jananko'en, Keranko'en, Kiri'en, Konanko'en, Perooji, Saadamanko'en, Tubanko'en.

n) Gungunbode

Jaafun, Rahaaji.

o) Gungun Sambo

Jananko'en, Konanko'en, Nordanko'en.

p) Gwiwan Kogi

Jalanko'en, Nadanko'en, SiiwaalBe.

q) Ibi

Ba'en, Bogoyanko'en, Daneeji, Gerooji, Gorkanko'en, Jaafun, Jalanko'en, NaatirBe, Nadanko'en, Tubanko'en, YaawooBe.

r) Jatau

Bokolooji, Daneeji, Gorkanko'en, Rahaaji, Sundurje, WoDaaBe.

s) Kila Gana Dere

Bokolooji, Jaafun, WoDaaBe

t) Kufayi

Jalanko'en, SiiwaalBe.

u) Kwatan Nanido

Daneeji, We'we'Be.

v) Mai Goge

Daneeji, Gorkanko'en, Jaafun, SiiwaalBe, WoDaaBe.

w) Mai Hula

Bokolooji, Daneeji, Jaafun, JaawooBe, Jalanko'en, SisilBe, Sulebawa, WoDaaBe.

x) Malin Yero

FulBe na'i. Raahaaji.

FulBe wuro. Jaafun, Katsinanko'en.

y) Mararaba

Ba'en, Bogoyanko'en, Daneeji, Jalanko'en, Manganko'en, Wageeji, WoDaaBe,

z) Mayo Kam

Daneeji

aa) Mayo Ranewo

Ba'en, Rahaaji, WoDaaBe.

bb) Mayo Selbe

Ba'en, Butanko'en, Daneeji, Dauranko'en, Gamanko'en, Rahaaji, WoDaaBe,

cc) Mutum Biyu

Ba'en, Babanko'en, Babbal, Be Girga, BooDi, Daayi, Daga'en, Daneeji, Degereeji, Fa'aBe, Gerkanko'en, Ibegiye, Ilorkano'en, Kiri'en, Sundurje, TaniraaBe, Uda'en, WoDaaBe, We'we'Be, Yaabaaji, Yakanaaji.

dd) Nanguru

Ba'en, Gorkanko'en, Kiri'en, Konanko'en, Moodanko'en, Rahaaji, Rimfanko'en, Wiya'en

ee) Sansane

Gerooji, Kiri'en, Manganko'en, Rahaaji, Rimfanko'en, Saadamanko'en, ToorooBe, Wageeji, YaawooBe.

ff) Sarkin Kudu

Ba'en, Ciromanko'en, Daneeji, FulBe Gok, Gezanko'en, Gommanko'en, Gorkanko'en, Jalanko'en, Keranko'en, Komanko'en, Moodanko'en, Nadanko'en, We'we'Be, WoDaaBe.

gg) Sheka

Ba'en, Daneeji, HorewalDe, Jaafun, Rahaaji, SiwalBe, We'we'Be.

hh) Shomo Petel

Ba'en, WoDaaBe.

ii) Sunkani

Jaafun

jj) Suntai

Ba'en, Bogoyanko'en, Daneeji, Galeeji, Jaafun, Jalanko'en, Jamnanko'en, Kawaaji, Malanko'en, Moodanko'en, NaatirBe, Nadanko'en, SiiwalBe.

kk) Takalafiya

Daneeji, Kiri'en, Rahaaji, YaawooBe.

ll) Takum

Bogoyanko'en, Daneeji,

mm) Tonti

Bokolooji, WoDaaBe.

nn) Tsokundi

Ba'en, Bogoyanko'en, Borkumanko'en, BooDi, Daneeji, Gerooji, NaatirBe, Tubanko'en.

oo) Wukari

Bogoyanko'en, Daneeji, Galeeji, Gorkanko'en, Jalanko'en, Rahaaji, Siwaalbe, WoDaaBe,

pp) Wuro Jam

Daneeji, Garbanko'en, Jalanko'en, Kiri'en, Nadanko'en, Nordanko'en, Rahaaji, Rimfanko'en, Saadamanko'en, Wageeji.

qq) Zudei

Daneeji, Jaafun, WoDaaBe

Section II.

This appendix lists alphabetically all the names of groups cited as present in southern Gongola State. They are recorded in the form originally given. As some forms are Hausa, and others Fulfulde, I have attempted to normalise them all to a standard Fulfulde spelling. They have been compared to a comprehensive list prepared by Nelson and Na'ango (n.d.). After each name, I have given the place of origin of the group, as far as this is known. In some cases, informants conflicted with published or archival material and I have noted this as far as possible.

Akuji see Daneeji. Also Aku'en.
Autanko'en. A **suudu** of the Jaafun.
Ba'anko see Bawanko'en.
Ba'awa see Ba'en.
Ba'el see Ba'en.
Ba'en.

One of the most widespread clans in Adamawa, mentioned by Barth, who travelled in this area in the 1850's as one of the original nomadic groups to reach Bornu in the pre-Jihad period.

Babanko'en.
Babbal.
Badumanko'en.
Barawanko'en. A group from the Barawa area south of Bauchi.
Bawanko'en. Perhaps an elided form of Barawanko'en (q.v.)
Be Girga.
Bewe'en
Bogoyanko'en. A **lenyol.**
Bokolooji.
BooDi. A **lenyol** that migrated from Kano via Bauchi and Zing.
Borkumanko'en.
Bornawa. A Hausa term referring to all migrants from Bornu, in this case probably to WoDaaBe. Also Borno'en and Bornanko'en.
Bororo see Mbororo.
Butanko'en. A widespread group from Buta, near Ningi.
Ciromanko'en.
Daayi
Dabanko'en. A **suudu** of the Badumanko'en.
Daga'en.
Daneeji.

A large group named for the white long-horns it specialises in rearing. Their most recent homeland was between Kano and Katsina, and many individuals maintain strong residential ties with this area. The Daneeji only began to colonise the plateaux of the Shebshi range after 1975, although they have been present on the Mambila plateau since 1950.

Danyanko'en.
Dauranko'en. A group from Daura, a **suudu** of both the Gorkanko'en and the SiwalBe.
Degereeji. A WoDaaBe **lenyol** (Stenning, 1959:196 & Dupire, 1970:325).

Dindima'en.
Fa'aBe.
Faranko'en. A Jaafun lineage from Ngaundere.
Fikaaji. A group that migrated from Fika town in northeast Central Nigeria.
FulBe Bamle.
FulBe Gok.
Galeeji. A **lenyol.**
Galooro.
Gamadanko'en. A lineage of the Jos FulBe.
Gamanko'en. A **lenyol.**
Garbanko'en.
Gerkanko'en.
Geroogi see Gerooji.
Gerooji. Also Gerewji. A **lenyol.**
Gezanko'en.
GommanKo'en.
Gorkanko'en. A **lenyol.**
Gudali.

A general name for all groups from the Sokoto area herding the white gudali shorthorn cattle.

HorewalDe.
IBegiye.
Iloranko'en.
Isho'en.
Jaafun.

Also Djafun, Jafun, Jaafun'en. The Jaafun claim to have come from Bauchi, but most of the groups in southern Gongola have come from northern Cameroun in the recent past. Many of the Lamidates of Adamawa were originally conquered by Jaafun, for example Ngaundere (Pfeffer, 1937).

JaawooBe.
Jallanko'en. A **lenyol.**
Jamnanko'en.
Jananko'en.
Jaranko'en. Probably an elided form of Jarawanko'en, a group from the Jarawa area south of Bauchi. A Jaafun **lenyol.**
Jawolawa.
Jo'oDi.
Kamni Boggi.
Karawanko'en.
Katsinanko'en.
Kawaaji
Kesu'en.

One of the original nomadic groups to enter Adamawa in the pre-Jihad period (Webster, 1917). Originated from Kano, and migrated via Zing.

Kilba'en. A group from the Kilba area, near Hong in northern Gongola State.
Kiri. A sedentary **lenyol** of the Ba'en (Mohammadou, 1981:231).

Kitako'en.
Komanko'en.
Konanko'en. A **suudu** of the SiwalBe, presumably from Kona in Jukun country.
Majanko'en. A **suudu** of the Jaafun.
Malle. A group from Mali who migrated to the Mambila plateau in the 1960's.
Manganko'en. A group from Manga, near Panyam in Plateau State. A HusooBe lineage.
Manshara. A Hausa name applied to a FulBe section.
Mbororo, also Bororo.

A general name applied by outsiders to all nomadic FulBe. The term is not used by the nomads themselves, who use either FulBe na'i or FulBe ladde.

Moodanko'en. A **suudu** of the SiwalBe.
Naadanko'en. A **suudu** of the SiwalBe.
Naatirbe. A **lenyol.**
Nabaaji.
Ngara'en.
Ningawa. A Hausa term applied to those coming from the Ningi area, a **suudu** of the WeweBBe.
Nordanko'en.
Perooji.
Pigaaji.
Raahaaji.

A term applied to a **lenyol** specialised in the rearing of the 'red' longhorn, known as BoDeeji in the southern Gongola area.

Rimfanko'en. Also Rimpanko'en. A nick-name given a **suudu** of the SiwalBe coming from Kano.
Rogoji.
Saadamanko'en. A **suudu** of the SiwalBe.
Salanko'en.
SisilBe.
SiiwaalBe.

Also SualBe. A nomadic lineage of the Ba'en, migrating from Zaria, via Bauchi and Zing. A **lenyol** with numerous **suudu** in this area.

Silanko'en
Sundurje.
TaniraaBe.
TorooBe.
Tubanko'en. A **lenyol.**
Tukanko'en.
Uda'en. A **lenyol** specialised in sheep-herding.
Ve've'be. also WeweBBe, WeweDBe, -a nomadic lineage of the Ba'en.
Wageeji. Also Waageeji. A **suudu** of the SiwalBe.
Wiiti. A common term applied to settled FulBe in the Ganye Region. The original FulBe Wiiti claim to have come from Gombe.
Wiya'en.
Wuuti see Wiiti.

WoDaaBe.

The most widespread group of all, the WoDaaBe are spread from Mali to Sudan. They are divided into numerous lineages (**lenyol**). Most of the WoDaaBe remain nomadic, although they have settled sporadically in areas of southern Gongola.

Yaabaaji.
YaawooBe.
YilarBe.

Section III.

The Hierarchy of Nomadic FulBe Social Organization.

(From Dupire, 1970:313).

lenyol Maximal Lineage.

(The largest group claiming a common ancestry, reckoned patrilineally.)

suudu Secondary Lineage.

(The group that the **lenyol** splits into for migrations.)

The **suudu** gathers for the **worso** or annual assembly, usually during the wet season, when it is practical to collect in the same area.

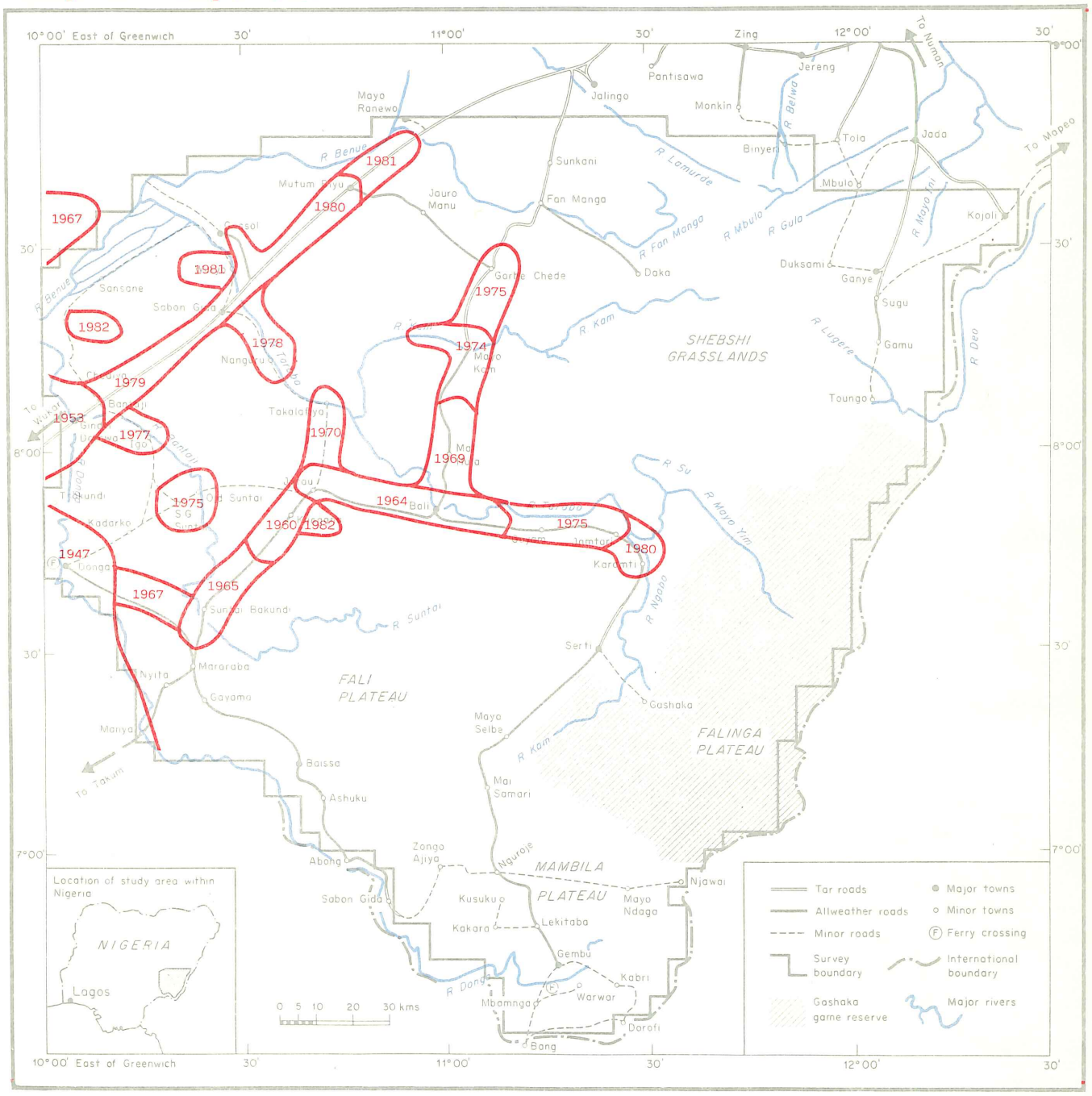
wuro Minimal lineage.

Wuro is also used to refer to 'compound' and is applied to the clusters arriving in the course of a migration.

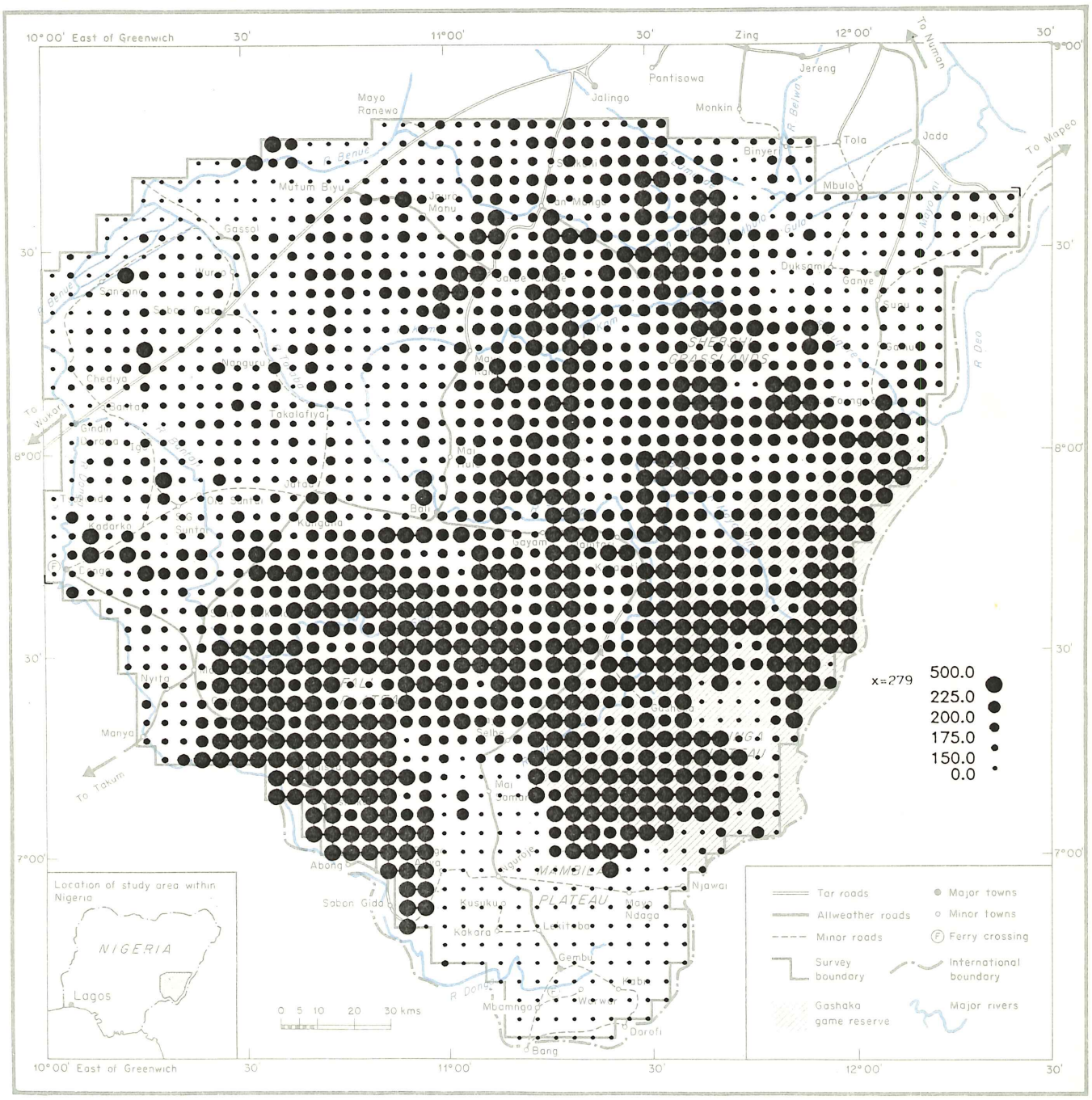
APPENDIX VI

ADDITIONAL MAPS

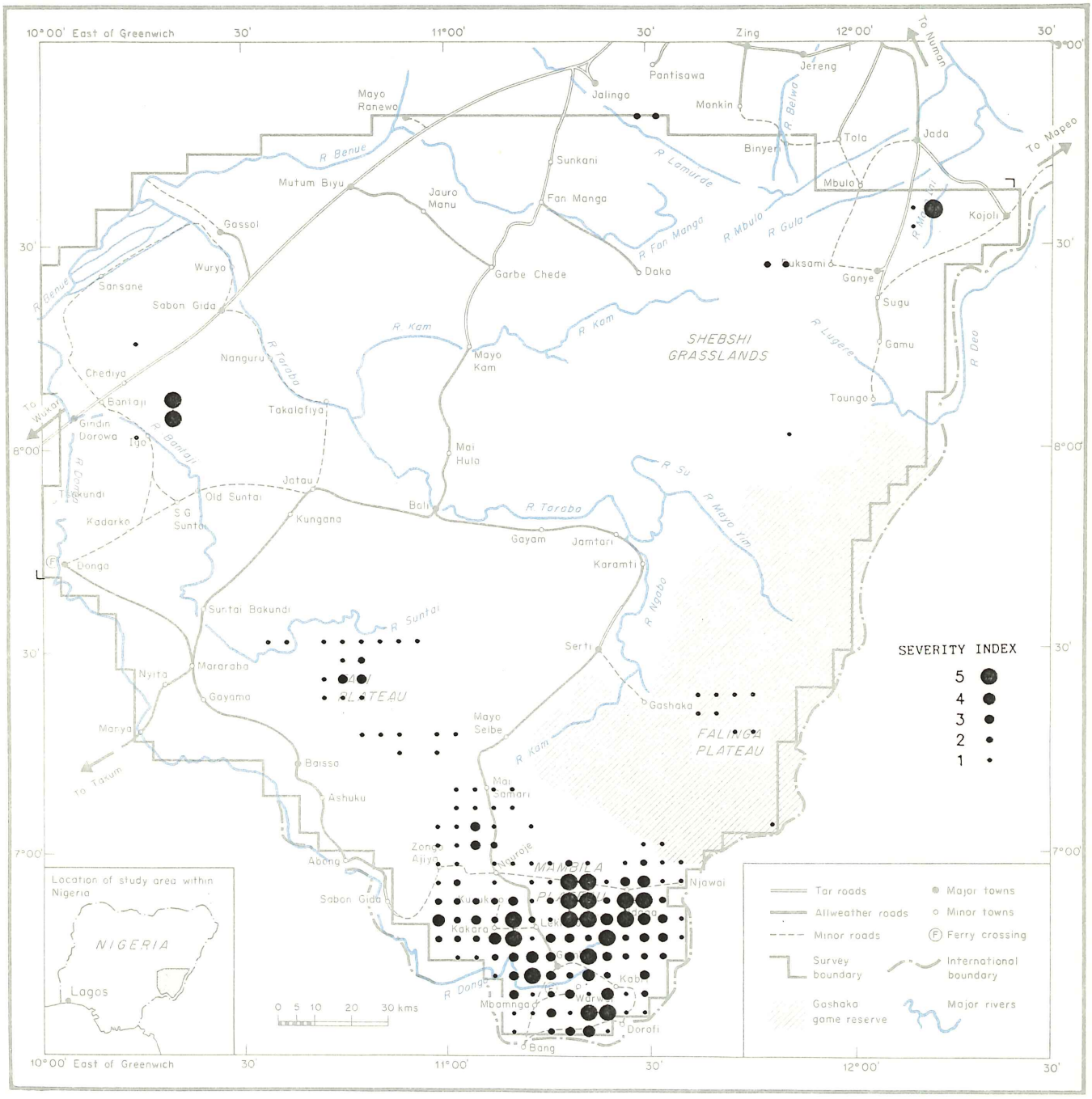
Map III Expansion of Tiv Farmers



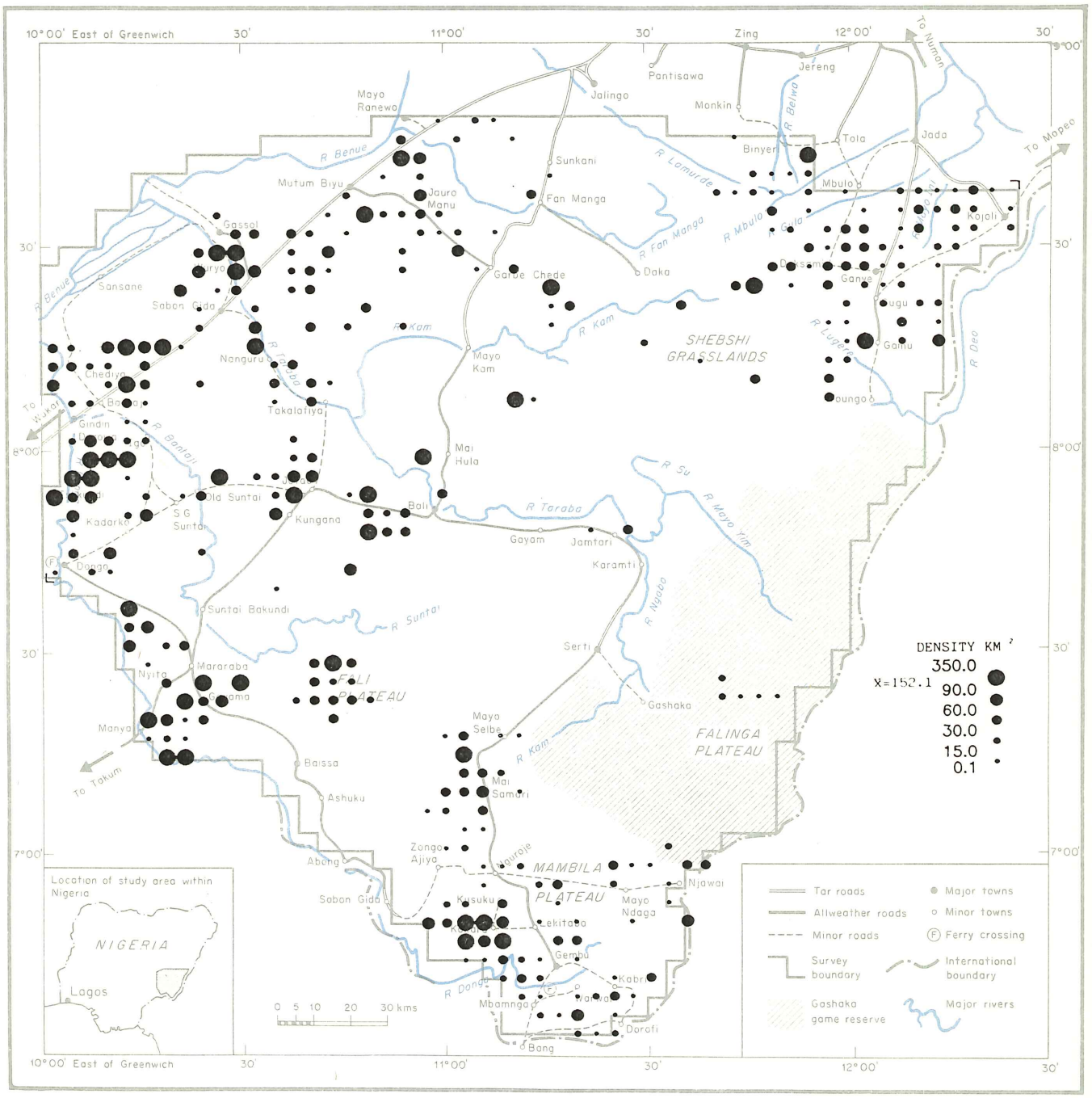
Map IV Vegetation Density Index



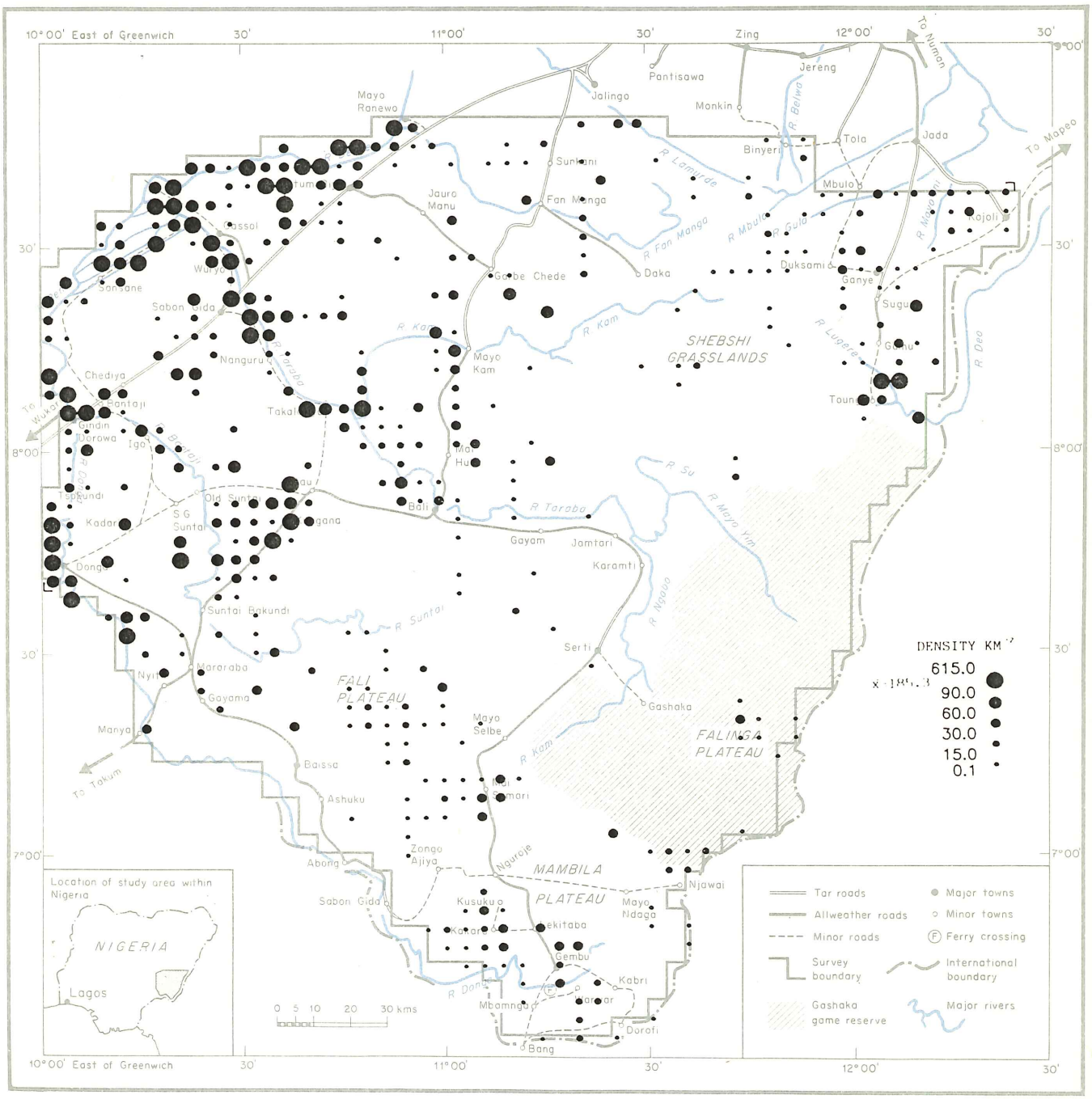
Map V Erosion



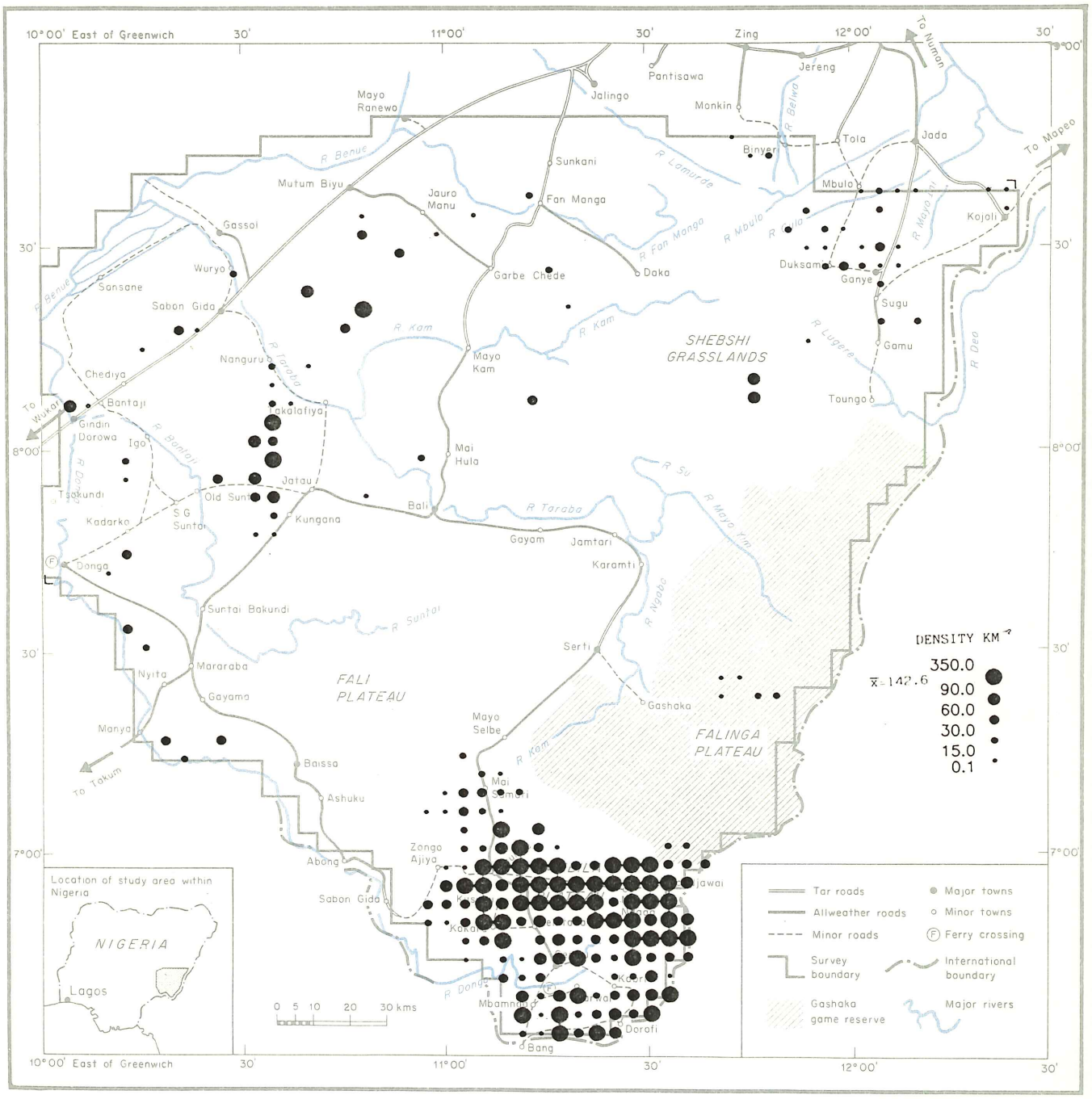
Map VI White Cattle : Wet Season 1983



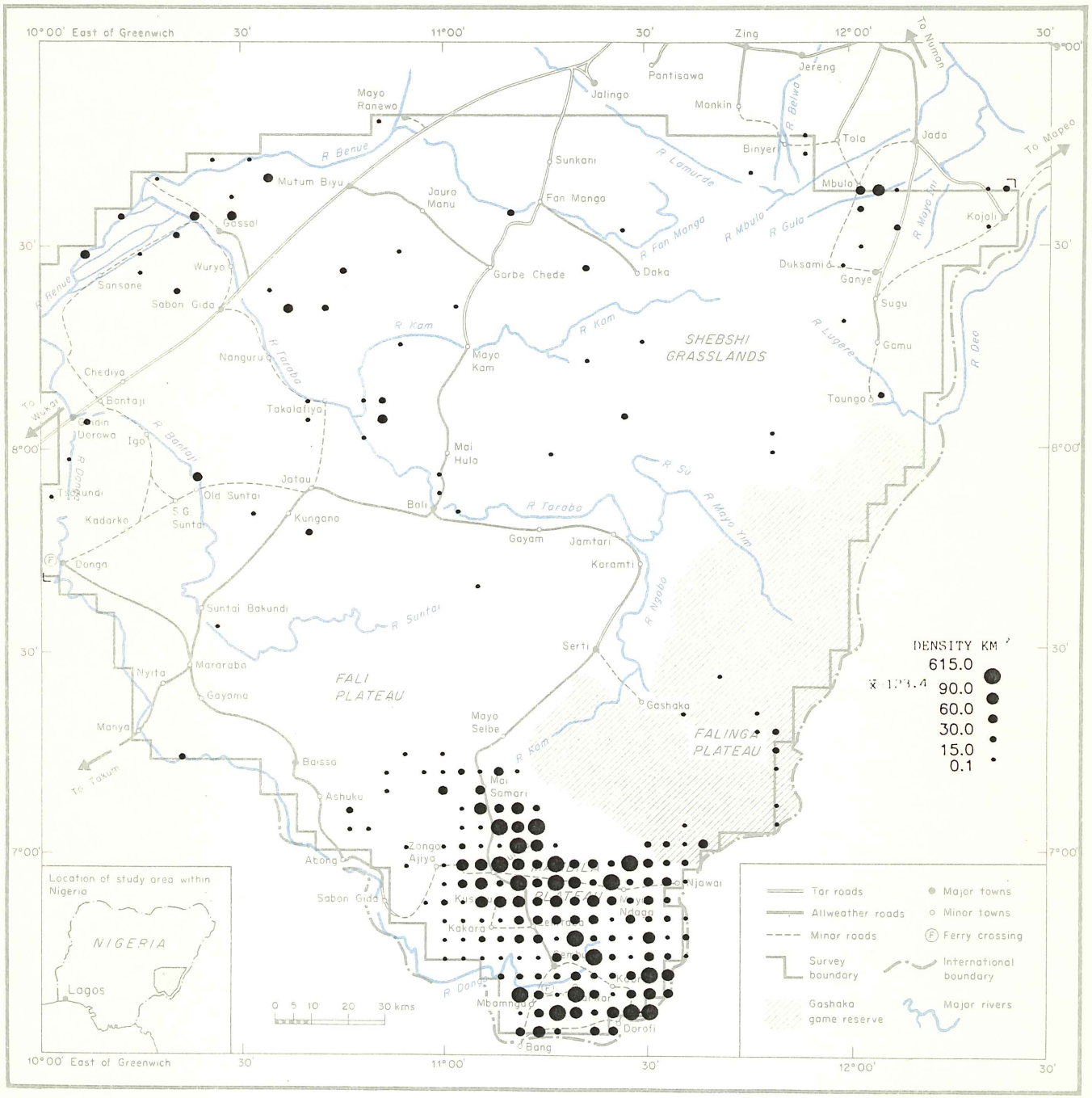
Map VII White Cattle : Dry Season 1984



Map VIII Red Cattle : Wet Season 1983



Map IX Red Cattle : Dry Season 1984



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