

LIVESTOCK AND LAND USE IN
SOUTHERN GONGOLA STATE

Working Paper: 7

STRATIFIED WET SEASON CATTLE POPULATIONS
IN SOUTHERN GONGOLA STATE.

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1 Introduction.

Resource Inventory and Management (RIM) Limited has been contracted by the Nigerian Federal Livestock Department's Livestock Project Unit to carry out an assessment of livestock and land use in southern Gongola State, for the purposes of regional development planning. Extensive aerial and ground surveys were conducted during the wet season of 1983, the preliminary results of which have already been reported (RIM, 1983). Complementary surveys are scheduled to take place 1983/84 dry season.

This working paper forms one of a series of supporting documents prepared by RIM scientists during the course of their studies. It provides an updated and detailed breakdown of the cattle population in southern Gongola State, and is based on a more thorough computer analysis of the information collected during the wet season aerial survey (RIM, 1983). Estimates are given of the number of cattle and the number of cattle herds found within selected regional and land use categories, together with estimates of mean density, and mean herd size in the various strata.

The data are presented mainly in tabular form, with a few graphs to illustrate some major trends. At this stage commentary has been kept to a minimum, in anticipation of the results of the forthcoming dry season survey, which should provide the basis for more meaningful comparison and discussion.

2 Method of Analysis.

Population and herd estimates for each stratum within the ten selected regional and land use categories were determined using the ratio method of estimation recommended by Jolly (1969), covered in detail by Norton Griffiths (1978) and outlined in RIM (1983).

In essence, for each regional and land use category, the gridded aerial survey data of cattle and herd numbers were analysed line by line, and mean values calculated for each stratum represented in each line. From these an overall mean stratum value for the area surveyed was determined, weighted in favour of those lines with a larger number of representative grids. Standard errors were also calculated and are shown as percentages of the mean values given. Red and white cattle populations were analysed separately, and their results pooled to provide figures for the total cattle population.

3 Results.

3.1 Total Wet Season Cattle Population of Southern Gongola State.

Table 1 provides revised estimates of the red and white cattle populations present within the 43,875 square kilometer aerial survey zone of southern Gongola state during the 1983 wet season. These figures have been slightly modified, and represent an updated version of those presented in Table 1, page 9, of the preliminary wet season report (RIM, 1983).

3.2 Cattle Populations in the Principal Land Systems.

Bawden and Tuley (1966) defined and mapped 30 land systems in Southern Saradauna and Southern Adamawa Provinces in the southern part of what is now known as Gongola state. Twenty-seven of these land systems fall within the RIM's aerial survey zone. Wet season cattle population estimates within each of the principal land systems are given in table 2; only land systems occupying an area larger than 500 square kilometers are presented in the table. Those excluded are: (1) Gotel Mountains - 125 square kilometers; (2) Chabal Hindu Plateau - 25 square kilometers; (3) Vogel Peak - 25 square kilometers; (6) Tiba Plateau - 325 square kilometers; (10) Filinga Plateau - 100 square kilometers; (11) Kiri Plateau - 275 square kilometers; (12) Sabere Platform - 100 square kilometers; (18) Atlantika Mountains - 50 square kilometers; and (22) Zinna Platform - 75 square kilometers.

3.3 Cattle Populations in the Regional Land Systems.

The 27 LRD land systems that occurred within the southern Gongola survey area were amalgamated into five regional groupings, each with generally similar characteristics. The component land systems within each land region are as follows: The Mambilla Plateau from LRD land systems 4,5,7,8,9 and 13; The Central Complex from LRD Systems 1,2,3,6,10,11,12,14,15,16,17,18,19,24 and 26; The Central Lowlands from LRD land systems 25 and 29; The Ganje Lowlands from LRD land systems 20,22 and 23; The Benue Flood Plains from LRD land system 30. Table 3 provides a breakdown of the estimated cattle population within each of these regional land systems.

3.4 Cattle Populations in Major Vegetation and Land Use Types.

The most upto date and comprehensive vegetation and land use maps of Nigeria are those derived by interpretation of Side Looking Airborne Radar (SLAR) imagery (Hunting Technical Services, 1978), and published by the Federal Department of Forestry (1978) as a set of 69 1:250,000 scale maps covering the entire country. Seven of the nine major vegetation and land use formations identified in Nigeria are represented in RIM's survey zone in southern Gongola State. Two of these, however, covered areas of less than 500 square kilometers: Shrubland and Thicket - 25 square kilometers; Cultivation > 60% intensity - 50 square kilometers, and have therefore been excluded from table 4 which gives a breakdown of cattle population by the remaining five predominant vegetation and land use types.

3.5 Cattle Populations at Various Altitudes.

With reference to a LRD/DOS (1972) relief map of the Benue valley the study area on southern Gongola state was divided into four altitude categories at intervals of 500 meters above sea level. The estimated cattle populations with these altitude ranges are given in table 5.

3.6 Cattle Populations in River Catchments.

The study area in southern Gongola state was divided into 11 river catchments, on the basis of boundaries indicated in Bawden and Tuley (1966). Table 6 gives a breakdown of wet season cattle populations within each of these principal catchments.

3.7 Cattle in Local Government Authority Areas.

The boundaries shown on the Gongola State Map, published in 1982 by the Survey Department in Yola, indicate that 14 Local Government Authority areas lie wholly or partly within RIM's survey zone. The estimated total wet season cattle populations for each of the six LGA's completely contained within the study area, are given in table 6, which also shows the partial cattle populations of seven other LGA's whose boundaries extend outside the zone surveyed. The remaining area - Zing - has been excluded because only 100 square kilometers lies within the study area.

3.8 Cattle Populations at Various Distances from Roads.

Using the Gongola State Map as reference, the distance from the centre of each grid square within the survey zone to the nearest major road was determined, from which the wet season cattle populations at various distances from major roads were estimated. The results are given in table 8 and the trends for "all cattle" illustrated graphically in figure 1.

3.9 Cattle Populations at Various Distances from Major Towns.

Using the Gongola State Map as reference, the distance from the centre of each grid square within the survey zone to the nearest major town was determined, from which the wet season cattle populations at various distances from major towns were estimated. The results are given in table 9 and the trends for "all cattle" are illustrated graphically in figure 2.

3.10 Cattle Populations at Various Distances from Major Rivers.

Using the 1:250,000 topographical maps produced by the Nigerian Federal Surveys Department as reference, the distance from the centre of each grid square within the survey zone to the nearest major river was determined, from which the wet season cattle populations at various distances from major river were estimated. The results are given in table 10 and the trends for "all cattle" are illustrated graphically in figure 3.

6 References.

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TABLE 1: WET SEASON CATTLE POPULATION ESTIMATES FOR SOUTHERN GONGOLA STATES*.

| | Total Population Size** | Population Density km | Stocking Rate ha/hd | Total Number Herds** | Mean Herd Size |
|-----------------|-------------------------------|-----------------------------|---------------------------|----------------------------|----------------------|
| All Cattle | 686,700 | 15.65 | 6.4 | 15,800 | 43 |
| Red Cattle*** | 321,700 (26) | 7.33 | 13.6 | 8,300 (15) | 39 |
| White Cattle*** | 365,000 (10) | 8.32 | 12.1 | 7,500 (14) | 49 |

* Area Surveyed: 43,875 square kilometers.

** Figures in parenthesis are % standard error.

*** Red cattle are mostly "Rahaji" = "Bodeeji"

White cattle are mostly "Bunaji" = "Daneeji"

TABLE 2: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL LAND SYSTEMS** OF SOUTHERN GONGOLA STATE.

| Land Systems | Area sq. Km. | ALL CATTLE | | | RED CATTLE*** | | | WHITE CATTLE*** | | | | | |
|----------------------|-----------------|-----------------|---------------------|----------------|-------------------|-----------------|---------------------|-----------------|-----------------|---------------------|----------------|------------|-----|
| | | Total Number | Density /sq. Km. | Herd Number | Mean Herd Size | Total Number | Density /sq. Km. | Herd Number | Total Number | Density /sq. Km. | Herd Number | | |
| 4 Mambilla 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 Mambilla 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 | 1,230 | 6 | 1,100 (51) | 0.9 | 30 (50) | 37 | 5,800 (36) | 4.7 | 1,200 (60) | 5 |
| 23 Ini Plain | 1,300 | 29,600 | 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 (98) | 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't 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" = "Daneaji".

TABLE 3: WET SEASON CATTLE POPULATION* IN REGIONAL LAND SYSTEMS OF SOUTHERN GONGOLA STATE.

| Land Region | Area sq. Km. | ALL CATTLE | | | RED CATTLE | | | WHITE CATTLE | | | | | |
|--------------------|--------------|--------------|------------------|-------------|----------------|--------------|------------------|--------------|-----------|--------------|------------------|-------------|-----------|
| | | Total Number | Density /sq. Km. | Herd Number | Mean Herd Size | Total Number | Density /sq. Km. | Herd Number | Herd Size | Total Number | Density /sq. Km. | Herd Number | Herd Size |
| Mambilla 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 | 2,400 | 15 | 9,000 (28) | 3.4 | 500 (45) | 18 | 27,700 (20) | 10.7 | 1,900 (37) | 15 |
| Benue Floodplains | 2,625 | 33,300 | 12.7 | 310 | 107 | 800 (65) | 0.3 | 10 (57) | 80 | 32,500 (37) | 12.4 | 300 (38) | 100 |

* Figures in parenthesis are % standard error.

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

TABLE 4: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL VEGETATION AND LAND USE TYPES IN SOUTHERN GONGOLA STATE.

| Vegetation/ Land Use Type | ALL CATTLE | | | RED CATTLE** | | | WHITE CATTLE** | | | | | |
|---------------------------------|-----------------|-----------------|---------------------|-----------------|---------------------|--------------|-----------------|--------------------|----------------|--------------|------------|-----|
| | Area sq. km. | Total Number | Density /sq. km. | Total Number | Density /sq. km. | Herd Size | Total Number | Density sq. km. | Herd Number | Herd Size | | |
| Grassland | 9,700 | 366,600 | 37.8 | 9,000 | 27.1 | 41 | 263,000 (19) | 6,800 (19) | 103,600 (15) | 10.7 | 2,200 (13) | 47 |
| W-S-G / W** Transition | 13,775 | 142,100 | 10.3 | 2,060 | 2.1 | 69 | 28,700 (20) | 560 (21) | 113,400 (15) | 8.2 | 1,500 (12) | 76 |
| Woodland | 13,425 | 52,000 | 3.9 | 1,170 | 0.9 | 44 | 12,600 (41) | 270 (38) | 39,400 (25) | 2.9 | 900 (22) | 44 |
| Forest | 1,175 | 1,500 | 1.3 | 20 | 0.3 | 75 | 300 (92) | 10 (91) | 1,200 (98) | 1.0 | 10 (86) | 120 |
| 30 - 60% Cultivation | 5,725 | 122,800 | 21.4 | 3,500 | 2.9 | 35 | 16,800 (20) | 700 (40) | 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" = "Daneeki".

TABLE 5: WET SEASON CATTLE POPULATIONS* IN RELATION TO ALTITUDE
IN SOUTHERN GONGOLA STATE.

| Altitude meters asl | Area sq.Km. | ALL CATTLE | | | RED CATTLE | | | WHITE CATTLE | | | | | |
|------------------------|----------------|-----------------|--------------------|----------------|--------------|-----------------|--------------------|----------------|--------------|-----------------|--------------------|----------------|--------------|
| | | Total Number | Density /sq.Km. | Herd Number | Herd Size | Total Number | Density /sq.Km. | Herd Number | Herd Size | Total Number | Density /sq.Km. | Herd Number | Herd 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" = "Daneaji".

TABLE 6: WET SEASON CATTLE POPULATIONS* IN THE PRINCIPAL RIVER CATCHMENTS OF SOUTHERN GONGOLA STATE.

| Catchment | Area sq.km. | ALL CATTLE | | | RED CATTLE | | | WHITE CATTLE | | | | | |
|-------------------|----------------|-----------------|--------------------|----------------|--------------|-----------------|--------------------|----------------|--------------|-----------------|--------------------|----------------|--------------|
| | | Total Number | Density /sq.km. | Herd Number | Herd Size | Total Number | Density /sq.km. | Herd Number | Herd Size | Total Number | Density /sq.km. | Herd Number | Herd 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 | 100 | 40 | 5,500 (53) | 1.2 | 80 (50) | 69 | 1,700 (59) | 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 | 600 | 46 | 6,900 (52) | 1.3 | 100 (44) | 69 | 24,500 (22) | 4.7 | 500 (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 | 1,440 | 11 | 1,300 (50) | 0.7 | 40 (49) | 33 | 14,100 (34) | 7.6 | 1,400 (55) | 10 |
| 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" = "Daneaji".

TABLE 7: 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. | Herd Number | Total Number | Density /sq.km. | Herd Number | Total Number | Density /sq.km. | Herd Number | |
| Bali | 8,675 | 72,900 | 8.4 | 1,200 | 20,000 (24) | 2.3 | 420 (31) | 52,700 (22) | 6.1 | 780 (22) | 68 |
| Donga** | 2,950 | 55,700 | 18.9 | 660 | 5,500 (23) | 1.9 | 100 (41) | 50,200 (12) | 17.0 | 560 (14) | 90 |
| Ganye | 7,050 | 51,200 | 7.3 | 2,350 | 11,000 (30) | 1.6 | 250 (22) | 40,200 (22) | 5.7 | 2,100 (39) | 19 |
| Gashaka | 7,000 | 4,400 | 0.6 | 120 | 1,700 (45) | 0.2 | 40 (45) | 2,700 (50) | 0.3 | 80 (40) | 34 |
| Jada** | 325 | 6,200 | 19.1 | 500 | 2,600 (41) | 8.1 | 350 (65) | 3,600 (16) | 11.0 | 150 (21) | 24 |
| Jalingo** | 1,150 | 3,300 | 2.9 | 67 | 600 (90) | 0.5 | 7 (89) | 2,700 (38) | 2.4 | 60 (29) | 45 |
| Kurmi | 3,025 | 14,800 | 4.9 | 410 | 500 (65) | 0.2 | 30 (71) | 14,300 (38) | 4.7 | 390 (38) | 37 |
| Mambilla | 4,200 | 320,300 | 76.3 | 8,290 | 263,500 (7) | 62.7 | 6,790 (8) | 56,800 (18) | 13.5 | 1,500 (16) | 38 |
| Matar Fada** | 1,225 | 61,200 | 50.0 | 660 | 2,700 (44) | 2.2 | 40 (36) | 58,500 (18) | 47.7 | 620 (17) | 94 |
| Mutum Bixu | 5,625 | 84,900 | 15.1 | 1,100 | 12,000 (30) | 1.9 | 240 (25) | 72,900 (16) | 11.4 | 940 (13) | 78 |
| Nassarawa** | 275 | 5,600 | 20.4 | 150 | 500 (85) | 1.8 | 20 (86) | 5,100 (43) | 18.6 | 130 (36) | 39 |
| Yelli** | 350 | 4,700 | 13.4 | 170 | 400 (45) | 1.0 | 20 (41) | 4,300 (20) | 12.3 | 150 (18) | 29 |
| Yorro** | 375 | 800 | 2.2 | 20 | 0 | 0 | 0 | 800 (78) | 2.2 | 20 (81) | 40 |

* Figures in parenthesis are % standard error.

** Indicate LGAs extending beyond area surveyed, and partial cattle population.

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

Handwritten notes: "I 88" and "49 goats" circled.

TABLE 8: WET SEASON CATTLE POPULATIONS* AT VARIOUS DISTANCES FROM MAJOR ROADS
IN SOUTHERN GONGOLA STATE.

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

* Figures in parenthesis are % standard error.

** Red cattle are mainly "Rahaji" = "Bodeeji",
White cattle are mainly "Banaji" = "Daneaji"

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

| Distance from Major Town km | ALL CATTLE | | | | RED CATTLE** | | | | WHITE CATTLE** | | | | |
|-----------------------------|-------------|--------------|-----------------|-------------|--------------|--------------|-----------------|-------------|----------------|--------------|-----------------|-------------|-----------|
| | Area sq.km. | Total Number | Density /sq.km. | Herd Number | Herd Size | Total Number | Density /sq.km. | Herd Number | Herd Size | Total Number | Density /sq.km. | Herd Number | Herd 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 surveyed, and partial cattle population.

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

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

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

* Figures in parenthesis are % standard error.

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

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FIGURE 1: ALL CATTLE AT VARIOUS DISTANCES FROM MAJOR ROADS.

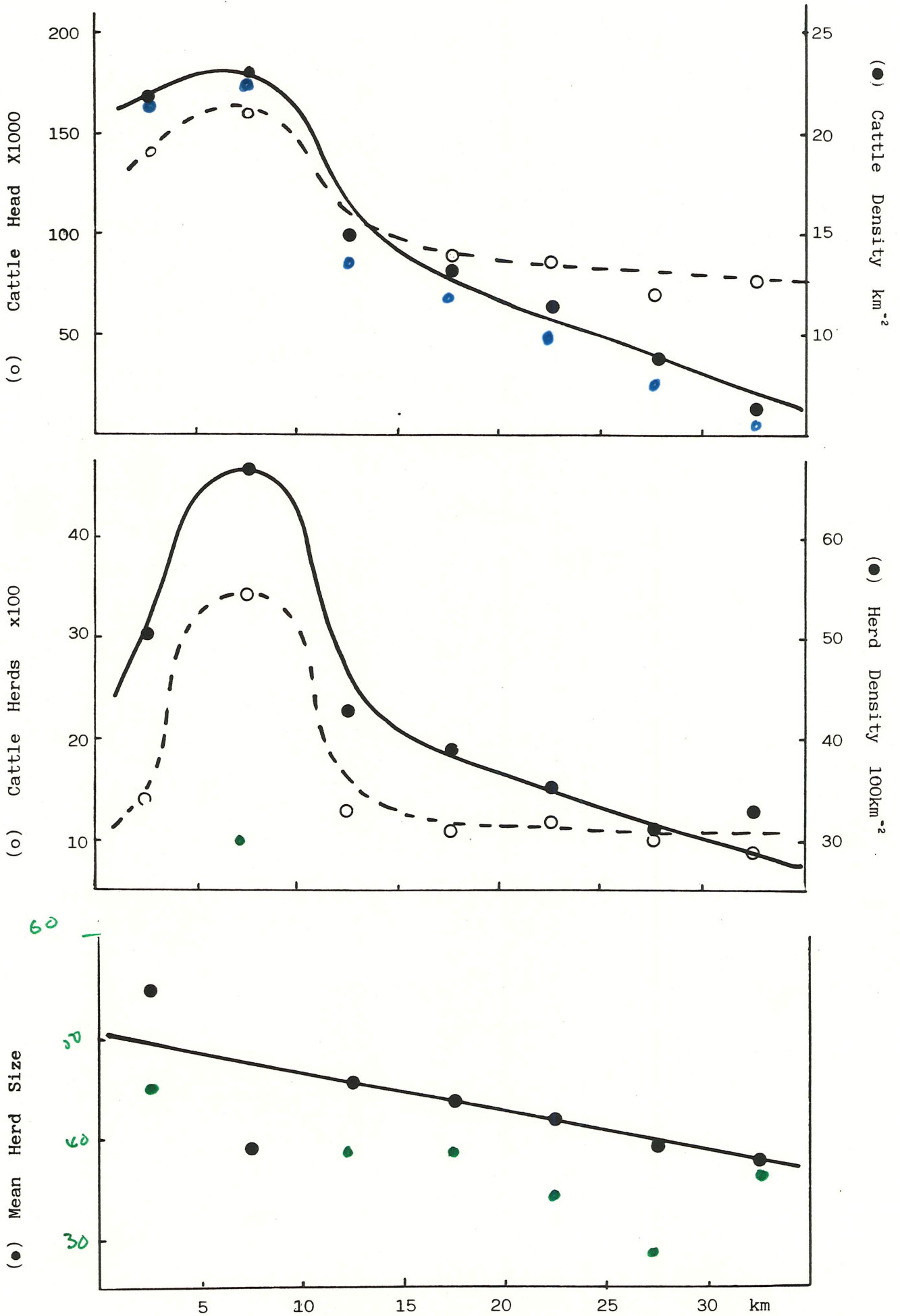


FIGURE 2: ALL CATTLE AT VARIOUS DISTANCES FROM MAJOR TOWNS.

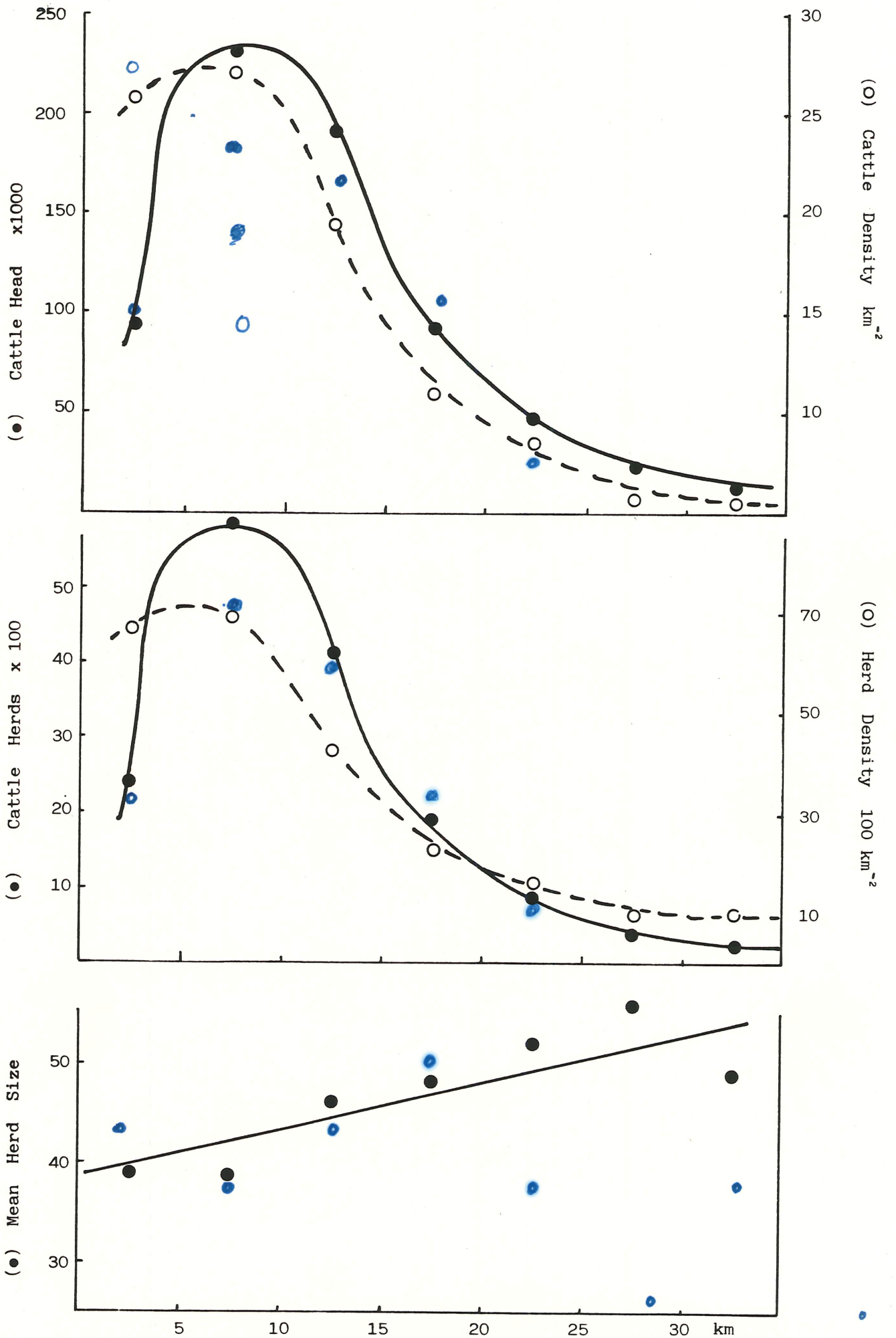


FIGURE 3: ALL CATTLE AT VARIOUS DISTANCES FROM MAJOR RIVERS.

