



TRYPANOTOLERANT LIVESTOCK IN WEST AND CENTRAL AFRICA

VOLUME 3 – A DECADE'S RESULTS



ILCA

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**TRYPANOTOLERANT LIVESTOCK
IN WEST AND CENTRAL
AFRICA**

VOLUME 3 – A DECADE'S RESULTS

by

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Table of Contents

	PAGE
PREFACE	xv
INTRODUCTION	xvii
PART I: POTENTIAL UTILISATION OF TRYPANOTOLERANT LIVESTOCK	1
CHAPTER 1: POPULATIONS AND THEIR CHANGES	3
1.1 HUMAN AND LIVESTOCK POPULATIONS	3
1.1.1 HUMAN POPULATION	3
1.1.2 CATTLE POPULATION	5
1.1.3 SHEEP AND GOAT POPULATION	5
1.2 TRYPANOTOLERANT CATTLE GROUPS	5
1.2.1 THE N'DAMA BREED	7
1.2.2 THE SAVANNAH SHORTHORN	8
1.2.3 THE DWARF SHORTHORN	8
1.2.4 ZEBU X HUMPLESS CATTLE GROUP	9
1.3 TRYPANOTOLERANT SMALL RUMINANT BREEDS	10
CHAPTER 2: RESEARCH ACTIVITIES	13
2.1 RESEARCH POLICIES ON TRYPANOTOLERANT LIVESTOCK BREEDING	13
2.2 RESEARCH ACTIVITIES ON THE PRODUCTIVITY OF TRYPANOTOLERANT BREEDS	14
2.3 RESEARCH ON TRYPANOTOLERANCE	16
2.3.1 VECTORIAL POTENTIAL OF TSETSE	16
2.3.2 STUDY OF THE PARASITE	17
2.3.3 FINAL-HOST RESPONSE	17
CHAPTER 3: DEVELOPMENT ACTIVITIES	21
3.1 PLANNING AND COORDINATION OF DEVELOPMENT ACTIVITIES	21
3.1.1 PLANNING	21
3.1.2 COORDINATION	23

3.2 MULTIPLICATION UNITS	24
3.2.1 CATTLE PROGRAMMES	24
3.2.2 SMALL RUMINANT PROGRAMMES	26
3.2.3 PERFORMANCE EVALUATION PROGRAMMES	26
3.3 DEVELOPMENT PROJECTS	28
3.3.1 LIVESTOCK DEVELOPMENT PROJECTS	28
3.3.2 INTEGRATED RURAL DEVELOPMENT PROJECT WITH A "LIVESTOCK PRODUCTION" COMPONENT	31
PART II: UPDATING OF COUNTRY STUDIES	35
CHAPTER 1: SENEGAL	37
1.1 BACKGROUND	37
1.2 LIVESTOCK NUMBERS AND DISTRIBUTION	38
1.3 CATTLE	39
1.3.1 BREED CHARACTERISATION	39
1.3.2 DISEASES	40
1.3.3 HERD MANAGEMENT	41
1.4 SHEEP AND GOATS	41
1.4.1 INDEX OF PRODUCTIVITY	41
1.4.2 DISEASES	42
1.5 RESEARCH AND DEVELOPMENT ACTIVITIES	42
1.5.1 RESEARCH CENTRES	42
1.5.2 DEVELOPMENT PROJECTS	43
1.6 SELECTED BIBLIOGRAPHY	44
1.7 MAJOR CHANGES SINCE 1977	46
CHAPTER 2: THE GAMBIA	47
2.1 BACKGROUND	47
2.2 LIVESTOCK NUMBERS AND DISTRIBUTION	47
2.3 CATTLE	48
2.3.1 N'DAMA BREED CHARACTERISATION	48
2.3.2 DISEASES	50
2.3.3 HERD MANAGEMENT AND COMPOSITION	50
2.4 SHEEP AND GOATS	51

2.5 RESEARCH AND DEVELOPMENT ACTIVITIES	51
2.5.1 RESEARCH CENTRES	51
2.5.2 DEVELOPMENT ACTIVITIES	52
2.6 SELECTED BIBLIOGRAPHY	53
2.7 MAJOR CHANGES SINCE 1977	54
CHAPTER 3: GUINEA BISSAU	55
3.1 BACKGROUND	55
3.2 LIVESTOCK NUMBERS AND DISTRIBUTION	55
3.3 CATTLE	56
3.3.1 BREED CHARACTERISATION	56
3.3.2 DISEASES	57
3.3.3 HERD MANAGEMENT AND COMPOSITION	57
3.4 SHEEP AND GOATS	59
3.5 RESEARCH AND DEVELOPMENT ACTIVITIES	59
3.5.1 RESEARCH CENTRES	59
3.5.2 DEVELOPMENT PROJECTS	59
3.6 SELECTED BIBLIOGRAPHY	60
3.7 MAJOR CHANGES SINCE 1977	60
CHAPTER 4: GUINEA	61
4.1 BACKGROUND	61
4.2 LIVESTOCK NUMBERS AND DISTRIBUTION	61
4.2.1 CATTLE	61
4.2.2 SHEEP AND GOATS	62
4.3 CATTLE	62
4.3.1 BREED CHARACTERISATION	62
4.3.2 DISEASES	63
4.3.3 HERD MANAGEMENT AND COMPOSITION	63
4.4 SHEEP AND GOATS	64
4.5 RESEARCH AND DEVELOPMENT ACTIVITIES	64
4.5.1 RESEARCH CENTRES	64
4.5.2 MULTIPLICATION HERDS AND DEVELOPMENT PROJECTS	64

4.6 SELECTED BIBLIOGRAPHY	66
4.7 MAJOR CHANGES SINCE 1977	66
CHAPTER 5: SIERRA LEONE	69
5.1 BACKGROUND	69
5.2 LIVESTOCK NUMBERS AND DISTRIBUTION	69
5.3 CATTLE	70
5.3.1 N'DAMA BREED CHARACTERISATION	70
5.3.2 DISEASES	72
5.4 SHEEP AND GOATS	72
5.5 RESEARCH AND DEVELOPMENT ACTIVITIES	73
5.6 SELECTED BIBLIOGRAPHY	73
5.7 MAJOR CHANGES SINCE 1977	74
CHAPTER 6: LIBERIA	75
6.1 BACKGROUND	75
6.2 LIVESTOCK NUMBERS AND DISTRIBUTION	75
6.3 CATTLE	76
6.3.1 BREED DESCRIPTION	76
6.3.2 DISEASES	76
6.3.3 HERD MANAGEMENT AND COMPOSITION	76
6.4 SHEEP AND GOATS	76
6.5 RESEARCH AND DEVELOPMENT ACTIVITIES	76
6.5.1 RESEARCH CENTRES	76
6.5.2 MULTIPLICATION HERDS	77
6.5.3 DEVELOPMENT ACTIVITIES	77
6.6 SELECTED BIBLIOGRAPHY	78
6.7 MAJOR CHANGES SINCE 1977	78
CHAPTER 7: MALI	79
7.1 BACKGROUND	79
7.2 LIVESTOCK NUMBERS AND DISTRIBUTION	80
7.3 CATTLE	80
7.3.1 BREED CHARACTERISATION	81

7.3.2 DISEASES	82
7.3.3 HERD MANAGEMENT AND COMPOSITION	82
7.4 SHEEP AND GOATS	83
7.5 RESEARCH ACTIVITIES AND DEVELOPMENT	83
7.5.1 RESEARCH CENTRES AND PROGRAMMES	83
7.5.2 MULTIPLICATION HERDS AND DEVELOPMENT PROJECTS	84
7.6 SELECTED BIBLIOGRAPHY	85
7.7 MAJOR CHANGES SINCE 1977	86
CHAPTER 8: BURKINA FASO	87
8.1 BACKGROUND	87
8.2 LIVESTOCK NUMBERS AND DISTRIBUTION	88
8.3 CATTLE	88
8.3.1 BREED CHARACTERISATION	88
8.3.2 DISEASES	91
8.3.3 HERD MANAGEMENT	91
8.4 SHEEP AND GOATS	93
8.4.1 SHEEP	93
8.4.2 GOATS	93
8.4.3 DISEASES	94
8.4.4 HERD MANAGEMENT	94
8.5 RESEARCH AND DEVELOPMENT ACTIVITIES	95
8.5.1 RESEARCH CENTRES	95
8.5.2 MULTIPLICATION AND EXTENSION	95
8.5.3 DEVELOPMENT PROJECTS	95
8.6 SELECTED BIBLIOGRAPHY	97
8.7 MAJOR CHANGES SINCE 1977	97
CHAPTER 9: COTE D'IVOIRE	99
9.1 BACKGROUND	99
9.2 LIVESTOCK NUMBERS AND DISTRIBUTION	99
9.3 CATTLE	101
9.3.1 BREED CHARACTERISATION	101

9.3.2 DISEASES	104
9.3.3 HERD MANAGEMENT AND COMPOSITION	104
9.4 SHEEP AND GOATS	104
9.4.1 BREED CHARACTERISATION	104
9.4.2 DISEASES	107
9.4.3 HERD MANAGEMENT	107
9.5 RESEARCH AND DEVELOPMENT ACTIVITIES	108
9.5.1 RESEARCH CENTRES	108
9.5.2 MULTIPLICATION HERDS	108
9.5.3 DEVELOPMENT ACTIVITIES	110
9.6 SELECTED BIBLIOGRAPHY	111
9.7 MAJOR CHANGES SINCE 1977	112
CHAPTER 10: GHANA	113
10.1 BACKGROUND	113
10.2 LIVESTOCK NUMBERS AND DISTRIBUTION	113
10.3 CATTLE	114
10.3.1 BREED CHARACTERISATION	115
10.3.2 DISEASES	117
10.3.3 HERD MANAGEMENT AND COMPOSITION	117
10.4 SHEEP AND GOATS	117
10.4.1 BREED CHARACTERISATION	117
10.5 RESEARCH AND DEVELOPMENT ACTIVITIES	118
10.5.1 RESEARCH CENTRES	118
10.5.2 DEVELOPMENT AND MULTIPLICATION ACTIVITIES	118
10.6 SELECTED BIBLIOGRAPHY	119
10.7 MAJOR CHANGES SINCE 1977	119
CHAPTER 11: TOGO	121
11.1 BACKGROUND	121
11.2 LIVESTOCK NUMBERS AND DISTRIBUTION	121
11.3 CATTLE	122
11.3.1 BREED CHARACTERISATION	122

11.3.2 DISEASES	126
11.3.3 HERD MANAGEMENT AND COMPOSITION	126
11.4 SHEEP AND GOATS	126
11.4.1 BREED DESCRIPTION	126
11.4.2 DISEASES	129
11.5 RESEARCH AND DEVELOPMENT ACTIVITIES	129
11.5.1 RESEARCH CENTRES	129
11.5.2 MULTIPLICATION HERDS	130
11.5.3 DEVELOPMENT PROJECTS	131
11.6 SELECTED BIBLIOGRAPHY	131
11.7 MAJOR CHANGES SINCE 1977	132
CHAPTER 12: BENIN	135
12.1 BACKGROUND	135
12.2 LIVESTOCK NUMBERS AND DISTRIBUTION	136
12.3 CATTLE	137
12.3.1 BREED DESCRIPTION	137
12.3.2 DISEASES	139
12.3.3 HERD MANAGEMENT AND COMPOSITION	140
12.4 SHEEP AND GOATS	140
12.4.1 BREED CHARACTERISATION	140
12.4.2 DISEASES	140
12.5 RESEARCH AND DEVELOPMENT ACTIVITIES	141
12.5.1 RESEARCH CENTRES	141
12.5.2 MULTIPLICATION HERDS	141
12.5.3 DEVELOPMENT PROJECTS	142
12.6 SELECTED BIBLIOGRAPHY	143
12.7 MAJOR CHANGES SINCE 1977	144
CHAPTER 13: NIGERIA	145
13.1 BACKGROUND	145
13.2 LIVESTOCK NUMBERS AND DISTRIBUTION	145
13.3 CATTLE	147

13.3.1 BREED DESCRIPTION	147
13.3.2 DISEASES	149
13.3.3 HERD MANAGEMENT	149
13.4 SHEEP AND GOATS	150
13.4.1 BREED DESCRIPTION	150
13.4.2 DISEASES	152
13.4.3 HERD MANAGEMENT	152
13.5 RESEARCH AND DEVELOPMENT ACTIVITIES	152
13.5.1 RESEARCH CENTRES	152
13.5.2 MULTIPLICATION HERDS	152
13.5.3 DEVELOPMENT ACTIVITIES	154
13.6 SELECTED BIBLIOGRAPHY	154
13.7 MAJOR CHANGES SINCE 1977	155
CHAPTER 14: CAMEROON	157
14.1 BACKGROUND	157
14.2 LIVESTOCK NUMBERS AND DISTRIBUTION	157
14.3 CATTLE	158
14.3.1 BREED DESCRIPTION	158
14.3.2 DISEASES	158
14.3.3 HERD MANAGEMENT	159
14.4 SHEEP AND GOATS	159
14.4.1 BREED DESCRIPTION	159
14.4.2 DISEASES	159
14.4.3 HERD MANAGEMENT	159
14.5 RESEARCH AND DEVELOPMENT ACTIVITIES	160
14.5.1 RESEARCH CENTRES	160
14.5.2 MULTIPLICATION HERDS	161
14.5.3 DEVELOPMENT PROJECTS	161
14.6 SELECTED BIBLIOGRAPHY	162
14.7 MAJOR CHANGES SINCE 1977	162

CHAPTER 15: CENTRAL AFRICAN REPUBLIC	163
15.1 BACKGROUND	163
15.2 CATTLE NUMBERS AND DISTRIBUTION	163
15.2.1 CATTLE	163
15.2.2 SHEEP AND GOATS	165
15.3 CATTLE	166
15.3.1 BREED DESCRIPTION	166
15.3.2 DISEASES	166
15.3.3 HERD COMPOSITION	166
15.4 SHEEP AND GOATS	168
15.5 RESEARCH AND DEVELOPMENT ACTIVITIES	168
15.5.1 RESEARCH CENTRES	168
15.5.2 MULTIPLICATION HERDS	168
15.5.3 DEVELOPMENT PROJECTS	168
15.6 SELECTED BIBLIOGRAPHY	169
15.7 MAJOR CHANGES SINCE 1977	169
CHAPTER 16: GABON	171
16.1 BACKGROUND	171
16.2 LIVESTOCK NUMBERS AND DISTRIBUTION	171
16.3 CATTLE	172
16.3.1 BREED DESCRIPTION	172
16.3.2 DISEASES	173
16.3.3 HERD MANAGEMENT	173
16.4 SHEEP AND GOATS	174
16.4.1 BREED DESCRIPTION	174
16.4.2 DISEASES	174
16.4.3 HERD MANAGEMENT	174
16.5 RESEARCH AND DEVELOPMENT ACTIVITIES	175
16.5.1 RESEARCH CENTRES	175
16.5.2 MULTIPLICATION HERDS	175
16.5.3 DEVELOPMENT PROJECTS	176

16.6 SELECTED BIBLIOGRAPHY	176
16.7 MAJOR CHANGES SINCE 1977	177
CHAPTER 17: CONGO	179
17.1 BACKGRUND	179
17.2 CATTLE NUMBERS AND DISTRIBUTION	180
17.3 CATTLE	180
17.3.1 BREED DESCRIPTION	180
17.3.2 DISEASES	182
17.3.3 MANAGEMENT SYSTEMS	182
17.4 SHEEP AND GOATS	183
17.4.1 BREED DESCRIPTION	183
17.4.2 HERD MANAGEMENT	184
17.5 RESEARCH AND DEVELOPMENT ACTIVITIES	184
17.5.1 RESEARCH CENTRES	184
17.5.2 MULTIPLICATION HERDS	184
17.5.3 DEVELOPMENT PROGRAMMES	186
17.6 SELECTED BIBLIOGRAPHY	187
17.7 MAJOR CHANGES SINCE 1977	187
CHAPTER 18: ZAIRE	189
18.1 BACKGROUND	189
18.2 CATTLE NUMBERS AND DISTRIBUTION	189
18.3 CATTLE	190
18.3.1 BREED DESCRIPTION	190
18.3.2 DISEASES	191
18.3.3 HERD MANAGEMENT	191
18.4 SHEEP AND GOATS	192
18.5 RESEARCH AND DEVELOPMENT ACTIVITIES	192
18.5.1 RESEARCH CENTRES	192
18.5.2 MULTIPLICATION HERDS	192
18.5.3 DEVELOPMENT PROJECTS	194
18.6 SELECTED BIBLIOGRAPHY	195

18.7 MAJOR DEVELOPMENTS SINCE 1977	195
CHAPTER 19: EQUATORIAL GUINEA	197
19.1 BACKGROUND	197
19.2 LIVESTOCK NUMBERS AND DISTRIBUTION	198
19.3 CATTLE	199
19.4 SHEEP AND GOATS	199
19.4.1 BREED DESCRIPTION	199
19.5 RESEARCH AND DEVELOPMENT ACTIVITIES	199
19.6 SELECTED BIBLIOGRAPHY	200
19.7 MAJOR CHANGES SINCE 1977	201

PREFACE

The third volume of this joint report was prepared by the Food and Agriculture Organization of the United Nations (FAO/OAA) and the International Livestock Centre for Africa (ILCA/CIPEA). The data contained in this report were collected in the various countries by Drs Shaw, Assogbakpe and Ly during consultative FAO missions and complemented by data provided by national research stations participating in the African Trypanotolerant Livestock Network initiated by ILCA and staff liaising with the FAO Programme for the Control of African Animal Trypanosomiasis and for the development of the relevant zones.

Grateful acknowledgement is made to all concerned for their efficient collaboration, without which this document could not have been produced.

This volume is the continuation of volumes 1 and 2 of this study and to avoid confusing readers, it was unanimously decided that this volume should be published in both the FAO and ILCA series under the old method of numbering. This volume will therefore be published as FAO study: Animal Production and Health Paper 20/3 and ILCA Monograph 2, Volume 3.

This volume was written for the FAO by C H Hoste and E Chalon with the GCP/RAF/190/ITA regional project team for the upgrading, multiplication and conservation of trypanotolerant livestock in West Africa, and for ILCA by J C M Trail, C H Hoste and Y J Wissocq with the Animal Productivity and Trypanotolerant Team.

INTRODUCTION

Volume 1 of this report Trypanotolerant Livestock in West and Central Africa presented the study area and its livestock and a description of trypanotolerant cattle and their productivity. Recommendations and possible locations for further evaluation of the production potential and the management and conservation of these livestock breeds were also presented.

Volume 2 presented detailed information on trypanotolerant livestock found in each of the 18 countries of the study area.

Field missions to collect the data presented and analysed in Volumes 1 and 2 were undertaken between 1977 and 1978. The data presented therefore reflect the situation prevailing in 1975-76 and at the latest in 1977. These data were released almost 10 years after the initial survey, during which time rapid developments have taken place in this sector. A reappraisal of trypanotolerant livestock and an initial assessment of activities carried out by countries and regional and international bodies were therefore deemed necessary.

Recent data on countries published in this volume were collected during an FAO study to evaluate supply and demand in trypanotolerant breeding cattle and to assess the contribution of trypanotolerant cattle to the national economy. The study, entitled Trypanotolerant Cattle and Livestock Development in West and Central Africa (Shaw and Hoste, 1987), was based on data collected between April and June 1985.

Additional data were provided by national research institutions in the various countries and the research team of the ILCA-coordinated African Trypanotolerant Livestock Network, in collaboration with the International Laboratory for Research on Animal Diseases (ILRAD).

Information was obtained from questionnaires sent out regularly by FAO to liaison officers working with the Programme for the Control of African Animal Trypanosomiasis and Related Development in relevant zones. This volume therefore presents major results obtained since the publication of Volumes 1 and 2 and updates national data on trypanotolerant cattle.

Part 1 of this present Volume 3 analyses populations and their trends between the two surveys (Chapter 1) and reviews research activities (Chapter 2) and development activities (Chapter 3). It also gives recent information available on the potential and utilisation of trypanotolerant livestock, which accounts for its title.

Part 2 presents recent data for the 18 study countries, as well as for Equatorial Guinea which was not covered in Volume 2. This information should be studied in conjunction with Volume 2 for an overall and updated view of trypanotolerant livestock production in each country. Countries are discussed in the same order in both volumes.

An additional section on major developments occurring during the study period has been included at the end of each country study.

A selected bibliography for each country is included at the end of each country study. A general list of references for Parts 1 and 2 appears at the end of the document. The main comments and analyses are summarised in the conclusion.

PART 1

POTENTIAL AND UTILISATION OF TRYPANOTOLERANT LIVESTOCK

CHAPTER 1

POPULATIONS AND THEIR CHANGES

The study countries are the same as those covered in Volumes 1 and 2. In addition, Equatorial Guinea has also been included in the present study.

An important difference between this and the previous volumes is that, because of the unavailability of recent and reliable data on the different regions of a country, no distinction is made between general data and data for a study area for countries which are only partially affected by animal trypanosomiasis.

The geographical description, relief and hydrography of the area therefore remain unchanged. With regard to climate and vegetation, it should be noted that the countries of the Sahel and adjacent countries experienced low precipitations in the late 1970s and early 1980s, resulting in increased degradation of the vegetation and an alarming increase in the rate of erosion and desertification. However, it appears that the climatic situation has since improved.

The distribution of the tsetse fly, which is directly related to changes in the climate and vegetation, has also changed. Only a few reliable studies have been made recently. These were revised by Katondo (1984) and used to update the tsetse fly distribution map published by CSTR/OUA in 1977. Depending on the country, the northern distribution limits may be fixed at between 50 and 100 km further south than shown in Volume 1.

This chapter discusses human and animal populations and trypanotolerant cattle, sheep and goat numbers by breed.

1.1 HUMAN AND LIVESTOCK POPULATIONS

General statistics for 1985 on total area, human populations and livestock and population densities are presented in Table 1.1 for each country included in the study.

1.1.1 HUMAN POPULATION

The total human population in the 19 countries in 1985 was estimated at 205 million; this was 37% of the total population of Africa in a region covering only 26% of the continent. Average density was 26 inhabitants/km² compared to 19 inhabitants/km² for the whole of Africa. Population densities in the individual countries of the study area ranged from 104 inhabitants/km² in Nigeria to 4.1 inhabitants/km² in the Central African Republic.

Compared with data given in Volume 1, the population in the study area has increased by about 40 million inhabitants in eight years a mean annual growth rate of 2.8%. However, there is a wide variation between countries: the population growth rate for Equatorial Guinea is 1.8% and for Côte d'Ivoire 4%. Population density has increased from 21 inhabitants/km² in 1977 to 26 inhabitants/km² in 1985.

Table 1.1. Human and animal populations, 1985.

Country	Size	Inhabitants	Livestock numbers				Livestock densities in the study zone			
			Cattle			Sheep	Goat	Cattle hd/km ²	Sheep- goats hd/km ²	Liveweight kg/inhab*
			Total	Trypano- tolerant						
Benin	112 622	3 833 000	922 000	760 000	1 242 900	1 093 200	8.2 (8)	20.7 (4)	51.8 (9)	
Burkina Faso	274 200	6 836 000	3 000 000	1 000 000	2 100 000	2 645 000	10.9 (3)	17.3 (5)	86.2 (3)	
Cameroon	475 000	9 972 000	4 099 000	11 000	2 300 000	2 500 000	8.6 (6)	10.1 (9)	77.4 (5)	
Central African Republic	623 000	2 607 000	2 147 400	7 400	93 619	1 016 748	3.4 (13)	1.8 (16)	144.4 (2)	
Congo	342 000	1 900 000	65 000	65 000	85 000	180 000	0.2 (16)	0.8 (18)	8.4 (16)	
Côte d'Ivoire	322 500	1 018 000	922 000	672 000	1 032 000	748 000	2.8 (14)	5.5 (13)	17.9 (13)	
Equatorial Guinea	28 051	300 060	320	100	5 000	20 000	0.01(19)	0.9 (17)	1.8 (19)	
Gabon	267 700	1 300 152	17 400	17 400	96 000	90 000	0.06(18)	0.7 (19)	50.0(17)	
Gambia	11 300	695 886	305 000	299 000	162 000	175 000	29.5 (1)	29.8 (2)	82.0 (4)	
Ghana	238 500	12 203 574	1 002 000	994 000	1 554 760	1 282 677	4.2 (12)	11.9 (6)	18.1(12)	
Guinea	245 900	6 000 000	2 307 000	2 307 000	1 026 000	914 785	9.4 (5)	7.9 (11)	69.9 (6)	
Guinea Bissau	36 125	870 000	300 000	300 000	110 000	230 000	8.3 (7)	9.4 (10)	64.6 (8)	
Liberia	114 400	2 061 498	12 600	12 600	210 000	200 000	0.1 (17)	3.6 (14)	4.9 (18)	
Mali	1 240 000	7 850 000	6 663 000	1 092 000	6 329 000	6 928 300	5.3 (9)	10.7 (7)	173.0 (1)	
Nigeria	923 750	96 000 000	10 900 000	200 000	9 500 000	22 300 000	11.8 (2)	34.4 (1)	25.3 (10)	
Senegal	196 200	6 038 000	2 200 000	1 053 000	1 967 000	983 000	10.8 (4)	11.2 (8)	69.8 (7)	
Sierra Leone	72 300	3 700 000	333 200	333 200	264 000	145 000	4.6 (10)	5.6 (12)	16.9 (14)	
Togo	56 800	3 015 000	247 000	242 000	620 772	734 937	4.3 (11)	23.0 (3)	22.4 (11)	
Zaire	2 345 000	29 671 407	1 461 000	451 100	964 200	4 501 700	0.6 (15)	2.3 (15)	11.8 (15)	
Grand total	7 922 348	205 022 577	36 903 920	9 816 800	29 662 251	46 688 347	4.6	9.6	37.1	

*1 (hd) of cattl = 0.66 TLU.

1 small ruminant = 0.08 TLU.

1 TLU (Tropical Livestock Unit) = 250 kg liveweight.

Source : Compiled by authors.

1.1.2 CATTLE POPULATION

The total cattle population of the 19 countries in the study area in 1985 was estimated at 37 million head; this was 21% of the African cattle population, of which only 9.8% were considered trypanotolerant. This wide variation is due to the large number of zebus found outside the tsetse areas of Senegal, Mali, Burkina Faso and Nigeria (an estimated 20 million head, 50% of which are in Nigeria) or in areas of negligible trypanosomiasis risk such as Cameroon or Central African Republic.

The countries with the highest cattle population densities are the Gambia, with about 30 head/km² and Nigeria with almost 12 head/km². The lowest densities are to be found in the central African countries (Gabon, Congo, Zaire and Equatorial Guinea) with half a head of cattle or less per square kilometre. It would be inappropriate to make a direct comparison between these figures and those for 1977 as they were not obtained from the same source and some countries have since carried out a more accurate census and revised their national statistics. However, a comparison may be made between the cattle populations of these countries between 1975 and 1985, using the figures given by Hoste (1987a) which were obtained from the same sources for the main livestock producing regions of tropical Africa.

Although mean growth rate of the cattle population was 1.4% during the study period, the growth rates were 2.3% in Sudano-Sahelian Africa, 1.0% in humid and subhumid West Africa and 3.9% in humid central Africa. The growth rate for East Africa was 0.8% and for southern Africa 1.0%.

1.1.3 SHEEP AND GOAT POPULATION

Statistics on small ruminants populations are even less reliable than data available on cattle numbers. In 1985 the total small ruminants population in the 19 study countries was 77 million head (30 million sheep and 47 million goats)

Average population density for small ruminants was 10 head/km² in the 19 study countries, with the highest density in Nigeria (34 head/km²) and the lowest in Gabon (0.7 head/km²)

A direct comparison between these figures and those for 1977 will prove erroneous. With regard to populations, a comparison of the figures for 1975 and those for 1985 by Hoste (1987a) indicate a growth rate of 1.8% for tropical Africa, 2.2% for Sudano-Sahelian Africa, 1.6% for humid and subhumid West Africa, 0.5% for central Africa, 1.7% for East Africa and 1.6% for southern Africa.

1.2 TRYPANOTOLERANT CATTLE GROUPS

Table 1.2 indicates for individual countries the number of animals and percentages of the cattle population accounted for by each trypanotolerant group.

Out of a total of 10 million trypanotolerant cattle, counted in 1985, the long-horned *Bos taurus* group, represented by the N'Dama is the largest group, accounting for 49.5%. The Savannah Shorthorn is the next largest group with 20% followed by the Dwarf West African Shorthorn which accounts for 1.0%. Zebu x N'Dama crossbreeds account for 12.6% and zebu x West African Shorthorn for 16.9% of the trypanotolerant cattle population.

Table 1.2. Cattle numbers by breed classification and country, 1985.

Country	N'Dama		Dwarf W.A Shorthorn		Savannah Shorthorn		Zebu x N'Dama		Zebu x Savannah Shorthorn	
	No.	%	No.	%	No.	%	No.	%	No.	%
Benin	500	0.01	37 500b	36.6	58 000f	2.9	-	-	664 000p	40.2
Burkina Faso	-	-	-	-	49 000d	4.9	-	-	510 000j	30.8
Cameroon	1 700	0.03	1 000c	1.08	300h	0.5	-	-	-	-
Central African Republic	600	0.01	-	-	6 700d	0.37	1 001)	-	-	-
Congo	54 400	1.1	10 600b	10.5)	-	-	-	-	-	-
Côte d'Ivoire	138 000	2.8	1 000b	0.9	35 000d	7.8	-	-	183 000j	11.1
Équa. Guinca	-	-	-	-	100h	0.03	-	-	-	-
Gabon	16 000	0.34	500b	0.5)	500d	40)	0.1	-	-	-
Gambia	290 000	5.9	-	-	-	-	9 000i	0.7	-	-
Ghana	30 200	0.6	100c	0.1	839 300e	2.7	-	-	124 400n	7.5
Guinea	2 192 000	45.3	-	-	-	-	115 000j	9.3	-	-
Guinea Bissau	300 000	6.2	-	-	-	-	-	-	-	-
Liberia	7 100	0.16	5 500a	5.4	-	-	-	-	-	-
Mali	409 000	8.4	-	-	-	-	683 000k	55.2	-	-
Nigeria	26 000	0.55	26 000c	25.5	53 000g	2.8	-	-	95 000q	5.8
Senegal	644 000	13.2	-	-	-	-	409 000i	33.0	-	-
Sierra Leone	333 200	6.9	-	-	-	-	-	-	-	-
Togo	5 000	0.1	2 500b	2.4	158 000f	8.0	-	-	76 500c	4.6
Zaire	415 000	8.3	15 000b	17.1	-	-	21 100n	1.7	-	-
Total	4 862 700	100	99 700	100	1 963 900	100	1 237 600	100	1 652 900	100
(%) of total trypanotolerant population	49.5		1.0		20.0		12.6		16.9	

a. Liberian Dwarf b. Lagoon c. Forest Muturu d. Baoulé e. Ghana Shorthorn f. Somba g. Savannah Muturu h. Bakosi, Doaya and Kapsiki i. Djakore j. Mere k. Bambara l. Mbororo Zebu x N'Dama m. N'Dama x Mateba and N'Dama x Angola or Africander n. Ghanaian Sanga o. Porgou p. Borgou and Borgou crosses q. Keteku.

Source: Compiled by authors.

Compared with the figures for 1977 given in Volume 1, the trypanotolerant cattle population increased at an average annual rate of 3.2% during the eight-year study period.

The relatively high growth rate is mainly due to a substantial increase of 4.5% in the N'Dama population which increased by 45 to 50% in relation to the total trypanotolerant cattle population.

The Savannah Shorthorn population increased at a rate of 2% per year. However, its percentage of all trypanotolerant cattle dropped from 22 to 20% during this period. The number of West African Dwarf Shorthorn remained stable with an annual rate of increase of 0.2%. Consequently the percentage has decreased from 1.3% to 1.0% of all trypanotolerant cattle. The general opinion is that crossbreeding with the zebu breed has led to a rapid rise in the number of crossbreeds and that the pure trypanotolerant breeds are in danger of extinction. This is not confirmed by the above figures in view of the fact that the zebu x West African Shorthorn population increased at a rate of only 2.1% and its percentage dropped from 32 to 29% of all trypanotolerant cattle.

These results should, however, be critically evaluated as the cattle populations for most countries are based on projections and not actual census figures. Nevertheless, an effort can be

made to study the development trend of individual trypanotolerant groups in each country and determine whether the changes observed are real or due to national readjustments in numbers.

1.2.1 THE N'DAMA BREED

The geographical distribution of the N'Dama cattle group in 1985 in their original breeding areas and areas of introduction is shown in Table 1.3.

In the original breeding areas, more detailed studies of the numbers than those conducted in Volume I were made in Guinea Bissau, Guinea and Sierra Leone. A direct comparison between the two sets of data cannot therefore be made. The significant drop in the number of N'Dama cattle in Senegal (-14%), Mali (-12%) and Liberia (-35%) is of particular interest. On the other hand, the number of N'Dama cattle in Côte d'Ivoire seems to have increased considerably.

Results for the introduction zones could be more readily compared and a significant increase in the N'Dama population during the eight-year study period was noted (308 000 head in 1977 compared with 549 400 head in 1985). An annual growth rate could not be calculated because several head of cattle were imported during the study period (Shaw and Hoste, 1987).

Table 1.3. Geographical distribution of the N'Dama cattle (1985).

Country	N'Dama population in study area	Percentage of total N'Dama population	Total cattle population of study area	Percentage of N'Dama in total cattle population of study area
<u>Original areas</u>				
Guinea	2 192 000	45.3	2 307 000	95.0
Senegal	644 000	13.3	2 200 000	29.2
Mali	409 000	8.4	6 663 000	6.1
Sierra Leone	333 200	6.9	333 200	100
Guinea Bissau	300 000	6.2	300 000	100
Gambia	290 000	5.9	305 000	95.1
Côte d'Ivoire	138 000	2.8	922 000	14.9
Liberia	7 100	0.16	12 600	56.3
Subtotal	4 313 300	88.96	13 042 800	33.0
<u>Areas of introduction</u>				
Zaire	415 000	8.3	1 461 000	27.3
Congc.	54 400	1.1	65 000	83.7
Ghana	30 200	0.6	1 002 000	3.0
Nigeria	26 000	0.55	10 900 000	0.2
Gabon	16 000	0.34	17 400	91.9
Togo	5 000	0.1	247 000	2.0
Cameroon	1 700	0.03	4 099 000	0.04
Central African Republic	600	0.01	2 147 400	0.03
Benin	500	0.01	922 000	0.05
Burkina Faso	-	-	3 000 000	
Equatorial Guinea	-	320	-	
Subtotal	549 400	11.04	23 861 120	2.2
Total	4 862 700	100	36 903 920	13.1

Source: Compiled by authors.

1.2.2 THE SAVANNAH SHORTHORN

The number of Savannah Shorthorn in their original breeding areas and areas of introduction in 1985 are indicated in Table 1.4.

There was a significant increase in the number of Savannah Shorthorn in Ghana (+36%) and in Côte d'Ivoire (+40%). The population remained static in Burkina Faso and Togo and dropped considerably in Benin (-23%) and Nigeria (-35%).

Table 1.4. Geographical distribution of the Savannah Shorthorn group, 1985.

Country and breed name	Shorthorn population in study area	Percentage of total Shorthorn population	Total cattle population of study area	Percentage of Shorthorn in total cattle population of the area
<u>Original areas</u>				
Ghana (Ghana Shorthorn)	839 300	42.7	1 002 000	83.7
Burkina Faso (Baoulé or Méré)	490 000	24.9	3 000 000	16.3
Côte d'Ivoire (Baoulé)	350 000	17.8	922 000	37.9
Togo (Somba)	158 000	8.0	247 000	63.9
Benin (Somba)	58 000	2.9	922 000	6.3
Nigeria (Muturu)	53 000	2.8	10 900 000	0.5
Cameroon (Doayo, Kapsiki, Bakosi)	8 300	0.5	4 099 000	0.2
Subtotal	1 956 600	99.6	21 092 000	9.2
<u>Areas of introduction</u>				
Central African Republic (Baoulé)	6.5-7 500	0.37	2 147 400	0.3
Equatorial Guinea	100		320	31.2
		0.03		
Gabon (Baoulé)	500		17 400	28.7
Subtotal	7 300	0.4	2 165 120	0.4
Total	1 963 900	100	23 010 120	8.5

Source: Compiled by authors.

In areas of introduction, the number of Baoulé cattle dropped by 50% in the Central African Republic during the eight-year study period.

1.2.3 THE DWARF SHORTHORN

The number of Dwarf Shorthorns in each country of the study area is given in Table 1.5.

The total cattle population in the original areas and areas of introduction remained almost unchanged between 1977 and 1985.

Table 1.5. Geographical distribution of the Dwarf Shorthorn group, 1985.

Country and breed name	Dwarf Shorthorn population in study area	Percentage of total Dwarf Shorthorn population	Total cattle population of study area	Percentage of Dwarf population in total cattle population of study area
<u>Original areas</u>				
Benin (Lagune)	37 500	36.6	922 000	4.1
Nigeria (Muturu)	26 000	25.5	10 900 000	0.2
Liberia (Muturu)	5 500	5.4	12 600	4.4
Togo (Lagune)	2 500	2.5	247 000	1.0
Côte d'Ivoire (Lagune)	1 000	0.9	922 000	0.1
Cameroon (Muturu)	1 000	0.9	4 099 000	0.02
Ghana (Muturu)	100	0.1	1 002 000	0.01
Subtotal	73 600	71.9	18 104 600	0.4
<u>Areas of introduction</u>				
Zaire (Lagune)	15 000	17.9	1 461 000	1.2
Congo (Lagune)	10 600	10.5	65 000	16.2
Gabon (Lagune)	500	0.5	17 400	2.8
Subtotal	26 100	28.1	1 543 400	1.8
Total	99 700	100	19 648 000	0.5

Source: Compiled by authors.

The major changes to be noted are the rapid disappearance of the Muturu in Liberia (-63%) and in Nigeria (-32%) which is allegedly offset by the increase in the number of Lagune in Benin (+87%). However, the population figures being very small and census figures unreliable, what shall be kept in mind is simply that this trypanotolerant cattle group has remained more or less stable in number during the study period although they remain seriously exposed to extinction.

1.2.4 ZEBU X HUMPLESS CATTLE GROUP

Table 1.6 gives the numbers of N'Dama and Shorthorn crosses by country.

In general, the zebu x N'Dama population increased at a higher annual rate than the zebu x Shorthorn crossbreeds (+2.5% compared to +1.8%). The zebu x N'Dama population increased significantly in Guinea and Mali. A large number of these crossbreeds have also been introduced into the Gambia.

The zebu x Shorthorn population increased fivefold in Côte d'Ivoire and Benin (+33%). It remained stable in Burkina Faso, Ghana and Togo. The difference in the number recorded for Nigeria appears to be due to the difference in census methods employed.

Table 1.6. Distribution of the zebu x taurine crossbreed, 1985.

Country and breed name	Zebu x N'Dama crossbreeds	Zebu x Shorthorn crossbreeds	Percentage of all crossbreeds	Total cattle population of study area	Percentage of crossbreeds in total cattle study area
Mali (Méré)	683 000	–	23.6	6 663 000	10.2
Benin (Borgou)	–	664 000	22.9	922 000	72.0
Burkina Faso (Méré)	–	510 000	17.6	3 000 000	17.0
Senegal (Djokoré)	409 000	–	14.1	2 200 000	18.6
Côte d'Ivoire (Méré)	–	183 000	6.4	922 000	19.8
Ghana (Sanga)	–	124 000	4.4	1 002 000	12.4
Guinea	115 000	–	3.97	2 307 000	4.9
Nigeria (Keteku)	–	95 000	3.27	10 900 000	0.8
Togo (Borgou)	–	76 500	2.7	247 000	30.9
Zaire	21 100	–	0.73	1 461 000	1.4
Gambia	9 000	–	0.31	305 000	2.9
Central African Republic (Bambara)	100	–	0.02	217 400	0.004
Gabon	400	–		17 400	2.3
Total	1 237 600	1 652 900	100	32 093 800	11.1
	2 890 500				

Source: Compiled by authors.

1.3 TRYPANOTOLERANT SMALL RUMINANT BREEDS

Estimated numbers of small ruminants by country are presented in Table 1.1. The total small ruminant population in the 19 study countries was 77 million, comprising 30 sheep and 47 million goats, a ratio of 1.6:1.

The trypanotolerant population may be estimated by subtracting the large numbers of non-trypanotolerant small ruminants found in Senegal, Mali, Burkina Faso, Nigeria, Cameroon and Zaire. Table 1.7 gives the most reliable estimates obtained in spite of numerous unknown factors.

The trypanotolerant small ruminant population in the 19 West African countries studied is estimated at 32 million of which 12 million are sheep and 20 million goats. In all the West African countries except Nigeria, the number of sheep is only marginally higher than that of goats (9.4 million compared to 9.1 million). In Nigeria and central African countries, however, there are substantially more goats than sheep (10.8 million goats and 2.6 million sheep). The ratio of goat to sheep may be as high as 11:1 in the Central African Republic or 5:1 in Zaire.

Because of the unreliable nature of the data available, they cannot be compared with the data given in Volume 1. Nevertheless, it appears that the trypanotolerant sheep and goat populations have remained static.

Table 1.7. Trypanotolerant sheep and goat populations by country, 1985.

Country	Sheep	Goat	Sheep + goat
Benin	1 243	1 093	2 336
Burkina Faso	1 170*	1 830*	3 000*
Cameroon	540*	585*	1 125*
Central African Republic	94	1 017	1 111
Côte d'Ivoire	1 032	748	1 780
Congo	85	180	265
Equatorial Guinea	5	20	25
Gabon	96	90	186
Gambia	162	175	337
Ghana	1 555	1 283	2 838
Guinea	110	230	340
Guinea	1 026	915	1 941
Liberia	210	200	410
Mali	1 265**	1 385*	2 650*
Nigeria	1 000*	5 320*	6 320*
Senegal	770*	385*	1 155*
Sierra Leone	264	145	409
Togo	621	735	1 356
Zaire	770*	3 600*	4 370*
Total	12 018	19 936	31 954

* Estimates are based on proportions determined in FAO/ILCA/UNEP (1980) and applied to current populations.
Source: Compiled by authors.

By comparing the human and animal population figures given above, the following conclusions may be drawn:

- The total animal population increased during the study period but at a lower rate than the human population
- The trypanotolerant cattle population maintained a relatively high rate of increase of 3.2% per year due mainly to a preference for the N'Dama breed which increased at a rate of 4.5% during the study period
- Overall data available do not confirm the general theory that the population of zebu x West African Shorthorn is increasing at a faster rate than purebred trypanotolerant population although this would evidently vary from country to country
- The trypanotolerant sheep and goat populations are increasing at a lower rate than expected for these species
- Some progress has been made in the past few years in the compilation of reliable and comparable national statistics. However, greater effort should be made in this field.

CHAPTER 2

RESEARCH ACTIVITIES

Research activities on trypanotolerant livestock may be classified under two main headings, depending on whether the emphasis is on studying and increasing the productivity level of these breeds or on their trypanotolerance.

Both topics are of course complementary and interactive but for clarity purposes, are treated separately. Recent developments in the research policies of the different countries are discussed in section 2.1 and the results obtained in the two areas are evaluated in section 2.2.

2.1 RESEARCH POLICIES ON TRYPANOTOLERANT LIVESTOCK BREEDING

A review of the 19 West and central African countries would be a tedious exercise. Furthermore, some of these countries have continued to pursue the same research policies since the previous study and continue to strive for improving their livestock production systems. This report will therefore focus on the major achievements of the past 10 years.

A major activity in trypanotolerant livestock research was the establishment in the Gambia of the International Trypanotolerance Centre (ITC/CIT) which became operational in 1984.

ITC was established through the stated political will of the Gambia and with a loan from the African Development Bank (ADB) for its construction, as part of a national livestock development project. The Centre has also developed a research programme. The entomological section is funded by the UK Overseas Development Administration (ODA), the Animal Health and Production Section by the regional funds of the European Economic Community (EEC) through the International Livestock Centre for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD).

Senegal collaborates actively with ITC in this research programme from its station in Kolda, Casamance. There has also been a radical change in its livestock development policies which now encourage studies to be conducted in the village environment rather than on-station. A systems approach which appears promising has also been developed.

In view of the size of its trypanotolerant livestock population, Guinea has taken an important decision in the field of animal research and production to discontinue crossbreeding of the N'Dama breed with the exotic Red Steppe breed. At the same time, priority is being given to research activities on the N'Dama and the establishment of a national breeding programme for this breed.

On the other hand, Mali seems to be committed to pursuing its programme of crossbreeding the N'Dama breed with exotic breeds such as the Red Steppes at the Centre de recherches zootechniques de Sotuba in an effort to improve milk production in the suburban

areas of the capital. The activities of the Central Veterinary Laboratory now include the planning of chemoprophylaxis strategies for the trypanocidal treatment of various livestock species and for tsetse control.

Burkina Faso continues to support the Centre for Animal Trypanosomiasis Research (CRTA) and its two components the tsetse programme and the trypanotolerant programme. Togo has, however, expressed the wish to discontinue research programmes on trypanotolerance at Avetonou Livestock Production and Research Centre (ALPRC) and to focus on production of draught oxen and beef cattle.

Despite the small size of its trypanotolerant cattle, Cameroon has agreed that the Livestock Production Research Centre (LPRC) should maintain and study local trypanotolerant cattle breeds on-station. The major objective here is to conserve the genetic stock of its local breeds but this effort is noteworthy.

Central African countries are still more concerned with increasing the number of trypanotolerant livestock than with actual research on those breeds. Only Gabon and Zaire are actively conducting research on trypanotolerant livestock within the framework of the African Trypanotolerant Livestock Network. The small ruminant programme in the Congo may be included in this category because it is pursuing with applied research objectives. However, these are far from real research policies on trypanotolerant livestock.

2.2 RESEARCH ACTIVITIES ON THE PRODUCTIVITY OF TRYPANOTOLERANT BREEDS

Two detailed studies which provided substantial additional information on the productivity of trypanotolerant cattle were conducted during the study period. The first, conducted in Senegal and published by Fall et al (1982), provided additional information on the productivity of Djallonké sheep and N'Dama cattle maintained on station at Kolda. The second, conducted in Sierra Leone and published by Carew et al (1986), provided comparative results on the productivity of the N'Dama and Sahiwal breeds and crossbreeds of the two breeds raised at Teko Station. Data analysis and preparation of the reports were carried out in collaboration with the Livestock Productivity and Trypanotolerance team of ILCA.

The most important activity of the study period was the establishment of the African Trypanotolerant Livestock Network by ILCA and ILRAD and the knowledge already derived from its work.

The Network was established following a joint FAO/ILCA/UNEP study. The results of the study were published in Volumes 1 and 2 of this Monograph. The brief introduction to the Network is an extract from ILCA (1986a).

A large amount of data had been collected during visits made in 1977 and 1978 as part of the FAO/ILCA/UNEP study. The main contribution of the study is that it rehabilitated trypanotolerant livestock in showing its relatively high productivity and renewed interest in trypanotolerant livestock. Nevertheless, it was evident that more detailed data would have to be obtained on the productivity of different trypanotolerant breeds maintained in different areas and under different levels of tsetse challenge and livestock production systems.

Consequently, ILCA developed a research network to improve livestock production in tsetse-affected regions of Africa by achieving a better understanding of genetic resistance,

acquired resistance, environmental factors which affect susceptibility and the effectiveness of current control measures and ensuring optimal application of both existing knowledge and recent research findings (ILCA, 1986a).

The selection of sites for the network was based on several criteria: complementarity in terms of disease level, tsetse challenge and livestock breeds; the willingness of national institutions concerned to cooperate; the availability of basic research infrastructure; and the extent to which donor agencies were prepared to provide the supplementary funds required.

The key factor determining the success of such a network, which requires the collection of very large quantities of data in fields as diverse as environment, veterinary epidemiology and livestock production parameters, is the standardisation of protocols and data-recording systems and the training of field staff in the collection of data. To this end, ILCA, in collaboration with ILRAD and the International Centre for Insect Physiology and Ecology (ICIPE) has organised training courses in English and French every year since 1982, and in 1983 published a training manual (Murray et al, 1983).

Within the Network, ILRAD is responsible for training, standardisation of protocols on livestock diseases, and evaluation of trypanosomiasis risk and ILCA is responsible for coordinating research activities at the sites selected and for collaborating with national organisations and donor agencies. ILCA is also responsible for the animal production and nutrition as well as for data-processing aspects.

By December 1986, training had been provided for 53 field staff and 11 sites had been established in 7 countries. Tsetse and animal populations for each site are presented in Table 2.1. This table illustrates clearly the very wide range of combinations between tsetse populations and livestock production systems in which data are routinely collected. Additional data were obtained by a comprehensive analysis of data from a network-associated site in Tanzania.

By the end of 1985 eight sites had already collected data covering at least the two-year period 1 January 1984 to 31 December 1985. An internal meeting of the Network was therefore convened to plan how the preliminary results for each site were to be analysed. The proceedings of that meeting was published in June 1986 (ILCA, 1986a), and a report on the first two years of the Network were published in December 1986 (ILCA, 1986b).

Since then, the Network has continued to collect data and a second meeting, held in November 1987, was attended by over 100 researchers who reviewed the progress made in their various activities. Fourteen sites in nine countries were represented. Research workers from other national and international institutions also participated in the meeting at which recognised specialists presented the state-of-the-art knowledge in their respective fields.

The meeting also evaluated all programmes and planned future activities of the Network. These activities will be conducted under four major topics:

- trypanosomiasis epidemiology
- trypanotolerance
- genetics of trypanotolerance
- biological and economic evaluation of the effect of control measures on productivity.

Further information on these topics may be found under the relevant sections.

Table 2.1. Tsetse and livestock populations at Network sites.

Site	Country	Tsetse group	Species	Type	Management system
Kolo	Zaire	<i>palpalis</i>	Cattle	Trypanotolerant	Ranch
Avetonou	Togo	<i>palpalis</i>	Cattle and sheep	Trypanotolerant and non-trypanotolerant	Ranch and Village
Sokode	Togo	<i>palpalis</i>	Sheep and goat	Trypanotolerant	Village
Tengrela	Côte d'Ivoire	<i>palpalis</i>	Cattle and sheep	Trypanotolerant and non-trypanotolerant	Village
Boundiali	Côte d'Ivoire	<i>palpalis</i>	Cattle and sheep	Trypanotolerant and non-trypanotolerant	Village
Idiofa	Zaire	<i>palpalis</i> and <i>fusca</i>	Cattle	Trypanotolerant	Village
OGAPROV	Gabon	<i>palpalis</i> and <i>fusca</i>	Cattle	Trypanotolerant and non-trypanotolerant	Ranch
Mushie	Zaire	<i>fusca</i>	Cattle	Trypanotolerant	Ranch
Muhaka	Kenya	<i>morsitans</i> and <i>fusca</i>	Cattle	Non-trypanotolerant	Ranch
Ghibe	Ethiopia	<i>morsitans</i> and <i>palpalis</i>	Cattle	Non-trypanotolerant	Village
ITC	The Gambia	<i>morsitans</i> and <i>palpalis</i>	Cattle	Trypanotolerant	Village

Source: ILCA (1987).

2.3 RESEARCH ON TRYPANOTOLERANCE

As was clearly stated in the introduction to this chapter, the division between research activities on productivity and those on trypanotolerance was somewhat arbitrary. For example, it is evident that data collected and analysed by the African Trypanotolerant Livestock Network will make a significant contribution toward a better understanding of trypanotolerance.

At the same time, more basic research is being conducted by national and international laboratories on the vector-parasite-host complex which are discussed in the following section. The ultimate objective of these research activities is to strengthen the trypanotolerance of trypanotolerant breeds and to induce it in local or exotic trypanosusceptible breeds, in order to increase the potential for livestock production in tsetse-infested areas.

Since it is impossible to cover all the aspects involved in a single institution, each laboratory or centre is more or less specialised. Current research work is classified according to whether the main focus is on the vector, the parasite or the host. Although the first two are not directly concerned with trypanotolerance, they cannot be ignored when studying this phenomenon. The following review is from Hoste (1987a) and ILCA (1988a).

2.3.1 VECTORIAL POTENTIAL OF TSETSE

The vectorial potential of any given tsetse species is a function of its ability to ingest trypanosomes when feeding on an infected host, to develop an infection and to transmit infective trypanosomes to new hosts. Many factors related to the tsetse (species, sex, age, physiological conditions, feeding habits), the trypanosome involved (strain, forms, number), and the ecology (climate, host availability) can influence each of these three stages.

Research on this subject has been conducted by various African and European institutes, including the International Centre of Insect Physiology and Ecology (ICIPE) in Kenya and the Tsetse Research Laboratory (TRL) at Langford, Bristol, UK.

A review by Rogers (1985) on trypanosomiasis risk was published recently. The problem has since become even more complex. Recent research has even produced some evidence of discrepancies in tsetse resistance to trypanosome infection (Maudlin et al, 1986).

Another important area of research concerns the factors determining the tsetse-host attraction. This needs to be studied at the breed, species and individual level, since it is obvious that an increased number of bites increases the risk of infection. Research in that field is conducted mainly by ICIPE, TRL and the Tropical Development and Research Institute (TDRI) in the UK, the Tsetse and Trypanosomiasis Division of the Veterinary Services in Zimbabwe and, more recently, the tsetse control team of the Centre de recherches sur les trypanosomoses animales (CRTA) in Burkina Faso.

Researchers of the African Trypanotolerance Livestock Network are also studying the various factors which determine tsetse challenge and their relationship with trypanosome prevalence in livestock.

2.3.2 STUDY OF THE PARASITE

ILRAD has undertaken to improve the current level of knowledge of the trypanosome, its characteristics, development and ability to modify its structure, with a view to controlling multiplication of the trypanosomes. This may eventually lead to the production of a vaccine.

Trypanosome infections, particularly in trypanotolerant animals often result in low-level and sporadic parasitaemia. More reliable methods of diagnosis in the field should therefore be developed, particularly in cases where samples can only be obtained at very infrequent intervals. Such methods would contribute towards more accurate trypanosome diagnosis and research methods.

CRTA is also studying the trypanosome, mainly to monitor and compare its development within trypanotolerant and trypano-susceptible animals.

2.3.3 FINAL-HOST RESPONSE

This covers two very distinct areas of research: mechanisms of trypanotolerance and characterisation of the trypanotolerance trait of the most trypanotolerant cattle breeds.

Several research centres in Africa and elsewhere are currently working on the definition of trypanotolerance, on means of determining or at least evaluating it, and on possible selection criteria.

Trypanotolerance appears to be associated with at least three apparently related characteristics with independent genetic control namely the capacity to control parasitaemia, resist the development of anaemia and develop an effective immune response (Murray, 1988).

ILRAD and CRTA conducted detailed studies on the development of chancres at bites area but no significant results were recorded (ILRAD, 1986).

Research work, notably with experimental infections by injections, has demonstrated that differences in levels of parasitaemia may be the result of innate differences in the immune response and that within the immune responses, the antibody response constitutes the most important factor. Many other factors, such as the host's ability to stimulate pleomorphism in the trypanosome or certain physiological characteristics, may also be implicated in these resistance mechanisms to trypanosoma. A comprehensive summary on the subject has been written by Murray et al (1982) and a more specific one on the immunology of the African trypanosomiasis by Roelants and Pinder (1984). The main research organisations studying this aspect of the host response are ILRAD (ILCA, 1986) and CRTA.

Various individual and external factors often interfere with the understanding of the phenomenon of trypanotolerance, making it an extremely difficult field of research, but nevertheless an interesting one. In fact, trypanotolerance can be affected by the age and sex of the animal, by maternally derived immunity, previous infections, stress factors such as poor nutrition, overwork, inter-current disease and physiological condition (weaning, parturition, lactation) and the animal's susceptibility to other diseases. It can also be affected by the intensity of the trypanosomiasis risk and the virulence of the trypanosome strain involved. Available information on the influence of all these factors on trypanotolerance was reviewed by Murray et al (1982) and more recently by Touré and Hoste (1986a).

Researchers of the African Trypanotolerant Livestock Network conducting studies on the genetics of trypanotolerance are primarily concerned with the traditional method of genetically improving resistance to diseases which could provide information directly usable in practical animal breeding applications. Results obtained so far have been promising and further research to determine heritability and genetic correlation between criteria associated with the traits described by Murray (ILCA, 1988) is being conducted.

Furthermore, disease resistance in some domestic and laboratory species has been shown to be associated with the major histocompatibility complex (MHC). An association between the MHC and trypanotolerance, and the identification of individuals having superior trypanotolerance traits through this association could pave the way for developing cost-effective and practical trypanotolerance selection programmes (Teale et al, 1988).

Major research efforts are also being made to identify genetic marker systems for characterising trypanotolerant and trypano-susceptible animals. Ideally, these markers should be simple and low-cost and should be usable as criteria for selecting for trypanotolerance. Two research centres studying this aspect of trypanotolerance are based in West Africa: CRTA in Burkina Faso and the Avetonou Research and Livestock Production Centre (Centre d'Elevage d'Avetonou, Togo) (ARLPC). An ILRAD team is also studying this subject as are other institutes in Europe including the Animal Breeding Research Organisation (ABRO) in Edinburgh, Scotland, UK, the Institute of Tropical Medicine in Antwerp, Belgium and the National Agricultural Research Institute (INRA) in Jouy-en-josas, France.

Although no definitive and simple parameter has yet been found, some promising results seem to have been obtained by comparing haemotypes of trypanotolerant and trypano-susceptible livestock, such as polymorphism of serum proteins (albumin, transferrin), erythrocytes (blood types, haemoglobin, nucleoside purine, phosphorylase purine, carbonic anhydrase, dehydrogenase malate) and leucocytes (major histocompatibility system, deaminase adenosine) (CRTA, 1986).

In conclusion, it should be emphasised that since the publication of Volumes 1 and 2 of this Monograph, decisive progress has been made by countries and research organisations involved.

Almost all tsetse-infested West and central African countries are aware of the importance of pure trypanotolerant breeds and the need to conduct research on these breeds. The enthusiasm shown by national research bodies to be integrated into or to participate in the African Trypanotolerance Livestock Network is ample evidence of this fact.

The establishment, during this period, of the African Trypanotolerant Livestock Network which covers or will cover 16 sites in 10 countries (ILCA, 1988b) demonstrates the dynamism of the two major international research centres, ILCA and ILRAD. The desire of the international community to participate in research activities on trypanotolerant livestock is also reflected in the funding it provided for the establishment of the International Trypanotolerance Centre (ITC/CIT).

In spite of these encouraging results, the major part of the work remains to be completed and the efforts already made should be sustained. Improved contacts between national and international research institutes during the past 10 years have resulted in increased collaboration and in certain cases joint programme planning. Donor agencies are aware of this and are now encouraging closer collaboration. The biannual meetings of the International Scientific Council for Trypanotolerant Research and Control, an institution of the Organisation of African Unity (ISCTRC/OAU) have also substantially contributed towards improving contact and collaboration among researchers.

CHAPTER 3

DEVELOPMENT ACTIVITIES

While research on the productivity of trypanotolerant livestock and trypanotolerance were being conducted during the past 10 years, major changes also occurred in multiplication units and livestock development projects. Although some activities have been discontinued, most are being continued and developed and several new projects are being implemented.

The most important and recent developments of the period, however, were the efforts made by governments of countries involved and donor agencies to plan and coordinate their activities in this field. That is why we have chosen to devote a paragraph to planning and coordination activities before tackling the output of development projects and multiplication units.

3.1 PLANNING AND COORDINATION OF DEVELOPMENT ACTIVITIES

During the past few years, considerable effort has been made to plan and coordinate development activities on trypanotolerant livestock production. Almost all the countries studied have developed a national trypanotolerant livestock development strategy or have at least identified some priority activities in this field, on their own or with the assistance of external missions. Consultation and coordination structures have also been set up and/or become operational during the past 10 years.

3.1.1 PLANNING

The most recent project study or studies carried out by each country to plan or promote national livestock production are presented in Table 3.1. Most of these documents were produced within the past five years and are therefore still relevant. In spite of their diverse origins, they all submitted a number of clearly identified project documents considered as priorities by the governments concerned. Consequently, there are a number of documents available which will assist in determining the context in which development activities are or will be carried out. It should be noted that this is a relatively new phenomenon. Furthermore, as is evident in Table 3.1, most prospective donors and executing agencies were involved in planning these development policies and in identifying or formulating new projects. This should facilitate funding and promote regional cooperation.

FAO, on its part, has made considerable efforts in this field. Out of the 19 countries studied, 15 were visited by support missions either as part of the International Programme for the Coordination of Dairy Development and the International Programme for the Development of the Meat Sector, or the Programme for the Control of African Animal Trypanosomiasis and Development of Relevant Areas.

Table 3.1. Recent studies conducted on the development of trypanotolerant livestock.

Country	Title of study	Body responsible	Bibliographic reference
Senegal	Sectorial study of animal husbandry in Senegal (location and scope) Development of the Gambia River Basin Pre-investment Section Plan	WB/FAO/ Government UNDP	DSPA (1982) UNDP (1982)
Gambia	PICDL/PIDSV Mission (2)	FAO	FAO (1980)
	Development of the Gambia River Basin Pre-investment action plan	UNDP	UNDP (1982)
Guinea Bissau	Mission PICDL/PIDSV (2)	FAO	FAO (1985)
	Sectorial study on animal husbandry	WB	Tacher (1985)
Guinea	PAG Mission (3) to Mano River Union countries	FAO	FAO (1983)
	Livestock development project. Feasibility study	WB	BDPA (1985)
Sierra Leone	Livestock development study	EDF	Hunting (1979)
	PAG Mission (3) to Mano River Union countries	FAO	FAO (1983)
Liberia	PICDL/PIDSV Mission (2)	FAO	FAO (1979)
	PAG (3) Mission to Mano River Union countries	FAO	FAO (1983)
	Study on the possibilities for increasing animal protein production	EDF	EFD, in preparation
Mali	PICDL/PIDSV (2)	FAO	FAO (1977)
	Status report on livestock production in Mali	Government	DNE (1984)
Burkina Faso	Livestock production in Burkina Faso (4 volumes)	FAO	FAO (1985)
Côte d'Ivoire	Strategy and plan of action for the development of livestock production (summary + 11 annexes)	FAO/ government	FAO (1986)
Ghana	PAG (3) Mission	FAO	FAO (1985)
Togo	PAG (3) Mission	FAO	FAO (1981)
Benin	PAG (3) Mission	FAO	FAO (1981)
	National Seminar on Livestock Production	Government	MFEPP (1982)
	PICDL/PIDSV Mission (2)	FAO	FAO (1984)
Nigeria	A livestock production plan for Nigeria	WB/government	FMA (1981)
Cameroon	Food self-sufficiency. Gold book. Bamenda	Government	Cameroon (1984)
	Agropastoral Association	FAO	FAO (1986)
	PICDL/PIDSV Mission (2) Preliminary studies for a livestock project	WB/UNDP/ government	in progress
Central African Republic	Feasibility study of trypanotolerant cattle	BADEAC/gov't	BDPA (1984)
	Preparation of second livestock development project	WB/gov't	BDPA (1984)
Gabon	Identification of the needs of the Livestock Services	FAO	FAO (1984)
	Fifth Plan 1984-1988. Objectives, strategies, cost	Government	Gabon (1985)
Congo	PAG Mission (3)	FAO	FAO (1982)
Zaire			
Equatorial Guinea	PICDL/PIDSV Mission (2)	FAO	FAO (1983)

Note: (1) Refer to selected bibliography for each country.

(2) PICDL/PIDSV International Programme for the Coordination of Dairy Development/ International Programme for the Development of the Meat Sector.

(3) PAG Mission: is preparatory assistance mission to countries within the framework of the FAO Programme for the Control of African Animal Trypanosomiasis and Development of Relevant Areas.

Source: Country studies.

3.1.2 COORDINATION

In 1974, the World Food Conference requested FAO to undertake a long-term programme for the control of African trypanosomiasis (AAT). A preparatory five-year phase was initiated in 1975, during which FAO and the various funding bodies involved focused their efforts on training senior and intermediate-level national staff, strengthening research on the disease and its vector and treatment of trypanotolerant livestock. Several meetings of expert groups and consultative missions discussed various aspects of the AAT including the socio-economic problems of integrated rural development and environmental conservation.

The Programme for the Control of African Animal Trypanosomiasis was launched in 1979 and a steering body, the AAT Commission, was created. Most tsetse-affected countries and major agencies are members of the Commission which meets every two years. The fourth meeting of the Commission, which coordinates all activities on the various aspects of the programmes, was held in Ouagadougou in November 1986.

At its last two sessions, the Commission emphasised the need for five subregional support units to be established for the development of tsetse-infested areas or areas in which tsetse had recently been eradicated. Following these recommendations, the Government of Italy, in collaboration with FAO, established the first sub-regional unit in West Africa in Ouagadougou in 1983. Seven countries of the subregion—Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger and Congo—are directly involved. The other units have not yet been established. FAO also launched a more specific programme for the upgrading, multiplication, and conservation of trypanotolerant livestock in West Africa with the assistance of the Italian Government. The programme directly involves Benin, Burkina Faso, Côte d'Ivoire, the Gambia, Ghana, Guinea Bissau, Liberia, Mali, Senegal, Sierra Leone and Togo. Cameroon, the Central African Republic, Congo, Gabon, Nigeria and Zaire (which have a relatively large trypanotolerant livestock) and other interested countries, collaborate closely in this programme.

The objectives of this trypanotolerant livestock programme are:

- to provide governments of countries concerned with data on the characteristics, availability, cost and health status of trypanotolerant livestock
- to assist governments in the formulation of development projects on the use of trypanotolerant livestock and in obtaining funding for such projects
- to provide technical assistance to ongoing projects
- to encourage transfers of breeding stock, genetic material (semen and embryos) and biological specimens between countries
- to evaluate training requirements of individual countries and provide the necessary training
- to study, recommend and encourage measures for the conservation of trypanotolerant breeds in danger of extinction and/or absorption.

To this end, the project cooperates closely with:

- national and international centres conducting research on trypanotolerance
- national projects for selection and multiplication of trypanotolerant livestock
- development projects utilising trypanotolerant livestock, including draught animals.

As part of this FAO regional project, a detailed survey was conducted in 19 West and central African countries covered by the project, to investigate the trade in trypanotolerant cattle breeding stock and supply and demand in each country. This study was the subject of an FAO publication (Shaw and Hoste, 1987). The information collected during these missions and from

other sources was also used by FAO and ILCA in the preparation of this present Volume 3 of Trypanotolerant livestock in West and Central Africa. Finally, FAO in collaboration with ILCA, ILRAD and the Technical Centre for Agriculture and Rural Cooperation is preparing a documentary film on trypanotolerant livestock and trypanotolerance.

In order to facilitate the coordination of activities in these areas and the operations of the two regional projects, the latter requested each participating country, through the Commission, to set up a national interministerial and multidisciplinary committee for the control of AAT and development of tsetse-infested areas or areas recently freed from tsetse and appoint a liaison officer with the programme. The officer will collect information on all national activities on AAT control and will, therefore, be the main contact for all external bodies wishing to operate in that field. A remarkable tool has thus been developed in each country and should be fully utilised.

Apart from efforts at the national level to chart a strategy for the identification and coordination of projects, donor agencies, which are often involved in these projects, hold consultations, and the frequent round-table discussions between governments and donor agencies are an indication of the concern for efficiency which is currently the main preoccupation of all parties concerned.

Planning and coordination activities undertaken during the past few years reflect the importance attached to livestock production in tsetse-infested areas. There is good reason to be optimistic as these activities, which are discussed in the next two paragraphs, were undertaken recently or are yet to be undertaken.

3.2 MULTIPLICATION UNITS

This section discusses only those structures concerned primarily with the multiplication of trypanotolerant livestock for use in the production of improved breeding stock, draught animals (in the case of cattle) or meat, and with relatively large herds (generally 500 head or more). Furthermore, only new structures or those with a substantial change in the number of livestock are mentioned. Consequently, herds considered as static during the study period are not included and to obtain an overall view of the situation of multiplication units the data contained in this document should be studied in conjunction with those presented in Volumes 1 and 2.

This section is divided into three parts: the first deals with cattle programmes; the second deals with small ruminants; and the third discusses performance evaluation programmes necessary to ensure the success of both cattle and sheep-goat upgrading and multiplication activities.

3.2.1 CATTLE PROGRAMMES

Table 3.2 lists trypanotolerant cattle multiplication herds which have either expanded or are newly constituted. Twelve countries have reactivated, improved or established trypanotolerant cattle multiplication units during the past 10 years.

Table 3.2. Expanding or recently established trypanotolerant cattle multiplication herds.

Country	Name of structure	Establishment date	Breed and numbers	Objectives/Remarks	External aid
Guinea	N'Dama selection and multiplication centre	1979	N'Dama: 300 head in 1985	Selection and multiplication centre Difficulty in constituting Centre herds Phase II, envisaged for 1986, will focus on the rural area	UNDP/FAO
Mali	Yanfolila N'Dama (ONDY) Ranch, Madina Diassa	1974	N'Dama: 984 head in 1977 and 1800 in 1985	EDF funding will end in 1987	EDF
Côte d'Ivoire	Marahoue Ranch	1975	N'Dama: 3 000 head in 1977 and 12 000 head in 1985	N'Dama selection and multiplication	EDF
	Commercial cattle breeding projects			N'Dama x Abundance	
	+ Noroningue	1979 1980	330 N'Dama + 394 N'damance in 1984	crossbreeding	
	+ Panya	1977 1980	282 N'Dama, 394 zebu 1554 crossbreeds in 1984	Zebu x N'Dama crossbreed	
	+ Badikaha (herd)	1980	1300 Shorthorn in 1985	Beef production	
Ghana	Wulugu Livestock Company	1980	700 WAS in 1985	Multiplication and production of draught oxen	Bank of Ghana
Togo	Adele Ranch	1979	Somba and N'Dama 2740 head in 1984	Absorption of Somba by N'Dama for production of draught oxen, area 60 000 ha, 15 600 TLU	EDF
Benin	M'betecoucou Station	1972	Borgou: 110 head in 1977, 1660 head in 1986	Borgou selection and multiplication	UNDP/FAO 1975 ADB, since 1978
	Samiondji Station	1975	100 head of Lagune in 1977, 500 head in 1986	Lagune selection and multiplication	
Nigeria	State ranches (n=25) Private ranches (n=625)		11 300 N'Dama in 1985 106 000 WAS + N'Dama in 1985	Importation of 5000 N'Dama from the Gambia in the 1980's	
Cameroon	SOCAPALM (Cameroon Oilpalm Company)	1979	350 N'Dama in 1979, 950 head in 1985	Importation of 350 head from Zaire	
Central African Republic	Bambari Station		63 Baoule in 1977 200 head in 1985	Regrouping of Baoule in one station	WB
Gabon	Okouma Ranch		N'Dama 850 (1978), 1600 (1985)	110 N'Dama imported in the 1980s	
	Nyanga Ranch		35 (1978), 8300 (1985)	Projected herd size of 30 000 head in 1992	
	Lekabi Ranch	1980	3370 head in 1985	Projected herd size of 12 000 head in 1992	
	Ngounie Ranch	1980	1080 head in 1985	Projected herd size of 5000 head in 1992 plus 3500 in village nucleus herds	
Congo	Louila Ranch		N'Dama 2700 (1977), 5700 (1985)	Importation of 3000 head from Zaire between 1975 and 1982	EDF 1978 to 1982
	Louboulou Ranch		2750 (1977), 3540 (1985)	Projected herd size of 5000 head	
	Dihesse Ranch		3500 (1977), 13 000 (1985)	Projected herd size of 15 000 head	
Zaire	Mushie Ranch	1977	177 000 head in 1984	Projected herd size of 23 500 head; private ranches	WB/France till 1978
	Kalombi Ranch		1400 (1977), 4000 (1984)	Projected herd size of 4000 head; private ranches	
	Lombo Ranch		9000 (1977), 15 000 (1984)	Projected herd size of 15 000 head; private ranches	

An estimated 120 000 head were born or introduced into this livestock production system during the study period.

Source: Volume II. Country studies.

3.2.2 SMALL RUMINANT PROGRAMMES

Just like with the cattle programmes small experimental herds maintained by universities and research centres and herds which have remained relatively static during the study period are not taken into account. These restrictions indicate that little importance was given to small ruminants during the study period. In fact, only four countries could be considered as having made any significant progress in this field: Congo, Côte d'Ivoire, Ghana and Togo. The activities undertaken in these countries are presented below.

Côte d'Ivoire: This country exerted the most effort in sheep production during the past 10 years and has obtained spectacular results. Of particular interest is the establishment in 1976, with EDF and FAC¹ assistance of the National Sheep Centre (CNO) in Boumi which maintained a flock of 3400 sheep including 1600 dams in 1986 and the "Elevage SODEPALM of Toumoudi", which has a flock of 5300 sheep. These activities are part of a National Sheep Selection Programme (PNSO) presented in Table 4.

Ghana: Two multiplication units have been established in this country. Ejura farm was established in 1983 with a herd of 880 sheep and 140 goats as part of a development programme aimed at improving sheep and goat production. The Juaso Oil Palm Plantation maintained a herd of about 320 sheep in 1983.

Togo: Togo, with FAC assistance, established a multiplication, selection and distribution centre under traditional management system for Djallonke sheep. In 1986, the station at Kolokopé had a flock of 2000 sheep.

Congo: The Peoples' Republic of the Congo decided recently to develop small ruminant production. With the assistance of FAO, the Government has established a technical support centre for small ruminant production. Phases 1 and 2 were implemented between 1982 and 1987. Technical assistance for a livestock centre recently established at Inoni-Falaise was also provided by FAO.

It should be emphasised once again that few resources are allocated to small ruminant upgrading and multiplication and that the term "small ruminants" generally refers only to sheep. The goat production sector, although a major source of animal protein, is still neglected.

3.2.3 PERFORMANCE EVALUATION PROGRAMMES

A discussion of performance evaluation programmes and cattle and small ruminant programmes in the same chapter may, *a priori*, seem out of place. However, the development of performance evaluation systems directly influences results obtained in multiplication units. Furthermore, it must be acknowledged that this topic has hitherto been often neglected and that is why a detailed discussion has been devoted to it in this chapter.

The objectives of multiplication centres or units are, or should be, to produce upgraded breeding stock or at least to increase the productivity of their animals. To this end, a simple but adequate performance evaluation system, adapted to particular situations, which enables the official to make the necessary management decisions, should be developed. Unfortunately, such systems do not exist or are not considered a priority in most existing units and even in newly established units.

¹ FAC = Fonds d'aide et de coopération (France).

It may be said with confidence that in most cases, when livestock production results are not as good as expected, this is because production is not stringently and accurately monitored. However, the task of the breeder and in particular the processing and interpretation of data collected in the field have been greatly facilitated with the development of the computer.

The initial programme was planned and developed on a large scale in the early 1970s and implemented in Botswana (McNamara et al, 1974) where it was used as part of a beef cattle selection programme to monitor 5000 cattle on 16 farms and stations participating in the programme. The system was subsequently used in Swaziland, and in Kenya under the title "Kenya Beef Recording System" (KBRS) by ILCA (ILCA, 1977).

During the same period in Côte d'Ivoire, a computerised individual monitoring system for use in traditional livestock production systems was developed by IEMVT researchers (Poivey et al, 1978 and 1981). Using such a system, which operates on the principle of exchange lists and thus permanent dialogue between producers (through extension staff) and the biometrics unit, 8000 head of livestock in 64 village herds were monitored in 1980. A second programme for the evaluation of weight performances in cattle-rearing and fattening units was developed simultaneously and used to monitor and evaluate over 1000 young bulls in 1980 in village trial and selection stations established. A computerised monitoring programme for use in a ranching system has been developed by another IEMVT team and is currently being tested in Mali (Planchenault, 1985).

The main disadvantage of these monitoring and evaluation performance systems is the distance between recording sites (village, ranch etc) and processing centres and the constraint imposed by "heavy" data-processing equipment (air conditioning, size and cost of hardware, programs requiring a large memory etc). In all instances, this causes delays, sometimes inordinate, between the time the data were collected and the time they were sent to the producer for decision-making. This major constraint has now been overcome with the development of the microcomputer which is relatively low-cost and has a large memory.

With the development of the microcomputer, ILCA developed "IDEAS" (ILCA Data Entry and Analysis Systems/Système CIPEA d'enregistrement et d'analyse de données) (Wissocq et al, 1988). This system:

- processes all the major parameters: reproduction, viability, growth, milk, wool, traction and amalgamates them into suitable indices of productivity for all animal species: cattle, sheep, goats, camels, horses and donkeys
- provides standardised data base files for regional comparisons and national decision-making
- records climatic, nutritional and management data for use in the biological interpretation of statistical results
- allows all information on an individual animal to be immediately accessible
- allows the analyses on an individual farm to run to the point where all logical herd-level decisions can be made without having access to large computer facilities.

Such a tool, when widely disseminated, should considerably improve day-to-day management and animal and economic performances of multiplication units. The immediate consequence would be renewed interest on the part of donors in such projects and a revitalisation of the sector.

Consequently, since 1985, ILCA and FAO have jointly organised a training course on the standardisation of data on animal production in Africa and the utilisation of IDEAS software package.

3.3 DEVELOPMENT PROJECTS

In an effort to simplify presentation, an initial distinction will be made between "livestock" projects and integrated rural development projects with a livestock component. A further distinction is made within "livestock" projects, between general projects (national or regional) and specific projects: animal health, animal traction and small ruminants.

3.3.1 LIVESTOCK DEVELOPMENT PROJECTS

Four types of livestock development projects are discussed under this heading:

1. "General" projects
2. Animal health projects
3. "Animal traction" projects and
4. Small ruminant projects.

3.3.1.1 GENERAL PROJECTS

Livestock development projects for each country are presented in Table 3.3. These involve several aspects such as strengthening of national services, training of producers, range management etc, at the provincial, national or regional level.

Some of these projects have been mentioned in Volumes 1 and 2 and are therefore relatively old. They are included in the Table either because they continue to receive external funding or they are still being implemented. Finally, new projects have been planned and included in this list.

3.3.1.2 ANIMAL HEALTH PROJECTS

During the past 10 years renewed outbreaks of rinderpest have been reported and a new Pan-African Rinderpest Vaccination Campaign was carried out by OAU/IBAR with the assistance of the EEC. Within the past few years, however, a series of emergency measures were introduced in some countries with the assistance of the FAO Technical Cooperation Programme. Although not specific to trypanotolerant livestock production, these projects are important to, and directly influence, its development. The following countries have benefited from such assistance: Senegal (1983 and 1985), the Gambia (1981 and 1983), Sierra Leone (1984), Liberia (1983/84), Mali (1983 and 1984), Burkina Faso (1984), Togo (1980), Nigeria (1986) and Zaire (1986).

A bovine pleuropneumonia vaccination programme was also funded by FAO in 1986 in the Central African Republic, primarily for the vaccination of livestock from neighbouring countries.

Table 3.3. General livestock development projects.

Country	Name of structure	Establishment date	Breeds and number or implementation area	Objectives/Remarks	External aid and duration
Senegal	Improvement of livestock production and pastures in Bakel Department	1975	350 000 ha, 40 000 head of cattle	Extension service in animal husbandry	Phase II USAID 1985-1989
	Senegal Oriental Livestock Development Project (PDES0)	1976	1 300 000 ha 132 000 head of cattle	Improvement of health and extension services	WB/BADEA/ Kuwait Phase II 85/89
Gambia	Project on the establishment and development of the International Trypanotolerance Centre (ITC)	1984	The entire country. Continued monitoring of 50 000 head of N'Dama	Strengthening of veterinary services Reduction of mortality rate by 50% Reduction of calving interval to less than 24 months Improve annual growth by 50 kg or more	ADB loan repayable over a 50-year of 10-year grace period
Guinea	Project on the modernisation and development of the livestock sector	1986	Entire country	Strengthening of national services Increasing meat production by 75% Increasing milk production by 95% Establishment of a training centre and a vaccine production unit	WB/FAC/ CCCE/ BADEA 4 years First phase
Mali	Livestock development in Southern Mali project	1978	± 100 000 ha	Improvement of animal health marketing and extension services etc (project discontinued)	EDF till 1985
	Mali Livestock Sector Project	1982	Entire country	Strengthening of the veterinary laboratory and National Directorate for Livestock	USAID 5 years
Burkina Faso	Improvement of traditional animal husbandry in Comoé (Phase II)	1982	Upper Basin region	Pastoral development	EDF till 1985
	Development of East Soudré pastoral zone	1981	Sondré region	Range management	The Netherlands till 1985
	Feedlot centre and Léo pastoral zone	1980	Léo region	Feedlot centre and range management	The Netherlands
Côte d'Ivoire	SODEPRA North (livestock production extension in the North) + since 1984 extension on zebu production in the North	1972	417 700 sedentary cattle	Extension for producers	CCCE/FAC/ GTZ/AGCD Phase 3, 1986-1990
		1984	315 100 head of transhumant cattle 38 200 draught animals 23 800 ranch cattle	Range management	
		1975/76	54 250 head of cattle 29 730 sheep	Extension for producers	
	National Artificial Insemination Centre	1986	Entire country	Development of AI for cattle and sheep	UNDP/FAO till 1985 and ADB for 4 yrs Belgium for 3 yrs
Benin	Project to develop livestock production in South Borgou Project to promote livestock production in Atacora	1983	South Borgou province	Improvement of traditional animal husbandry system	EDF
			Atacora province	Development of traditional animal husbandry	GTZ from 1983-88
Cameroon	Meat Plan I and II	1975/86	Adamaoua and North West province	Loan to producers, setting-up ranches, slaughter houses, strengthening veterinary services, tsetse eradication mission etc. Defining a national livestock development strategy.	WB end of Phase I in January 1986 WB/ UNDP for 10 months
	Initial studies for a livestock production project	1980/85	Entire country		
		1986/87			
Central African Republic	Second livestock production plan	1986	Entire country	Strengthening of national services Extension for Mbororo producers revitalisation of trypanotolerant cattle production Setting-up of a veterinary laboratory	WB/IFAD/ BAD/EDF for 5 years FAC
Gabon	Agro-pastoral development of Lebamba zone	1980	Lebamba zone	Study of socio-economic aspects	UNDP duration 2 years
	Development of nucleus herds	1985	Vicinity of OGAPROV/ Agrogabon	Nucleus herds provided by Agrogabon	
Congo	Livestock development in Boundji District	1986	Boundji District	Supply of material, equipment and technical assistance	FAO

Source: Volume II. Country studies.

Apart from these purely health projects, the following projects have been funded during the past 10 years to strengthen or establish veterinary structures.

Guinea Bissau: In 1985, the country received assistance in the form of laboratory material, medicines and vaccines from UNDP.

Guinea: Between 1984 and 1986, FENU provided funds for the construction and equipping of five veterinary centres and a small laboratory in Upper Guinea.

Central African Republic: FAC plans to contribute towards the funding of veterinary laboratory to be established in Bangui as part of the second livestock development project.

Zaire: Since 1986, Belgium has funded a veterinary assistance project involving between 5000 and 10 000 head of cattle for producers in Mbanza Ngungu, Bas-Zaire.

3.3.1.3 "ANIMAL TRACTION" PROJECTS

Only specific animal traction projects are discussed in this section. Most integrated rural development projects which include a livestock production component (see section 3.3.2) also include an animal traction component. Table 3.5 gives a more comprehensive view of current activities in animal traction.

Only three countries, Benin, Sierra Leone and Togo, have had or currently have specific development projects on animal traction. They are discussed briefly below:

Benin: The national animal traction and animal production project launched with UNDP assistance ended in 1977. A new animal traction project funded by The Netherlands was started in 1980, but ended in 1983. New funding sources are being sought.

Sierra Leone: The Work Oxen Project was started in 1978 with ODA assistance to promote training and distribution of work oxen. Plans are currently underway to set up work oxen project units in each province.

Togo: The "Projet sur la promotion de la traction animale" was launched in 1977 (PROPTA ex PRODEBO). It coordinates all national activities on animal traction. It aims to train 6000 pairs of oxen, as well as trainers and provide veterinary supplies for the projects. EDF is providing external support.

These examples do not reflect the renewed interest shown in animal traction in the various West and central African countries during the past few years. In this respect, meetings on animal traction organised in 1985 and 1986 by Togo and Sierra Leone with the assistance of USAID, and current efforts being deployed jointly by FAO and ILCA to set up an animal traction research network, are very eloquent. As a result of these efforts, new projects may be implemented in the near future.

3.3.1.4 "SMALL RUMINANT" PROJECTS

A special effort has been made by eight countries to develop livestock multiplication upgrading and training projects on small ruminant production. The projects and their main objectives are presented in Table 3.4.

The project implemented in Côte d'Ivoire is also supported by the two multiplication units, the National Sheep Centre (CNO) and the Toumodi SODEPALM animal production

scheme. Although the reproduction career of about 5000 ewes is currently being monitored under this programme, the aim is to rapidly constitute a selection herd of 10 000 ewes. The programme has already produced spectacular results and provides producers participating in the scheme with highly productive breeding rams. This demonstrates the importance of these selection schemes and indicates that some of them are quite suited to livestock production conditions in Africa.

Table 3.4. Projects on the development of small ruminants production.

Country	Name of structure	Established	Breed and numbers or area of implementation	Objective/remarks	External aid duration
Senegal	Project to develop sheep production in Kaolack and Fatik Regions (PRODELOV)		3000 ha	Training on sheep production	FAC Phase II 1985-89
Côte d'Ivoire	National sheep selection programme (PNSO)	1983	Entire country 3600 ewes monitored in 1985	Improvement and multiplication of Djallonke sheep	FAC Phase I 1983-87
Ghana	Development of sheep and goat production		Ejura Farm and producers in vicinity	West African Dwarf x Sahel crossbreeding	UNDP/FAO initially
Togo	Small ruminants project	1980	Entire country	Health aspect Research, demonstration and extension activities at Kolohe Station	EDF 1980 USAID since 1985 FAC 1983-87
Benin	Development of small ruminant production project	1978	Atacora, Borgou and Zou provinces	Phase I: health Phase II: livestock production	USAID Phase I 1978-83 Phase II 1983-88
Cameroon	Project to assist traditional sheep producers	1981	Northwest province	Bamenda-Mankon Station research on diseases and productivity	Belgium
Congo	Sheep-goat Technical Centre (CAT)	1982	Likouala, Basin, and Plateaux Region	Animal health, improvement on pasture mass selection herding, night pens	FAO (technical assistance) Phase I 1982-85 Phase II 1985-87
Equatorial Guinea	Milk goat project	1985	Bioko Island	Survey under village conditions On-station production and technology	GTZ

Source: Volume 2. Country studies.

3.3.2 INTEGRATED RURAL DEVELOPMENT PROJECT WITH A "LIVESTOCK PRODUCTION" COMPONENT

Each of the integrated rural development projects presented in Table 3.5 include a "livestock production" component. However, this is mainly geared towards the breeding, training and maintenance of work oxen for use in crop production as part of the project's global objectives. In certain cases the aim of the project is to integrate agricultural and livestock production. In most instances, however, the livestock "production" component is mentioned "pour mémoire" or to boast that the projects are integrated rural development schemes while actually they are often the "least important" component of these projects.

Table 3.5. Integrated rural development projects with a livestock component.

Country	Name of structure	Established	Breed and numbers or implementation areas	Objectives/remarks	External aid duration
Senegal	Lower Casamance Integrated Agricultural Development Project (PIDAC) Sedhiou Rice Project	1979	Under the Casamance Development Company Casamance	Tagging and monitoring of draught oxen; herd management; veterinary pharmacies Training of farmers using draught animals	
Gambia	Gambia Mixed Farming and Resources Management Project	1980	Entire country	Training of farmers in use of draught animals	USAID 1980-85
Guinea Bissau	Zone I Integrated Project Zone II Integrated Project		Biombo, Cacheu, Oio Bafata, Gabu	Assistance to livestock service, development of animal traction Distribution of 3000 teams of oxen	Sweden EDF/ FAC
Sierra Leone	Koinadugu Integrated Development Project Northern Integrated Agricultural Development Project		Koinadugu District Northern province	Management of Musaia Station Management of Malal Mara ranch (200 ha and 200 head in 1985)	Funding till 1986
Mali	South Mali Project (CMDT)		Cotton zone	Training in animal traction by Malian Textiles Company	WB
Burkina Faso	Integrated Development of the central-eastern ORD	1983	Central-eastern ORD	Strengthening regional livestock structures Nouhao valley range management	Italy/FAO 5 years
Côte d'Ivoire	Development of livestock production in the southeastern region Development of livestock production in the forest region of the southwest Development of livestock production in the western forest region	1981 1984 1983	South-east of the country South-west of the country West of the country	Establishment of farms Intensive mixed farming and animal husbandry Animal species with short breeding cycle	CCCE ADB Belgium
Ghana	Ghanaian/German Agricultural Development Project (GGADP) Northern Region Integrated Project (NORRIP) Upper Region Agricultural Development Project (URADEP)	1974 1970 1977	Northern and Upper regions Upper Region	Training in animal traction Planning body for development of northern region All activities of the Ministry of Agriculture in the region	GTZ CIDA/WB/ ODA/GTZ till 1984
Togo	North Togo Integrated Development Programme	1976	Kara Region	Training in cattle and sheep breeding	UNDP/FAC Phase III 1981-86
Benin	Atacora Integrated Rural Development Project Zou Integrated Rural Development Project National Oilseeds Industries company (SONICOG) ex-(SOBEPALM)	1983 1983	Atacora province Zou province Ouémé province	Rural development Rural development Livestock production on oilpalm plantations	WB/FIDA/ OPEC 1983-88 WB/FIDA/ OPE WB/FAC/ CCCE 1981-88
Central African Republic	Ouham-Pende Integrated Rural Development Project Project on the rural development of Bamangui-Bangoran-Vakaga Districts	1985	Ouham-Pende Bamangui, Bangoran and Vakaga Districts	Development of animal traction Integrated rural development	GTZ UNDP
Zaire	Kwango-Kwilu Integrated Agricultural Development Project	1986	Kwango-Kwilu	Refresher course for field officials	WB/GTZ/ FAO
Equatorial Guinea	Niefang Integrated Rural Development Project		Niefang	Small ruminants deworming	FAC

Source: Volume II. Country studies.

At the end of this chapter on development activities on trypanotolerant livestock production during the past 10 years one could say there is reason to be optimistic, if not complacent. Encouraging results have been achieved and, more importantly, the groundwork for the planning and coordination of development programmes has been laid. These efforts should prove productive within the next few years and the next decade for the development of trypanotolerant livestock production can be approached with confidence.

PART 2

UPDATING OF COUNTRY STUDIES

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CHAPTER 1

SENEGAL

1.1 BACKGROUND

The Directorate of Animal Health and Production (La Direction de la Santé et des Productions Animales) is currently reporting to the State Secretariat for Animal Resources (Le Secrétariat d'Etat aux Ressources Animales) which is itself under the Ministry of Rural Development [le Ministère du Développement Rural (MDR)].

The Agricultural Research Institute of Senegal [L'Institut Sénégalais de Recherches Agricoles (ISRA)], also under MDR, consists of six departments, three of which are involved with livestock production: a Research Support Department (Département appui à la recherche), a Research Department for Production Systems and Technology Transfer to Rural Areas (Département de recherches sur les systèmes de production et le transfert de technologie en milieu rural) and a Department of Animal Health and Production Research (Département de recherches sur la santé animale et les productions animales) which includes the Livestock Research Centres of Kolda and Dahra and the National Livestock Production and Veterinary Research Laboratory [Laboratoire National d'Élevage et de Recherches Vétérinaires (LNERV)] in Dakar-Hann.

Data for the country and study area are given in Table 1.

Table 1. Human and animal populations of Senegal, 1983.

	Country	Study area
Human population (1983)		
- number	6 038 000	
- density	30.7/km ²	
Animal population (1983)		
- cattle	2 200 000	1 210 000
- sheep	1 967 000	1 245 000
- goats	983 000	

Sources: For human population, projections (+2.8%) based on 1976 national census, Direction de la Santé et des Productions Animales (DSPA), 1985. For animal population, Ministry of Rural Development, Livestock Production Division Statistics, 1985 (quoted by Ly, 1985).

In 1979, tsetse infested 70 000 km² (or 36% of the country) out of a total area of 196 200 km² (Touré, 1979). According to a new tsetse distribution map prepared by Laveissiere and Toure (1982), all of the Casamance Region is infested with tsetse as well as most parts of Senegal Oriental, a strip in the south of Sine Saloum along the Gambian border and the coast, and the Dakar and Thies areas. *G. p. gambiensis* is found in all the areas mentioned. *G. morsitans submorsitans* is found throughout the Casamance Region, in the south of Sine Saloum and in the south, southeast and northeast of Senegal Oriental. *G. longipalpis* is found in the northeast, west and southwest of Casamance.

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The combined effect of drought and abuse of forest resources has resulted in major changes in the distribution of tsetse in the mid-east areas of the country within the past few years. *G. morsitans submorsitans*, which used to be found as far north as longitude 14°40' only 10 years ago, has practically disappeared above 13°50'N (Diaité, 1984).

1.2 LIVESTOCK NUMBERS AND DISTRIBUTION

The number of cattle in 1983 in the departments of the three regions studied is shown in Table 2, broken down according to the three breeds—N'Dama, Djakoré and Gobra Zebu—found in the area. The N'Dama constitutes 53% of the cattle population in the study area and about 30% of the total number of cattle. The Djakore accounts for 33% of the herd in the study area and 18.5% of the total population.

Statistics in Senegal do not always differentiate between sheep and goats. It is generally agreed that two-thirds of all the small ruminants are sheep and one-third goats. The number of small ruminants by species, when available, is given in Table 2.

Table 2. Livestock numbers in the study area of Senegal, 1983.

Region and department	Cattle			Sheep	Goat	
	Total	N'Dama	Djakoré			Zebu
CASAMANCE						
Ziguinchor	12 790	12 700	—	—	9 050	12 750
Oussouye	8 000	8 000	—	—	2 510	3 350
Bignona	77 000	77 000	—	—	54 700	23 070
Sedhiou	84 000	84 000	—	—	53 370	47 000
Kolda	158 400	158 400	—	—	91 870	129 930
Velingara	108 700	108 700	—	—	40 000	45 700
Subtotal	448 800	448 800	—	—	252 500	261 800
SENEGAL ORIENTAL						
Tambacounda	151 470	106 000	37 900	7 570	—	139 740
Bakel	162 580	1 600	157 680	3 300	—	18 760
Kedougou	22 550	22 550	—	—	—	65 700
Subtotal	336 600	130 150	195 580	10 870	—	224 200
SINE SALOUM						
Fatik	57 406	—	14 352	43 054	—	118 850
Foundiougne	46 451	18 580	27 871	—	—	140 093
Gossas	52 225	—	13 225	39 000	—	33 732
Kaffrine	126 615	4 700	80 370	41 545	—	67 839
Kaolack	49 848	—	26 918	22 930	—	64 135
Nioro du Rip	92 355	41 455	50 600	—	—	82 706
Subtotal	424 600	64 735	213 336	146 529	—	507 400
Total (study zone)	1 210 000	643 685	408 916	157 399	—	1 244 900

Source: DSPA (1983).

1.3 CATTLE

1.3.1 BREED CHARACTERISATION

1.3.1.1 N'DAMA

Livestock production stations and ranches show a preference for N'Dama with fawn coats as these are preferred by countries importing N'Dama. Another reason given is that this coat colour is associated with a greater resistance to trypanosomiasis. However, a study conducted by Touré et al (1981) showed that fawn N'Dama are neither more nor less trypanotolerant than white, black or pied N'Dama.

1.3.1.1.1 Performance traits

A comprehensive study of reproduction parameters for N'Dama raised on-station was conducted by ISRA with the assistance of ILCA in 1982 (Fall et al, 1982). Detailed information on reproduction parameters, mortality, body weight, linear measurements and productivity are presented in this document.

The main results obtained at the station during the 1974–81 period are:

- Age at first calving is given as 39.8 months \pm 0.8 months with a coefficient of variation (CV) of 14.1%; a calving interval of 495 \pm 16 days with a coefficient of variation of 26%; an average breeding career of 7.5 years and an average lifespan of 10.8 years
- Mortality rates in calves are 9.6% between birth and weaning at six months and 1.3% from six months to one year. Mortality rate for breeding cows is 2.9% per year and average interval between generations is 6.7 years
- Average daily weight gain for calves is 0.36 kg between birth and weaning at six months and 0.21 kg/day between birth and 30 months. Average body weight of cows is 234 kg
- The three body measurements of the animal—weight at withers, scapulo-ischial length and chest girth—were analysed and correlated with body weight
- Reproduction parameters, viability and body weight of calves and dams have been combined to obtain the productivity index.

1.3.1.1.2 Index of productivity

Table 3 summarises estimates of the production traits of the N'Dama based on the index computed in Volume 1 which is defined as the total weight of one-year-old calves plus the liveweight equivalent of milked-out yield per cow maintained per year or per 100-kg cow maintained per year.

Table 3. N'Dama productivity estimates at CRZ, Kolda.

Adult female viability (%)	97
Calving percentage	75
Calf viability to one year (%)	80
Calf weight at one year (kg)	111
Productivity index per cow per annum (kg)	67.6
Adult female weight (KG)	232
Productivity index per 100-kg cow maintained per annum (kg)	29.1

Source: Compiled by authors.

The methods used to calculate productivity indices in the ILCA study (1982) were slightly different and are as follows:

Index 1: Calf weight at nine months per cow per year. Calculated for each calving as the product of the weight of calf at nine months x 365 ÷ calving interval.

Index 2: Calf weight at nine months per 100 kg per cow per annum. Calculated as index 1 ÷ average weight of cow x 100.

Index 3: Total weight of calves at nine months per 100 kg metabolic weight per cow per annum. Calculated as index 1 ÷ average cow weight to the power 0.73 x 100.

The value of these indices calculated from 280 data sets are 70.1, 29.1 and 127 kg for indexes 1, 2 and 3, respectively.

Since the publication of these results, CRZ, Kolda has started a research programme in village environment. Preliminary comparative data obtained for N'Dama raised at CRZ and traditional production systems are presented in Table 4.

Table 4. Comparative average weight of N'Dama raised at CRZ, Kolda, and in the traditional production system.

Age	Number	Mean weight (kg)
CRZ, Kolda		
Females		
Birth	66	16.33
3 months	52	46.42
6 months	38	71.86
9 months	14	78.08
Males		
Birth	69	16.49
3 months	48	44.44
6 months	38	86.13
9 months	10	89.9
Traditional livestock production system		
Birth	69	14.05
3 months	1	22.0
6 months	2	37.02
9 months	6	46.66

Source: CRZ (1984).

1.3.1.2 DJAKORE

Comparative productivity research on this breed was first conducted by ISRA, primarily as part of the production systems study. However, no new data are currently available.

1.3.2 DISEASES

Thirteen outbreaks of foot-and-mouth disease were reported in the Louga and Diourbel regions between 1983 and 1984 (DSPA, 1983). According to the most recent report by the Directorate of Animal Health and Production (FAO, 1986), there were several outbreaks of rinderpest in neighbouring countries in 1984 and 1985. No case of contagious bovine pleuropneumonia was reported during this period. Several outbreaks of anthrax (58 foci of blackquarter and 23 of

anthrax) were recorded. The number of reported outbreaks of botulism remained stable (25 foci) as did the number of cases of pasteurellosis (25 foci).

Senegal received FAO assistance in 1983 for a one-year project entitled "Emergency Rinderpest Campaign and Strengthening of Dakar Laboratory" and in 1985 for a Rinderpest Control Project.

1.3.3 HERD MANAGEMENT

There has been a rapid increase in the use of animal traction in Senegal and the number of draught oxen in 1985 was estimated at 130 000 teams. (P H Starkey, Reading, UK, personal communication, 1986).

Lhoste(1986) emphasises the increasing use of females for animal traction. In Sine Saloum, 325 pairs of cows and 9039 pairs of oxen were used in 1974. In 1981, 8051 pairs of cows and 23 054 pairs of oxen were used. Since 1978, one-fourth of the traction power has been supplied by cows. The major difficulty is to synchronise the breeding season of the two cows with ploughing. A rest period of three to four months should be allowed during calving (end of pregnancy and beginning of lactation). Work females also have less draught power and less resistance than males. Nevertheless, agropastoralists recognise the numerous advantages of using females for traction:

- the longer working life of the female
- females are easier to train and move at a faster pace
- production of milk and calves.

1.4 SHEEP AND GOATS

A comprehensive study of the performance traits of West African dwarf sheep raised under village conditions was conducted by ISRA with the assistance of ILCA in 1982 (ILCA, 1982). Detailed data on reproduction parameters, mortality rates, weight, body measurements and productivity are given in this document.

The main results obtained at this station during the period 1974 to 1981 were as follows:

- age at first lambing 575 days with a lambing interval of 495 days
- mortality rates for sheep were: 33% from birth to weaning at four months and 19% from four months to one year old. Mortality rate for breeding ewes was 14.8% per year
- daily weight gain for sheep was 0.06 kg from birth to weaning at four months and 0.04 kg from birth to one year. Average body weight for ewes was 23.5 kg
- the three body measurements, height at withers, scapulo- ischial length and chest girth were analysed and correlated with body weight
- reproduction parameters, viability and body weight of ewes and lambs were combined to obtain productivity indices.

1.4.1 INDEX OF PRODUCTIVITY

Table 5 summarises estimates of the productivity of West African dwarf sheep using the index defined in Volume I as the total weight of lambs at five months per ewe maintained per year or per 10 kg of ewe maintained per year.

Table 5. Productivity estimates for West African dwarf sheep.

Ewe viability (%)	85.2
Lambing rate (%)	115
Lamb viability to one year (%)	48
Lamb weight at 5 months (kg)	10
Productivity index per ewe per year (kg)	5.96
Ewe weight (kg)	23.5
Productivity index per 10-kg ewe maintained per year (kg)	2.54

Source: Compiled by authors.

The following new productivity indices for ewes were calculated using methods similar to those used for cows (ILCA, 1982):

Index 1: Total weight of lambs weaned at four months per ewe per year. Calculated for each lambing as being the total weight of lambs weaned at four months per ewe x 365 + next lambing interval

Index 2: Total weight of lambs weaned per kg of ewe maintained per year. Calculated as index 1 + average weight of ewe.

Index 3: Total weight of lambs weaned per metabolic weight of ewe raised per year. Calculated as index 1 + average weight of ewe maintained to the power 0.73.

The results obtained for 397 data sets were 11.5 kg for index 1, 466 g for index 2 and 1103 g for index 3.

1.4.2 DISEASES

There was a significant drop in the number of reported cases of peste de petits ruminants in 1983–84 compared to 1982–83 (6 foci as against 13) (FAO, 1986).

There was an increase in the number of sheep and goat pasteurellosis foci in 1984–85 (37 foci compared to 33 in 1983–84). There was no increase in the number of sheep pox foci (2 foci).

1.5 RESEARCH AND DEVELOPMENT ACTIVITIES

1.5.1 RESEARCH CENTRES

The following four research centres in Senegal work on trypanotolerance or with trypanotolerant breeds.

The National Laboratory for Livestock Production and Veterinary Research (LNERV) continues its activities on vaccine production and research on trypanosomiasis, trypanotolerance and trypanotolerant livestock (cattle and small ruminants) (LNERV, 1985). Technical assistance is provided by IEMVT (France) and recently by the World Bank through ISRA.

In 1985, CRZ, Kolda maintained 450 N'Dama and 200 West African dwarf sheep. Twelve sires are sent each year to the study area and the programme will eventually be extended to all ecological areas in which N'Dama are found (Ly, 1985). The mandate of the centre is the dissemination of genetic innovation obtained under station conditions. To this end, a pre-extension programme was introduced in 1978 involving a number of herds in nearby villages,

to prepare and monitor reception conditions and utilisation of sires supplied by the station and eventually evaluate their effect on herd productivity.

Thirteen herds in seven villages, comprising 1300 head, are currently involved in the programme (Landais, 1985).

These two bodies should collaborate with the International Trypanotolerance Centre in The Gambia within the framework of the African Trypanotolerant Livestock Network.

CRNA, Bambey, is now mainly involved with crop research. Its livestock component (trypanotolerant livestock selection and crossbreeding) has been closed down and the livestock distributed to the Kaolack and Casamance stations.

Finally, the Experimental Units (UE) programme of the Kaolack Centre in Sine Saloum has been taken over by ISRA systems and production team. ISRA's livestock research programmes for 1985 were as follows (ISRA, 1985):

- Production systems in Sine Saloum (Kaolack and Fatick): surveys, monitoring and livestock trials
- Production systems in Basse-Casamance: livestock production and monitoring systems, animal traction
- Support research for production systems in Sine Saloum (Kaolack and Fatick regions): animal traction equipment.

1.5.2 DEVELOPMENT PROJECTS

Various development projects on trypanotolerant livestock have been launched since the last study was completed.

The Project to Develop Livestock Production in Senegal Oriental (PDESO) is managed by the Textile Fibres Development Company (SO.DE.FI.TEX). It was launched in 1976 with funds provided by the World Bank, BADEA and Kuwait. The initial phase of the project was to encourage livestock production in the northern part of Senegal Oriental north of the Dakar-Bamako railway, a project involving an area of 1 300 000 ha and 132 000 head of cattle. A second phase is to be implemented between 1980 and 1985 (*Agri-Afrique*, 1985 and Kane and Ka, 1986).

In 1984, PDESO introduced a southern area livestock production phase in Senegal Oriental and Haute Casamance to provide adequate veterinary service and training in the nutritional aspect of breeding stock. This project covered 456 000 head of cattle and 260 000 head of sheep and goats and will last for five years (*Agri-Afrique*, 1985 and SO.DE.FI.TEX, 1986).

SO.DE.FI.TEX is also responsible for the "Senegal and Haute Casamance Rural Project" (PDRSO) and is primarily involved with the dissemination of animal traction (15 000 teams). The five-year project, begun in 1985, is funded by the CCCE, IDA, FAC, Kuwait and Senegal (*Agri-Afrique*, 1987).

The Casamance Region Development Company (SOMIVAC) also has a livestock production development component as part of a new project, "The Lower Casamance Integrated Agricultural Development Project" (PIDAC). This phase was introduced in 1979 to tag draught animals and monitor diseases within the framework of the SOMIVAC "agricultural programme". These activities were extended in 1981 with the establishment of small-scale rural projects. The livestock production programme comprises various aspects: herd management, management of

sheep barns, veterinary materials and products, village veterinary pharmacies, training etc (PIDAC/SOMIVAC, 1986).

The Project to Improve Livestock Production and Pastures in Bakel Department, launched in 1975, aims to train producers in livestock management activities (350 000 ha and 40 000 head of cattle managed). The second phase, to be implemented between 1985 and 1989, is funded by USAID (*Agri-Afrique*, 1985).

The Sedhiou Rice Project (PRS) in Casamance provides training for farmers in the use of draught animals and encourages the production and fattening of trypanotolerant cattle.

Since the last study was completed, a sheep production project has been established in Sine Saloum. The "Project to Develop Sheep Production in Kaolack and Fatick Regions" (PRODELOV) covers Gossas, Guinguinéo-Gandiaye and Mbar, an area of 3000 ha. A second phase, to be implemented between 1985 and 1989, will be funded by the FAC (Ly, 1985 and *Agri-Afrique*, 1985).

In 1982, UNDP undertook a study at the request of the Gambian River Basin Authorities during which three livestock development projects were identified:

- Integrated Livestock Production Development Project in Kedougou Department, Senegal Oriental (a six-year project starting in 1981)
- Development of the livestock production sector in Casamance (a five-year project starting in 1981)
- Livestock Fattening Project in Sine Saloum, expansion of pilot units for intensive beef production (a two-year project starting in 1981) (UNDP, 1982).

These projects are, however, in the planning stage.

Finally, it should be pointed out that the new agricultural policy of Senegal encourages private investment in identified projects. With regard to trypanotolerant livestock production, some privately owned structures are currently being established (Ly, 1985). These include:

- the ranch for the finishing beef cattle in Senegal Oriental. Planned production of 4000 head per year. Cost: 800 million CFA francs
- the fattening company (SABEVI). Planned production of between 4000 and 6000 head per year. Cost: 850 million CFA francs
- SOPELA N'Dama Multiplication Unit in Missira. Cost: 200 million CFA francs.
- There are also indications that some private companies are interested in establishing a trypanotolerant cattle ranch in Kedougou Department.

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1.7 MAJOR CHANGES SINCE 1977

The number of cattle fell slightly in the country (-10%) and the study area (-8%) during the study period. Sheep and goat populations increased slightly (+11% for the whole country and +20% for the study area). Although the trypanotolerant cattle population (N'Dama and Djakoré) remains the largest group in the country (48% of the total cattle stock in 1983 and 47% in 1976), the drop in the percentage of N'Dama within this group is alarming (746 000 head in 1976 and 644 000 head in 1983, a drop of -14%). Data analysis carried out jointly by ISRA and ILCA provided valuable information on the performance traits of N'Dama cattle and Djakoré sheep raised under station conditions. New ISRA research programmes to be funded through a World Bank project should provide important data on livestock production under village conditions.

Finally, during the past few years, major efforts have been made with regard to livestock research and development in the Casamance, Sine Saloum and Senegal Oriental regions. The government encourages private investments in this sector and several private ranches should be established within the next few years. Furthermore, with close cooperation with the International Trypanotolerance Centre (ITC) in The Gambia, significant progress should be made in trypanotolerant livestock production in Senegal in the near future. It should be stressed that Senegal is one of the major exporters of N'Dama breeding stocks.

CHAPTER 2

THE GAMBIA

2.1 BACKGROUND

The Animal Health and Production Department (AHPD), under the Ministry of Agriculture and Natural Resources is responsible for all livestock production activities. It currently comprises seven divisions, four of which are concerned with livestock production: the Directorate, the Animal Health Division, the Animal Husbandry and Production Division and the Animal Industries Division.

Background data for the country are given in Table 1.

Table 1. Human and animal populations of the Gambia, 1983.

Human population (1983)	
– number	695 886
– density	61.6/km ²
Animal population (1983)	
– cattle	305 000
– sheep	162 000
– goats	175 000

Sources: For human population: 1983 census figures.

For animal population: projections based on 1978-79 census carried out by the Animal Health and Production Department (AHPD) (0% for cattle, 2.5% for sheep and goats).

According to FAO (1986) report, *G. morsitans submorsitans* is found throughout the country in the dry savannah woodlands, except in the west of the Western Division. *G. palpalis gambiensis* is found on either side of the river in natural areas of oil palm groves, mangrove swamps, the intermediate forested swamps and the steep riverbanks of Upper River Division. The presence of *G. longipalpis* has not been reported recently.

The International Trypanotolerance Centre (ITC) is currently conducting a detailed study on tsetse distribution as part of its research programme. During the initial year of their study, Snow and Rawlings (1986) confirmed the presence of *G. palpalis* in the areas around Gunjur (low density) and Pirang (high density). *G. morsitans* was found in the Keneba area (high density) and the Nioo and Sare Ngai areas (low density).

2.2 LIVESTOCK NUMBERS AND DISTRIBUTION

The final results of the national livestock census carried out in 1978-79 were still being compiled when the last study was published. These data have been used in Table 2 which shows the livestock population and density by administrative division.

Table 2. Cattle numbers and density by administrative division, 1979.

Administrative division	Population			Densities per km ²		
	Cattle	Sheep	Goats	Cattle	Sheep	Goats
Western	39 700	23 484	32 429	21.5	12.7	17.6
Lower River	30 800	14 307	13 451	20.1	9.4	8.8
McCarthy	96 700	48 185	44 996	34.0	16.9	15.8
Upper River	86 000	33 045	40 437	42.9	16.5	20.2
North Bank	51 850	26 938	26 782	23.5	12.2	12.2
Total	305 000	145 959	158 095	26.9	12.9	13.9

Source: AHIPD (1979). Densities calculated by authors.

The Gambia still has one of the densest cattle populations in Africa. Cattle numbers seem fairly stable. Stocking rate was 25.5/km² in 1973, 27/km² in 1975, 26.2/km² in 1978 and 26.8/km² in 1979.

The highest livestock concentrations are found in the Upper River and McCarthy Island Divisions which occupy 47% of the total area and account for 44% of the cattle population, 55% of the sheep population and 54% of the goat population.

2.3 CATTLE

Almost the whole cattle population of The Gambia is of the N'Dama type. Some N'Dama x zebu crossbreeds and zebu are found in the eastern part of the country. In 1985 the N'Dama accounted for 95% (290 000 head) of the total cattle population, the N'Dama x zebu crossbreeds for 3% (9000 head) and the zebus for 2% (6000 head) (Quartey, 1984; Shaw, 1985).

2.3.1 N'DAMA BREED CHARACTERISATION

As of its establishment in 1984, ITC developed a livestock breeding and monitoring methodology. The preliminary results, which were submitted to the ITC Board of Trustees at its first two meetings (ITC, 1985; 1986), are presented in this document. More comprehensive data on the performance traits of N'Dama under village conditions in the Gambia will, however, be published shortly by the Centre.

2.3.1.1 PERFORMANCE TRAITS

According to a survey conducted by Clifford between 1974 and 1979 (Clifford, 1986a), age at first calving is between 40 and 66 months and fertility rate between 50 and 60% in areas of low trypanosomiasis challenge.

A recent study on annual calving patterns, based on 83 births in 15 herds in Keneba, Manduwarr, Karantaba and Burong (ITC, 1985), shows that 44.6% of calves are born in November, December, January and February.

In 1986, Clifford (1986b) quoted the body weight by age group of 21 herds in the Kombo area under village conditions in an area of low trypanosomiasis risk. The results are given in Table 3.

Table 3. Body weight by age group in the Kombo area.

	Age	Number	Weight (kg)	Extremes
Females	8 D	523	230	(165-345)
	6 D	53	199	(130-275)
	4 D	52	177	(100-290)
	2 D	61	151	(80-220)
	1-2	82	110	(50-160)
	0-1	179	66	(25-130)
Subtotal		1010		
Males	8 D	20	283	(200-350)
	6 D	19	205	(150-250)
	4 D	33	190	(140-265)
	2 D	40	161	(85-220)
	1-2	61	121	(60-175)
	0-1	156	69	(30-145)
Subtotal		329		

Source: Clifford (1986b).

ITC (1985) noted trypanosomiasis infection rate varied with age and that weight was also influenced by infection rate. Preliminary results of this study are given for information purposes in Table 4.

Table 4. Influence of age on trypanosomiasis infection rate and of infection rate on growth.

Infection rate and age	Age	Infection rate(%)	Average weight (kg)
	0-1 year	2.1	44.5
	1-3 years	7	128
	3-6 years	6.8	216
	6 years	6.5	248
S I T E			
	Gunjur		Keneba
Infection rate tryp.(%) of cattle	2.3		9.1
Average age			
- preweaning	47		42
- postweaning	130		127
- of breeding females (>4 years)	242		222

Source: ITC (1985).

ITC has also started studying the milk-yield potential of N'Dama in the Gambia (ITC, 1986). A total of 400 lactations for 85 cows (53 at Keneba and 32 at Gunjur) were monitored. The results, based on data collected for individual cows over a four-month period at an interval of 25 to 35 days, indicate an average daily milk yield of 1.6 kg per cow at Keneba and 1.2 kg at Gunjur. This, according to the authors, accounts for the higher average daily weight gain of calves at Keneba (0.21 kg/day) compared to those at Gunjur (0.16 kg/day).

2.3.2 DISEASES

Since the joint vaccination campaign against rinderpest (P.C 15) was carried out between 1966 and 1969, there has been no outbreak of the disease in The Gambia. All calves are vaccinated annually against the disease. In 1981 and 1983, The Gambia received FAO assistance in the form of vehicles, vaccines and refrigerating and veterinary materials, as part of the Pan-African Emergency Vaccination Campaign against Rinderpest. FAO also provided technical assistance for the training of staff.

Contagious bovine pleuropneumonia is still a serious threat in The Gambia and annual vaccination is compulsory.

There are occasional outbreaks of anthrax, blackquarter and hemorrhagic septicemia. Sporadic cases of tuberculosis and brucellosis have also been reported but their incidence has been low. Streptothricosis is a major problem among calves during the rainy season.

Liver flukes are found in areas bordering rivers and in swampy areas but its incidence is unknown for the time being.

Babesiosis and anaplasmosis are common diseases although the infection rate is low (FAO, 1986).

According to an ITC survey conducted in the Gunjur and Keneba areas, the rate of trypanosomiasis infection in cattle was 2.3% and 9.1%, respectively.

2.3.3 HERD MANAGEMENT AND COMPOSITION

The most important feature of the husbandry system practised in The Gambia is the fact that the animals are not herded in enclosures but are tethered by their horns to wooden stakes at night. After pasture grazing the herd returns to the night pen area where each animal is tethered to its stake by the horns. This is worth noting when monitoring and conducting individual research on supplementary feeding.

Herd composition in two ITC areas of operation is analysed in Table 5.

Table 5 shows that there is a significant difference between animals in the 0–1 year group and those in the 1–2-year group for both males and females. This indicates a high mortality rate between birth and 1 year.

With regard to animal traction, FAO (1980) gives a figure of 17 672 oxen (5.8% of the national cattle population) for 1978. In 1970, this number was between 300 and 400 oxen.

These figures demonstrate the growing interest in draught animals shown by farmers during the past few years. Draught animals are put to work at about five years old and work

continuously for five years. It should nevertheless be noted that in spite of an increased interest much of the draught power required is provided by donkeys.

Table 5. Herd composition in two areas.

Villages		Kombo	Kiang West
Females	8	43.5%	29.9%
	6	4.0%	5.3%
	4	3.9%	5.7%
	2	4.6%	4.3%
	1-2 years	6.1%	8.1%
	0-1 year	13.4%	9.5%
Subtotal		75.4%	62.8%
Number		1010	450
Male castrates	8	0%	7.4%
Males	8	1.5	3.1%
	6	1.4%	2.1%
	4	2.5%	3.1%
	2	3.0%	3.9%
	1-2 year	4.6%	8.1%
	0-1 year	11.7%	9.5%
Subtotal		24.6%	37.2%
Number		329	266
Total		100%	100%
Total number		1339	716

Source: Touray and Clifford (1985).

2.4 SHEEP AND GOATS

The most recent data available on sheep and goats are for diseases.

The latest Animal Health and Production Department report presented at a FAO/CILSS (FAO, 1986) meeting identifies the major disease affecting sheep and goats in The Gambia as peste de petits ruminants (PPR) which causes heavy losses and requires the organisation of vaccination campaigns. Streptothricosis and internal parasites are widespread and also cause heavy economic losses.

2.5 RESEARCH AND DEVELOPMENT ACTIVITIES

2.5.1 RESEARCH CENTRES

The most important event of the study period was the establishment of the International Trypanotolerance Centre (ITC) which is responsible for and has significantly promoted the "Trypanosomiasis Research Programme in the Gambia". The activities of the Centre and of Yundum station are presented in Table 6.

Table 6. Research centres and programmes in The Gambia.

Name	: International Trypanotolerance Centre
Location	: Three major project sites: Abuko, 10 km from Banjul; Bansang, 310 km from Banjul and Keneba, 170 km from Banjul.
Size	: Abuko 35 ha; Bansang 200 ha and Keneba 200 ha.
Breeds and numbers	: N'Dama The production and development subproject (see below) ensures the continuing survey of the 50 000 head of N'Dama and the research subproject monitors 2000 head. The Centre will also maintain breeding stocks and research animals.
Objectives	: to encourage better utilisation of trypanotolerant livestock and increase productivity of village herds using all possible means. The Centre consists of three components: – a production and development subproject which aims to reduce mortality rate by 50% – a research subproject which conducts field and station studies on the trypanotolerance and productivity of N'Dama under village conditions. – a training subproject which is expected to begin in 1987.
Aid	: The production and development subproject is funded by ADD loan repayable over a period of 50 years with a grace period of 10 years. The productivity aspect of the research subproject is funded by the EEC through ILCA and ILRAD and the tsetse and trypanosomiasis aspect by ODA and Belgium. The initial phase of this subproject will last three years and the second phase is in the planning stage. The training subproject should be funded by UNDP and managed by FAO. The initial phase should last four years. The Centre which commenced operations in 1984, will be officially opened in early 1987.
Name	: Yundum Experimental Station and sheep and goat development project.
Location	: Yundum, 25 km from Banjul and Yoroberi Kunda.
Organisation responsible	: Animal Health and Productivity Department
Size	: 200 ha
Breeds and numbers	: 120 N'Dama and a nucleus herd of 16 sheep.
Objectives	: to study reproduction performances and parameters of N'Dama; intensification of sheep and goat production.
External aid	: Assistance requested from UNDP.

Sources: Shaw (1985); Touray (1985).

2.5.2 DEVELOPMENT ACTIVITIES

The Gambia Mixed Farming and Resource Management Project envisaged in the previous study was established in 1980 with the assistance of USAID for a period of five years. Although the main objective of the scheme is the production of wheat for human consumption, it also includes a draught power component.

Between 1985 and 1987, The Gambia received funds from UNDP for the implementation of a programme entitled "Assistance to the Department of Animal Health and Production". The aim of the project, which is managed by FAO, is to reorganise the administrative aspect and the field sections of the Department of Animal Health and Production.

The Livestock Marketing Board (LMB) is responsible for marketing and exporting trypanotolerant breeding stock. The LMB has holding grounds at Pirang and Farabasuta with a capacity of 300 head each, at Kabokor of 600 head and at Sikunda for 100 head. These serve as an assembly point for animals purchased in villages for slaughter or for export (Shaw, 1985).

In the more specific field of livestock production, FAO carried out a study mission as part of the international programme for the development of the meat sector. The following four projects, for which funds are being sought, have been identified:

- Animal health improvement
 - Institution: AHPD
 - Location : Various sites in the country
 - Duration : Four years
 - Cost : US\$ 2 450 000
- Applied research on trypanotolerance and production of trypanotolerant livestock
 - Institution: AHPD
 - Location : To be decided
 - Duration : Four years
 - Cost : US\$ 2 100 000
- N'Dama multiplication and improvement Centre
 - Institution: AHPD
 - Location : Yori Beri Kunda
 - Duration : Five years
 - Cost : US\$ 2 500 000
- Sheep breeding pilot project
 - Institution: AHPD
 - Location: Yundum
 - Duration : One year
 - Cost : US\$ 50 000

However, projects 2 and 3 can be considered to be covered by ITC activities.

The Gambia River Basin Authority is also planning to establish a project to improve N'Dama livestock and increase the number of N'Dama breeding centres (UNDP, 1982) has been envisaged but so far implementation has not yet begun.

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2.7 MAJOR CHANGES SINCE 1977

The cattle population of The Gambia has been considered stable for several years and the cattle population density remains the highest in Africa. The sheep and goat population increased slightly during the same period (+12%). However, the increase was due exclusively to an increase in the sheep population which appears to be increasing while the number of goats remains static. The use of draught power has increased considerably over the past 10 years and the number of draught animals is currently estimated at 5.8% of the total livestock population.

The landmark event in livestock production was the establishment in 1984 of the International Trypanotolerance Centre (ITC) and the development of its research and development programmes. This Centre is of importance not only to livestock production in The Gambia but to all countries involved in trypanotolerant livestock production.

CHAPTER 3

GUINEA BISSAU

3.1 BACKGROUND

In 1984, Guinea Bissau created a Ministry of Rural Development (Le Ministère du Développement Rural) comprising several "Directorates" one of which is the "General Directorate of Livestock Production". The latter consists of three departments: the Department of Animal Health (comprising nine veterinary sections subdivided into 13 veterinary stations, modern abattoirs and traditional slaughterhouses), the Department of Animal Production [Le Département de la production animale (including breeding stations)] and the Department of Veterinary Research (which includes the Central Laboratory and regional branches) (Tacher, 1985).

Table 1 contains data for human and animal populations of Guinea Bissau.

Table 1. Human and animal populations of Guinea Bissau, 1985.

Human population (1985)	
- number	870 000
- density	24/km ²
Animal population (1985)	
- cattle	300 000
- sheep	110 000
- goat	230 000

Source: For human population: projections (+2.2%) from 1979 census.

Chardonnet (1983) mentions an earlier survey on tsetse distribution conducted by Pinto in 1951 which provides more information than the OAU/SITC map of 1977. However, it needs to be updated. According to this survey, *G. palpalis* is found in almost all of the coastal areas and on the islands off the estuaries. *G. morsitans* is widely distributed in southern Gabu and Bafata regions and in the regions north of Rio Cowbal. There are also pockets of infestation in the Oio region. The rest of the country has a lower tsetse density. *G. longipalpis* is found in most areas of the country and *G. fusca* in the south.

3.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Table 2 shows livestock distribution by region for 1980, when the most recent census was carried out.

Table 2. Livestock numbers and distribution in Guinea Bissau, 1980.

Regions	Cattle	%	Sheep	%	Goats	%
Cacheu	25 565	9.8	4 926	5.2	31 607	16.1
Bissau	1 111	0.4	1 141	1.2	4 644	2.3
Oio	34 060	13.1	12 619	13.4	47 912	24.5
Bafata	74 283	28.6	45 669	48.3	58 650	30
Gabu	105 225	40.4	28 145	29.7	36 507	18.6
Bolama	1 718	0.7	549	0.6	3 956	2
Biombo	7 376	3.6	122	0.1	2 771	1.4
Quinara	2 996	1.1	741	0.8	4 049	2
Tombali	5 914	2.3	699	0.7	5 333	2.7
Total	258 248	100	94 614	100	195 429	100

Source: Ministerio do Desenvolvimento Rural (1985).

3.3 CATTLE

3.3.1 BREED CHARACTERISATION

The 300 000 head of cattle in Guinea Bissau described as "N'Dama" are not of the typical N'Dama type but represent a rather heterogeneous population. The "Livestock Department" still makes a distinction between Boenca or the typical N'Dama and Fulani based on phenotypes such as size, coat colour, shape of the horns etc. Manjaca breeds are currently very few and may be considered as extinct (FAO, 1985).

3.3.1.1 N'DAMA PRODUCTION PARAMETERS

Production parameters (FAO, 1985) for Bafata and Gabu sectors, where the cattle are mainly of the Foula type, are given below:

- Age at first calving : 4 years
- Weaning age : 10-12 months
- Fertility rate: : 50%
- Age at culling : about 10 years

The relatively long calving intervals and in particular, an unbalanced nutritional regime, account for the low fertility rate. Furthermore, surveys conducted recently in the Gabu area suggest that the number of bulls available for servicing is insufficient. Apparently the normal practice, is to use the neighbour's bull for servicing purposes during free-ranging.

The calving season is mainly between September and November indicating that cows are serviced mainly in January and February. Tacher (1985) confirms these figures in his report for the World Bank and gives age at first calving of 4 years and 4 months, weaning age of 9 months and calving rate of 49.5%.

FAO (1985) gives a mortality rate of 28.2% for 0 to 1-year old Fulani N'Dama calves and of 16.85 between 1 and 2 years. Tacher (1985) gives a mortality rate of 15% for 0 to 1 year old calves and an overall mortality rate of 8% but does not make any distinction between breeds.

Fulani parameters of production (FAO, 1985) are:

- Birthweight : 10-12 kg

- Carcass weight : about 90 kg
- Milk yield : 0.6 kg milked out daily during the rainy season (approximately one-third of total milk yield, the remaining two-third being consumed by the calf). At Bissora station, 120 kg of milk was obtained by hand-milking over a 150-day lactation period.

3.3.2 DISEASES

The disease status is based on a few animal disease surveys or clinical diagnoses rarely confirmed by pathological examinations (FAO, 1986).

The health status can be considered as relatively good because of the absence of deadly diseases such as Rinderpest and contagious bovine pleuropneumonia (CBPP). The last outbreak of rinderpest was reported in 1967. However, there is still the risk of an outbreak through contact with animals from neighbouring countries in search of pasture. In 1984/85 Guinea Bissau received FAO assistance under the "Livestock Health Production Project" which provided vaccines and equipment for a rinderpest vaccination campaign (FAO, 1985).

Black quarter causes heavy losses among 1 to 2-year-old calves. Other diseases include anthrax (all age groups), brucellosis (28.4% of animals in the Northeastern region are affected), pasteurellosis (affects mainly calves at the end of the rainy season), tetanus and tuberculosis (2% of carcasses examined) (Tacher, 1985). No data are available on the incidence of these diseases.

Trypanosomiasis is widespread. A survey of calves between the ages of 0 and 2 years indicated that more than two-thirds of the calves are infected at an average age of 43 days. *T. vivax* (64%) trypanosoma is the most widespread followed by *T. congolensis* (28%) and *T. brucei* (7%). There are isolated cases of other parasitic diseases such as babesiosis and anaplasmosis (Ansumane, 1986).

Several cases of multiple gastro-intestinal parasitism have been reported. Ascariidiosis, coccidiosis and strongylosis are common among 0-4 month old calves. Strongylosis is common among adults particularly during the rainy season.

Infection by ticks mangesmites, and fleas are also common. The sporadic outbreaks of streptothricosis which pose no serious threat to *Bos taurus* have been reported (Tacher, 1985).

3.3.3 HERD MANAGEMENT AND COMPOSITION

Tacher (1985) described herd management methods in Guinea Bissau. Livestock production is practised extensively throughout the country. It is coexistent with rather than integrated into the agricultural system except in areas in which draught power is being developed. Forages are not cultivated and agricultural byproducts and forages are not conserved. Little use is made of household refuse and agro-industrial byproducts (except for the use of brewer's dregs and cotton seeds).

Sedentary livestock breeding and a type of transhumance livestock production are practised in Guinea Bissau. This is well documented by Tacher (1985) who can be used as reference for further information. The development of draught power is relatively recent. There are currently between 2000 and 4000 pairs of work oxen. A work oxen development project is being implemented in Bafata and Gabu sectors. The project is funded by FED and FAC and trained 2960 pairs of bullocks between 1978 and 1984. The aim was to train and allocate 3000

pairs and provide health follow-up and control. The project's funding will soon come to an end (FAO, 1985).

Herd composition, based on the 1980 census, is presented in Table 3.

Table 3. Herd composition in Guinea Bissau, 1980.

Females		Males	
Cows	46.3	Bulls	6.9
Heifers	13.8	Steers	4.2
Calves	10.7	Young males	9.4
		Calves	8.7
Total	70.8	Total	29.2

Source: Ministerio do Desenvolvimento Rural (1985).

A study on herd size was carried out by the Ministerio do Desenvolvimento Rural in 1984. The results appear in Table 4.

Table 4. Cattle herd sizes in the nine regions of Guinea Bissau.

Region	Herd size	Number of herds						
		0-50	51-100	101-150	151-200	201-250	251-300	301
Cacheu	1579	1503	56	15	5	-	-	
Bissau	188	188	-	-	-	-	-	-
Oio	1919	1779	117	20	2	1	-	-
Bafata	1085	492	390	131	42	16	7	7
Gabu	1566	874	616	40	13	8	15	-
Bolama	308	308	-	-	-	-	-	-
Biombo	1232	1223	8	1	-	-	-	-
Quinara	288	225	3	-	-	-	-	-
Tombali	326	326	-	-	-	-	-	-
Total	5431	6918	1190	207	62	25	22	7
%	100	82.1	14.1	2.5	0.7	0.3	0.2	0.1

Source: Ministerio do Desenvolvimento Rural (1985).

Average number of cattle per household is about 37. However, as is evident from Table 5, this varies considerably between regions.

Table 5. Number of cattle per household in Guinea Bissau.

Region	Number of cattle	Number of cattle per household
Cacheu	25 565	16.2
Bissau	1 111	5.9
Oio	34 060	17.7
Bafata	74 283	68.4
Gabu	105 225	67.1
Bolama	1 718	5.5
Biombo	9 376	7.6
Quinara	2 996	13.1
Tombali	5 845	17.9

Source: Ministerio do Desenvolvimento Rural (1985).

3.4 SHEEP AND GOATS

According to an FAO (1985) study, production parameters for sheep are: lambing rate 167%, mortality rate between 0 and 6 months 15–20%, and average adult weight 25 to 30 kg.

Fertility rate for goats is estimated at 250–300%, mortality rate for 0–6-month-old kids at 10–12% and average adult weight at 18–21 kg.

3.5 RESEARCH AND DEVELOPMENT ACTIVITIES

3.5.1 RESEARCH CENTRES

The two state ranches, both under the Director of Veterinary Services, continue their activities.

In 1985 the Bissora Station maintained about 150 N'Dama and 10 Gir and 5 N'Dama x Gir crossbreeds produced by artificial insemination of N'Dama cows. It aims to improve beef and milk production in the N'Dama. Crossbreeding with Zebu Nelore is also envisaged. The station, which received external funding from Switzerland, is also involved in the extension of draught power.

Bissau Station continues its activities aimed at improving milk production (Ly, 1985). Funding for the Pradis Station project is still being sought.

3.5.2 DEVELOPMENT PROJECTS

Data on the integrated rice and cotton (Bafata) and groundnut (Bafata) development projects and the Rice Seed Multiplication Project (Contuobel) are unavailable. However, the projects continue with their activities.

The following new development projects on livestock breeding were submitted at a CILSS meeting in 1986 (FAO, 1986):

- UNDP project to provide laboratory material, medicines and vaccines (implemented in 1985)
- FAO livestock health protection project for a joint vaccination campaign against anthrax and blackquarter and strengthening of the livestock section
- Zone 1 (Biombo, Cacheu and Oio) integrated project: assistance to the livestock production section of this area and development of the use of work oxen (financed by Sweden)
- Zone 2 integrated project (Lafata and Gabu): this project has distributed an estimated 3000 pairs of work oxen
- Financial assistance is provided by FED and FAC.

In 1985, an FAO mission visited the country to identify rural development projects with livestock production components. The following projects were endorsed:

- Assistance to Bissora livestock production station
- Establishment of a livestock research centre at Bissora
- Establishment of small ruminants research site.

In Gabu, the following projects/studies were endorsed:

- Study of the traditional livestock production system
- Campaign to prevent mortality of calves between 15 days and 4 months old

- Epizootiologic study of disease constraints in the country
- Socio-economic study of methods of improving animal production
- Improvement of livestock and meat marketing methods.

The projects have been submitted to donors by the government but there is no indication as to whether funding will be provided.

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3.7 MAJOR CHANGES SINCE 1977

The figures given in this study for the human and animal populations are significantly higher than those presented in the previous study and are based on data for censuses carried out following the publication of Volume 2 of this study. They, therefore, better reflect the current situation in the country. One should, therefore, try to avoid making comparisons between the two series. In view of the renewed interest shown in animal husbandry during the past few years, the government is giving priority to this sector. Some development projects are in the pipeline. A comprehensive study of the sector was carried out in 1985 and funds are being sought for several projects which have already been identified.

These various activities should help determine the potential for livestock production in Guinea Bissau and encourage its future development.

CHAPTER 4

GUINEA

4.1 BACKGROUND

In 1984 the Ministry of Agricultural Development was subdivided into a State Secretariat for Livestock and Fisheries, a State Secretariat for Rural and Craft Development and a State Secretariat for Water Resources and Forestry.

Data for the country are given in Table 1.

Table 1. Human and animal populations of Guinea, 1983/1984.

Human population (1983)	
– number	6 000 000
– density	24.4/km ²
Animal population (1984)	
– cattle	2 307 000
– sheep	1 026 000
– goats	914 785

Source: For human population: 1983 census figures.

For animal population: Estimates by the Directorate of Livestock Production, 1984 (FAO, 1985).

According to a study by Sanders (1984), almost the entire country is infested by tsetse. *G. fusca* is found in Lower Guinea and Forest Guinea, *G. longipalpis* and *G. morsitans submorsitans* in Central and Upper Guinea, *G. tachinoides* in Upper and Lower Guinea, *G. pallicera* and *G. tabaniformis* in Forest Guinea and *G. palpalis gambiense* in all regions.

4.2 LIVESTOCK NUMBERS AND DISTRIBUTION

4.2.1 CATTLE

Table 2 shows cattle numbers by region and for the country for 1984.

Table 2. Cattle distribution by region for 1984.

Region	Area		Cattle		Average cattle density/km ²
	km ²	% of total area	Number	% of national herd	
Lower Guinea	45 000	18	299 910	13	6.5
Central Guinea	54 900	22	1 084 290	47	19.7
Upper Guinea	100 000	41	761 310	33	7.7
Forest Guinea	46 000	19	161 490	7	3.4
Total	245 900	100	2 307 000	100	9.4

Source: Animal Husbandry Division (1984) quoted by Ly (1985).

Table 2 shows that the Fouta Djallon Highlands in Central Guinea account for about 47% of the national herd. Lower Guinea accounts for 13% of the herd with a cattle density lower than the national average of 9.4%. The coastal area has less cattle and large stretches of land are devoid of cattle. The cattle population in Central Guinea is evenly distributed. Upper Guinea accounts for a third of the national herd. However, the stocking density is 2.5 times lower than that for Central Guinea and the distribution more uneven. Forest Guinea has the lowest cattle population in the country.

4.2.2 SHEEP AND GOATS

The distribution of sheep and goats by region and in the country in 1984 is shown in Table 3.

Table 3. Distribution of sheep and goats by region, 1984.

Region	Sheep	%	Density/km ²	Goats	%	Density/km ²
Lower Guinea	196 660	19	4.3	170 600	19	3.8
Central Guinea	440 710	43	8.0	489 595	53	8.9
Upper Guinea	278 630	27	2.8	127 295	14	1.3
Forest Guinea	110 000	11	2.4	127 295	14	2.8
Total	1 026 000	100	4.2	914 785	100	3.7

Source: Directorate of Livestock Production (1984) quoted by Ly (1985).

According to this Table, sheep and goats are found throughout the country. The greatest concentration, however, is in Central Guinea.

4.3 CATTLE

4.3.1 BREED CHARACTERISATION

The N'Dama breed accounts for 95% or 2 192 000 head of the cattle population in Guinea. The remaining 5% (115 000 head) are zebu x N'Dama crossbreds found mainly in the north-east of the country, near the border with Mali.

4.3.1.1 N'DAMA PRODUCTION PARAMETERS

The most recent production parameters provided by the Livestock Division (BDPA, 1984) are given in Table 4. The figures are for production under village conditions.

Table 4. N'Dama production parameters.

Fertility rate		54%
Mortality rate	0-1 year	34%
	1-2 years	12%
	2-3 years	10%
	3 years and over	3-5%

Source: BDPA (1985).

The N'Dama Selection and Multiplication Centre at Boke also collected some data. However, in view of initial difficulties experienced by the centre, during its establishment these parameters cannot be considered as the norm for N'Dama production under station conditions in Guinea.

4.3.1.2 ZEBU X N'DAMA CROSSBRED OR "MERE"

No recent data are available on this breed.

4.3.1.3 IMPORTED CATTLE

All research programmes on exotic cattle have been discontinued.

4.3.2 DISEASES

Contagious bovine pleuropneumonia has been brought under control although there are still sporadic outbreaks. Anthrax and blackquarter are on the decline with the introduction of routine vaccination. A vaccination campaign against swine rinderpest is envisaged in border areas to guard against possible infection from neighbouring countries.

Guinea received FAO assistance in 1983-84 under the "Emergency vaccination campaign against rinderpest" (Ly, 1985).

Trypanosomiasis is generally not a serious problem in Guinea due to the trypanotolerance of the N'Dama breed. Mortality due to trypanosomiasis is recorded mainly in areas along the eastern and northern borders where there is uncontrolled N'Dama x zebu crossbreeding. The main foci of trypanosomiasis are to be found in Upper Guinea (Mandiana, Sigui, Kérouané, Kankan, Kouroussa) and the areas bordering the Fouta Djallon Highlands (Kounolara, Gaoual, Tougué, Mali, Koubia, Dinguirage and Dabola) (Sande, 1984).

4.3.3 HERD MANAGEMENT AND COMPOSITION

4.3.3.1 DESCRIPTION

Animal husbandry practices in Guinea have remained unchanged over the past few years.

4.3.3.2 HERD SIZE AND COMPOSITION

Village herds generally contain a high percentage of bulls and steers. A "herd" usually consists of several individual herds belonging to a number of owners.

Bulls in large herds containing several hundred head of cattle are usually better developed. There is also a higher percentage of oxen, sometimes as old as seven or eight years, probably indicating that some males are withdrawn from the breeding process and retained as a sort of "savings on the hoof".

Owners of large herds generally select males with a good conformation and offspring of old cows which have weaned a large number of calves as replacement bulls. This empirical, pedigree breeding is a simple method based on adaptability, hardiness, trypanotolerance and conformation (Devillard, 1985).

Average herd composition for the country according to the Livestock Division (FAO, 1985) is shown in Table 5.

Table 5. Cattle herd composition.

Age	Male	Age	Female
0-1 year	10%	0-1 year	10%
1-2 years } 2-3 years } 3-4 years }	8%	1-2 years } 2-3 years } 3-4 years }	25%
>4 years	6%	>4 years	41%
Total	24%	Total	76%

Source: FAO (1985).

4.3.3.3 WORK OXEN

The use of work oxen in Guinea is a major activity introduced in Central Guinea as early as 1925. Today animal traction is more widely used in Upper Guinea where 9% of the cattle are draught oxen while the national average is 4.2%. The number of draught oxen and distribution by region in 1983 is given in Table 6.

Table 6. Number and distribution of work oxen, 1983.

Region	Number of cattle	% of oxen	Number of oxen (1)
Lower Guinea	292 920	1%	2 900
Central Guinea	1 084 801	2%	21 700
Upper Guinea	770 587	9%	69 350
Forest Guinea	159 721	3%	4 700
Total	2 306 029	4.2%	98 650

(1) Calculated by authors.

Source: Directorate of Livestock Production, Guinea (1983).

4.4 SHEEP AND GOATS

No recent data on small ruminants are available.

4.5 RESEARCH AND DEVELOPMENT ACTIVITIES

4.5.1 RESEARCH CENTRES

All animal husbandry research in Guinea currently focuses on genetically improving beef and milk production of the N'Dama as well as its draught power. Attempts at crossbreeding using exotic breeds such as the Red Steppe have proved unsuccessful and have been discontinued. Research on natural pastures are also being conducted at national research centres listed in Table 7.

The three research centres no longer receive external aid.

4.5.2 MULTIPLICATION HERDS AND DEVELOPMENT PROJECTS

The new livestock development strategy is based on N'Dama selection from the N'Dama Selection and Multiplication Centre at Boke, in the north of Lower Guinea.

The Centre which started its operations in 1981 with UNDP/FAO funding is under the State Secretariat for Livestock Production and Fisheries. In 1987, it maintained 282 head of

N'Dama. Its objectives are to genetically improve the milk and beef production of the N'Dama as well as its animal power. Furthermore, the Centre provides training in animal health and livestock production for private traditional producers.

A second phase, expected to begin in July 1986, will focus mainly on the rural areas (extension and intensification of health measures, improvement of production and marketing conditions). The Boke centre will thus serve as a support and demonstration centre. The programme will involve about 250 000 cattle (Moustapha, 1986 and Sande, personal communication, 1987).

Between 1984 and 1986 Guinea received a total of US\$ 218 000 for the construction and equipping of five veterinary centres and a small laboratory in Upper Guinea.

Table 7. National research centres in Guinea.

Name	: Ditinn State Farm
Organisation responsible	: State Secretariat for Livestock Production and Fisheries
Size	: 1000 ha of natural pastures
Breeds and numbers	: In 1987 there were 87 head of N'Dama and 50 N'Dama x Red Steppe crossbreeds but the latter are being phased out
Objectives and activities	: Genetic improvement of the N'Dama for milk and beef production and draught purposes. The Centre was selected by the Mano River Union (MRU) to implement the Programme for the Genetic Improvement of Trypanotolerant Livestock
External aid	: A feasibility study is envisaged prior to a request for funding by the EEC.
Name	: Famoyla State Farm
Organisation responsible	: State Secretariat for Livestock Production and Fisheries.
Size	: 1600 ha out of which 75 ha are cultivated and 80 ha are improved pastures.
Breeds and numbers	: Crossbreeding has been discontinued and reconversion with pure N'Dama is being carried out. In 1984, two thirds of the 60 head of cattle were N'Dama and one-third were crossbreeds. The latter are being phased out.
Objectives and activities	: Similar to those of Ditinn State Farm.
Name	: Foulaya National Agricultural Research Institute (INRAF)
Organisation responsible	: State Secretariat for Research
Breeds and numbers	: Crossbreeding has been discontinued and reconversion using pure N'Dama (50 head in 1983) is being carried out. The Centre was selected by MRU to implement the Programme for the Genetic Improvement of Trypanotolerant Livestock

Source: Ly (1985) and Sande (personal communication, 1987).

A major project on the modernisation and development of the livestock sector is currently being implemented. The objective of the four-year project is to increase meat production by 75% and milk production by 95% within 20 years. It involves several phases one of which is the improvement of the present state of the livestock sector and the introduction of a private sector into livestock production development. A team of expatriate technical assistants, a training centre and a vaccination production unit will also be provided under the project. The

total cost of the project to be funded by the World Bank, FAC, EEC, BADEA, the Government of Guinea and direct contributions from beneficiaries is estimated at US\$ 22 million (Agri-Afrique, 1986a and 1986b; *Marchés Tropicaux*, 1986).

It should also be emphasised that as part of its Programme for the Genetic Improvement of Trypanotolerant Cattle, the Mano River Union has selected the N'Dama Selection and Multiplication Centre at Boke, Ditinn State Farm and the National Agricultural Research Institute as part of the network.

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4.7 MAJOR CHANGES SINCE 1977

In view of the recent changes which have taken place in Guinea and which directly affected livestock production, the situation in this sector cannot be easily evaluated. The figures contained in this study, based on surveys and pilot censuses carried out in preparation for a national livestock development project, are significantly higher than those for 1976-77. However, they do give a better reflection of the actual situation.

With 45% of the total N'Dama population, Guinea accounts for the largest number of N'Dama cattle.

Within the last few years, three significant events have occurred in the livestock production sector:

- **Liberatisation of the internal market with the suppression of State sales quotas**
- **Discontinuation of crossbreeding of N'Dama with exotic breeds, consequently giving priority to projects on the improvement of the pure N'Dama breed**
- **The implementation in 1986 of a national project on the modernisation and development of the livestock sector following numerous studies.**

In the light of the above decisions, the prospects for livestock production in Guinea appear promising and the country may be in a position once again to export improved N'Dama breeding stock.

CHAPTER 5

SIERRA LEONE

5.1 BACKGROUND

The country is divided into three administrative provinces and the Western area which includes the capital, Freetown.

Makeni is the capital of the Northern Province, Kenema of the Eastern Province and Bo of the Southern Province.

Livestock activities are the responsibility of the Veterinary Division of the Ministry of Agriculture and Natural Resources which is a merger of two ministries, the Ministry of National Resources and the Ministry of Agriculture.

Data for the country are given in Table 1.

Table 1. Human and animal populations of Sierra Leone, 1984.

Human population (1984)	
– number	3 700 000
– density	51/km ²
Animal population (1984)	
– cattle	333 181
– sheep	264 000
– goats	145 000

Source: For human population, official projection (+2.3%) based on the 1974 census.

For animal population, projection (+1.3% for sheep and goats and 0.0% for cattle) based on the Hunting Technical Services Limited Report census (1979).

During area-specific surveys conducted by Luckins et al (1979), no tsetse species were captured at Njala. *G. palpatis* was captured at Teko and Musaia. According to a recent survey, *G. tachinoides* is found in the Northern Province around Teko (Carew, 1984).

5.2 LIVESTOCK NUMBERS AND DISTRIBUTION

An aerial animal population census was carried out by Hunting Technical Services Ltd in 1978. The results were not available for publication in Volume 2 of this study and are presented in Table 2 by province or district.

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5.3 CATTLE

The majority of the cattle population in Sierra Leone (333 181 head) are of the trypanotolerant N'Dama breed.

Table 2. Livestock distribution in Sierra Leone, 1978.

District	Cattle	Sheep	Goats
Bo	2 027	13 123	16 702
Bonthe	137	5 096	8 314
Moyamba	7 015	31 525	9 417
Pujehun	512	11 710	2 399
Southern Province	9 691	61 454	36 833
Kailahun	592	6 828	10 241
Kenema	291	21 553	5 711
Kono	29 397	8 678	6 819
Eastern Province	30 280	37 059	22 771
Bombali	76 456	27 422	24 318
Kambia	22 037	14 978	6 729
Koinadugu	151 455	34 808	14 215
Port Loko	30 815	47 900	15 510
Tonkolili	11 572	17 437	14 854
Northern Province	292 335	142 545	73 626
Western Province	875	2 952	832
Total	333 181	244 010	134062

Source: Hunting Technical Services Ltd (1979).

5.3.1 N'DAMA BREED CHARACTERISATION

5.3.1.1 PERFORMANCE TRAITS

The report of the Hunting Technical Services Ltd gives an age at first calving under village conditions of 48 months, calving rate of 65%, mean herd mortality rate of 15%, mortality rate of calves between 0 and 1 year of 45% and adult mortality rate of 3%.

Teko Livestock Station imported some Sahiwal in 1974 with the aim of improving the milk production of the N'Dama. Data collected between 1971 and 1980 were analysed with the assistance of ILCA (Carew et al, 1986) and give valuable information on the comparative performance of the N'Dama, Sahiwal and their crossbreds.

The main results of this study are given in Table 3.

Table 3. Production traits of N'Dama, N'Dama x Sahiwal and Sahiwal at Teko station (estimated least squares means).

	N'Dama	Sahiwal	N'Dama x Sahiwal
Age at first calving (months)	46.5 ± 0.7	37.7 ± 1.2	32.4 ± 2.1
Calving interval (days)	545		
Calf mortality rate(%)			
- perinatal	2	4.7	4
- 0-6 months	6.4	25.5	2.7
- perinatal and 0-6 months	8.4	30.2	6.7
- 6-12 months	1.5		
- adult cow mortality rate	0		16.6
Weight(kg)			
- birth	14.9	23.8	22.0
- 3 months	35.3	62.5	45.8
- 6 months	49.9	97.9	66.4
- 9 months	63.0	129.6	83.5
- 12 months	75.5	152.2	98.0
- 15 months	84.5	191.3	112.6
- 18 months	94.4	218.8	134.7
- of mature cows:	208		
- at calving	225	395	238
- 3 months after calving	192	336	206
- 6 months after calving	188	321	210
- 9 months after calving	191	337	213
ADG of calves (g/d)			
- 0-6 months	194	411	246
- 0-18 months	146	361	208

Source: Carew et al (1986).

5.3.1.2 PRODUCTIVITY INDEX

Table 4 summarises estimates of the main production traits of the N'Dama based on the index defined in Volume I of the previous study.

Table 4. N'Dama productivity estimates at Teko station.

Adult females viability (%)	100
Calving percentage (%)	67
Calf viability to one year (%)	92.1
Calf weight at 1 year (kg)	75.5
Productivity index per cow per year (kg)	46.5
Adult females weight (kg)	208
Productivity index per 100 kg of cow per year (kg)	22.3

Source: Index compiled by authors.

In the study by Carew et al (1986), the following indices were calculated using a slightly different method from that used to calculate earlier indexes:

Index 1: Calf weight at 6 months per cow per year calculated for each calving as the product of calf weight at 6 months x 365 ÷ calving interval

Index 2: Calf weight at 6 months per 100 kg of cow per year, calculated as index 1 + average weight of cow x 100

Index 3: Total weight of calves at 6 months per 100 kg metabolic weight per cow per year, calculated as index 1 + average cow weight raised to the power 0.73 x 100.

The results appear in Table 5.

Table 5. Productivity index by breed for the three breeds.

	Index 1	Index 2	Index 3
N'Dama	35	19.7	80
N'Dama x Sahiwal	39.6	21.8	90
Sahiwal	67.8	21.1	101

Source: Carew et al (1986).

Furthermore, this study shows that for 6-month-old calves, the Sahiwal breed, compared to the N'Dama, produces 13% more calves per cow per year, 11% more calves per 100 kg cow maintained per year and 12% more calves per 100 kg metabolic weight per cow per year.

Compared to the N'Dama, productivity estimates for 6 month-old-calves produced by the pure Sahiwal breed was 105% higher per cow per year, 16% higher per 100 kg of cow per year and 34% higher per 100 kg metabolic weight per cow per year. It should, however, be emphasised that these results were obtained under station conditions and may vary considerably under other environmental conditions (Carew et al, 1986). There are no longer any pure Sahiwal at Teko station.

5.3.2 DISEASES

In spite of vaccination campaigns conducted over the past 15 years, rinderpest and contagious bovine pleuropneumonia are a major threat. In 1984, a "Protective vaccination campaign against rinderpest" was funded by FAO as part of a cooperation programme for assistance project. In January 1985, this project was followed by the Pan African Rinderpest Campaign (PARC).

Although animal trypanosomiasis does not seem to be a major problem, a joint FAO/IAEA mission was undertaken in 1986 at the request of the government to study the possibility of using the release of sterile males to control african animal trypanosomiasis.

5.3.3 HERD MANAGEMENT AND COMPOSITION

Through the activities of the Sierra Leone Work Oxen Project, started in 1978, work oxen are now extensively used in the Northern Province. The project had trained 350 pairs of draught oxen by the end of 1984, mainly in the Bombali and Koinadugu districts. With an estimated N'Dama population of 330 000, the country can produce 40 000 draught oxen (Starkey, 1982). It has been envisaged to establish Work Oxen Units in the other provinces with the Ministry of Agriculture and Natural Resources which has been providing funds to the project since 1985, with the participation of ODA (Shaw, 1985; Starkey, 1986).

5.4 SHEEP AND GOATS

No recent data on sheep and goats were available.

5.5 RESEARCH AND DEVELOPMENT ACTIVITIES

Musaia Stock Farm, Njala University College and Teko Station continue to carry out upgrading and multiplication activities with N'Dama cattle. In 1983, Njala University maintained a herd of 210 N'Dama and Teko Station a herd of 60 N'Dama, 50 crossbreds and 15 Sahiwals. In 1986, the last of the purebred Sahiwals had allegedly disappeared at this station. Data on Musaia Stock Farm were not available.

There are a number of rural development projects referred to as IADP (Integrated Agricultural Development Project) with a livestock production component. They include:

The Koinadugu Integrated Agricultural Development Project which should end in 1986 and is managed by Musaia Station.

The Northern Integrated Development Project manages the Malal Mara ranch which has an area of 200 ha. In 1985, the ranch had a herd of 200 head. These two projects are managed by the Ministry of Agriculture and Natural Resources.

Other Integrated Agricultural Development projects (IADP) include the Eastern Area IADP and the Northwest IADP, neither of which has a livestock component (FAO, 1983).

Other developmental activities include the Work Oxen Project mentioned above and the Mano River Union (MRU) Development Programme with several components: pastures and forage resources, development of trypanotolerant cattle and sheep and pig production (Shaw, 1985).

A feasibility study was conducted recently by an FAO mission in the three MRU countries on the establishment of a N'Dama Upgrading and Multiplication Centre Network (Gyening, 1986). The centres selected for Sierra Leone are Musaia, Teko, Malal Mara and Njala University.

An FAO mission is expected to visit Sierra Leone in September 1986, to identify a Small Ruminants Production Development Project and an Integrated Livestock and Agricultural Development Project.

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5.7 MAJOR CHANGES SINCE 1977

A detailed study including aerial surveys was carried out in 1978-79 on the livestock sector in Sierra Leone. Even though the data presented in this study were collected several years ago, they are evidently more representative of the current situation than previous data.

Additional data were obtained by analysing data for Teko Station on the production of N'Dama raised under station conditions and on N'Dama x Sahiwal crossbreds. The disappearance of the pure Sahiwal breed and the decreasing number of N'Dama x Sahiwal crossbreds indicate that in spite of the relatively high performances obtained, crossbreeding between trypanotolerant and trypanosusceptible breeds remain difficult to control even in a well controlled environment.

The continued participation of Sierra Leone in the joint Mano River Union programme for the upgrading of the N'Dama would ensure that it continues to develop its cattle breeding sector.

CHAPTER 6

LIBERIA

6.1 BACKGROUND

The National Livestock Bureau (NLB) of the Ministry of Agriculture is still in charge of the livestock sector.

Data for human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Liberia, 1982/83.

Human population (1982)	
– number	2 061 498
– density	21.4/km ²
Animal population (1983)	
– cattle	12 600
– sheep	210 000
– goats	200 000

Source: For human population, Ministry of Planning and Economic Affairs (1983). For animal population estimates, National Bureau (1983) quoted by Shaw (1985).

According to Pabs–Garnon (1984), *G. palpalis*, although distributed widely, is found mainly in the north-east of the country. *G. nigrofusca* and *G. fusca* are found in the forest zones. Detailed studies were conducted only in Bong and Sinoe counties (Pabs–Garnon, personal communication, 1985).

6.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Livestock numbers by county are summarised in Table 2.

Table 2. Livestock numbers in Liberia, 1983.

Country	Total	%	N'Dama	Muturu
Bong	2346	18.6	1290	1056
Cap: Mount	151	1.2	136	15
Grand Bassa	1200	9.67	976	224
Grand Gedeh	1762	13.96	1762	0
Lofa	824	6.53	824	0
Maryland	2087	16.54	522	1565
Montserzado	270	2.14	177	93
Nimba	716	5.67	716	0
Sinoe	3242	25.69	710	2534
Total	12600	100	7113	5487

Source: National Livestock Bureau, Liberia (1983) quoted by Shaw (1985).

The cattle population of Liberia—7113 N'Dama and 5487 Muturu—are exclusively of the trypanotolerant breed. The N'Dama are found mainly in Bong (north) and Grand Gedeh (south-east) counties and the Muturu in Maryland and Sinoe (south) counties.

The cattle populations of Grand Gedeh, Lofa and Nimba countries are wholly trypanotolerant.

No recent data on small ruminant distribution are available.

6.3 CATTLE

6.3.1 BREED DESCRIPTION

6.3.1.1 LIBERIAN DWARF

No data on the productivity of this breed are available.

6.3.1.2 N'DAMA

Research on the performance traits of the N'Dama conducted at the Central Agricultural Research Institute (CARI, 1983) gave an age of first calving of between 30 and 35 months, a calving rate of 83% and a mortality rate of 27% for 0 to 1-year-old calves.

6.3.2 DISEASES

In 1983–84, Liberia implemented an Emergency Rinderpest Vaccination Programme as part of an FAO technical cooperation assistance programme project (Shaw, 1985).

Pabs-Garnon (1985) indicated that *T. brucei* and *T. congolense* were isolated on N'Dama and Muturu cattle.

6.3.3 HERD MANAGEMENT AND COMPOSITION

No new data on herd management are available.

6.4 SHEEP AND GOATS

No recent data on production parameters for small ruminants could be obtained.

6.5 RESEARCH AND DEVELOPMENT ACTIVITIES

6.5.1 RESEARCH CENTRES

The activities of the two research centres carrying out research on trypanotolerance are described in Table 3.

Table 3. Research centres in Liberia.

Name	: CAES (Central Agricultural Experimental Station) is now known as CARI (Central Agricultural Research Institute).
Organisation responsible	: Livestock Bureau, Ministry of Agriculture, Monrovia
Size	: 100 ha
Breeds and numbers	: 182 head, mainly N'Dama with some Muturu and N'Dama x Muturu crossbreds. 14 goats and 70 sheep.
Objective	: Selection, multiplication and study of production parameters of the N'Dama and Muturu breeds. Training centre for draught animals. CARI has been selected as a multiplication and selection centre for N'Dama in Liberia (as part of the Mano River Union Programme).
Name	: College of Agriculture and Forestry (CAF)
Organisation responsible	: University of Liberia
Size	: 100 ha
Breeds and numbers	: In 1980 the Brown Swiss were slaughtered and the number of cattle dropped to 6.

Source: Shaw (1985).

6.5.2 MULTIPLICATION HERDS

In 1984, the largest multiplication herds in Liberia were maintained by the Liberia Agricultural Company in Bong county (200 head), David Moore Farm (300 head), Foya Unity Cooperative (150 head) and Todec State Farm (100 head). Smaller livestock units are also maintained at Buto Oil Corporation in Sinoe county (60 head), the United Methodist Church (35 head), Panama Agricultural Training Centre (25 head) and Sasstown Project. Cattle breeds maintained in these centres are of the N'Dama and Muturu types (Shaw, 1985).

Other large farms such as President Tubman Farm, Minister Phillip Farm, the Liberian Government Farm, Firestone Plantation (ceded to CAF) and Bomitill Farm are no longer in operation (Shaw, 1985).

6.5.3 DEVELOPMENT ACTIVITIES

FAO undertook a mission to formulate projects in the three countries of the Mano River Union (MRU) (FAO, 1983).

In 1984, delegates from the three MRU countries participated in a workshop organised with the assistance of FAO to study the possibility of establishing an N'Dama Improvement and Multiplication Centre Network in the three countries.

A mission recently visited the three countries to promote the project (Gyening, 1986). CARI, CAF, LAC, Todec, Foya and Mr Moore's Farm were selected to participate in the network.

Other studies are also planned at the national level, the EEC intends to fund a feasibility study shortly on the possibilities of increasing animal beef protein production. Within this framework, an N'Dama Selection and Multiplication Centre, which will also distribute animals to villages producers, will be set up. The possibility of developing animal traction will also be studied.

The cost of the study is estimated at 75 000 ECUs (Shaw, 1985).

Finally, a mission is expected to visit the country by the end of 1986 to formulate an integrated development project with a livestock component.

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6.7 MAJOR CHANGES SINCE 1977

While the sheep and goat populations have substantially increased during the study period, there has been a dramatic fall in the number of cattle. However, in the absence of reliable census figures, these figures should be analysed with some caution.

It should be noted that the drop in the cattle population is due to the rapid disappearance of the Muturu rather than of the N'Dama. In fact, the Muturu population, estimated at 15 000 head in 1976-77, has allegedly dropped to 5500 head by 1983. The studies and projects envisaged by the EEC and the joint Mano River Union Project should help revitalise cattle production in Liberia.

CHAPTER 7

MALI

7.1 BACKGROUND

In 1981, the Ministry of Rural Development (le Ministère du Développement rural) was restructured and is now the Ministry responsible for Rural Development (le Ministère chargé du Développement rural). This ministry comprises the Animal Husbandry Department, the Water Resources and Forestry Department and the National Cooperation Department. The Ministry is also in charge of the National Institute for Animal Husbandry, Forestry and Hydrobiological Research (INRZFH), the Mali Animal Husbandry and Beef Office (OMBEVI) and the Central Veterinary Laboratory (LCV) responsible for the production of vaccines and animal health research.

The country is divided into seven administrative regions and Bamako district, corresponding to eight veterinary regions covering 46 sectors and 128 veterinary stations.

Table 1 gives data for human and animal populations for the country.

Table 1. Human and animal populations of Mali.

	Country	Study area
Human population (1985)		
- number	7 850 000	
- density	6.3/km ²	
Animal population		
- cattle (1984)	6 663 000	2 099 000
- sheep (1983)	6 329 000	1 026 800
- goats (1983)	6 928 000	1 047 300

Sources: For human population, projections (+2.6 %) based on 1977 census figures. Directorate of Affairs. Economic
For cattle population, estimates of the National Livestock Directorate (DNE) (1983) (quoted by Assogbakpe, 1985); for small ruminants, OMBEVI (1984) from 1982 cens.s.

Recent surveys on tsetse distribution were conducted by Ashton et al (1980) and Okiwelu et al (1980).

According to Ashton et al (1980), the northern limit of *G. tachinoides* in Mali can be defined by a line running from west to east south of the River Senegal, north of the Baoule river, above the "Boucle de Baoule", north of Segou and then northwards to San. *G. palpalis* is found in the south-east of the country. Its northern limits are defined by a line running from the point at which the River Niger crosses the southern Malian border north towards the confluence of the rivers Bafing and Bani then south towards the Mali border.

Distribution of *G. morsitans submorsitans* follows a continuous and discrete pattern.

The northern limits of continuous distribution of *G. morsitans submorsitans* is similar to that of *G. tachinoides* and extends from the western border of Mali, northwards above the "Boucle de Baoule" and thence southward just below Bamako crossing the border between

Mankono and Tingrela. Localised distributions of *G. morsitans* occur in the area of the Niger between Bamako and Ségou and in the region where the Bagoe and Bafing rejoin the river Bani.

7.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Livestock numbers for the area in 1983 are given in Table 2.

Table 2. Livestock numbers and distribution in Mali ('000).

Region	Cattle							Small ruminants	
	Cattle total	N'Dama	%	Cross-breeds	%	Zebu	%	Sheep	Goats
<u>Kayes</u>									
Kayes	233	7	3	51	22	175	75	126.3	173.6
Bafoulabé	78	15	20	47	60	16	20	35.8	50
Kéniéba	30	30	100	-	-	-	-	17.3	14.5
Kita	53	28	23	20	36	5	9	13	13.8
<u>Koulikoro</u>									
Koulikoro	65	7	10	34	53	24	37	52.3	52.5
Bamako	10	2	15	6	60	2	25	8.5	7.5
Kangaba	29	29	100	-	-	-	-	9.6	7.8
Dioïla	214	43	20	104	49	67	31	100	90.2
<u>Ségou</u>									
Ségou	151	-	-	21	14	130	86	157	237
San	79	-	-	-	-	79	100	86	48
Tomiman	91	-	-	-	-	91	100	105	35
<u>Sikasso</u>									
Yanfolila	66	60	90	5	8	1	2	19.6	21.4
Bougouni	230	70	30	75	33	85	37	44.6	41
Kolondiéba	160	24	15	69	43	67	42	44.7	45.6
Kndiolo	70	21	30	27	38	22	32	25.5	23.2
Sikasso	219	44	20	72	33	103	47	91.9	104.5
Koutiala	257	26	10	139	54	92	36	71.4	71.6
Yorosso	64	5	5	13	19	48	76	12.3	10.1
Total	2579	409	20	683	32	1007	48	1026.8	1047.3

Sources: Distribution of cattle by breed estimated by authors in consultation with the Directorate of National Livestock, 1984; OMBEVI, 1983 and 1984 for small ruminants.

There was a significant reduction in livestock numbers between 1972 and 1982 mainly in Mopti, Timbuktu and Gao regions due to the combined effects of drought (shortage of forage, insufficient water points) and necessary destocking (sales and slaughter) (FAO, 1982).

7.3 CATTLE

In 1985, the trypanotolerant cattle population was estimated at 409 000 head of N'Dama and 683 000 head of N'Dama x zebu crossbreeds.

7.3.1 BREED CHARACTERISATION

7.3.1.1 N'DAMA PERFORMANCE TRAITS

A survey was conducted in 1983 in the Sikasso region (DNE, 1983) to collect data on the performance traits of N'Dama under village conditions. A total of 1814 cattle distributed in three herd types (sedentary (S), short transhumant (t) and long transhumant (T)) were involved. The major results obtained from the survey are presented in Table 3.

Table 3. Performance traits of the N'Dama under village conditions.

	S	t	T
Number of adult cows	1699	38	77
Age at first calving (years)	5	5	6
Calving rate (%)	62	66	84
- r	1.2	7.7	4.1
- extremes	60 to 64.7	50.9 to 81.6	74.4 to 92.9
Calving interval (months)	19.4	18.2	14.3
Mortality rate for 0-1-year-old calves (%)			
- female	16.2	16.7	38.9
- male	13.3	15.0	23.1
Adult mortality rate (%)			
- female	-	18.4	-
- male	-	13.2	-

S = sedentary; t = short transhumant; T = long transhumant.

Source: DNE (1983).

Production traits for 1984 and 1985 for N'Dama raised at Madina Diassa ranch are given in Table 4. The mortality quotient mentioned in the Table is the number of calves which die in a year divided by the number of calves born in the same year.

Table 4. Performance traits of N'Dama raised at Madina Diassa ranch in 1984 and 1985.

	1984	1986
Fertility rate (%)	58.7	54.8
Total mortality rate (%)	18.9	
Mortality rate for male and female calves (%)	35.9	
Mortality rate for 0-1-year-old calves (%)	24.3	
Mortality quotient for 0-1-year-old calves (%)	32.4	26.2
Birthweight (kg)	13.7	12.3
Weight at 30 days (kg)	12.7 ± 0.5	15
- male	22.3 ± 1.25	
- female	20.4 ± 1.05	
Average weight at 140 days (kg)		
- male		65
- female		61.5
Weight at 205 days (kg)	60.54 ± 4.3	
Weight at 550 days (kg)	97.6 ± 9.3	115 to 143
Average weight of adult males (kg)		300
Average weight of adult females (kg)		220
Average daily weight gain between 30 and 205 days (g/d)	216.4 ± 20	
Average daily weight gain between 205 and 550 days (g/d)	122.7 ± 20	

Sources: Planchenault (1985); FAO (1986a).

7.3.1.1.1 Index of productivity

Table 5 summarises estimates of the main production parameters required to calculate a productivity index based on the total weight of 1-year-old calves produced per 100-kg cow maintained per year. These productivity indices are based on data collected under village conditions and on ranches in areas of high trypanosomiasis risk in which cattle are raised primarily for beef.

Table 5. N'Dama productivity estimates.

	Ranch	Village
Cow viability (%)	87.8.	81.6
Calving rate (%)	54.8	62
Calf viability to 1 year (%)	75.7	83.8
Calf weight at 1 year (kg) (estimated)	120	81
Productivity index/cow/year (kg)	53	46.3
Cow weight (kg)	250	230
Productivity index per 100-kg cow maintained per year	21.1	20.2

Source: Indexes calculated by authors.

7.3.1.2 MERE OR BAMBARA

No recent data are available on the Méré.

7.3.1.3 OTHER CROSSBREDS

Recent data on the production parameters of N'Dama x exotic breeds are not available.

7.3.2 DISEASES

Rinderpest is currently a major problem particularly in areas bordering Mauritania.

In 1983 and 1984, Mali received assistance in the form of the "Emergency vaccination campaign against rinderpest" and "Strengthening of the production capacity of the Central Veterinary Laboratory" projects.

The report of the Directorate of Livestock and Animal Health sectors presented at an FAO/CILSS meeting (FAO, 1986b) indicated that in 1985 there were persistent outbreaks of rinderpest (20 foci), no focus of contagious bovine pleuropneumonia, several outbreaks of blackquarter (21 foci) and anthrax (11 foci) and of pasteurellosis (47 foci).

Studies carried out on animal trypanosomiasis in the Niger Basin between Bamako and Ségou (Awab et al, 1981) show cattle infection rate of 5.36% during the rainy season and 3.11% during the dry season. The tsetse species found are *T. vivax*, followed by *T. congolense* and *T. brucei* in that order.

7.3.3 HERD MANAGEMENT AND COMPOSITION

Fattening and animal traction are developing at a satisfactory rate. The number of draught oxen in the country in 1984 was estimated at 400 000 head. These animals are generally put to work between age 3 and 9.

The livestock production component of the Mali Textile Company (CMDT) manages a herd estimated at 200 000 draught oxen. About 10 Kuri cows and bulls were introduced recently into the Bouganaba area in the Sikasso District to study the possibility of improving their conformation (DNE, 1984a).

A survey conducted in Sikasso region (DNE, 1983) analysed the composition of sedentary herds (S), short transhumant herds (t) and long transhumant herds (T). The results are given in Table 6.

Table 6. Herd composition in Sikasso region (%).

	S	t	T
Number of herds	117	3	3
Total cattle number	4879	124	216
Males			
0-1 year	8.6	8.1	6.0
1-3 years	10.6	12.9	15.7
Entire adult males	3.6	3.2	3.3
Castrated adult males	19.0	10.5	2.8
Total	41.8	34.7	27.8
Females			
0-1 year	9.9	13.7	8.3
1-3 years	13.5	21.0	19.9
Adults	34.8	30.6	44
Total	58.2	65.3	72.2

Sedentary herds; t = short transhumant herds; T = long transhumant herds.

Source: DNE (1983).

7.4 SHEEP AND GOATS

No recent data on the production parameters of sheep and goats have been obtained since the last study.

7.5 RESEARCH ACTIVITIES AND DEVELOPMENT

7.5.1 RESEARCH CENTRES AND PROGRAMMES

In June 1984, CRZ, Sotuba maintained 217 head of cattle 113 of which were Moor Zebu, 39 N'Dama and the remainder crossbreds. CRZ has discontinued its research on the pure N'Dama breed. It is currently conducting studies on 1/2 Steppe Red, 1/4 Moor Zebu and 1/4 N'Dama crossbreds. These crossbreds should subsequently be distributed in the Bamako region for dairy production.

The Central Veterinary Laboratory (LCV) is the only institution currently conducting research on Animal Trypanosomiasis in Mali. Its trypanosomiasis activities focus on research on strategies for the use of trypanocidal products on various types of livestock. To this end, a study on the effect of trypanocidal products on N'Dama productivity, partly financed by FAO, is

currently being conducted at the Madina Diassa ranch. Preliminary results of this study indicate a highly significant difference between treated and untreated groups (Traoré, 1986).

Furthermore, LCV is implementing a chemopreventive programme for village herds in Djinikorola and Yaban in Sikasso sector.

The entomological section of LCV, which is operated by entomologists of LCV and the *ex-Terres nouvelles* project completed in 1981 (Diall, 1984) is currently participating in a tsetse eradication trial using screens in Madina Diassa area, in collaboration with the Parasitology Department of the School of Medicine.

Other activities include research on helminthology, bacteriology and virology. Furthermore, LCV is still engaged in the production of vaccines (LCV, 1984).

7.5.2 MULTIPLICATION HERDS AND DEVELOPMENT PROJECTS

The two N'Dama multiplication herds in Mali, maintained under Operation N'Dama Yanfolila (ONDY) and Sikasso Tea Farm, are still in operation. In January 1987, the ONDY herd consisted of 1706 N'Dama comprising 159 male calves, 137 female calves, 486 heifers, 243 steers, 641 cows and 40 bulls. FED funding, which was resumed in 1982 following a two-year break, was discontinued during the first semester of 1987. The herd on Tea Farm remains static at around 140 head. It should be noted that since the herd was constituted in 1973, no new animals have been introduced. Consequently, there has been an extremely high level of inbreeding (Assogbakpe, 1985; Traoré, personal communication, 1987).

No recent data are available on the Baguinda Integrated Development Operation.

The objectives of the Mali Livestock Sector Project are to strengthen the Central Veterinary Laboratory and the National Directorate of Livestock with particular emphasis on cold storage facilities, rural credit facilities for fattening animals under village conditions and research on animal productivity conducted in collaboration with INRZFH and ILCA. Furthermore, the project conducts research on tsetse and tick distributions and trypanosomes control (vector-disease aspect). This five-year project, funded by USAID, commenced in August 1982 and is a continuation of Mali Livestock I and II projects.

The Mali South Livestock Development project covers Sikasso region, Dioila sector in the Bamako region and the southern areas of Segou, San and Tominian sectors involving an area of 100 000 km² and in 1983, 1 692 600 head of cattle and 1 109 700 sheep and goats. Programme activities included improvement of animal health services (construction of vaccination pens, equipping of veterinary stations and pest control), fattening of livestock under village conditions, providing credit facilities for the purchase of oxen and distribution of sires in the rural area. The five-year project, funded by the EEC, commenced in 1979. An evaluation mission was undertaken in July 1984 (SATEC, 1984). Due to marked discrepancies in the performance of various phases funding was discontinued and the programme ended in December 1984.

The Livestock and Meat Credit Establishment (ECIBEV) is concerned with meat production in some villages in Koulikoro region and operates a feedlot in Tienfala, 30 km from Bamako. It receives aid under the USAID sectoral project.

A study mission to prepare a Livestock Development Project in the Kayes south area was undertaken in 1984. The establishment of an N'Dama Multiplication Station is envisaged as part of this project (DNE, 1984b).

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7.7 MAJOR CHANGES SINCE 1977

The significant difference between cattle population figures given in this volume and those for 1976–77 points once again the difficulty involved in obtaining reliable estimates when censuses are not carried out. A small ruminant census carried out in 1982 shows that figures for 1976–77 were grossly underestimated.

Total cattle population in the study area increased at a steady rate of +16% from 1 810 000 head in 1977 to 2 099 000 head in 1984. However, distribution by breed changed significantly, revealing a gradual and alarming disappearance of the N'Dama (N'Dama -12%, zebu x N'Dama +31% and zebu +22%).

Since early 1987, and except for the CMDT draught oxen training operations in southern Mali Madina Diassa (ONDY) ranch has been the sole operation involved in trypanotolerant livestock development in Mali following the end of the Mali South Livestock Development Project, except for the CMDT draught oxen training operations in the area.

CHAPTER 8

BURKINA FASO

8.1 BACKGROUND

The Republic of Upper Volta was renamed Burkina Faso in August 1983.

The Directorate of Animal Husbandry is one of five technical directorates of the Ministry of Agriculture and Animal Husbandry. It comprises four central departments: the Department of Pastoral Resources, the Department of Animal Husbandry, the Animal Health Department and the Animal Products Inspectorate. Three structures, the Laboratory for Veterinary Research and Diagnosis, the National Veterinary Pharmacy (PHANAVET) and the Tsetse Eradication School (ELAT) (FAO, 1986a) are also attached to the Ministry.

The Regional Development Offices (ORD) have been replaced by 11 Provincial Agricultural Development Bodies (OPDA). The aim of these bodies is to develop agricultural production (animal and crop) and they comprise all decentralised bodies of the Ministry of Agriculture and Animal Husbandry.

Data on human and animal populations of Burkina Faso are given in Table 1.

Table 1. Human and animal populations of Burkina Faso, 1984.

	Country	Study area
Human population (1984)		
- number	6 836 000	5 600 000
- density	25.5/km ²	27.5/km ²
Animal population (1984)		
- cattle	3 000 000	1 800 000
- sheep	2 100 000	1 200 000
- goats	2 645 000	1 825 000

Source: Livestock Division (quoted by Ly, 1985).

Specific surveys on tsetse distribution have been conducted recently. Cuisance et al (1984) carried out a study in the Sidéradougou pastoral area and reported the presence of *G. palpalis gambiensis*, *G. tachinoides* and *G. morsitans submorsitans*. According to an FAO survey conducted in 1985–86 at Ceziét-Lanviera ranch near the village of Samorogouan, *G. palpalis gambiensis*, *G. morsitans submorsitans* and *G. tachinoides* are found throughout this region (FAO, 1986b).

Tsetse distribution surveys are also being conducted in Nouhao valley, within the framework of an integrated development project in the Eastern-Central region, with the assistance of GCP/RAF/191/ITA FAO project.

8.2 LIVESTOCK NUMBERS AND DISTRIBUTION

To facilitate comparisons with the last study and taking into account the fact that the new administrative divisions still do not have all the statistics, livestock numbers for 1982 are given under the former regions in Table 2.

Table 2. Livestock numbers and distribution in the former "departments" in 1982.

Department	Cattle			Sheep-Goats		
	Number	%	Density nb/km ²	Number	%	Density nb/km ²
Sahel	574 000	20	15.6	797 000	18	21.6
Nord	129 195	4.5	10.5	310 030	7	25.2
Centre-Nord	258 390	9	11.9	664 350	15	30.8
Hauts-Bassins(*)	200 970	7	8.1	398 610	9	16.1
Centre-Ouest	258 390	9	22.9	265 740	6	10
Centre	315 810	11	14.4	354 320	8	16.1
Centre-Est	129 195	4.5	11.5	132 870	3	11.8
Est	373 230	13	7.5	442 900	10	8.9
Volta-Noire	373 230	13	11.3	531 480	12	16.1
Sud-Ouest	129 195	4.5	7.4	265 740	6	15.2
Comoe	129 195	4.5	7	265 740	6	14.4
Total	2 871 000	100	10.4	4 429 000	100	16.2

(*) Bobo-Dioulasso and Diebougou OPDA.

Source: Livestock Division statistical data (1984).

The 490 000 Méré or Baoulé and 510 000 zebu x humpless cattle account for almost two-thirds of the cattle population in Burkina Faso, the remaining 2 000 000 head being zebu. The latter are found mainly in the north of the country. Their geographic distribution and the degree of crossbreeding with humpless cattle depends on adaptability to the climate and their susceptibility to diseases, in particular trypanosomiasis. However, in the Western region, where the most fertile soils are found, the zebu can migrate far south during the dry season without serious trypanosomiasis risk. Abundant pasture can be found and adequate health treatment is provided (FAO, 1985).

8.3 CATTLE

A study of livestock in Burkina Faso was carried out in 1985 by the Sub-regional Development Aid Unit as part of an FAO programme for the eradication of animal trypanosomiasis. Most of the results presented below are from that study (FAO, 1985).

8.3.1 BREED CHARACTERISATION

Distribution of the various breeds of cattle depends on latitude. The zebu is found in the north and the humpless breeds in the south with a transition zone of crossbreeds between the 11th and 12th parallels (roughly between the 900 and 1000 mm isohyets).

The zebu population consists of two breeds, the Sudanian Fulani Zebu which makes up almost the total cattle population and the Azouak, imported from Niger, of which there are only about a thousand head (FAO, 1985).

8.3.1.1 MERE OR BAOULE PRODUCTION TRAITS

A recent study on the production traits of humpless cattle was carried out in Poni province (Oumarou, 1986). The means for data collected on 51 herds consisting of 2498 head are given in Table 3.

Table 3. Baoulé production traits.

Fertility rate (n = 970)	57.7%
Age at first calving (n = 271)	56 months
Calving interval (n = 448)	17 months
Mortality rate of calves	7.3%
of heifers	4.6%
of cows	1.2%
Total	5.2%
Milk yield (n = 40)	300 ml/d (250 – 600 ml)
Birthweight of males (n = 4)	9 – 13.5 kg
of females (n = 4)	9 – 12 kg
mean (n = 8)	11 kg
Weight at 5 months	39 kg
Adult cow weight (n = 5)	150 kg
Average carcass yield (n = 7)	42%

Source: Oumarou (1986).

8.3.1.1.1 Index of productivity

Table 4 summarises estimates of the main productivity index required to calculate a productivity index giving the total weight of one year old calves produced per 100 kg of cow maintained per year. This productivity index is based on data collected under village conditions with average trypanosomiasis challenge for beef production.

Table 4. Baoulé productivity estimates under village conditions.

Cow viability (%)	98.8
Calving rate (%)	57.7
Calf viability to one year (%)	92.7
Calf weight at one year (kg)	70 (a)
Annual milked-out yield (kg)	50 (a)
Productivity index per cow per year (kg)	33.1
Adult cow weight (kg)	50
Productivity index per 100-kg cow maintained per year (kg)	28.6

(a) Estimates.

Source: Indexes calculated by authors.

8.3.1.2 ZEBU CROSSBREED X HUMPLESS CATTLE

No recent data on the productivity of crossbreeds are available.

8.3.1.3 N'DAMA

The N'Dama breed is no longer found in Burkina Faso except for a few head kept on station and some zebu x N'Dama crossbreeds in the south-west of the country.

8.3.1.4 ZEBU PRODUCTION TRAITS

Several surveys have been conducted to estimate the major production parameters of livestock in Burkina Faso (mainly zebu and zebu x humpless cattle crossbreeds) (FAO, 1985). The results of these surveys are given in Table 5.

Table 5. Zebu production traits.

Fertility rate (%)	60
Mortality rate (%)	
0-1 year	25-40
1-3 years	3-10
Adults	3
Offtake (%)	11-12
Annual growth rate (%)	2

Source: FAO (1985).

8.3.1.4.1 Index of productivity

Table 6 gives the major estimated production parameters required to calculate a productivity index giving the total weight of 1-year-old calves produced per 100 kg of cow raised per year. This index is based on data collected for beef production under village conditions with average trypanosomiasis risk.

Table 6. Zebu productivity estimates under village conditions.

Adult female viability (%)	97
Calving rate (%)	60
Calf viability to one year (%)	60
Calf weight at 1 yr (kg)	120(a)
Productivity index per cow per year (kg)	43.8
Adult cow weight (kg)	280
Productivity index per 100-kg cow maintained per year (kg)	15.6

(a) Estimates.

Source: Indices calculated by authors.

8.3.1.5 AZOUAK AND ITS CROSSES

No recent data have been collected on this breed. However, the numbers remain small and most are kept under station conditions.

8.3.2 DISEASES

In 1984 Burkina Faso carried out an "Emergency vaccination campaign against rinderpest" with FAO assistance. According to the last report of the Department of Animal Health submitted at an FAO/CILSS meeting (FAO, 1986), there were six reported foci of rinderpest in the central and southern parts of the country during the first semester of 1986. In 1985 there were seven foci in the north of the country alone. Isolated outbreaks of contagious bovine pleuropneumonia were also reported and four foci were reported in 1985. Other diseases are pasteurellosis, anthrax and blackquarter, tuberculosis and brucellosis.

Among parasitic diseases, trypanosomiasis is the major constraint to animal productivity. Almost all herds are vaccinated against the major contagious diseases. Herds are also treated with trypanocidal drugs when they migrate to tsetse-infested areas. In this regard, the possibility of chemoresistance should be pointed out. According to a study carried out between 1982 and 1984, in the Bobo Dioulasso area (Authie, 1984) 13 strains of *T. congolense* were shown to be resistant to isometamidium, and seven of these were also resistant to Berenil.

8.3.3 HERD MANAGEMENT

The different animal husbandry systems in Burkina Faso are described in detail in an FAO study on livestock production in this country (FAO, 1985). Data presented below complement those presented in Volume 2 of this study.

8.3.3.1 HERD MANAGEMENT IN CROPPING AREAS

Sedentary livestock production is practised in the south Sudan pastoral area and in the central region which has a high population density and by producers from traditionally pastoral ethnic groups. Once settled, these herders get involved in supplementary activities such as farming or trade, which require a fixed habitat.

In these regions livestock are generally owned by non-pastoralist ethnic groups primarily engaged in farming (Silmi-Mossi, Mossi, Bissa, Lobi). This accounts for the fact of their herds being sedentary.

The herds "home part" is the night park where the animals are generally guarded. The location of the night park is changed from time to time and the droppings collected for use as fertiliser on the pearl millet and sorghum fields of the producer/herder. Cattle graze mainly on natural pastures. Supplementary feeding with agro-industrial byproducts is rare. Dairy cows and sick animals are given a supplement of groundnut and cowpea haulms and millet and sorghum bran. When herds are kept for fattening, as is done by some farmers/herders in Pouytenga, Namentenga Province, the animals are given a maize supplement almost throughout the year. In September, some farmers take their herds out to "salt-lick areas" with a high content in sulphates and calcium carbonates for a "salt cure". The well-known are found in the Sahel zone north of Djelgodji.

8.3.3.2 TRANSHUMANCE

Livestock mobility (transhumance, nomadism, migration) is determined by ethnic group, pastoralists lifestyle and habitat of origin. The Fulani in Oudalan are nomads. In the Sahel and North Sudan zones and the Central region, however, they are transhumant pastoralists.

The Kel Tamacheck (Tuaregs and Bella) are all nomads. The Silmi-Mossi in Mossi country practise a very short transhumance and may be considered as sedentary.

Human and livestock migrations are practised primarily by producers in the Gondo Burkinabé area, mainly in the west of Sourou (Barani District) who migrate to the Black Volta area and those in Djelgodji area who migrate to Gourma. In the case of the latter, migration along the north-east border of Mossi country has become a regular phenomenon since the 1973 drought.

Other areas of migrations may be found in west of Mossi country, particularly in Samo country.

8.3.3.3 HERD COMPOSITION

Herds may be divided into three categories according to size and composition:

- herds in which the animals are owned by several farmers; the herds are generally sedentary and never consist of more than 25 to 30 head
- herds composed of animals owned by a Fulani "producer/herdsman", and animals owned by traders, farmers, civil servants. The average size is between 40 and 50 head
- herds owned mainly by a Fulani producer/owner. Herds of more than 120 head are divided into two or three groups depending on the size of available family labour. Herds may consist of between 10 and 200 head and sometimes 5000 head (FAO, 1985).

In 1986, FAO conducted a survey on herd composition in Gaoua region, on 51 Baoulé herds comprising 2498 head. The results are given in Table 7.

Table 7. Herd composition (%).

Females		Males	
Cows	35.5	Young bulls	6.8
Heifers	19.3	Steers	15.0
Female calves	9.2	Males calves	9.8
		Castrates	4.4
Total	64		36

Source: Oumarou (1986).

8.3.3.3 ANIMAL TRACTION

Animal traction was introduced in Burkina Faso about 30 years ago and is extensively used in areas in which cotton is cultivated (Bobo-Dioulasso, Dédougou). Few trypanotolerant cattle are used and most draught animals are zebu or zebu x humpless cattle. The zebu is preferred because it is easier to train, has a larger conformation and is found in large numbers in the humpless area.

The number of draught animals in the country is currently estimated at over 82 000 head (PH Starkey, Reading, UK, personal communication, 1986).

8.4 SHEEP AND GOATS

8.4.1 SHEEP

Production parameters collected during a Small Ruminants Breeding Programme in Yatenga and Sahel ORDs in 1977 and quoted by Disset (1985) are given in Table 8.

Table 8. Production parameters for Mossi and Fulani sheep.

	Mossi sheep	Peul sheep
Age at first lambing	13.5 months	13-15 months
Cyclical prolificity	100.2%	100.3%
Annual fertility rate	103-105%	75-84%
Birth distribution	2/3-3/4	3/4
	Cold season	Cold season
Offtake	16.45%	19.5%

Source: Results of the Yatenga Small Ruminants Project, quoted by Disset (1985).

Production parameters for Djallonké sheep collected at Sondré-east Station are presented in Table 9.

Table 9. Production traits for Djallonké sheep.

Age at first lambing	13-14 months
Lambing season	Throughout the year
Fecundity rate	97%
Cyclical prolificity rate	118%
Fertility rate	115%
Ewe productivity index	0.77-1.06 weaned lamb

Source: Results obtained at Sondré-east Ranch, quoted by Disset (1985).

8.4.2 GOATS

Performance traits obtained by the Programme for the Development of Small Ruminants in Yatenga and Sahel ORDs in 1977 and quoted by Disset (1985) are given in Table 10.

Table 10. Performance traits for Mossi and Fulani goats.

	Mossi goats	Fulani goats
Age at first kidding	9-12 months	-
Annual fertility rate	107%	103%
Annual fertility rate	91%	60-64%
Kidding season	Throughout the year	52-56%
		Cold season
Offtake	21%	18.95%

Source: Results of the Yatenga Small Ruminants Project, quoted by Disset (1985).

8.4.3 DISEASES

There are still pathological differences between the north and south of the country. Malnutrition appears to be the major cause of disease in the north while the humid climate in the south is responsible for certain diseases most of which are parasitic diseases. Rinderpest is found throughout the country. Little information is available on other diseases (FAO, 1985).

8.4.4 HERD MANAGEMENT

The FAO report on animal husbandry in Burkina Faso describes various small ruminant production systems (FAO, 1985). Systems vary from north to south or central.

In the north animals are herded throughout the year by herdsmen. Goats may be allowed to graze freely during the dry season but are taken to water points at least once a day. Stocking rates by hectare are well above average and with the recent drought, the goat, which consumes even thorns, has been blamed for being destructive. A few night parks, milking or veterinary treatment pens are sometimes constructed with thorn branches.

The animals may be given a supplement of millet stalks, wheat bran or cotton seeds.

In the central part of the country animals are herded only during the cropping season. Following the harvest, they are allowed to roam around the compounds (*zaka*) consisting of between one and five family units. An enclosure is constructed for the animals within the compound. The droppings are collected from these enclosures once or twice a year for use as manure in the fields. Crop residues are fed to the animals as a supplement.

In the south and south-west, the animals graze freely almost all year round. During the cropping season, crops are protected from the animals which are confined to empty huts at night as a precaution against theft. As the droppings are rarely used as manure, confinement huts are never cleaned up.

Table 11 shows a typical herd composition.

Table 11. Typical herd composition for sheep and goats.

	Sheep	Goats
Males	33.6	27.9
Females	66.4	72.1
Breeding females	41.4	39.0
0-1-year-old animals	42.7	46.8
Dam/young ratio	1:1	1:1.2

Source: FAO (1985).

8.5 RESEARCH AND DEVELOPMENT ACTIVITIES

8.5.1 RESEARCH CENTRES

The Animal Trypanosomiasis Research Centre (CRTA) has been continuing its studies on the biological control of *G. palpalis gambiense* by the sterile male technique and the integrated control of tsetse in the Sidéradougou area. The Centre is funded by France (IEMVT) and RFA (GTZ). Since 1978 CRTA has been conducting a research programme on trypanotolerance, identification and characterisation of trypanotolerant animals and resistance transmission and resistance mechanism. Furthermore, a cattle reproduction control programme with special emphasis on reproduction physiology, artificial insemination and embryo transfer was introduced in 1984.

The School for Tsetse Control (ELAT) is no longer funded by France and Germany, but FAO provides funds for training technical staff for tsetse control organisations in the subregion.

The Veterinary Research and and Diagnosis Laboratory has been renovated and provided with laboratory equipment with funds provided by the Federal Republic of Germany. The bacteriology, virology-serology and parasitology units are already in operation. France has provided technical assistance for the preparation of an epidemiological map of the country (FAO, 1986a).

The Burkinabe Agricultural and Livestock Research Institute (IBRAZ) has planned a Livestock Research Programme to be implemented at Saria Agricultural Station in the Sudano-Sahelian zone. The programme will focus mainly on small ruminants and the following activities: improvement of local breeds, production systems and feed regimes. The four-year project is estimated at 412 million CFA francs.

8.5.2 MULTIPLICATION AND EXTENSION

In 1985, Samandéni Station located near Bobo Dioulasso maintained 103 Baoulé and zebu x Baoulé crossbreeds on 1150 ha. The station has a stocking capacity of 250 cattle head. New activity programmes are currently being studied (Kaboret, 1985).

Banankélédaga Station maintains almost 250 head of Baoulé, zebu and N'Dama cattle owned by CRTA and about 150 sheep belonging to the Directorate of Animal Husbandry.

Matourkou Training Centre and Farako-Ba Station maintain demonstration herds for teaching purposes.

8.5.3 DEVELOPMENT PROJECTS

With regard to development projects presented in Volume 2, the Village Livestock Breeding Project and Project to improve Village Herds in Banfora ORD have been completed.

The Voltas Basin Development Project (AVV), and the Banfora Feed-lot and Work Oxen Assistance Project continue their activities. The West Volta Livestock Project (PEOV) continues its activities on beef production on a reduced scale. The project is directed by the Bobo Dioulasso and Dédougou OPDA.

Since then, other trypanotolerant livestock projects have been set up. The main ones are described in Table 12.

Table 12. Development projects.

Title and description	Donor-cost (in '000 CFA)
	Remarks/Duration
Development of Soudre-Est pastoral zone	Donor: The Netherlands Cost: 82 000 Duration: 1981 to 1984 Remarks: Mangua, implemented by AVV
Livestock Project in Haut-Bassins and Comoé ORDs	Donor: FED Cost: 550 000 Duration: 1982 to 1985 Remarks: Sideradougou
Integrated rural development of Centre-Est ORD	Donor: Italy-FAO Cost: 13 117 000 Duration: 1983 to 1990 Remarks: 1 962 000 for livestock production including 500 000 CFA for the development of Nouhao rangelands
Léo feedlot and pastoral zone	Donor: The Netherlands Cost: 210 000 Duration: 1980 to 1982 Remarks: Extended from 1983 to 1986.

Source: FAO (1985).

FAO implemented two regional projects in Burkina Faso funded by the Italian Government in 1983 as part of the FAO Programme for the Control of African Animal Trypanosomiasis and Development of Affected areas. The two projects, entitled "Improvement, multiplication and conservation of trypanotolerant livestock in West Africa" and "Sub-regional Support Unit for Development within the framework of the Programme for the Control of African Animal Trypanosomiasis and Development" of Affected areas are based in Ouagadougou. They provide methodological support in areas within their scope in various countries of the subregion. Duration for both projects is five years.

In 1986, an FAO project formulation mission identified a project for the Control of African Animal Trypanosomiasis in the Niger River Basin (Niger, Benin and Burkina Faso) (FAO, 1986c) to be funded within the framework of the FAO programme for the control of African animal trypanosomiasis. UNDP was approached and expressed interest in the project which should begin in 1987.

Burkina Faso as well as the other countries of the "Conseil de l'Entente" received assistance in 1987 from the FAO for the preparation of a transhumant movement map, as part of a technical cooperation programme.

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8.7 MAJOR CHANGES SINCE 1977

Various reforms, including some in the livestock sector, are currently being carried out in Burkina Faso, formerly Upper Volta.

Cattle, sheep and goat populations increased during the study period. However, cattle distribution by breed has changed significantly. In 1977, zebu accounted for 33% of the cattle population in this area. By 1984, this figure had increased to over 45%! The Shorthorn population has remained static (484 000 head in 1977 and 490 000 head in 1983) and their relative importance in national livestock production has decreased.

Major development projects are currently being implemented in the south of the country. Their main objective, however, is not the development of Shorthorn production but the development of reception areas for zebu migrating from the Sahel.

The main bodies currently working on trypanotolerant livestock in Burkina Faso are CRTA, which is carrying out research on trypanotolerance in Burkina Faso, and FAO, which in 1982 implemented two regional projects as part of its Programme for the Control of African Animal Trypanosomiasis and Development of Affected Areas.

CHAPTER 9

COTE D'IVOIRE

9.1 BACKGROUND

Yamoussoukro became the capital of Côte d'Ivoire in 1983, replacing Abidjan.

The Ministry of Animal Production, created in 1966, was merged with the State Secretariat for Agriculture (Le Secrétariat d'Etat à l'Agriculture) in 1983 as the Ministry of Rural Development (le Ministère du Développement rural).

Following a re-organisation of the ministries in July 1986, two ministries, the Ministry of Agriculture and the Ministry of Water Resources and Forestry, were created from the Ministry of Agriculture, Water Resources and Forestry. The Ministry of Rural Development was restructured to create two ministries: the Ministry of Rural Development and the Ministry of Animal Production.

Data on human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Côte d'Ivoire, 1985.

Human population (1985)	
– number	10 187 000
– density	31.77/km ²
Animal population (1985)	
– cattle	922 000
– sheep	1 032 000
– goats	748 000

Sources: For human population: data for 1983, projections (+4.1%) based on 1975 census figures, Ministry of Economy and Finance. For cattle, sheep and goat populations: the Directorate for Livestock Production in the Ministry of Rural Development (MDR), 1985; Animal Production Development Company (SODEPRA) (1985) and Sarniguet (1986).

A recent study on tsetse distribution in Ivory Coast Northern Savannah region was carried out by FAO and GTZ in 1979/80. According to the survey, the riverine species *G. palpalis palpalis*, *G. palpalis gambiensis* and *G. tachinoides* and the savannah species *G. morsitans submorsitans* and *G. longipalpis* are found throughout the study area. *G. fusca*, *G. medicorum*, *G. pallicera pallicera* and *G. palpalis* are found in the south of the study area (UNDP-FAO/GTZ, 1982).

9.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Livestock numbers in each region in 1982 are given in Table 2.

In 1985, the national herd was estimated at 922 000 cattle out of which, 605 000 cattle are found in the sedentary traditional system, farms and ranches and 317 000 in the transhumant system.

The Northern region accounts for an estimated 86% of the cattle population, the Southern region for 10% and South Forest region for 4%.

Table 2. Livestock numbers and distribution. 1985.

	Numbers	%
North Zone		
- Transhumant	317 000	
- Sedentary	455 900	
- Farms and ranches	23 800	
Subtotal for North	796 700	86.5
Centre Zone		
- Humpless cattle under traditional system	90 500	Management
- Humpless cattle on farms and ranches	4 500	
- Subtotal for Centre Zone	95 000	10.3
West, South-east and South-west Zones		
- Humpless cattle under traditional system	20 000	Management
- Humpless cattle on farms and ranches	9 500	
Subtotal for South Forest Zone	29 500	3.2
Subtotal for farms and ranches	37 800	4.0
Rounded total		
- Sedentary	605 000	65.8
- Transhumant	317 000	34.2
Total cattle number	922 000	100.0

Source: Sarniguet (1986).

Cattle numbers and distribution for 1985 by livestock production systems in Northern region are given in Table 3.

Table 3. Cattle numbers and distribution in the Northern Departments, 1985.

Department	Sedentary livestock	Transhumant livestock	Work oxen	Stations and ranches	Total cattle
Touba	9 700	-	500	-	10 200
Biankouma	6 300	-	-	3 000	9 300
Seguela	3 600	-	400	12 600	16 600
Mankono	5 900	-	500	-	6 400
Odienne	25 900	1 400	2 000	-	29 300
Boundiali	50 000	69 200	12 700	2 300	134 200
Khorogo	125 500	152 000	12 400	200	290 100
Ferkessedougou	76 900	65 300	9 300	5 700	157 200
Bouna	113 900	27 200	400	-	141 500
Total	417 700	315 100	38 200	23 800	794 800

Source: Sarniguet (1986).

Cattle distribution by breed in the Northern regions for the years 1979, 1982 and 1985 are shown in Table 4. The figures give an indication of the extent of zebu x humpless crossbreeding operations in the northern part of the country.

The Table shows a significant decline in the number of Baoulé from 73% of the cattle population in the north in 1979 to 56% in 1985. This indicates an annual decrease of 4.5% per year. At this rate, if no conservation measures are taken, the percentage will drop to 20% within the next 20 years and the breed will become extinct within the next 40 years.

Table 4. Cattle numbers and distribution by breed in the northern region, 1985 (%).

Region	1979				1982				1985			
	B	ND	M	Z	B	ND	M	Z	B	ND	M	Z
Touba	29	68.5	2	0.5	11.5	83	5	0.5	16	78	5	1
Odienne	0.5	99.5	-	-	0.2	99.8	-	-	-	100	-	-
Boundiali	78	13	6.5	2.5	70	18	3	9	69	7	15	9
Ferkesse dougou	-	-	-	-	86	3	11	1	76	6	17	1
Korhogo Nord	94	3	3	-	93	2	5	-	63	2	32	3
Korhogo Sud									72	2	23	3
Bouna	99	0.5	-	0.5	97	1.5	0.5	1	88	1	10	1
Total	73	23	3	1	67	27	4.5	1.5	56	25	16	3

B = Baoulé; ND = N'Dama; C = Crossbred; Z = Zebu.

Source: Hoste (1986).

9.3 CATTLE

9.3.1 BREED CHARACTERISATION

In 1985, the trypanotolerant cattle population of Côte d'Ivoire was an estimated 672 000 head comprising 138 000 N'Dama, 350 000 Baoulé, 1000 Lagune and 183 000 zebu x humpless crossbreds.

9.3.1.1 BAOULE PRODUCTION TRAITS

Landais and Poivey (1981) quoted a mortality rate of 18.3% for 0-1-year-old calves under village conditions, including 4.2% dying before they are a month old and following a sample survey in 65 pens operated by SODEPRA Nord 1.3% for calves dying within three days of birth. Godet et al (1981) estimate milk yield at between 130 and 150 kg for a 210-day lactation period (standard deviation 122 days). Hoste et al (1983) give a milk yield of 400 kg (coefficient of variation 22%) for a 210-day lactation period for cows at CRZ, Bouake.

Khorogo CRZ studied average daily weight gain under village conditions for various ages in Affouvassou, Centre region. The results are shown in Table 5.

Table 5. Average daily weight gain (g/d) for calves in Affouvassou.

	Age (months)							Cumul
	1	2	3	4	5	6	6-12	
ADG (g/d)	203	137	107	110	127	180	76	110
Numbers	32	32	32	32	32	32	32	31

Source: CRZ, Khorogo (1980).

9.3.1.2 N'DAMA PRODUCTION TRAITS

In its technical annual report (SODEPRA, 1984), the Animal Production Development Company gives various data for reproduction parameters and mortality rate for N'Dama. Parameters collected under village conditions are given in Table 6 and those for ranches or breeding stations in Table 7. Numbers and standard deviations are not given and these figures should, therefore, be taken just as examples.

Table 6. N'Dama reproduction traits and mortality rate under village conditions (1984 data).

	SODEPRA-North	SODEPRA-Centre
Fecundity rate (%)	48	48.3
Mortality rate (%)		
- Overall	-	3.3
- 0-1-year-old calves	10.2	-
- Adults	3	-

Source: SODEPRA (1984).

Table 7. N'Dama reproduction traits and mortality rate ranch-reared, 1984.

	Marahoué	Abokouamekro	Sipilou
Fertility rate (%)	60.3	53.3	47
Fecundity rate (%)	64.6	55.9	47.6
Mortality rate - Overall	7.3	15.1	11.1
- Calves	7	26	10.1
Females - Heifers	8.12	12.8	8.6
- Breeding heifers	2.96		7.7
- Cows	4.94	7.2	17.3
Males - Male calves	8.4	12.8	15.5
- Steers	9		
- Bulls	5.6	7.2	8.7

Source: SODEPRA (1984).

Godet et al (1981) give the following estimates for N'Dama milk yield under traditional management: average milk yield of between 200 and 220 kg for a lactation period of 210 days (standard deviation 122 days). Hoste et al (1983) gave a milk yield of 475 kg for CRZ, Bouake (coefficient of variation of 22%) for a 210-day lactation period.

Data collected by SODEPRA (SODEPRA, 1984) for growth rate for calves raised on ranch or breeding stations are given in Table 8.

A feedlot trial was conducted under breeding station conditions to determine the potential for fattening N'Dama calves (Janssens, 1986). A total of 60 two-year-old N'Dama steers were given a supplementary feed of cotton seeds, molasses and licking powder for 6 months. Initial weight was 178 ± 8 kg and weight at the end of six maintained months was 225 ± 15 kg. Average weight gain during the 6-month trial period was therefore 260 g/d.

Table 8. Growth rate for N'Dama calves under ranch or station conditions.

1. Data collected on Marahoué ranch							
Average weight (kg) at 9 months in breeding herd							
– Males							103.3 kg
– Females							99.4 kg
Average weight(kg) at 9 months in ranch herd							
– Males							98.3 kg
– Females							95 kg
2. Data collected on Noroningue Station							
<u>Age class</u>	<u>Birth</u>	<u>3 m</u>	<u>6 m</u>	<u>12 m</u>	<u>18 m</u>	<u>24 m</u>	
n =	21	23	39	42	56	40	
Weight (kg)	19.5	64	108	156	212	230	

Source: SODEPRA (1984).

9.3.1.2.1 Index of productivity

Table 9 summarises estimates of the main production traits required to build up a productivity index based on the total weight of 1-year-old calves per 100 kg of cow raised per year. The index is based on data for beef production collected under ranch conditions with average trypanosomiasis risk.

Table 9. N'Dama productivity estimates for beef production under ranch or station conditions with average trypanosomiasis risk.

Adult females viability (%)	92.8
Calving rate	60.3
Calf viability to 1 year (%)	74
Calf weight at 1 year (kg)	127
Productivity index per cow per year (kg)	58.7
Cow weight (kg)	250 (a)
Productivity index per 100-kg cow maintained per annum (kg)	23.5

(a) Estimates.

Source: Index calculated by authors.

9.3.1.3 MERE

No recent data are available on the Méré.

9.3.1.4 LAGUNE

No special studies on the Lagune breed have been carried out during the past 10 years.

9.3.1.5 ZEBU

Bonnet (1983–84) gave an estimated fertility rate of 55%, mortality rate for 0–1-year-old calves of 8% and an abortion rate of 4%. These figures were obtained from a survey of 3500 head of zebu from sedentary herds (Rombaut, personal communication).

9.3.2 DISEASES

The disease status in Côte d'Ivoire is described in detail by Touré (1986). Rinderpest is a constant threat and between 1983 and 1985 there were outbreaks of the disease in Ferkessedougou, Djeriba, Niellé, Sanhala, Khorogo and Sinématiali regions. In 1984, seven cases of contagious bovine pleuropneumonia were reported. There were outbreaks of anthrax and blackquarter in the north-east and north-west of the country in 1984. Bovine brucellosis, pasteurellosis and tuberculosis remain major problems. There have been no recent reports of foot- and-mouth disease and vaccination against this disease is not given.

Apart from trypanosomiasis, on which available data are sparse, few parasitic epidemiology studies have been conducted although it is agreed that parasitic diseases are widespread. Douati (1984) mentions a survey on animal diseases conducted by SODEPRA on village humpless cattle in northern Côte d'Ivoire which gives an infestation rate of 13% for 0 to 2-year-old calves. The Tsetse Eradication Project gives a mean infestation rate of 25% in this region for zebu calves.

9.3.3 HERD MANAGEMENT AND COMPOSITION

Landais (1983) analysed the sex composition of nine herds comprising 1407 head in Khorogo region. He reported that 24.6% were males and 75.5% were females. There were few males over two years and even fewer bulls. In 1983, the Marahoué herd consisted females, 20.1% males and 9.1% calves.

The number of draught animals in 1983 was estimated at over 34 000 in the cotton-producing region of which 27 700 were trained by SODEPRA Nord. In 1985, this scheme handled an estimated 38 200 head of draught animals (Sarniguet, 1986).

9.4 SHEEP AND GOATS

9.4.1 BREED CHARACTERISATION

9.4.1.1 SHEEP

Major efforts have been made to improve and develop small ruminant production in Côte d'Ivoire and recent data on production traits have been collected.

9.4.1.1.1 Performance traits

Bassowitz (1983) gives reproduction parameters and mortality rate for West African dwarf sheep under improved village conditions and under pastoral management. These two animal husbandry systems are more specific to the north of the country. In the first type of system the sheep are given supplementary feed (see section on "Herd composition and management"). The data are presented in Table 10.

Disset (1986) gives the reproduction traits and mortality rates obtained under village conditions. He gives a fertility rate of 106%, a lamb mortality rate of 3.7%, an adult mortality of 2.4% and an overall mortality rate of 6% (these figures are underestimates as some animals are born and die without being included in the survey).

Table 10. Reproduction traits of West African dwarf sheep under improved village and pastoral management conditions (weighted arithmetic means: 1980/81).

	Improved village conditions	Pastoral conditions
Number of lambings surveyed	207	362
Fertility rate (%)	122	151
Prolificity rate (%)	107	109
Mortality rate (%)		
– Global	21	24
– Males	16	30
– Females	25	19

Source: Bassewitz (1983).

Data on the reproductive performance and mortality rate of West African dwarf sheep under ranch or breeding station conditions are given in Table 11.

Table 11. Reproductive traits and mortality rate of West African dwarf sheep under ranch or breeding station conditions.

	(*)1	2	3	4	5	6
Fertility rate (%)	80	121	138	144	200	142
Prolificity rate (%)	113	109		132	124	
Mortality rate (%)						
– Global	10		28.1	7.0		7.5
– Young		15.6	13.6	11.4	21.4	7.9
– Adults		6.8		1.5	11	2.7

Sources:(*) 1: CRZ, Bouaké (1982).
 2: Herds managed by SODEPRA-Nord (SODEPRA, 1984).
 3: Badikaha Semen Farm (SODEPRA, 1984).
 4: National Sheep Breeding Centre (Disset, 1986).
 5: Sud Forestier Project (SODEPRA, 1984).
 6: Toumadi Sheep Production Scheme (Disset and Rombaut, 1986).

Table 12 contains data on the growth parameter of lambs raised under ranch or station conditions presented by SODEPRA in its technical activities report for 1984.

Table 12. Growth parameter of lambs raised under ranch or breeding station conditions.

Data collected at the National Sheep Breeding Centre	
Birthweight of	
– Single litter males	2.08
– Twin litter males	1.9
– Male average	2.1
– Single litter females	2.03
– Twin litter females	1.74
– Female average	1.90
– Male and female average	1.96
– Weight at 80 days	
– of males	10.95
– of females	9.86
– average	10.41
Average daily weight gain (g/d)	106
Weight(kg)	
– of males	19.84
– of females	16.79
– average	18.13
Data collected at the Sud-est Forestier project	
Birthweight (kg)	
– of males	1.9
– of females	1.8
Weight at 3 months	11.3

Source: SODEPRA (1984).

Disset and Rombaut (1986) give information on lamb growth at Sodepalm Sheep Farm, Toumodi. These data are given in Table 13.

Table 13. Growth parameters for sheep on SODEPALM Sheep Farm, Toumodi.

Birthweight (kg)	
– Single-litter lambs	2.47
– Twin-litter lambs	2.16
Weaning weight (kg)	
– Single-litter lambs	14.9
– Twin-litter lambs	13.85

Source: Disset and Rombaut (1986).

Daily weight gain for male lambs of single and twin litter births by age class are given in Table 14. Data were collected at Sodepalm Sheep Farm, Toumodi.

Table 14. Daily weight gain (DWG) of lambs by age class (g/d).

	Ages				
	0–30 d	30–90 d	90–120 d	120–180 d	205 d
Single-litter birth	173.4	105	100	98	
Twin-litter birth	142	90	87		99

Source: Sodepalm (1983–1984).

9.4.1.1.2 Productivity index

Table 15 summarises estimates of the main production traits required to calculate a productivity index giving the total weight of 5-month-old lambs produced per 10 kg of ewe maintained per year. This index is calculated from data collected at the National Sheep Breeding Centre.

Table 15. Productivity estimates.

Ewe viability (%)	95 (a)
Lambing rate (%)	137.5
Lamb viability to one year (%)	95
Lamb weight at 5 months (kg)	14 (a)
Productivity index per ewe per year (kg)	18.7
Ewe weight (kg)	25 (a)
Productivity index per 10 kg of ewe maintained per year	7.5

(a) Estimates.

Source: Index calculated by authors.

9.4.1.2 GOATS

This aspect of livestock production has been more or less neglected and no recent data could be obtained.

9.4.2 DISEASES

Peste des petits ruminants is the most serious viral disease. In 1984, there were three outbreaks involving 577 cases, of which 547 were fatal. A total of 21 731 doses of vaccine were injected to small ruminants.

Sheep pasteurellosis is controlled with a limited rate of coverage (1126 immunisations in 1984). The same applies for sheep pox and anthrax (Touré, 1986).

Nervous dysfunctions due to nutritional deficiencies are reported under intensive farming conditions. Recently, cases of adenocarcinoma of the pituitary mucosa, a disease with a rapidly evolving morbidity rate were reported for the first time (Rombaut, personal communication).

9.4.3 HERD MANAGEMENT

In his 1983 document, Bassewitz gives a detailed description of flock management in northern Ivory Coast. New data contained in the report are summarised below. Bassewitz (1983) classifies flock management under four systems: urban production system, Fulani pastoral production system, improved traditional management system and the free-range system. Urban livestock production is the most intensive of the traditional livestock production systems but involves only 5% of the sheep population. The animals, mainly Sahelian x West African dwarf crossbreeds, freely graze by the roadside and on refuse during the day, returning at nightfall to be locked up in mud huts. They are given a regular supplementary feed of corn, corn bran and cooking salt. This type of animal husbandry system is practised more for prestige purposes and as an investment rather than for commercial reasons.

Pastoral management became important following the sedentarisation of the Fulani in Côte d'Ivoire in 1972. An estimated 25% of the sheep population in the North are managed under this semi-sedentary husbandry system. Flocks are herded during the day by the owner's children and kept in an enclosure made up of thorn branches at night. This is a typical Sahelian practice introduced by the nomadic Fulanis. Flocks are generally large and are given little or no supplementary feed. However, traditional health care is provided. Flocks are raised for commercial purposes.

Almost 70% of the sheep in the north of the country are managed under the improved traditional management system. This system is practised mainly by the Senoufo in the north and northeast. Its main features are night penning, organised distribution of supplements, health care and herding by hired herdsmen or family members.

The free-range system is of minor importance in the north but widely practised in the Guinea savanna and forest region. The animals, which are considered as an investment, live as commensals are given no health care while being allowed to roam the village grazing by the roadside and on household refuse. Consequently, they cause considerable damage to crops, resulting in conflicts between farming and pastoral communities.

9.5 RESEARCH AND DEVELOPMENT ACTIVITIES

9.5.1 RESEARCH CENTRES

As a result of the cabinet reshuffling in July 1986, the Department of Education and Scientific Research was divided up into four ministries: the Ministry of National Education, responsible for Higher Secondary Education; the Ministry of Technical and Professional Training; the Ministry of Primary Education and the Ministry of Scientific Research. Within this Ministry, animal husbandry activities are carried out mainly by the Centre de recherche zootechnique (CRZ) de Minankro, Bouaké. In 1986, the centre, which is the Livestock Production Department of the Institut des Savanes (IDESSA), maintained 200 N'Dama, 430 Bagulé and 80 crossbreds of various combinations. The National Artificial Insemination Centre (CNIA) and the Central Laboratory for Animal Nutrition (LANCENA), which are structures of the Ministry of Livestock Production, conduct studies on animal husbandry under field or laboratory conditions. CNIA is under the Bingerville Animal Pathology Laboratory which carries out diagnostic work and produces vaccines. LANCENA (06 BP 353) is situated within the Ecole Nationale Supérieure d'Agronomie at Abobo in the outskirts of Abidjan. It controls the quality of animal feed produced in Côte d'Ivoire and carries out analyses and research on the nutritive value of feedstuff and digestibility of local products.

The National Sheep Centre (CNO) at Béoumi on Lake Koussou develops and improves livestock production techniques and material. It also conducts studies on the nutritional aspect of sheep production, improvement of pastures and selection of forages most suitable for sheep production. It also serves as a control base for rams in the National Programme for the Genetic Selection of West African Dwarf Sheep. The programme is partly financed by FAC.

SODEPRA, in collaboration with the International Livestock Centre for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD), carries out research on the productivity and health of trypanotolerant cattle and small ruminants at Tengrela and Boundiali within the framework of the African Trypanotolerant Livestock Network (ILCA, 1986). A small ecological laboratory has also been set up at Korhogo, as part of the Tsetse Eradication Project being implemented with the collaboration of Germany (GTZ), to determine the effect of insecticides on the fauna of regions in which the programme is being conducted. In 1986, the study programme of the project was concerned with testing new techniques for the control of *G. morsitans*, studying the effect of chemical attractants on *G. tachinoides* and the behaviour of *G. longipalpis* and *G. palpalis palpalis* (Douati, 1986).

9.5.2 MULTIPLICATION HERDS

Major livestock multiplication activities are still carried out by the Société de développement des productions animales (SODEPRA) through its three N'Dama ranches described in Table 16.

SODEPRA is also responsible for "Commercial Cattle Operations" which aim to develop various crossbreds to meet the demand for improved animals in Côte d'Ivoire. This project is being implemented in Noroningue and Panya stations and is presented in Table 17.

Table 16. SODEPRA ranches on which N'Dama cattle are bred.

Name	Abokouamékro	Sipilou	La Marahoué
Location	Near Yamoussoukro 120 km south of Bouaké	Near Biankouma north-west of Man	North-east of Ségéla
Organisation responsible	SODEPRA	SODEPRA	SODEPRA
Size	12 000 ha	12 000 ha	99 160 ha of which 65 960 are usable
Breeds and numbers	3007 N'Dama (end 1984)	3465 N'Dama (end 1984)	12 212 N'Dama (in 1985)
Starting year	1962	1964	1975
Objectives	Selection and multiplication of the N'Dama breed		
External aid	FED		

Source: Shaw (1985).

Table 17. Commercial cattle operations.

Name	Panya Station	Noroningue Station
Location	Near Boundiali	North of Ferkessedougou
Organisation responsible	SODEPRA	SODEPRA
Size	9000 ha	1200 ha
Breeds and numbers	2283 in 1984 of which 432 zebu, 282 N'Dama, 15 Ndamaze and 1554 Ndama'c.	394 Ndamance and 332 N'Dama in 1984
Objectives	Ndamaze production (N'Dama x Zebu Gobra crossbreeds)	Ndamance production (N'Dama x Abondance crossbreeds) Ndasie production (cross between N'Dama and Fleckvieh) BSIE and own resources
External aid	BSIE and own resources	

Source: De Rochemontix (1984); Shaw (1985).

The Ministry of Animal Production is also in charge of the following livestock centres:

- Bingerville Livestock Centre in the southern region near Abidjan works mainly with poultry and also provides training for producers.
- Bingerville Animal Pathology Laboratory recently set up an artificial insemination Centre for the collection and freezing of cattle semen and the collection and packaging of ram semen. An insemination programme funded by the Belgian and Ivorian governments was initiated in 1986. The project aims to inseminate 25 000 sheep and 5000 head of cattle over a three-year period.
- The National Sheep Centre whose objectives are: to develop and improve breeding techniques, provide training for herders and specialised technicians, conduct selection of the West African dwarf breed and supply producers with efficient breeding stock. In 1984, CNO had a flock of 2060 sheep and currently operates in association with six private breeders selected as selection and multiplication breeders under the selection programme (SODEPRA, 1984).
- The Oil Palm Development Company (Palm Industrie) maintains over 7000 head of cattle on five plantations located in the coastal area. In 1984, the herds consisted of 1000 Baoulé and crossbreeds on the Ehania plantation, 3000 N'Dama at Fresco, 800 N'Dama at Bolo, 1500 N'Dama in December 1986.

- The Société de développement des palmiers à huile (SODEPALM) has a sheep production programme at Toumodi. In 1986, the station had 5324 sheep. The programme was launched in 1979, with joint funding jointly by FAC and CCCE. External aid will cease in December 1986.

9.5.3 DEVELOPMENT ACTIVITIES

Livestock development activities are still carried out mainly by SODEPRA.

SODEPRA-nord (training of livestock producers in the Northern region) covers seven areas: Touba, Odienne, Boundiali, Ferkessedougou, Bouna and Korhogo north and south.

The programme involves 417 700 head of sedentary and 315 100 head of transhumant cattle, 38 200 draught oxen and 23 800 head of cattle raised on ranches or breeding stations. External aid is provided by France (CCCE and FAC), Germany (GTZ), Belgium (AGCD), (SODEPRA, 1985; Sarniguet, 1986). Since 1984, SODEPRA has also carried out the "Operation of Zebu Training in the North" and "Operation of Sheep Production in the North".

The project to provide Training and Development of Breeding farms in the Central Region covers five departments: Bouaké, Katiola, Boundoukou, Dimbokro and Yamoussoukro. In 1984 the project involved 54 252 head of cattle and 29 730 sheep. In 1985, funds were provided by ADB for a four-year period.

SODEPRA is also responsible for the Ferkessedougou Commercial Feedlot Centre which has fattened an estimated 7966 head of cattle. The project also trained 38 000 draught oxen in collaboration with Ivorian Textiles Company (CIDT).

SODEPRA is also responsible for Badikaha Semen Farm, located 50 km southeast of Khorogo. The farm has an area of 6732 ha and in 1982 maintained 1327 head of N'Dama, Ndamance and Baoulé. It will be the main multiplication centre for Ndamance breeding stock from Noroningue.

Recently, three other development projects were implemented:

- The project to develop livestock production in the forest areas of the South-eastern region, began in 1981, and is based in Abidjan. It is funded by CCCE.
- The project to develop livestock production in the forest area of the Western Region, based in Gagnoa, was launched in 1984 and is funded by ADB.
- The project to develop livestock production in the forest areas of Ouest Region, based at Man, was launched in 1983. It is funded by the Government of Belgium.

These three projects focus primarily on the development of intensive mixed farming and short-cycle livestock breed.

No recent data are available for the Bandana Valley Development Project operated by SODEPRA.

A National Sheep Selection Programme was launched in 1983. It is managed by the Ministry of Animal Production and funded by FAC. The programme aims to improve the conformation and sale weight of West African dwarf sheep (Humbert, 1984).

Finally, an important meeting was organised jointly by the government and FAO in 1986 in Bouaké. The meeting followed a series of consultations in the field to define a strategy and a

plan of action for livestock development for the years 1986–2000. Several development projects were identified during the meeting. The following involve cattle and small ruminant production:

- Establishment of dairy teaching farms
- Establishment of dairy production belts
- Providing assistance in the production of veterinary vaccines
- Animal Trypanosomiasis Control Project in Côte d'Ivoire
- Mobile veterinary diagnosis units
- Extensive semi-industrial improved feeding operations
- Pilot improved feeding and finishing operation in conjunction with animal traction in cotton-producing areas
- Mini-ranch operations
- Baoulé Selection and Multiplication Centre Project.

Funds are being sought for the various projects.

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9.7 MAJOR CHANGES SINCE 1977

In 1986, Côte d'Ivoire with FAO assistance developed a strategy and plan of action for national livestock development. During that period various studies on all sectors and animal species were published. The increase in the zebu population which numbered 107 000 head in 1977 should be noted. In 1986, it was estimated at 250 000 head. The percentage of Baoulé in the trypanotolerant population, compared to N'Dama, has decreased significantly due to a lack of interest in the breed and crossbreeding with European breeds. The largest N'Dama ranch in West Africa, with 12 000 head of N'Dama, is located in Côte d'Ivoire. A dairy programme using N'Dama x Abundance crossbreeds is currently being implemented in the vicinity of some large towns.

Côte d'Ivoire has made major efforts to improve and develop its small ruminant production. A major event in the subregion was the implementation of a National Sheep Selection Programme in 1983 which has produced significant results. Improved West African dwarf breeding rams may soon be on the international market.

CHAPTER 10

GHANA

10.1 BACKGROUND

In 1984, following a reorganisation of the regions, Upper Region was divided up into Upper East Region and Upper West Region.

Recent data for the country are given in Table 1.

Table 1. Human and animal populations of Ghana, 1983 and 1984.

Human population (1984)	
– number	12 205 574
– density	51.1/km ²
Animal population(1983)	
– cattle	1 007 015
– sheep	1 554 760
– goat	1 282 677

Sources: For human population: population census office, Accra, 1984. For animal population, Veterinary Services, Ministry of Agriculture, 1985.

Between 1979 and 1983 the Government of Ghana, in collaboration with the Federal Republic of Germany, conducted a survey on tsetse distribution in the Upper and Northern Region as part of the Ghanaian–German Tsetse Fly Control Project (Taylor, 1984; Gyening, 1985).

According to the survey, *G. palpalis palpalis* and *G. tachinoides* are found in areas bordering the major rivers. However, tsetse infestation is relatively low except in areas around the Red Volta which have a high level of infestation. The two riverine species are also found in the Yendi, Tamale, Walewale and Bambilla areas in the Northern Region, and in Damongo and Bole areas, where *G. morsitans submorsitans* are also found.

10.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Table 2 gives estimates of livestock population by species and region as published by the Ministry of Agriculture for 1983.

According to these figures, the distribution of cattle remains uneven. Upper and Northern Regions account for 73.7% of the national herd and the plains of Greater Accra and Volta Regions for 18.2%.

Sheep and goats are also heavily concentrated in the north. Upper and Northern Regions account for 40% of the sheep and 40% of the goat populations.

Table 2. Livestock numbers in Ghana, 1983.

Region	Cattle		Sheep		Goats	
	Number	%	Number	%	Number	%
Upper	392 597	39.1	339 353	21.8	303 085	23.6
Northern	348 349	34.8	276 016	17.8	238 063	18.5
Brong Ahafo	37 606	3.7	312 651	20.2	274 691	21.4
Ashanti	11 248	1.2	167 060	10.7	117 399	9.2
Western	4 306	0.4	203 353	13	96 936	7.6
Eastern	20 534	2.1	185 145	12	184 529	14.3
Volta	89 407	9	—	—	—	—
Greater Accra	93 166	9.3	—	—	—	—
Total	1 002 015	100	1 554 760	100	1 282 677	100

Source: Veterinary Services, Ministry of Agriculture, 1984.

Table 3 gives the cattle, sheep and goat populations in Ghana between 1973 and 1983. According to the Table, the animal population increased at a regular rate between 1973 and 1981. In 1982, the number fell due mainly to the effects of drought.

Table 3. Livestock population, 1973–83.

Year	Cattle	Sheep	Goats
1973	729 448	906 102	744 114
1974	744 602	902 236	779 084
1975	776 608	905 767	790 428
1976	790 601	900 466	874 200
1977	823 661	1 129 850	980 742
1978	835 912	1 107 946	1 314 664
1979	857 004	1 314 664	1 303 889
1980	876 841	1 449 418	1 303 889
1981	947 112	1 672 014	1 406 970
1982	924 697	1 482 274	1 215 059
1983	1 002 015	1 553 760	1 282 677

Source: Veterinary Services Department, Ministry of Agriculture, 1984.

10.3 CATTLE

Cattle breed distribution according to region in Ghana, estimated from census figures provided by the Veterinary Services Department (1983), are given in Table 4.

Trypanotolerant cattle account for 86% of the cattle population of Ghana which is estimated at over 1 000 000 head. The Ghana Shorthorn accounts for 83% of the trypanotolerant cattle population, the N'Dama 3% and a nucleus herd of Muturu in the Western Region 0.03%.

The remainder of the national herd consists of Sanga cattle, a cross between WAS and zebu (12.4%) and zebu cattle (0.8%). Zebu (White Fulani and Sokoto Gudali types), are imported from Nigeria. Some Nellore Zebu have also been imported from Brazil.

Some state and privately owned farms still maintain some exotic breeds (Frisonne, Jersey, Hereford) from countries with temperate climates.

Table 4. Cattle number and breed distribution in Ghana, 1983.

Region	Zebus	Sanga	N'Dama	Ghana S.	Muturu	Total
Upper	3 446	39 389	8 964	344 798	–	392 597
Northern	665	11 161	6 880	330 038	–	348 744
B/Ahafo	787	2 196	3 711	39 912	–	37 606
Ashanti	838	1 484	1 534	7 392	–	11 248
Western	5	13	102	4 119	67	4 306
Central		4 286		121	–	4 407
Eastern	811	6 580	2 852	10 291	–	20 534
Volta	526	29 337	3 871	55 673	–	89 407
S/Accra	1 000	29 992	2 247	59 927	–	93 166
Total	8 078	124 438	30 161	839 271	67	1 002 015
%	0.8	12.42	3.02	83.76	0.03	100

Source: Veterinary Services Department, 1984.

Cattle production under traditional management accounts for 99.2% of the cattle population of Ghana. Only 0.8% of the cattle population is raised on ranches or research stations.

10.3.1 BREED CHARACTERISATION

The only recent data available are for the Ghana Shorthorn and the Sokoto Gudali Zebu.

10.3.1.1 GHANA SHORTHORN PRODUCTION TRAITS

Table 5 gives the major production parameters for Ghana Shorthorn maintained at the Agricultural Research station, Legon, according to Millar (1979).

Table 5. Ghana Shorthorn production parameters.

Age at first calving	47.9 ± 11.3 months (n = 33, cv = 25.7 %)
Interval between first and second calvings	18.9 ± 8.9 months (n = 27, cv = 47.1 %)
Calving intervals	16.7 ± 1.7 months (n = 82, cv = 10.2 %)
Calf mortality	109 calves, 10 pre-weaning deaths = 10 %

Source: Millar (1979).

10.3.1.1.1 Productivity index

Estimates of the major production parameters required to calculate a productivity index going total weight of one year old calves per 100 kg of cow maintained per year are given in Table 6. This index is based on data collected at the Agricultural Research Station, Legon, and on estimates.

Table 6. Ghana Shorthorn productivity estimates.

Adult cow viability	96 (a)
Calving rate (%)	71
Calf viability to one year (%)	90
Calf weight at one year (kg)	135 (a)
Productivity index per cow per year (kg)	88
Cow weight (kg)	180 (a)
Productivity index per 100-kg cow maintained per year (kg)	48.8

(a) Estimates.

Source: Index calculated by authors.

10.3.1.2 GHANAIAN SANGA

No recent data for production parameters for this breed are available.

10.3.1.3 N'DAMA

Recent data on N'Dama are not available.

10.3.1.4 WEST AFRICAN DWARF SHORTHORN

No recent data have been collected on this breed.

10.3.1.5 ZEBU PRODUCTION TRAITS

The different parameters obtained for Ghana Shorthorn were compared with those for Sokoto Gudali Zebu raised under similar conditions. The data are given in Table 7.

Table 7. Sokoto Gudali Zebu production traits.

Age at first calving	43.4 ± 7.9 months (n = 24, cv = 18.2 %)
Interval between first and second calving	17.1 ± 7.5 months (n = 27, cv = 44.1 %)
Calving interval	15.6 ± 2.4 months (n = 27, cv = 15.4 %)
Calf mortality	129 calves, 8 preweaning deaths = 6.2 %

Source: Millar (1979).

10.3.1.5.1 Productivity index

Productivity index for Sokoto Gudali Zebu based on the production traits given above and on estimates are presented in Table 8.

Table 8. Sokoto Gudali Zebu productivity estimates.

Adult cow viability (%)	95 (a)
Calving rate (%)	76
Calf viability to one year (%)	93.8
Calf weight at one year (kg)	100 (a)
Productivity index per cow per year (kg)	71.1
Cow weight	180 (a)
Productivity index/100-kg cow maintained/annum (kg)	40.6

(a) Estimates.

Source: Index calculated by authors.

10.3.2 DISEASES

Rinderpest and other endemic diseases such as contagious bovine pleuropneumonia, streptothricosis, trypanosomiasis and anthrax are under control. Gyening (1985) noted that 25 482 trypanosomiasis treatments were provided by the health unit of the Department of Veterinary Services in 1982.

10.3.3 HERD MANAGEMENT AND COMPOSITION

In the 1930s animal traction was introduced into Upper Region and used by 3000 farmers. However, with the introduction of mechanised farming in 1957, the use of draught power which was promising fell sharply.

Its use was encouraged in Pong Tamale Region in the north in 1970 when difficulties were encountered in obtaining spare parts for tractors. Assistance was provided by various missions including GTZ, with the support of the Government.

The Ghanaian German Agricultural Development Project (GGADP) was started in 1974 in the Northern and Upper Regions. In December 1979, there were 5000 farms in the Northern Region and 1000 in the Upper Region using animal traction (Munzinger, 1982; Norrip Technical Unit and Wardrop Deloitte, 1984). According to Starkey, the number of draught oxen in 1986 was estimated at 20 000 head (P H Starkey, Reading, UK, personal communication, 1986).

10.4 SHEEP AND GOATS

10.4.1 BREED CHARACTERISATION

10.4.1.1 SHEEP PRODUCTION TRAITS

Recent data for productivity performance of West African Dwarf Shorthorn (WAD) and Nungua Blackhead (NBH) are given in Table 9.

Table 9. West African Dwarf (WAD) and Nungua Blackhead (NBH) productivity traits.

	Mean	WAD standard deviation	Mean	NBH standard deviation
Fertility	0.79	0.17	0.72	0.14
Prolificacy	1.51	0.26	1.02	0.2
% of lambs surviving after weaning	0.84	0.11	0.94	0.05
Lambing % per ewe serviced	1.19	0.31	0.89	0.26
Birthweight (kg)	1.3	0.03	2.2	0.07
Weight at weaning (kg)	5.8	0.28	9.8	0.24

Source: Ngere et al (1981).

10.4.1.2 GOATS

No recent data could be obtained on goats.

10.5 RESEARCH AND DEVELOPMENT ACTIVITIES

10.5.1 RESEARCH CENTRES

The research stations of the University of Ghana, Kumasi University and Achimota Animal Research Institute continue to carry out their various research activities.

Recent data for agricultural stations of the University of Ghana are unavailable.

10.5.2 DEVELOPMENT AND MULTIPLICATION ACTIVITIES

There are no recent data on livestock numbers on State Farms, Animal Husbandry Farms, Shai Hills Ranch or ranches operated by the Ghana Livestock Company.

Of the 12 farms managed by the Animal Husbandry Service, five have ceased operation.

Artificial insemination of cattle, within the framework of development activities in breeding stations, are no longer carried out at the following research stations:

- Sogakope in Volta Region
- Pong Tamale in Northern Region
- Kasua in Greater Region.

Semen from Brahman, Droughtmaster, Bradford, Frisonne and Sahiwal breeds, imported from Kenya, was used in the three stations.

No recent data could be obtained on the livestock production aspect of the Ghanaian-German Fertilising Project.

Development activities in Northern Region are carried out by two important institutions, the Upper Region Agricultural Development Programme (URADEP) started in 1977 and the Northern Region Integrated Programme (NORRIP) launched in 1970.

URADEP aims to improve agricultural production by initiating various integrated rural development programmes in Upper Region. This body was funded by the World Bank, Britain and the Federal Republic of Germany. NORRIP, which is funded by CIDA, conducts similar activities in the Northern Region.

In 1983 the Sheep and Goat Production Development Project being implemented on Ejura Farm maintained 880 sheep and 140 goats. Most of the ewes are crossed with the Sahel breed with the aim of improving format, and distributing taller animals to village breeders. The project also aims to improve traditional livestock management in seven villages (Vallerand, 1983).

Other stations involved in sheep and goat production are The Sheep and Goat Diseases Research Station at Techiman which has 400 animals including 180 ewes and 12 goats, and the Juaso Sheep Production on Oil Palm Plantation Station, which maintains 320 sheep.

With regard to new activities, the Aveyime Cattle Breeding Project, launched in 1974 with 50 head of cattle and the assistance of the Government of Italy, was revitalised in November 1984 with funding from EEC and 1200 head of cattle. This number is expected to reach 2000 head by the end of the fifth year of the project.

Its primary objective is beef production. However, it will also be involved in intensive training and extension activities designed to help local farmers improve their beef production.

A new company, Wulugu Livestock Company established in 1980, is also involved in livestock production. Located in Northern Region, 80% of its funds are provided by the Bank of Ghana. It maintains 700 head of West African Shorthorn and its objectives are to provide rural breeding stock draught animals and assistance to traditional farmers.

In 1985, as part of its Animal Trypanosomiasis Control and Related Development Programme, an FAO Project Formulating Mission visited Ghana to assist the Ghana Government in planning "Development in Onchocercosis Freed Areas of Northern and Upper Regions" projects. Consequently, the following projects were formulated:

- Livestock Development Assistance in Onchocercosis-Freed Resettlement Areas of North Ghana
- West African Shorthorn Breeding and Selection Centre. Training and Technical Assistance Centre for the extension service of the Animal Husbandry Department (FAO, 1985).

A second FAO mission visited Ghana in 1986, to conduct feasibility studies on the second project (FAO, 1986).

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10.7 MAJOR CHANGES SINCE 1977

The livestock population increased steadily during the study period. The West African Shorthorn remains the dominant cattle breed, accounting for 84% of the total cattle population. Compared

with neighbouring countries, the zebu and zebu x Shorthorn populations have not increased in Ghana (at least until 1983, when data were last available).

The government is currently making major efforts to develop and support livestock production in the northern part of the country. With the creation of Upper West Region and the priority accorded to it in development activities, a programme to improve and develop the West African Shorthorn should be introduced shortly. The programme would trigger awareness among producers about the need to conserve their animals as pure breeds and improve their format to meet the increasing demand for draught animals.

CHAPTER 11

TOGO

11.1 BACKGROUND

The Ministry of Rural Development is still responsible for eight Directorates. Three of which are concerned with animal production. These are the General Directorate of Rural Development, the Directorate for Animal Production and the Avetonou Research and Animal Production Centre (CREAT) are concerned with livestock production. The Veterinary Services and Animal Health Directorate remain under the Ministry of Rural Development.

Data on human and animal populations for the country are given in Table 1.

Table 1. Human and animal populations of Togo, 1984 and 1985.

Human population (1985)	
- number	3 015 000
- density	53.1/km ²
Animal population (1984)	
- cattle	246 893
- sheep	620 772
- goats	734 937

Sources: For human population: projections (+ 2.8%) for 1985 based on 1981 census figures.

For animal population: 1984 estimates, Directorate of Veterinary Services and Animal Health.

According to a Tsetse Distribution Survey conducted by Mawuena in Southern Togo (Mawuena, 1981), *G. tachinoides* is found up to its southern distribution boundary at 645' latitude North (near Avetonou) and *G. palpalis palpalis* as far down as the coast (615' N). As far as the *morsitans* group is concerned, *G. longipalpis* was trapped only at Egbi, near Avetonou.

11.2 LIVESTOCK NUMBERS AND DISTRIBUTION

The distribution of livestock in the five regions is shown in Table 2.1. The cattle population is concentrated largely in the north, with Savanes and Kara Regions accounting for 70% of the national herd.

Table 2.1 Cattle distribution in Togo, 1984.

Regions	Total numbers	% of national herd	Stocking density/km ²
Savanes	82 234	33.4	9.5
Kara	71 586	29.0	15.9
Centre	36 500	14.8	1.8
Plateaux	41 711	16.8	2.4
Maritime	14 862	6.0	2.1
Total	246 893	100	4.3

Source: Directorate of Veterinary and Animal Health Services (Direction des services vétérinaires et de la santé animale), 1984.

The distribution of sheep and goats in the five regions is given in Table 2.2. The Table indicates that there are seven times as many small ruminants as cattle in the country, concentrated mainly in the Savanes and Maritime Regions.

Table 2.2 Sheep and goat distribution in Togo, 1984.

Region	Total numbers	Sheep stocking density hd/km ²	Numbers	% of national herd	Goats numbers	% of national herd
Savanes	260 220	30	138 677	22.1	121 543	16.6
Kara	125 791	27.9	67 413	10.9	58 378	7.9
Centre	219 300	10.9	101 300	16.4	118 000	16.1
Plateaux	242 898	14.4	114 882	18.6	128 016	17.4
Maritime	507 500	74	198 500	32.0	309 000	42
Total	1 355 709	23.8	620 772	100	734 937	100

Source: Directorate of Veterinary and Animal Health Services (1984).

11.3 CATTLE

11.3.1 BREED CHARACTERISATION

In 1984, the trypanotolerant cattle population of Togo was 242 000 head comprising 5000 N'Dama, 158 000 Somba, 2500 Lagune and 76 500 Borgou. Exotic breeds such as German Brown, German Yellow, Gir and Guzen Zebu have either disappeared or are disappearing.

11.3.1.1 LAGUNE

Recent data collected on the measurements of this breed in Maritime Region (Agbemelo, 1983) are given in Table 3.

Table 3. Measurements of Lagune by age class and sex.

		Height at withers	Chest girth	Scapulo-ischial length
1-2 years	Male (n=20)	86.20 ± 2.54	106.05 ± 5.73	95.50 ± 4.18
	Female (n=25)	82.18 ± 2.5	102.48 ± 4.37	91.88 ± 3.45
2-3 years	Male (n=13)	91.15 ± 2.95	111.30 ± 4.2	99.10 ± 5.48
	Female (n=39)	89.38 ± 2.27	103.54 ± 3.82	93.87 ± 3.14
3-4 years	Male (n=13)	93.66 ± 2.1	125.07 ± 3.83	110.36 ± 2.94
	Female (n=27)	92.0 ± 1.52	121.81 ± 2.62	105.55 ± 3.25
>4 years	Male (n=8)	99.12 ± 2.15	137.25 ± 8.95	121.37 ± 6.13
	Female	96.38 ± 0.89	132.65 ± 0.99	119.20 ± 1.29

Source: Agbemelo (1983).

11.3.1.1.1 Production traits

Table 4 gives some production parameters for cattle raised under traditional management recorded by Agbemelo (1983) in Maritime Region. Standard deviations are not given and the values should therefore be taken as examples.

Table 4. Lagune production traits.

Fecundity rate (%) (n = 54)	43
Age at first calving (year)	3.5-4
Calving interval (months)	24
Male calf mortality rate (%)	37.9
Female calf mortality rate (%)	31.4
Heifer mortality rate (%)	0.85
Adult mortality rate (%)	1.21
Daily milk yield (kg) (n = 23)	1.5
– during a 225-day lactation period	295.3
Weight of animals (kg)	
1 to 2 years old (n = 53)	96
2 to 3 years old (n = 120)	111
3 to 4 years old (n = 130)	157
4 to 8 years old (n = 191)	209

Source: Agbemelo (1983).

11.3.1.1.2 Productivity index

Table 5 summarises estimates of the main production traits required to build up a productivity index based on total weight of one year old calves per 100 kg of cow maintained per annum. The index is calculated from data given above and from estimates.

Table 5. Lagune productivity estimates under village conditions.

Cow viability (%)	98 (a)
Calving rate (%)	43
Calf viability to one year (%)	66 (a)
Calf weight at one year (kg)	96
Productivity index per cow per year (kg)	27.5
Cow weight (kg)	157
Productivity index per 100-kg cow maintained per year (kg)	17.5

(a) Estimates.

Source: Index calculated by authors.

11.3.1.2 SOMBA

Tables 6, 7, 8, 9 and 11 contain data for fecundity and mortality rates and calf weight gain for Somba maintained at CREAT. Avegan (1984) collected data on Somba cow milk production on 25 animals. Total milk yield over a lactation period of 143 ± 6 days was 228.5 ± 22.4 kg.

11.3.1.3 BORGOU

No recent data on Borgou production traits are available.

11.3.1.4 N'DAMA PRODUCTION TRAITS

Data collected at CREAT in 1981 for N'Dama fecundity and mortality rates are given in Table 6 and compared with data for Somba and zebu raised under station conditions.

Table 6. N'Dama, Somba and zebu fecundity and mortality rates under station conditions.

	N'Dama	Somba	Zebu
Fecundity rate (%)	45	72	33
Mortality rate (%)			
0 to 1-year-old calves	13.4	12.9	8.3
0 to 2-year-old calves	7.4	15.2	10.5
Adult cows	0.9	1.9	3.5

Source: Grell et al (1982a).

According to Grell et al (1982a) mean calf weights for N'Dama, Somba and zebu are 108, 106 and 130 kg, respectively.

The main results obtained for weight changes and annual gain for female N'Dama, Somba and zebu studied at CREAT are given in Table 7. The Table indicates that Somba and N'Dama weight gains are higher than that of zebu.

Table 7. Weight changes and annual weight gain of N'Dama, Somba and zebu under station conditions.

Age group years	N'Dama			Somba		Zebu	
	(%)	(1)n	kg	n	kg	n	kg
2-3	15	1574	168	58	164	62	197
4-5	15	251	235	25	253	16	246
5 and over	55	204	260	81	262	91	262
Average weight			236		240		244
Weight gain							
2-3 years			48		57		25
3-4 years			19		32		24
4-5 years			25		9		16
Average weight gain/head			13.8		14.7		9.3
" " " /TLU			14.6		15.3		10.0

(1) = Number of weighings.

Source: Grell et al (1982a).

Grell et al (1982b) also studied the weight changes of N'Dama and Somba at the Research and Livestock Breeding Centre at Avetonou. The results are given in Table 8.

Table 8. Weight changes of N'Dama and Somba at CREAT (kg).

	N'Dama			Somba		
	n	\bar{x}	$\frac{s}{x}$	n	\bar{x}	$\frac{s}{x}$
Birthweight	1133	21.2	5.6	104	21.4	5.1
Weight at 120 days (1)	470	67.7	16.1	22	76.0	13.2
Weight at weaning	882	102.2	22.5	58	118.4	28.8
Weight at 360 days (1)	596	106.5	21.4	28	117.1	19.1
Weight at 720 days (1)	455	175.5	32.0	13	167.8	35.6

(1) Weight adjusted for age, based on average daily weight gain between two consecutive weighings.

Source: Grell et al (1982b).

Rudenaucr (1982) studied the effect of various types of pasture on N'Dama productivity. The main results of the study, given in Table 9, indicate that the net weight gain and daily weight gain of N'Dama on *Panicum/Cenrosema* are higher than that of N'Dama on natural pastures.

Table 9. N'Dama productivity by station and type of pasture.

	Natural pasture	<i>Panicum/Cenrosema</i>
Initial weight (kg) at 330 days	112.87	109.11
Final weight at 974 days	214.05	288.3
Net weight gain (kg)	101.18	160.6
Average daily weight gain (g/d)	157.1	249.4

Source: Rudenaucr (1982).

11.3.1.4.1 Productivity index

Productivity index for N'Dama, Somba and Zebu under station conditions calculated from production parameters collected at CREAT in 1981 are given in Table 10. According to the Table, productivity indices for N'Dama and Somba are higher than those of zebu.

Table 10. Productivity estimates for N'Dama, Somba and zebu under station conditions.

Parameter	Breeds		
	N'Dama	Somba	Zebu
Cow viability (%)	98.1	97.1	98.3
Calving percentage (%)	61	60	33
Calf viability to one year (%)	94.9	87	92.1
Calf weight at one year (kg)	109.9	142.3	163.4
Productivity index per cow per year (%)	64.2	75.3	50
Cow weight (kg)	236	240	244
Productivity index per 100-kg of cow maintained per year	27.2	31.4	20.5

Source: Grell et al (1982a).

11.3.1.5 WAKWA CROSSES

No recent data could be obtained for this breed.

11.3.1.6 BAOULE

Morkramer and Dekpo (1984) studied the production traits of a herd of Baoulé purchased from Côte d'Ivoire in 1979 and raised under station conditions at the Research and Breeding Centre.

Table 11 shows estimates for the main parameters required to calculate a productivity index giving the total weight of one-year-old calves per 100 kg of cow raised per year. The results obtained for this herd cannot be compared with those given in Table 10.

Table 11. Cattle productivity estimates for Baoulé maintained at CREAT.

Cow viability (%)	99.1
Calving percentage (%)	61
Calf viability to one year (%)	92.4
Calf weight at one year (kg)	77.8
Productivity index per cow per year (kg)	43.5
Cow weight (kg)	
Productivity index per 100-kg cow maintained per year (kg)	25.3

Source: Morkramer and Dekpo (1984).

11.3.1.7 ZEBU

In Tables 6, 7 and 10, data on zebu production traits were compared with those for other breeds.

11.3.2 DISEASES

A detailed report on the disease situation in Togo was prepared by an FAO preparatory assistance mission to Togo in 1981 (FAO, 1981).

A contagious bovine pleuropneumonia vaccination campaign was conducted between 1972 and 1975 in Savanes, Kara and Central Regions during which infected animals were eliminated. Since 1975, some combined pleuropneumonia-rinderpest vaccinations have been given, particularly since an emergency rinderpest campaign was launched in 1980 with the assistance of FED and FAO.

A recent serological survey on the scope of brucellosis indicated that 41% of the national herd was infected.

Trypanosomiasis is still endemic in Togo.

11.3.3 HERD MANAGEMENT AND COMPOSITION

In 1983, the Project on the Development of Cattle Breeding in Plateaux and Central Regions maintained an estimated 400 head of cattle, including 129 draught animals, in various centres. Between January and September 1983, it supplied various bodies with 836 draught animals.

In 1984, there were 4195 pairs of draught oxen in the country. Distribution by region is given in Table 12.

Table 12. Distribution of draught oxen in Togo, 1984.

Region	Number of pairs	%
Savanes	3214	76.6
Kara	637	15.2
Central	257	6.1
Plateaux	55	1.3
Maritime	32	0.8
Total	4195	100

Source: Poats et al (1985).

11.4 SHEEP AND GOATS

11.4.1 BREED DESCRIPTION

11.4.1.1 SHEEP PRODUCTION TRAITS

Defly et al (1982) reported a fecundity rate of 90% and a mortality rate of 40% for 0-1 year old lambs and 10% for lambs over 1 year under village conditions. Weights at birth, 1 month, 4 months and adulthood were 1.6, 4.4, 15 and 18 kg, respectively, for females and 2, 5.3, 18 and 26 kg for males.

Data collected by Amegee (1984) at the Agricultural College Farm are given in Table 13. The Table compares production parameters for West African dwarf and Vogan sheep.

Table 13 indicates that the West African dwarf sheep is more prolific than the Vogan. However, milk yield and birthweight of the Vogan are higher.

Table 13. West African dwarf and Vogan production traits.

	West African dwarf	Vogan
Prolificity rate (%)	148.4	145.5
Lambing interval (months)	7.3	7.6
Overall mortality rate (%)	20	25
Birthweight(kg)		
Single litter – males	1.7	2.7
– females	1.6	2.6
Twin litter – males	1.5	2.5
– females	1.3	2.3
Milk yield (kg)		
Ewe with one lamb	57.4 (in 105 d)	122 (in 124 d)
Ewe with two lambs	86.4 (in 112 d)	184 (in 139 d)

Source: Amegee (1984).

In 1984, the “Togo North” project collected data on production traits of 43 flocks with a total of 14 477 sheep. The results, according to flock management system, appear in Table 14.

Table 14. Production traits for West African dwarf sheep according to flock management system.

Flock management system	Production traits				
	C	IT	ECS	PES	I
Annual fecundity rate (%)	120	127	152	148	163
Mortality rate for 0–1 year old (%)	56	29	25	22	15
Adult mortality rate (%)	14	16	5.5	4.6	1.5

(1) T : Control system

IT : Improved traditional management system (preventive and curative treatments, improved housing)

ECS : Extensive communal management system

PES : Extensive individual management system

I : Intensive management system - artificial pastures, night pens, servicing by selected rams.

Source: van Vlaenderen (1984).

11.4.1.1.1 Productivity index

Table 15 summarises estimates for the main production parameters required to calculate a productivity index giving the total birthweight of five-month-old lambs produced per 10 kg of ewe maintained per year. This index is based on data collected under village conditions in an area of low to moderate trypanosomiasis risk.

Table 15. Productivity estimates for West African dwarf sheep under traditional management.

Ewe viability (%)	94.5
Lambing rate (%)	152
Lamb viability to one year (%)	75
Lamb weight at 5 months (kg)	15
Productivity index per ewe per year (kg)	17.6
Ewe weight (kg)	23
Productivity index per 10-kg ewe maintained per year(kg)	7.6

Source: Index calculated by authors.

11.4.1.2 GOAT PRODUCTION TRAITS

Defly et al (1982) compared various production parameters for West African Dwarf goats under traditional management with those obtained under improved management conditions. Table 16 gives the main results of the study.

Table 16. West African Dwarf goat production traits under traditional management and improved management.

Parameter	Traditional management	Improved management
Kidding rate (%)	150	180
Age at first kidding (months)	20	18
Average kidding interval (months)	12	10
Mortality rate (%) 0-1 year	45	15
over one year	15	10
Weight (kg) of females at birth	1.0	-
" " 1 month	3.0	-
" " 4 months	8.5	-
" " 6 months	10.0	-
Ewe weight:	14.0	-
Weight of males at birth	1.5	-
" " 1 month	4.0	-
" " 4 months	11.7	-
" " 6 months	12.0	-
" " maturity	17.0	-

Source: Defly et al (1982).

Amegbe (1984) recorded an estimated prolificacy rate of 169.6%, and an overall mortality rate of 30%. Birthweights for single- and twin-litter males were 1.16 and 1.14 kg, respectively, and for single- and twin-litter females 1.07 and 0.97 kg, respectively.

11.4.1.2.1 Productivity index

Table 17 shows estimates for production parameters required to calculate a productivity index giving the total weight of five-month-old kids produced per 10 kg of she-goat maintained per year. The index is based on data collected under improved management conditions in areas of low to average tsetse challenge areas.

Table 17. Estimates for West African Dwarf goat productivity maintained under improved management.

Female goat viability (%)	90
Kidding rate (%)	180
Kid viability to one year (%)	85
Kid weight at 5 months (kg)	10
Productivity index per female goat per year (kg)	16.1
Female goat weight (kg)	20 (a)
Productivity index per 10-kg female goat maintained per year (kg)	8

(a) Estimate.

Source: Index calculated by authors.

11.4.2 DISEASES

PPR is still endemic and a major problem particularly in Maritime Region. The disease is rapidly fatal in young animals and the constraint to small ruminant production justifies the need for regular vaccination campaigns (FAO, 1981).

Numerous parasitic diseases such as helminthiasis and coccidiosis mange bloodsucking ectoparasites (ticks and fleas) also pose major problems (FAO, 1984).

In 1982–83, as part of the Atakpamé Small Ruminants Project, 200 219 internal deworming treatments and 77 444 external deworming treatments 121 974 vaccinations against peste des petits ruminants (Pessinaba, 1984).

Mawuena (1985) showed that although West African dwarf sheep and goats are trypanotolerant, their survival in the tsetse-infested areas, especially in highly infested areas, is at the cost of their health. *T. vivax* infection caused anaemia, delayed growth or weight loss.

A study carried out at Sokode showed that 5.9% of sheep and 6.5% of goats were infected by *Trypanosoma* (ILCA, 1986).

11.5 RESEARCH AND DEVELOPMENT ACTIVITIES

11.5.1 RESEARCH CENTRES

The two research centres mentioned in Volume 2 of this study continue their work on trypanotolerant livestock in Togo. Their activities are described in Table 18.

Table 18. Research centres.

Name	Avetonou Livestock Production and Research Centre
Location	Avetonou, 100 km from Lomé
Breeds and numbers	2190 head comprised of 1035 N'Dama, 487 local breed, 213 zebu, 107 Baoulé and 384 crossbreeds (as at 31/3/86)
Objectives	Research on the selection of N'dama, trypanotolerance heritability, the effect of supplementary feed and lysozymes on trypanotolerant cattle will continue till 1988. New objectives are crossbreeding between the local N'Dama, zebu and Somba; distribution of draught animals and continuous experiments extension work
External aid	GTZ
Name	Agricultural College
Organisation responsible	University of Benin
Objectives	Improvement of different food crop varieties in Togo combined with sheep production.

Sources: Assogbakpe (1985); CREAT/GTZ (1986).

As part of the activities of the African Trypanotolerant Livestock Network and in collaboration with ILCA and ILRAD, CREAT carries out studies in Avetonou and at the Regional Directorate for Rural Development, Sokodo Central Region, on trypanotolerant cattle production traits and productivity, trypanosoma infection rate and tsetse infestation rate (ILCA, 1986).

11.5.2 MULTIPLICATION HERDS

A number of stations in the country maintain small herds of cattle, sheep and goats. The most recent on these data stations are given in Table 19.

Table 19. Multiplication herds.

Name	Adele ranch
Size	60 000 ha of which 56 000 are usable; stocking rate of 15 606 TLU
Breeds and numbers	2734 Somba and N'Dama in 1986
Objectives	Improving the local breed through the use of N'Dama bulls. Crossbreeding programme to produce 7300 pairs of draught oxen in 20 years. Introduction of crossbreds into the traditional livestock production system
External aid	EEC
Name	Borgou ranch
Location	Savanes Region
Size	48 700 ha
Breeds and numbers	Capacity for 15 000 head. The ranch has not yet commenced operations
Objectives	Somba and N'Dama crossbreeding programme Introduction of crossbreds obtained in the traditional system to improve the stock.
External aid	Undetermined
Name	Dako ranch
Location	Central Region
Size	23 500 ha
Breeds and numbers	Capacity for 5000 head of which 2000 will be obtained from Borgou ranch, 2000 from village herds and 1000 produced on the ranch itself. The ranch has not yet commenced operations
Objectives	Production of beef cattle, distribution of draught animals and Shorthorn crosses
External aid	To be decided
Name	"Béna Development" ranch. Germano-Togolese Mixed Economy Company established in 1972
Size	130 developed hectares
Numbers	The ranch has a sheep farm and in 1984 maintained a herd of 1290 head of cattle
Objectives	Production and marketing of ranch produce
Name	Kolokopé Station
Numbers	Estimated at 1994 sheep in 1986, of which 1267 were ewes and 727 were rams
Size	125 ha
Objective	Multiplication, selection and introduction under traditional production system
External aid	FAC

Source: Vallerand (1983); Addeh (1985); Lopez (1986).

Data on other small multiplication centres are given in Table 20.

Table 20. Other multiplication centres.

Name	Situation	Remarks
Nassablé Station	Savanna Region	54 N'Dama
Na Station	Central Region	Local breed
Dzogbegan Monastery	Dayes Region	Local breed and 66 Wakwa crossbreds
Dayes-Apeyiné Centre	Plateau Region	Local breed
Tove Agricultural Institute	"	30 N'Dama
Adeta Multipurpose Centre	"	Local breed

Source: Directorate of Veterinary and Animal Health Services (1984).

11.5.3 DEVELOPMENT PROJECTS

The following development projects are in progress in Togo:

- The "North Togo Integrated Development Programme to extend work oxen production and constitute a cattle and small ruminants herd traditional farmers to supply with nucleus herds. Phase 3 of this project is currently being implemented (1981–1986). Funding is provided by UNDP. A small ruminant development project undertaken as part of an FAO technical Cooperation Programme was integrated into the above project in 1981.
- Work oxen development project (PROPTA, formerly PRODEBO). This project was begun in 1977 to coordinate all national work oxen activities. Its objective is to train 6000 pairs of oxen and supply other centres with work oxen and draught equipment. It also provides training for trainers from institutions involved in work oxen and supplies other projects with veterinary products.
- "Small Ruminants" Project. This project was launched in 1980 with funding provided by EEC to set up The Kolokopé Support Centre. Its activities, particularly in the field of animal health, were strengthened in 1985 with funds provided by USAID. A research and extension component was introduced in 1983 at Kolokopé Station. This component will be funded by FAC till 1987.

Recent data on the Agricultural Pilot Project are unavailable.

A preparatory FAO assistance mission to the Togolese Government (FAO, 1981) identified three livestock development projects:

- Strengthening Veterinary services by setting up diagnostic laboratories and a veterinary pharmacy
- Establishment of a national work oxen support centre
- Livestock products marketing improvement programme.

However, funding is still being sought for the above projects.

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11.7 MAJOR CHANGES SINCE 1977

The cattle population increased slightly during the study period while the goat population remained stagnant and the sheep population dropped significantly (-22%).

Cattle production developed much more rapidly in Kara region and the population doubled between 1976 and 1984. However, there was no significant change in the distribution by breed. The most significant changes are in the numbers of Lagune which continue to decrease

and of Borgou, which increased slightly compared to other breeds. Comprehensive data on the performance of the Lagune under village conditions were collected and analysed in 1983.

The most spectacular results obtained during the past 10 years were in the development of work oxen and in the support to, and improvement of sheep production.

The CREAT's mandate was recently reviewed and the emphasis is currently on the production of work oxen and no longer on trypanotolerance. The 10-year research programme on trypanotolerance heritability will continue into 1988 in order to complete the 10 years initially planned.

CHAPTER 12

BENIN

12.1 BACKGROUND

Following the last cabinet reshuffling in 1984 resulted the Ministry of State Farms, Livestock Production and Fisheries created in 1980 and charge of Livestock Production, Water Resources, Forestry and Hunting, Fisheries and State Farms, was reintegrated into the Ministry of Rural Development and Cooperative Action (MDRAC) of which it was originally a part.

SODERA (Animal Resources Development Company) was dissolved in 1984 and its operations taken over by two new structures:

- The Directorate of State Farms a new department was created with the same status as the Directorate of Livestock Production and Fisheries.
- OBEPEP (Benin Office for the Management of Livestock and Fisheries Products) was also set up.

The National Directorate of Livestock Production and Animal Industries which is under the MDRAC was recently transferred from Parakou to Cotonou. A Trypanosomiasis Division has been created within this Directorate.

Livestock production services are provided in the six administrative regions of the country by the Livestock Production and Animal Industries Divisions (DEIA). DEIA heads were deployed in Regional Action Centres (CARDER) set up by the Ministry of Rural Development in 1975. The CARDER are involved in all activities relating to regional livestock production, agriculture, water resources and forestry, fisheries and packaging (Cotjia, 1984; Assogbakpe, 1985).

Livestock production zones were recently created in each province with the supervision of DEIA staff.

Data for human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Benin, 1984.

Human population (1984)	
- number	3 833 000
- density	34/km ²
Animal population (1984)	
- cattle	922 000
- sheep	1 242 900
- goats	1 093 200

Source: For human population projections (+ 2.8%) from 1979 census. For animal population, 1983/84 estimates by the Livestock Production Service (quoted by Assogbakpe, 1985).

No survey on tsetse distribution has been conducted since 1978. However, *Glossina fuscipleuris* is found in the south-east region near Porto Novo (Cotjia, personal communications, 1986).

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12.2 LIVESTOCK NUMBERS AND DISTRIBUTION

The livestock population of the six provinces in 1983/84 are given in Table 2.

Table 2. Livestock numbers and distribution, 1983/84.

Province	Cattle		Sheep		Goats	
	Numbers	% (*)	Numbers	% (*)	Numbers	% (*)
Borgou	600 000	65	571 900	46	364 900	33.4
Atacora	215 000	23.3	222 600	18	260 000	23.6
Zou	60 000	6.5	253 000	20.3	244 000	22.3
Ouémé	23 000	2.5	81 500	6.5	94 200	8.5
Atlantic	15 000	1.7	18 600	1.5	40 100	3.7
Mono	9 000	1	95 300	7.7	90 000	8.5
Total	922 000	100	1 242 900	100	1 093 200	100

(*) Percentage of national herd.

Source: Livestock Production Departments, 1983/84 estimates.

Cattle distribution by breed, according to data provided by the Ministry of Rural Development and Cooperative Action is shown in Table 3.

Table 3. Livestock breeds and numbers by region, 1983/84.

Provinces	N'Dama	Lagune	Somba	Borgou	Zebu	Crosses		
						L x B	S x B	Z x B
Borgou		-	-	30%	25%	-	-	45%
Atacora		-	26.8%	54.8%	1.4%	5.8%		11.2%
Zou		15%	-	15%	5%	65%	-	-
Ouémé		40%	-	35%	25%	-	-	-
Atlantic		80%	-	-	-	-	20%	-
Mono		80%	-	10%	2%	8%	-	-
Total	500	37 500	58 000	316 000	162 000		348 000	

Source: FAO (1986).

In 1984, there were an estimated 760 000 head of trypanotolerant cattle in the People's Republic of Benin. However, they are gradually being absorbed by zebu.

The largest group are the crossbreds, 30% of which are N'Dama x Borgou crossbreds.

The distribution of cattle breeds in Benin is undergoing profound changes and the number of zebu x Borgou crossbreds given in Table 3 is certainly grossly underestimated. In fact, several cattle owners have complained that pure Borgou bulls can no longer be found.

12.3 CATTLE

12.3.1 BREED DESCRIPTION

12.3.1.1 LAGUNE PRODUCTION TRAITS

Data on production traits for Lagune maintained under village conditions were collected in 1984 and compared with those obtained under improved management conditions. The results appear in Table 4.

Table 4. Lagune production traits under traditional management and under improved conditions.

	Traditional management	Improved management
Age at first calving	36–48 months (a)	24–36 months (a)
Fecundity rate	35–45%	58%
Calving interval	730 d(a)	365 d(a)
Mortality rate (year)	7%	5%
Birthweight		
– female	12 kg	11 kg
– male	10 kg	10 kg
Weaning weight (14 m) female	45–50 kg	85 kg
(12 m) male	34–40 kg	83 kg
Mature weight	120 kg	152 kg
Liveweight at slaughter	120–150 kg	

(a) Estimates.

Source: Samiondji Farm (1984).

Sintondji (1984) indicates an age at first calving (calculated for 17 cows) of 29 months and 3 days, a calving interval of 13 months and 18 days (based on 25 females and 60 calving intervals).

12.3.1.1.1 Productivity index

Table 5 gives estimates of the main production parameters required to calculate a productivity index giving the total weight of 1-year-old calves per 100 kg of cow maintained per year. This index is computed from data collected under village conditions and given in Table 4 and data from Samiondji Farm (Annual Report, 1984).

Table 5. Lagune productivity estimates under traditional management and station conditions.

	T	I(a)
Cow viability (%)	95 (b)	94
Calving rate (%)	45	45
Calf viability to 1 year (%)	93	78
Calf weight at 1 year (kg)	40	85.2
Productivity index per cow per year (kg)	17.2	30.8
Cow weight (kg)	120	152
Productivity index per 100-kg cow maintained per year (kg)	14.3	20.3

(a) T = Traditional management system; I = Improved conditions.

(b) Estimate.

Source: Index calculated by authors.

12.3.1.2 SOMBA

In 1984, Boukoumbe region, the original area of the Somba breed had an estimated 17 000 head of pure Somba. However, there is a high risk of crossbreeding with zebu and Borgou.

Monitoring control herds in Atacora by the Benin Project for the Rural Development of Atacora, launched in 1983, herds in Atacora. The Livestock should result in the future in availability of data on the productivity of this race. Currently, the Livestock PRoduction Department in Atocara Province has no data on this breed.

12.3.1.3 BORGOU

The number of pure Borgou is gradually decreasing.

The breed is a stabilised cross between the West African Shorthorn and the zebu. It still retains its coat colour and outward characteristics. However, with the gradual infusion of zebu blood, there is a risk that the Borgou may lose its characteristics and in particular, its trypanotolerance trait.

12.3.1.3.1 Production traits

Auer (1983/1984) reported an age at first calving of 50 months, calving interval of 20 months, and an estimated milk yield of 500 g/d for pure Borgou. Estimated weight at various ages, calculated from measurements, is given in Table 6. The data are for control herds in Atacora.

Table 6. Estimated weight of Borgou under traditional management from their measurements.

	Females		Males		Total	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
1 year	5	79	7	79	12	79
5 years	12	184	91	190	103	190
10 years	1	157	48	199	49	188

Source: Auer (1983/84).

12.3.1.3.2. Productivity index

Table 7 summarises the estimates of the main production traits required to compute a productivity index giving total weight of 1-year-old calves per 100-kg cow per year. This productivity index is calculated from data collected at M'Bétécoucou Ranch (Lopez, 1985).

Table 7. Borgou production traits, M'Bétécoucou ranch.

Cow viability (%)	96.7
Calving rate (%)	70.2
Calf viability to 1 year (%)	95
Calf weight to 1 year (kg)	110 (a)
Productivity index per cow per year (kg)	74.5
Cow weight (kg)	225
Productivity index per 100-kg cow maintained per year (kg)	33.2

(a) Estimate.

Source: Index calculated by authors.

12.3.1.4 PABLI

It appears that this breed is extinct.

12.3.1.5 CROSSBREDS

The number of crossbreds in the total cattle population of Benin is increasing. In descending order of importance, this group includes zebu x Borgou, Borgou x Somba and Borgou or zebu x Lagune crossbreds.

Producers are currently interested in having larger-framed draught animals through increased crossbreeding.

12.3.1.5.1 Performance traits

Lagune x Borgou productivity estimates obtained during a livestock production monitoring exercise of 15 control herds totalling 754 head are given in Table 8 (Auer and Auer, 1982).

Table 8. Lagune x Borgou production estimates under village conditions.

Age at first calving (n=316)	54 months (41-64)
Calving interval (n=523)	19 months (13-27)
Fecundity rate	63 %
Female calf mortality rate	45 %
Male calf mortality rate	55 %
Adult mortality rate	15 %
Calf birthweight	8 kg
Culled cow weight (at 13 years)	179 kg
Weight of 3-year-old steers	136 kg
Milk yield	200-500 g/d

Source: Auer and Auer (1982).

FAO (1986) reported a fecundity rate of 100% for 20 zebu x Borgou cows maintained at the Etoile Monastery. Daily milk yield was estimated at 1.25 kg per cow and young bull weight at 15 months at 180 kg. These animals are given trypanocidal treatment and a supplement of mineral salts, yam, cassava and brewer's dregs.

12.3.2 DISEASES

A detailed description of the disease situation was given in the report of an FAO (1981) Preparatory Assistance mission to the Republic of Benin. Rinderpest and contagious bovine pleuropneumonia are a threat in some provinces. Pasteurellosis is endemic. Blackquarter is reported mainly in Borgou.

Streptothricosis, tuberculosis and foot-and-mouth disease have also been reported.

Examinations carried out by Carder Diagnostic Laboratory at Atacora indicate that the rate of infestation by tick borne parasites (babesia and trypanosoma), strongylus, paramphistoman and coccidia is high for some herds (MDRAC, 1986).

Trypanosomiasis is widespread in the north and south of the country. In 1984, a total of 39 outbreaks were reported in Mono Province (FAO, 1986).

12.3.3 HERD MANAGEMENT AND COMPOSITION

The different livestock management systems are described in detail in the report on the National Technical Round Table on Trypanotolerant Cattle Production in Benin (MDRAC, 1986). In Benin, 99.4% of livestock are produced in the traditional management system and 0.6% on ranches or in research stations.

Production systems vary, depending on the region. In Atacora in the northeast of Benin, transhumance is practised for six months of the year. A semi-sedentary production system is found in the south. In Borgou, the system is semi-sedentary while in Zou Ouémé, Mono and Atlantic Regions the system is sedentary.

Compared to this internal transhumance by national producers within the country external transhumance (by producers from neighbouring countries) is practised on a relatively large scale. An estimated 40 000 head of transhumant cattle (between 5000 and 10 000 in Atacora province alone) entered Benin in 1981. This type of transhumance partly accounts for the increase in crossbreeding between local breeds and zebu and the gradual disappearance of local trypanotolerant cattle breeds. The work oxen programme stagnated in 1975 following a promising start in 1965. It was revitalised in 1980 with funding provided by the World Bank of Carder Borgou and in particular, of its activities on animal traction.

The number of work oxen was estimated at 15 206 teams in 1984. It is envisaged that 18 000 teams would have been trained by 1986 (FAO, 1986).

A survey on herd composition was conducted in Zou Province in 1982 (Auer and Auer, 1982). The results are given in Table 9.

Table 9. Herd composition in Zou Province (%).

Females		Males	
Calves	13	Calves	11
Heifers	22	Steers	11
Cows	37	Bulls	6
Total	72	Total	28

Source: Auer and Auer (1982).

12.4 SHEEP AND GOATS

12.4.1 BREED CHARACTERISATION

The health component of the USAID Livestock Development Project has been completed. A Livestock Production Study Project (Phase II) is planned to collect new data on small ruminants production parameters.

12.4.2 DISEASES

Peste des petits ruminants is very frequent and routine vaccination against the disease is necessary in places of occurrence.

12.5 RESEARCH AND DEVELOPMENT ACTIVITIES

12.5.1 RESEARCH CENTRES

A veterinary and livestock research laboratory has been set up in Agoukanmey, about 10 km from Cotonou. A unit of the laboratory at Niouli, 80 km from Cotonou, carries out research on forages.

The activities of the laboratory are currently limited to the study of local and imported exotic poultry breeds. However, a study of small ruminants performances is envisaged.

There are two diagnostic laboratories in Benin, one of which is located in Natitingou. It is under CARDER Atacora (Atacora Integrated Rural Development Project and Atacora Livestock Production Development Project). The laboratory includes bacteriology, parasitology and serology units, a tsetse control research unit and a mobile support clinic which monitors control cattle herds (MDRAC, 1986).

The other laboratory, located in Cotonou, Atlantic Province, carries out blood and faecal examinations.

Bohicon Laboratory is temporarily closed.

12.5.2 MULTIPLICATION HERDS

Current information on the main ranches and breeding stations in the Republic of Benin are given in Table 10.

Table 10. Multiplication herds.

Okpara Breeding Centre	
Organisation responsible	Directorate of State Farms (MDRAC)
Breeds and numbers	330 Borgou and 135 N'Dama (1986)
Objectives	Quarantine area for animals en route to Kpinnou.
External aid	Self-funding
Sékou Agricultural Secondary school	
Organisation responsible	Ministry of Middle and Higher Education
Breeds and numbers	119 Borgou x Lagune crossbreds and Lagune (1986). The Alpine Brown has disappeared.
Kpinnou Farm	
Organisation responsible	Directorate of State Farms (MDRAC)
Size	440 ha (300 in use)
Breeds and numbers	161 Borgou, 35 Lagune, 395 pigs (1986)
Objectives	Feedlot for Borgou (from Samiondji) Pig production for selection and distribution to village breeders
External aid	ADB till end of 1985. New funding sources are being sought.
M'Bétécoucou Station	
Organisation responsible	Directorate of State Farms (MDRAC)
Size	20 000 ha (1000 ha in use)
Breeds and numbers	1392 Borgou (1986)
External aid	ADB till end of 1986. Funding sources are being sought.
Samiondji Station	
Organisation responsible	Directorate of State Farms (MDRAC)
Size	15 000 ha (9000 ha in use)
Breeds and numbers	503 Lagune, 182 Borgou, 69 Méré (1986)
External aid	ADB till end of 1986. ADB funding for a second phase.

Source: FAO (1986).

12.5.3 DEVELOPMENT PROJECTS

Information on the various development projects being implemented is given in Table 11.

Table 11. Development projects.

SONICOG (National oil and soap processing) Company (Replaces SOBEPALII)	
Organisation responsible	Ministry of Finance and Economy
Size	Recent data unavailable
Breeds and numbers	245 crossbreds in North Ouidah and 63 in Ouedo in 1986
Objectives	Production of manure and beef
Work Oxen and Livestock Production Project	
Organisation responsible	Directorate of State Farms
External aid	End of funding
South Borgou Livestock Production Development Project	
Organisation responsible	Directorate of Livestock Production (MDRAC)
External aid	EEC/FED/RPB
Small Ruminant Production Development Project	
External aid	USAID. Phase 1 of project (health aspect) completed. A second phase (livestock production component) is envisaged
Integrated Rural Development Project in Atacora	
Organisation responsible	MDRAC
Duration	1983–1986
External aid	WB/IFAD/OPEC
Atacora Livestock Production Development Project	
Organisation responsible	MDRAC
Duration	1983–1988
External aid	GTZ/RPB
Zou Province Integrated Rural Development Project	
Organisation responsible	MDRAC
Duration	1983–1988
Organisation responsible	MDRAC
Duration	1983–1988
External aid	WB/FAC/CCCE
Work Oxen Project	
Organisation responsible	MDRAC
Duration	1980–1983
External aid	Holland/RPB Funds are being sought to continue the project
Parakou Fattening Project	
Organisation responsible	MDRAC
Duration	End of project. Funding is being sought.

Source: FAO (1986).

A mission on the feasibility of a single trypanosomes and tsetse flies control programme for the five "Etats de l'Entente" (Benin, Togo, Niger, Burkina Faso and Mali), was carried out in 1980 (Gravel and Tacher, 1980).

At the request of the Government of the Republic of Benin, an FAO mission visited the country in 1981 and identified the following development projects:

- Animal trypanosomiasis control and development of regions freed from tsetse flies

- Establishment of a veterinary diagnostic laboratory in Parakou with mobile epizootic diseases monitoring units, with branches specialised in small-scale livestock production and a trypanosomiasis unit
- Promoting and assisting livestock production in southern Benin
- Improvement of animal products marketing in southern Benin
- Livestock production and veterinary research units.

In an update of the mission report, an additional project entitled "Conservation of Animal Genetic Resources through the development and multiplication of purebred Lagune, Somba and Pabli cattle" has been included (Toure, 1984).

Additional activities to the livestock production component of the Integrated Rural Development Project in Zou Province (Chabeuf, 1983; Audru and Chabeuf, 1984) focused in particular on:

- the establishment of a parasitology laboratory in Dassa Zoume
- a Sheep Breeding Development Project including the establishment of a Sheep Production Centre in M'Bétécoucou, rehabilitation of this farm and establishment of subsidiary cattle and sheep production farms.

In 1986, FAO considered the possibility of setting up an African Animal Trypanosomiasis and Tsetse Control Project in the Niger River Valley (Niger, Burkina Faso and Benin) under the FAO Animal Trypanosomiasis Control Programme. Funding for the project is being sought (FAO, 1986).

Funding for all these project proposals has not been found yet.

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12.7 MAJOR CHANGES SINCE 1977

The cattle, sheep and goat population increased relatively fast during the study period.

The percentage of each breed in the total population also changed slightly. The percentage of Borgou and crossbreds increased from 69% in 1977 to 72% in 1984 while the percentage of Somba dropped from 10% to 6%. The population of Lagune is still adequate for conservation and development programmes to be undertaken. However, the station responsible for the breed also maintains Borgou which is a potential threat to the purity of the Lagune.

Animal traction has developed rapidly since the early 1980's and more than 18 000 pairs of oxen should be in use by 1986.

While multiplication herds are experiencing some operations difficulties, new livestock development projects were, however, launched during the last few years almost all over the country. These should notably increase the productivity of the national herd within the next few years.

CHAPTER 13

NIGERIA

13.1 BACKGROUND

The Federal Livestock Department (FLD) is currently responsible for the planning, management, evaluation and coordination of animal health programmes.

The National Livestock Project Unit (NLPU) and the River Basin Rural Development Authorities are in charge of implementing FLD's guidelines. The Federal Department of Pest Control Services is responsible for tsetse eradication and control.

The Nigerian Institute for Trypanosomiasis Research (NITR) carries out research on the tsetse fly and trypanosomiasis.

Research on livestock production and diseases is still conducted in universities.

Data on the human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Nigeria, 1985.

Human population (1985)	
– number	96 000 000
– density	104/km ²
Animal population (1985),	
– cattle	10 900 000
– sheep	22 300 000
– goat	9 500 000

Source: For human population, official projections (+2.5%) from 1963 census, quoted by Shaw (1985).
For animal population projections (+1.5% for cattle and +2.85 for sheep and goats) from the data of the Federal Ministry of Agriculture (1981).

Species found are: for the *palpalis* group *G. tachinoides* which is found in the north-east, *G. palpalis palpalis*, *G. pallicera pallicera* and *G. caligena*. Of the *morsitans* group, *G. longipalpis* is found in the south. The area of distribution of *G. morsitans submorsitans* in the north is gradually shrinking with the destruction of its habitat by the extension of arable land. As for the *fusca* group, *G. fusca*, *G. tabaniformis*, *G. nigrofusca*, *G. medicorum* and *G. haningtoni* species are found all over the country (Putt et al, 1980; Tsetse and Trypanosomiasis Division, 1960–78).

13.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Recent data on the study area presented in Volume II are unavailable. The only data currently available are for cattle, sheep and goat populations in the nine states of Southern Nigeria (Akinwumi and Ikpi, 1985).

In 1984, the cattle population of the nine states was 306 970 heads with the trypanotolerant cattle population standing at about 67 000 head. Distribution of the cattle population in the nine southern States of Nigeria is given in Table 2.

Table 2. Distribution of cattle in the nine southern Nigerian States.

State	Trypanotolerant cattle		Trypanosusceptible cattle		Total	
	Number	%	Number	%	Number	%
Ogun	6 621	35.79	11 879	64.21	18 500	6.03
Ondo	6 486	39.21	10 056	60.79	16 542	5.39
Oyo	25 211	18.00	114 843	82.00	140 054	45.62
Lagos	3 947	70.52	1 650	29.48	5 597	1.82
Bendel	1 984	5.76	32 448	94.24	34 432	11.22
Anambra	12 239	34.17	23 583	65.83	35 821	11.67
Imo	7 715	37.99	12 591	62.01	20 306	6.62
Rivers	471	17.54	2 214	82.46	2 685	0.87
Cross River	2 658	8.05	30 375	91.95	33 033	10.76
S. Nigeria	67 332	21.93	239 639	78.07	306 970	100.00

Source: State Veterinary and Animal Husbandry Department files and survey, September 1984 quoted by Akinwumi and Ikpi (1985).

The 1984 distribution of trypanotolerant cattle by breed in the nine States studied is shown in Table 3. Oyo State, where the main N'Dama-producing ranches are located, has about 25 000 head of trypanotolerant cattle and Anambra State some 12 000 head of trypanotolerant Muturu.

Kwara and Gongola States, which are not included in Tables 2 and 3, also possess trypanotolerant cattle. There are 53 000 Keteku and 40 000 Muturu cattle in Kwara State and 40 000 head of trypanotolerant cattle in Gongola State (RIM, 1984).

The total trypanotolerant population is estimated at about 200 000, including 26 000 N'Dama, 53 000 Savannah Muturu, 26 000 Forest Muturu and 95 000 Keteku. Recent data on Benue State are unavailable.

Table 3. Geographical distribution of trypanotolerant cattle in nine States studied in southern Nigeria.

State	Muturu		N'Dama		Keteku		Total	
	Number	%	Number	%	Number	%	Number	%
Ogun	536	8.1	4 677	70.6	1408	21.3	6 621	100
Ondo	3 660	56.4	2 540	39.1	286	4.5	6 486	100
Oyo	8 847	35.1	13 859	55.0	2505	9.9	25 211	100
Lagos	1 217	30.8	2 080	52.7	650	16.5	3 947	100
Bendel	1 547	75.8	437	24.2	-	-	1 984	100
Anambra	11 310	92.4	815	6.7	114	0.9	12 239	100
Imo	7 412	96.1	303	3.9	-	-	7 715	100
Rivers	399	84.7	72	15.3	-	-	471	100
Cross Rivers	2 575	96.9	51	1.9	32	1.2	2 658	100
Total	37 503	55.7	24 834	36.9	4995	7.4	67 332	100

Source: State Veterinary and Animal Husbandry Department files and survey, 1984 quoted by Akinwumi and Ikpi (1985).

Sheep and goat distribution by State is given in Table 4 for 1981, the last year for which data by State are available.

Table 4. Sheep and goat distribution by State, 1981.

State	Goat	Sheep
Anambra	400 000	250 000
Bauchi	1 500 000	600 000
Bendel	450 000	100 000
Benue	900 000	250 000
Borno	2 250 000	950 000
Cross Rivers	450 000	100 000
Gongola	850 000	300 000
Imo	300 000	150 000
Kaduna	2 600 000	1 000 000
Kano	4 500 000	1 800 000
Kwara	600 000	150 000
Lagos	50 000	-
Niger	750 000	450 000
Ogun	400 000	150 000
Ondo	450 000	200 000
Oyo	1 100 000	500 000
Plateau	1 600 000	200 000
Rivers	150 000	50 000
Sokoto	1 950 000	135 000
Total	21 250 000	7 335 000

Source: Federal Ministry of Agriculture (1981).

13.3 CATTLE

13.3.1 BREED DESCRIPTION

13.3.1.1 MUTURU

Table 5 gives some data on Muturu production traits.

13.3.1.2 N'DAMA

The most recent data available on N'Dama production traits were collected by Robert and Gray in 1973 and quoted in Volume II. Various production parameters for N'Dama, Muturu and zebu under station conditions are compared in Table 5.

Table 5. N'Dama, Muturu and zebu production traits.

	N'Dama	Muturu	Zebu
Age at first calving (d)	684 (n=3)	635 (n=6)	761 (n=9)
Calving interval (d)	363 (n=12)	350 (n=12)	403 (n=8)
Weight at birth (kg) – male	18.1	13.7	26.5
– female	15.9	13.9	22.7
3 months – male	54.6	38.9	78
– female	54.3	37.5	77.5
6 months – male	–	71.2	130.3
– female	92.1	61.5	128.6
9 months – male	119.3	98.1	178.2
– female	112.4	82.5	165.0
12 months – male	137.4	108.1	206.7
– female	124.6	93.5	193.2
15 months – male	166.7	123.3	225.0
– female	152.9	94.4	221.8
18 months – male	191.7	147.2	251.7
– female	165.8	110.0	234.3
Cow weight (kg)			
1–2 years	181	109	282
2–3 years	216	145	300
3–4 years	252	167	323
4–5 years	270	177	331
5–6 years	275	204	374

Source: Roberts and Gray (1973).

The N'Dama and Muturu breeds mature earlier and have a shorter calving interval than zebu breeds. However, zebu breeds gain weight faster.

13.3.1.3 KETEKU

Recent data on Keteku production traits are unavailable. Estimates of major production parameters, based on data given in Volume II, and a productivity index giving total weight of one-year-old calves per 100 kg of cow maintained per year are given in Table 6.

Table 6. Keteku productivity estimates.

Adult female viability (%)	97.8
Calving rate (%)	65
Calf viability to 1 year (%)	95.8
Weight of 1-year-old calves (kg)	140 (a)
Milked-out yield (kg)	50 (a)
Productivity index per cow per year(kg)	93.6
Adult female weight (kg)	295
Productivity index per 100 kg of cow maintained per year (kg)	31.7

(a) Estimates.

Source: Indices calculated by authors.

13.3.1.4 N'DAMA X KETEKU CROSSBREDS

No recent data were available on this crossbred.

13.3.1.5 ZEBU

Some zebu production traits are compared in Table 5 with those for N'Dama and Keteku.

13.3.2 DISEASES

Cases of suspected rinderpest were reported during the latter part of 1982 and a vaccination programme launched in May 1983. New outbreaks were reported in Ganye region and Gongola States in 1984 (RIM, 1984).

In 1986, Nigeria received FAO assistance under a project entitled "Strengthening of Technical Basis for Rinderpest Vaccine Production". The objective of the project was to improve vaccine production at the National Veterinary Research Institute.

The main trypanosomiasis vectors are still *T. vivax*, *T. congolense* and *T. brucei*. The effect of trypanosomiasis on N'Dama, Keteku and Muturu is indicated in a study carried out by Ilemobade in 1981 (Ilemobade, 1981).

13.3.3 HERD MANAGEMENT

Three livestock management systems were discussed in the previous study. In the present study, Akinwumi and Ikpi (1985) have chosen to describe five systems.

13.3.3.1 FREE-ROAMING

Here, management input is minimal although some supplements are given. The reported calving rate of 86% is the highest in the five systems. This is due to the fact that animals can graze freely after the harvest choosing from a wider variety of feeds (maize, cassava etc). Furthermore, breeding is not controlled.

However, cattle run greater risks under this type of management system (rustling, snake bites, other accidents) and often turn wild. This management system is found mainly in Bendel, Ogun, Ondo and Rivers States.

13.3.3.2 FAMILY HUSBANDRY

Animals are tethered close to the house where they can be watched. This system is found in all states except Bendel State. Calving rates are about 56%.

13.3.3.3 COMMUNAL MANAGEMENT

Cattle belonging to various owners in a village are herded together. The system, found mainly in Ondo State, was developed in certain regions to minimise damage to crops by cattle and prevent conflicts between farmers and cattle owners.

This system has been largely responsible for the conservation of the Muturu. Calving rates are relatively high (72%).

13.3.3.4 RANGELANDS ANIMAL HUSBANDRY

This type of management is the most widely practised in all nine States. The animals are herded in well defined areas. This system is regarded as a first step towards a ranching system. In eastern Nigeria, rangelands were fenced for use as pastures. A significant number of young oxen are maintained for fattening and marketing purposes.

This management system is practised by numerous Fulani and zebu cattle owners in Oyo, Ogun and Ondo States. The calving rate of 29% is the lowest in the five systems.

13.3.3.5 RANCHING

This is an intensive production system. Each ranch maintains numerous pastures divided into fenced paddocks to ensure controlled grazing. Several ranches have improved pastures.

The main objectives of these ranches are breeding, fattening and marketing. The calving rates of about 35% are relatively low.

13.4 SHEEP AND GOATS

13.4.1 BREED DESCRIPTION

13.4.1.1 SHEEP PRODUCTION TRAITS

A study made by Upton (1985) provides reliable data on production traits for West African dwarf sheep under village conditions. The main results of the study are given in Table 7.

Table 7. Production traits for West African dwarf sheep under village conditions.

Average litter size	1.23
Parturition interval (d)	322
Annual reproduction rate = $(a \times 365):b$	1.44
Survival rate to 3 months	0.84
Survival rate between 3 and 12 months	0.83
Survival rate between 0 and 12 months	0.7
Lambing rate:	0.98
- lamb survival to 12 months = $c \times f$	
Liveweight at 12 months (kg)	19.7
Breeding herd mortality	0.16

Source: Upton (1985); Sumberg and Cassaday (1985).

13.4.1.1.1 Productivity index

Table 8 summarises the estimates of the main production parameters required to compute a productivity index giving the total weight of 5-month-old lambs produced per 10 kg of ewe maintained per year. This productivity index is based on the data in Table 7 collected by Upton (1985).

Table 8. Sheep productivity estimates.

Ewe viability (%)	94
Lambing rate (%)	144
Lamb viability to 1 year (%)	70
Lamb weight at 5 months	10(a)
Productivity index per ewe per year (kg)	10.4
Ewe weight (kg)	20
Productivity index per 10 kg of ewe per year (kg)	5.2

(a) Estimate.

Source: Indices calculated by authors.

13.4.1.2 GOAT PRODUCTION TRAITS

Mack et al (1985) conducted research on West African Dwarf goats in Fashola village, 60 km north of Ibadan, Mgbakwu village in Anambra State, and Okwe village in Imo State. The results are given in Table 9.

Table 9. West African Dwarf goat production traits.

	Fashola	Mgbakwu	Okwe
Number of parturitions	41	109	57
Litter size	1.7	1.5	1.3
Kidding interval (d)	271±89	263±42	-
Number of kids per goat per year	2.3	2.0	-
Monthly kidding percentage	8.1	8.5	8.8
Kid mortality rate			
- Overall per month (%)	2.6±4.4	4.4±1.8	4.2±2.5
- 0-90 days (%)	11.1	24.8	18.6
Kid weight)			
at 30 days (kg)	3.5	2.5	2.4
at 90 days (kg)	5.7	4.7	4
Daily weight gain from 30-90 days (g/d)	36.6	36.6	33.3

Source: Mack et al (1985); Sumberg and Cassaday (1985).

13.4.1.2.1 Productivity index

Table 10 summarises the estimates of the main production parameters required to compute a productivity index giving the total weight of 5-month-old kids produced per 10 kg of goat maintained per year. This productivity index is based on data collected under traditional management systems.

Table 10. Goat productivity estimates.

Female viability (%)	80
Kidding rate (%)	210
Kid viability to 1 year (%)	52
Kid weight at 5 months (kg)	7.5(a)
Productivity index per goat per year (kg)	9.1
Goat weight (kg)	19 (a)
Productivity index per 10 kg of goat maintained per year (kg)	4.7

(a) Estimates.

Source: Indices calculated by authors.

13.4.2 DISEASES

Results of research carried out by the International Livestock Centre for Africa (ILCA) in Badeku and Fashola on blood and gastro-intestinal parasites infestations affecting goats are given in Table 11.

Table 11. Blood and gastro-intestinal parasitic infestation rate in goats.

	Badeku	Fashola
Number of observations	1048	1142
Blood parasites		
- Trypanosomes (%)	0.1	3.5
- Babesia (%)	6.8	20.4
- Anaplasma (%)	0.7	0.4
Gastro-intestinal parasites		
- Strongylus (%)	14.1	34.0
- Strongyloids (%)	10.8	17.2
- Moniezia	10.7	9.1
- Coccidia	6.9	26.2

Source: ILCA (1986).

In 1973, Fabiye (quoted by Sumberg and Cassaday, 1985) indicated high infestation rates by *strongyloides* and *haemonchus* during the rainy season in Zaria. *Gaigera*, *oesophagostomum* and *trichostrongylus* were prevalent during the latter part of the rainy season.

13.4.3 HERD MANAGEMENT

No recent data on herd management are available.

13.5 RESEARCH AND DEVELOPMENT ACTIVITIES

13.5.1 RESEARCH CENTRES

The main research centres are the Universities of Ibadan, Ife and Nsukka and the Nigerian Institute of Trypanosomiasis Research (NITR). The research centres conduct research on the reproduction, nutrition and health of trypanotolerant cattle.

The International Livestock Centre for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD) are conducting research on small ruminants production parameters in Badeku and Fashola, under the African Trypanosomiasis Research Network. ILCA continues to implement its own research programmes in the humid (Ibadan) and subhumid zones (Kaduna).

13.5.2 MULTIPLICATION HERDS

The total number of cattle raised on government or private ranches in 1984 is given in Table 12.

Table 12. Number of cattle raised by the government and private ranch.

State	Number of government ranches	Number of cattle	Number of private ranches	Number of cattle	Total number on ranches
Rivers	2	67	1	124	191
Cross river	4	466	8	1 473	1 939
Imo	1	386	6	225	611
Ondo	3	2432	36	17 290	19 722
Anambra	1	447	3	371	818
Bendel	3	143	4	352	495
Lagos	-	-	22	2 019	2 019
Oyo	7	6876	457	75 565	82 441
Ogun	4	511	88	9 127	9 638

Source: Cattle survey, Nigeria, September 1984. Quoted by Akinwumi and Ikpi (1985).

Recent data on six multiplication centres are given in Table 13. Akunnu and Imeko ranches were not mentioned in the previous study.

Table 13. Multiplication herds.

Name:	Upper Ogun Ranch
Location:	Oyo State, 50 km west of Oyo
Organisation responsible:	Western Livestock Company (WLC), Ibadan
Size	10 522 ha
Breeds and numbers	2258 N'Dama in 1984
Objectives	N'Dama multiplication, production of breeding stock for distribution to other ranches.
Name	Fashola Stock Farm
Location	Oyo State, 50 km west of Oyo
Organisation responsible	Ministry of Agriculture and Natural Resources, Ibadan
Size	550 ha
Breeds and numbers	620 N'Dama, Keteku and crossbreeds in 1985
Objectives	N'Dama multiplication, production of breeding stock. The ranch also serves as a transit station for imported animals.
Name	Ogboro ranch
Location	Oyo State, 150 km north of Oyo
Organisation responsible	WLC, Ibadan
Size	1864 ha
Breeds and numbers	1646 N'Dama in 1984
Objectives	N'Dama multiplication, production of breeding stock.
Name	Akunnu ranch
Location	Ondo State, 70 km east of Ado-Ekiti
Organisation responsible	WLC, Ibadan
Size	8094 ha
Breeds and numbers	1652 N'Dama in 1984
Objectives	N'Dama multiplication and production of breeding stock. In future the ranch will supply breeding stock to other ranches.
Name	Oko-Ako Ranch
Location	Ondo State, 90 km north-east of Ado-Ekiti
Organisation responsible	WLC, Ibadan
Size	10 025 ha
Breed and number	455 N'Dama, Keteku and crossbreeds in 1984
Objectives	N'Dama multiplication, production of breeding stock.
Name	Imeko Ranch
Location	Ogun State, 90 km northeast of Abeokuta
Organisation responsible	WLC, Ibadan
Size	4000 ha
Breeds and numbers	200 N'Dama from Upper Ogun Ranch in 1985
Objectives	N'Dama multiplication, production of breeding stock. The ranch was built up in 1983 and started operation in 1984. In the future, the ranch may be used for fattening activities.
External aid	All WLC ranches receive financial aid from the World Bank and the Western Livestock Company.

Source: Shaw (1985).

Recent data on other multiplication herds described in the previous study are not available.

13.5.3 DEVELOPMENT ACTIVITIES

Few additional data on development projects involving trypanotolerant cattle were available. As part of its activities, ILCA, in collaboration with IITA, has developed a fodder bank system with a view to increasing livestock production output. A number of these banks have been established since 1980 including several in Plateau, Niger, Benue and Gongola States, that is in places where trypanotolerant animals are also to be found (von Kaufmann, 1986).

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13.7 MAJOR CHANGES SINCE 1977

The total trypanotolerant cattle population, which nowadays is only 200 000 head declined significantly by almost a third during the study period. However, the N'Dama population increased from 15 000 to 20 000 head, as opposed to the other breeds which declined in a similar proportion. A special programme on the N'Dama breed is being implemented. In this regard, an estimated 5000 head were imported in the 1980s (Hoste and Shaw, 1987). Research activities carried out by ILCA, in collaboration with universities and other research bodies under the humid and subhumid zone programmes have provided important data on the productivity of trypanotolerant cattle and sheep breeds.

The government is currently exerting major efforts to develop N'Dama production in the southern States. Taking into account the current attractive pricing policy in the livestock sector, it is likely that some private producers will import N'Dama breeding stock for N'Dama production in the near future.

CHAPTER 14

CAMEROON

14.1 BACKGROUND

The country, which was originally divided into seven provinces, is now divided into 10 provinces. The Northwest and Southwest provinces comprise the former English-speaking West Cameroon and the other eight provinces the former French-speaking East Cameroon.

Data on human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Cameroon.

Human population (1986)	
– number	9 972 000
– density	920.9/km ²
Animal population (1984)	
– cattle	4 099 305
– sheep	2 300 000
– goats	2 500 000

Source: For human population: official projection (+2.4%) for 1986 from 1976 census figures.
For animal population: Cameroon (1984).

14.2 LIVESTOCK NUMBERS AND DISTRIBUTION

The numbers and distribution of cattle in 1984 are shown in Table 2.

Table 2. Cattle numbers and distribution, 1984.

Province	Numbers	% of national herd	Estimated humpless cattle population
Far North	1 030 662		6567–7880
North	441 193	77.43	
Adamaoua	1 702 429		952
West	178 815	4.36	
North-West	489 147	11.93	1277
South-West	11 429	0.28	
Littoral	2 867	0.07	
Centre	25 000	0.61	1508
East	209 763	5.12	
South	8 000	0.2	
Total	4 099 305	100	10 304–11 617

Source: Cameroon (1984).

According to Table 2, North, Far North and Adamaoua Provinces account for 77.4% of the national herd. Although 80% of the country is infested by the tsetse fly, trypanosusceptible zebu constitute over 99.8% of the national cattle herd.

Sheep and goat populations and distribution in 1984 are given in Table 3.

Table 3. Sheep and goat numbers and distribution in Cameroon, 1984.

Province	Sheep	Goats	Total	% of livestock
Far North	-	-	1 805 400	37.6
North and Adamaoua	-	-	441 600	9.2
West	-	-	984 000	20.5
North-west	-	-	456 000	9.5
South-west	9 600	14 400	24 000	0.5
Littoral	105 400	158 600	264 000	5.5
Centre and South	263 000	394 000	657 000	13.7
East	73 200	100 800	168 000	3.5
Total	2 300 000	2 500 000	4 800 000	100

Source: Cameroon (1984).

According to Table 3, North, Far North and Adamaoua Provinces still account for 50.4% of the total small ruminants population. A total of 1 113 000 sheep and goats, comprising 22.4% of the population, are found in North, North-west, Littoral, Centre, South and East Provinces. Out of this number, 657 000 are found in Centre and South Provinces. Data on the distribution of sheep and goats by trypanotolerant and trypanosusceptible breeds are not available.

14.3 CATTLE

14.3.1 BREED DESCRIPTION

Cameroon has about 11 000 head of trypanotolerant cattle consisting of 1500–2000 N'Dama, 6500–8000 Kapsiki and Doayo, 1000–1300 Bakosi and 800–1300 Muturu.

Between the end of 1979 and late 1981, 370 N'Dama (22 males and 348 females) were imported from Koudou, N'Konjock and JVL in Zaire under the M'bongo SOCAPALM (Littoral) project for cattle production under palm plantation. By August 1984, the herd numbered 900 head, including 340 cows.

Production traits recorded in 1983/84 give a fertility rate of 63%, a mortality rate from birth to 1 year of 4%, and a mortality rate for animals over 1 year old of 5%. Mean weight at birth is 17.6 kg and average daily weight gain for unweaned calves is 315 g/d (SOCAPALM, 1984).

14.3.2 DISEASES

The rinderpest epidemic which broke out in the country in February 1983 caused the death of approximately 21 000 head of cattle in both the trypanotolerant and trypanosusceptible populations. Although no further outbreaks have been reported since then, the disease remains endemic in the country (FAO, 1985).

In 1979, a tsetse and trypanosomiasis control programme was launched in Benue Province (FAO, 1979). Cameroon is making major efforts to control animal trypanosomiasis. At the end of the 1983–84 Tsetse Eradication Campaign, the Special Tsetse Eradication Mission (MSEG) eradicated the tsetse fly on an estimated 1 700 000 ha thanks to the Tsetse Division of N'Gaoundéré with the assistance of the Tsetse Division of Garoua, another 1 350 000 ha were also freed from tsetse infestation (MSEG, 1983).

A mission (Mawuena, 1985) undertaken under the tsetse and trypanosomes control activities has submitted a project entitled "Tsetse and Animal Trypanosomiasis Surveillance Unit for Tsetse-free Areas and Strengthening of Special Tsetse Eradication Mission in the Republic of Cameroon with Technical Materials".

14.3.3 HERD MANAGEMENT

Some N'Dama cattle are used as work oxen on the oil palm plantations located in the southern half of the country.

14.4 SHEEP AND GOATS

14.4.1 BREED DESCRIPTION

14.4.1.1 SHEEP PRODUCTION TRAITS

Table 4 gives production traits recorded by IRZ under improved management (IRZ, 1983–84) and Neilsen at the Bamenda–Mankon station (Neilsen, 1985).

Table 4. Production traits for West African dwarf sheep under improved management and station conditions.

	Improved management	On-station
Fertility rate (%)	75	95.2 (n=21)
Twinning rate (%)	10	21.3 (n=21)
Mortality rate (%) 0–4 months	39	30.8
Weight at birth (%)	3.3	2.05 (a)–1.57(b)(n=48–24)
Weight at 1 month		5.18 (a)–3.84(b)(n=48–24)
at 2 months		8.03 (a)–5.00(b)(n=48–24)
at 4 months	15	
of 1-year-old ewes		21.2 (a)–19.5(b)
Average daily weight gain (g/d)		
0–30 days		104 (a)–74(b) (n=48–24)
30–80 days		79 (a)–63(b) (n=48–24)

(a) Single birth; (b) twin birth.

Source: For on-station, Nielsen (1985). For improved management, IRZ (1983–84).

14.4.2 DISEASES

No recent data on diseases are available.

14.4.3 HERD MANAGEMENT

Five major management systems are used in Cameroon. They were described in detail at the Seminar on Small Ruminant Production held in Bata in 1985 (UDEAC, 1985):

- a) **Free-ranging:** The animal is allowed to roam freely and fend for itself. This management system involved numerous drawbacks (agropastoral conflicts, poor management of pastures etc) and is prohibited by law. It is, nevertheless, the most common small ruminant management system in Adamaoua and Littoral Provinces.
- b) **Tethering:** The animal is tethered to a stake or shrub. Although this system prevents conflicts, animals have to be provided with food and water.

- c) **Herding:** The herd is cared for by a herder.
- d) **Improved management:** This system is becoming more popular. Animals are usually fed supplements (groundnut and cowpea haulm, millet stalks and cakes) and provided with health care. Large herds of 1000 head or more are usual under this system.
- e) **Fattening** is practised mainly in Far North and North Provinces. Small feedlot units maintain between 20 and 30 castrates which are marketed after a few months of fattening. However, small ruminant fattening is generally limited to one or two animals kept for between 8 and 12 months at most (UDEAC, 1985).

Herd size varies substantially depending on the region. In the southern provinces, with the exception of the West and North-west, average herd size is between 5 and 10 heads. In the northern provinces and North and North-west Provinces, herds of between 15 and 20 head are common. In Far North Province average herd size is 100 head.

Sheep and goats are raised in separate flocks or in mixed flocks of sheep and goats or in herds of sheep and cattle.

14.5 RESEARCH AND DEVELOPMENT ACTIVITIES

14.5.1 RESEARCH CENTRES

The Livestock Research Institute (IRZ) continues to carry out research activities on the improvement and selection of local cattle, sheep and goat breeds and on nutrition. In 1984, IRZ launched a research programme on trypanotolerant breeds aimed primarily at conserving the purity of these breeds.

Yagoua station in Far North Province currently maintains over 200 head of Kapsiki and Namshi which will subsequently be used to form two purebred herds of 250 breeding females. An attempt at establishing Mutura breed on Bangangté Station, Western Province failed for unknown reasons. A further attempt is, however, envisaged.

The following research stations are also managed by IRZ:

- Bambui Station which has a zebu-based beef production programme and a milk production programme using Holstein and Jersey cows. It also conducts research on pastures;
- Jakiri Station, a National Livestock Production and Veterinary Training Centre (Assogbakpe, 1985).

Recent data on other research stations mentioned in Volume II could not be obtained.

The National Veterinary Laboratory (LANAVET) conducts analyses and manufactures vaccines in Boklé Garoua. It was established in 1984 and received FAO assistance in 1985 under the project entitled "Vaccine Production at Boklé Laboratory".

A project to provide aid to village sheep producers in Cameroon, with Belgian funding was implemented at Bamenda-Mankon Station, North-West Province in 1981. The project conducts research on the diseases and productivity of the West African dwarf sheep.

14.5.2 MULTIPLICATION HERDS

In 1979, an N'Dama Production Centre was established on the M'Bongo Plantation of the Cameroon Oilpalm Company (SOCAPALM). The Centre has an area of 10 000 ha and maintained 952 N'Dama, including 340 breeding females in 1985. It aims to produce 4200 head of cattle, including 1300 breeding females for beef production. CCCE provides 65% of the external aid. Phase I will last six years (SOCAPALM, 1984).

14.5.3 DEVELOPMENT PROJECTS

The Investment Centre [Centre d'Investissement (FAO/World Bank)] conducted several missions to Cameroon in 1984 to identify priority agricultural investment projects which could attract external aid (FAO, 1984).

An FAO mission visited Cameroon in 1985 (FAO, 1985) under the Dairy Development Coordination Programme (PICDL) and the International Programme for the Development of the Meat Sector (PIDSV). At the end of the mission, the following development projects were submitted:

- development of animal traction
- establishment of two pilot centres for the development of small-scale sheep and goat production
- introduction of trypanotolerant cattle to areas of high trypanosomiasis challenge with a view to developing beef production.

The "Meat II plan", which covers Adamaoua and North-west Provinces, is the main livestock development project in Cameroon. Phase II of the project, which was discontinued in January 1986, comprised five components:

- The loans-to-producers scheme (through FONADER)
- The establishment of three ranches, two abattoirs and livestock production training and extension units (UVE) to be implemented through the Animal Products Development Company (SODEPA)
- The Special Tsetse Eradication Mission (MSEG)
- The strengthening of veterinary services in Adamaoua
- The Coordination Unit.

To pave the way for the implementation of "Meat II Plan" an agreement for a project entitled "Preliminary Studies for a Livestock Production Project", was signed between the Government of Cameroon which will provide US\$ 320 000 from loans secured from the International Development Association (IDA), UNDP which will contribute US\$80 000 and the World Bank which will implement the project.

The immediate objective of the project which should be completed in 10 months is to carry out a series of baseline studies on:

- the socio-economic environment of livestock production
- the impact of tsetse control activities
- loans to producers
- the financial viability of the Animal Products Development Company (SODEPA).

A second FAO consultation mission was scheduled for the end of 1986 to study the possibilities for conserving and multiplying endangered trypanotolerant breeds and identify their role in national livestock development policies (Hoste, 1986).

A project to establish stations in Batouri, Garoua and Mbam region for the development of small ruminant production is under consideration (UDEAC, 1985).

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14.7 MAJOR CHANGES SINCE 1977

Trypanotolerant cattle production is still of minor importance in Cameroon where the total trypanotolerant population is about 11 000 head. This estimate is significantly higher than the figure for 1977 and the increase is certainly due to imports and N'Dama production development at SOCAPALM.

Although limited in numbers, trypanotolerant cattle breeds have not been neglected and IRZ has initiated a research programme on these breeds. Purebred herds of about 250 breeding Kapsoki, Namshi and Muturu cows raised under station conditions are being or will shortly be formed.

The encouraging results obtained by SOCAPALM also indicate that trypanotolerant cattle breeds may become important in the south of the country on oilpalm plantations or in areas such as the relatively sparsely populated Centre Province.

CHAPTER 15

CENTRAL AFRICAN REPUBLIC

15.1 BACKGROUND

The General Directorate of Livestock Production and Animal Industries is now under the Ministry for Rural Development. It comprises the Directorate of Animal Production and Industries which is responsible for the Bambari Multiplication Centre and Doumic and Katakpa stations and a Directorate of Animal Health in charge of Bouar and Bambari Veterinary Laboratories. Data on human and animal populations for the country are given in Table 1.

Table 1. Human and animal populations of the Central African Republic (1983 and 1984).

Human population (1984)	
– number	2 607 000
– density	4.2/km ²
Animal population (1983)	
– cattle	2 147 384
– sheep	93 619
– goats	1 016 748

Source: For human population, official projections from 1986–1990 the Five Year Development Plan.
For animal population, RCA (1983).

There are still no specialised bodies or departments responsible for tsetse and African animal trypanosomiasis control in spite of the serious health threat posed by this disease. According to Mawuena (1984), almost the whole country is infested by the tsetse fly except for the mountainous Western region in Bouar which is in a high-altitude area. Several species have been identified in the region in previous years. However, the data available need to be updated. Tsetse control campaigns were organised in 1961–62 (in Topia Region), and in 1967 and 1970. It appears that the areas treated have been totally re-infested.

15.2 CATTLE NUMBERS AND DISTRIBUTION

15.2.1 CATTLE

The cattle population of the Central African Republic still consists mainly of Mbororo Zebu. The remainder of the population consists of Fulani Zebu, and of trypanotolerant cattle maintained in the sharecropping system or on livestock production stations and some zebu x humpless cattle crossbreds. A census was carried out during the rinderpest vaccination campaign conducted in 1983. Table 2 shows cattle distribution by district in 1983, of all cattle mainly belonging to the zebu breed (nomadic cattle), and of trypanotolerant cattle and crossbreds (sedentary cattle).

Table 2. Cattle distribution by administrative division, 1983.

Veterinary Inspectorate	District	Nomadic cattle		Sedentary cattle	
		Population	No. of sharecropping units	Population	
Western	Nana-Mambéré	402 006	62	605	
	Haute-Sangha and Sangha Economique	207 975	33	1 217	
	Total	610 041	95	1 822	
North-west	Ouham-Pendé	413 480	31	440	
	Ouham	254 355	96	1 005	
	Total	667 835	127	1 445	
Centre-South	Ombella-Mpoko	367 368		917	
	Lobaye	69 445		74	
	Total	436 813		991	
Centre-North	Kemo Grib	41 423	17	218	
	Gribi Economique	18 178	4	34	
	Bamingui Bangoran	-	-	-	
	Vakage	57 703	-	-	
	Total	114 304	21	(1)252	
Eastern	Ouaka	210 023	181	3 470	
	Basse-Kotto	91 578	106	1 690	
	Mbomou	6 278	10	97	
	Haute-Kotto	350	11	542	
	Total	308 299	308	(2)5 761	
Total (CRA)		2 137 292	-	10 092	

(1) 1982 data have been used for 1983 for lack of fresh data.

Source: RCA (1983).

The total cattle population increased to 2 147 384 head, including 99.6% of trypanosusceptible cattle and 0.4% of humpless cattle. According to estimates by the General Directorate of Livestock and Animal Industries, the trypanotolerant cattle population for 1984 was about 7400 head comprised of 6700 Baoulé, 600 N'Dama, and 100 zebu x humpless crossbreds.

Ranches and research stations account for 7% of the trypanotolerant cattle population. The remaining 93% are maintained under traditional management systems (Dgcia, 1984).

At the end of sharecropping operations in 1970, there were an estimated 22 000 *Bos Taurus* (Desrotour, 1982). Since then, the humpless cattle population has been increasingly declining at a mean annual rate of 4.9%. Table 3 summarises the development of this breed, based on 4500 head imported between 1955 and 1969.

Table 3. Development of *Bos taurus* numbers in sharecropping operations.

Year	Number of <i>Bos taurus</i> in sharecropping operations	Growth rate in %
1965	7 620	-
1969	15 150	+ 18.7
1978	9 550	- 5
1984	7 400	- 4.2

Source: BDPA (1985).

15.2.2 SHEEP AND GOATS

The distribution of sheep and goats in 1983 by district is given in Table 4. The data were collected during annual agricultural surveys and during the census carried out by some livestock inspectorates. No data on the distribution of sheep and goats between trypanotolerant and trypanosusceptible small ruminants were obtained.

Table 4. Distribution of sheep and goats by district, 1983.

Veterinary inspectorate	District	Sheep	Goats
Western	Nana-Mambéré	18 019	119 898
	Sangha Econ.	5 140	28 637
	Total	23 159	148 535
North-West	Ouham-Pendé	17 574	122 230
	Ouham	19 209	197 419
	Total	36 783	319 649
Centre-South	Ombella-Mpoko	4 071	43 269
	Lobaye	3 845	38 861
	Total	7 916	82 130
Centre-North	Kemo, Gribing.	559	46 373
	Gribingui.Econ.	974	35 166
	Bamingui Bangoran	2 228	10 051
	Vakata	-	-
	Total	3 761	91 590
Eastern	Ouaka	16 306	180 536
	Basse-Kotto	5 249	143 177
	Haute-Kotto	-	27 047
	Mbomou	445	24 084
	Haute-Mbomou	-	-
Total	22 000	374 844	
Total CAR, 1983		93 619	1 010 748

Source: RCA (1983).

As was the case in 1975, there are 10 times more goats than sheep and the goat population is concentrated mainly in the Western and Eastern Regions. The six administrative districts of Nana-Mambéré, Ouham, Ouham-Pendé, Ouaka, Bamingui-Bangoran and Basse-Kotto account for 76% of the total population (UDEAC, 1985).

15.3 CATTLE

15.3.1 BREED DESCRIPTION

15.3.1.1 BAOULE

The only recent data available are those collected in 1984 by a BDPA mission, for Baoulé herds maintained under sharecropping systems. The results are given in Table 5.

Table 5. Baoulé production traits in herds raised in sharecropping systems.

Age at first calving	2 years 10 months–3 years
Fertility rate	66%
Mortality rate	
– 1 year	23%
– adult	5%
– overall	10–16.6%

Source: BDPA (1984).

15.3.2 DISEASES

According to BPDA (1984), the main diseases reported in 1982 were rinderpest, bovine pleuropneumonia, brucellosis and tuberculosis. In 1986, the Central African Republic received FAO assistance under a disease control project entitled “Bovine Pleuropneumonia Control Project”.

Gastro-intestinal parasites, mainly strongylus, account for 50% of deaths among young animals for which an infestation rate as high as 80% is registered. Trypanosome infestation account for 10% of deaths among young animals, 13% of adult mortality, 18% of abortions and 8% of total livestock mortality.

15.3.3 HERD COMPOSITION

15.3.3.1 SHARECROPPING SYSTEM

The BDPA study carried out in 1984 also gave data on composition of herds maintained in the sharecropping system. As shown on Table 6, these reflect:

- a comparable number of males and females among calves not offtaken
- a sharp decline in the proportion of young bulls (9.5% compared to 18% for heifers) in the 1–3-year-age class, indicating an early and selective offtake of males probably as early as age 2
- a proportion of bulls (5.6%) i.e. 1 bull out of 17.9 head corresponding to an average sharecropping herd size of 18 to 20 head
- an absence of oxen, due to the fact that producers are unfamiliar with the selection and management of breeding stock and therefore only raise entire males which are sometimes sold as work oxen.

Table 6. Composition of herds maintained in the sharecropping system (%).

Bulls	5.6	}	26.7
- Young bulls	9.5		
- Male calves	11.6		
Cows	42.3	}	73.3
- Heifers	18.0		
- Female calves	13.0		
Total	100		

Source: BDPA (1984).

15.3.3.2 RANCHING

Recent data on ranching are not available.

15.3.3.3 ANIMAL TRACTION

The number of work oxen in the Central African Republic in 1983 was 3132 pairs of oxen. The administrative subdistrict of Paoua alone accounted for 2160 out of the 2742 pairs in Ouham-Pendé Province.

Table 7 shows the distribution of work oxen by administrative district in 1983.

Table 7. Distribution of work oxen by administrative district, 1983.

Administrative district	Pairs of oxen	% of work oxen
Ouham-Pendé	2742	87.5
Ouham	190	6.1
Gribingui économique and Kémo Gribingui	50	1.6
Ouaka and Basse-Kotto	150	4.8
Total	3132	100

Source: BDPA (1984).

Ouham-Pendé and Ouham divisions together account for 93.6% of the total work oxen population, with a mean growth rate of 40% per year. The distribution of work oxen by breed in Ouham-Pendé administrative district in 1983 is shown in Table 8.

Table 8. Distribution of work oxen by breed in Ouham-Pendé, 1983 (%).

Breed	Work oxen
M'Bororo Zebu	84.2
Fulani Zebu	2.5
Baoulé Shorthorn	9.9
N'Dama Shorthorn	0.9
Zebu crossbred x Shorthorn	1.0
Others	1.5
Total	100

Source: BDPA (1984).

The number of work oxen in Ouako and Basse-Kotto, however, is lower and its growth is limited.

The use of animal traction is, therefore, developing rapidly. Recent statistics available indicate that there were 3455 pairs of work oxen in 1985 (ACADOP, 1985).

15.4 SHEEP AND GOATS

The proportion is still 1 sheep for 30 inhabitants and 1 goat for 3 inhabitants. Herd offtake rate is estimated at 30%.

The sheep population includes all shades, from the Forest West African Dwarf type to the long-haired Sahel type. The goat population consists mainly of the West African Dwarf breed.

15.5 RESEARCH AND DEVELOPMENT ACTIVITIES

15.5.1 RESEARCH CENTRES

The Pasteur Institute in Bangui continues its research activities on ticks and tick-borne diseases.

15.5.2 MULTIPLICATION HERDS

The only station for which recent data were available was Bambari Station. In 1984, the station maintained 200 N'Dama and under the Second Livestock Development plan, this number should reach 354 head in five years. The objective of the station is to collect the available Shorthorns from former sharecropping schemes to redistribute them to M'Bororo Zebu producers who will cross them with their zebu to produce crossbred work oxen.

15.5.3 DEVELOPMENT PROJECTS

The most important development project in the Central African Republic is the Second Livestock Development Plan. The project, which was launched in 1986 and which was expected to be finalised in 1990, is funded by WB/IFAD/ADB/CAR and FED. It is an extension of FAO, FED and World Bank projects and covers the whole country. It comes under the General Directorate for Livestock and Animal Industries, and is mainly geared towards improving M'Bororo production. However, it also has three objectives relating to trypanotolerant cattle:

- to encourage, through Bambari Station, the use of Shorthorn x zebu crossbreds as work oxen;
- to distribute an estimated 2372 trypanotolerant cattle among about 100 sharecropping herds and train producers;
- to produce 1200 young bulls during the initial year for animal traction. This number should reach 5600 head within five years.

Under the project, FAC will contribute towards the funding of a veterinary laboratory to be set up in Bangui (Marchés tropicaux, 1986). Finally, two integrated rural development projects currently being implemented include livestock production components. These are the Ouham-Pendé Integrated Rural Development Project financed by GTZ which aims to promote animal traction and the Integrated Rural Development Projects for Bamangui, Bangoran and Vakagan Administrative Districts which were launched in 1985 with UNDP funding.

In 1984, the Agricultural Production Development Office (BDPA) conducted a BDEAC feasibility study on a trypanotolerant cattle conservation project in the Central African Republic (BDPA, 1984). Although the project was not independently funded, some of the proposals were incorporated into the Second Livestock Production Development Plan.

In 1985, the Central African Republic received UNDP assistance under a project entitled Integrated Rural Development of Bamingui-Bangoran and Vakaga Administrative Districts.

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15.7 MAJOR CHANGES SINCE 1977

The cattle population continues to increase at a rapid rate mainly as a result of the influx of M'bororo Zebu from neighbouring countries. The cattle population increased from 1 115 000 head in 1977 to an estimated 2 150 000 head during the study period. On the other hand, the trypanotolerant cattle population has decreased from 22 000 in 1970 to 7400 head. However, renewed interest is being shown in these breeds and several studies on their conservation have been undertaken within the past few years.

Under the 2nd Livestock Production Development Plan which was launched in 1988, a number of activities geared at trypanotolerant breeds have been carried out. Promising results obtained hitherto indicate that the decline in numbers will soon come to an end and that production of these breeds will be resumed within the next few years.

CHAPTER 16

GABON

16.1 BACKGROUND

Data on human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Gabon, 1983 and 1985.

Human population (1983)	
- number	1 300 152
- density	4.9/km ²
Animal population (1985)	
- cattle	17 400
- sheep	96 000
- goats	90 000

Source: For human population: Direction Générale de l'Economie, 1984 (estimates).
For animal population: Direction Générale de l'Elevage, 1985.

The only specific study carried out recently at Okouma ranch (ILCA, 1986) indicate that *G. palpalis*, *G. nashi* and *G. tabaniformis* are found in Okouma and *G. tabaniformis* and *G. palpalis* in North-Lekedi.

16.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Table 2 shows cattle distribution by management system for 1985.

Table 2. Cattle numbers and distribution, 1985.

Number in ranches	OGAPROV	Okouma	658
		South Lekedi	930
			1 588
	Agrogabon	Nyanga	8 250
		Lekabi	3 372
		Ngounic	1 081
			12 703
	Franceville (private)		1 300
Size of small units			
1. Remainder of former sharecropping schemes			
Figures vary with sources		1000 to 2000	(5th Plan)
	Number selected	1000 to 1500	(BDPA, 1984)
2. Leboka Producers' Cooperatives (North Lekedi)		1500	
		300	
	Total	17 400	

Source: OGAPROV (1985); Agrogabon, quoted by Assogbakpe (1985).

The livestock population in Gabon, and in particular the cattle population, has increased significantly during the past few years. Cattle numbers increased from 6180 in 1981 to 17 391 in 1984. That was due partly to several importations of N'Dama (7653 head) from Senegal, the Gambia, Zaire and Congo during the period (Shaw, 1986). Table 3 shows changes in cattle, sheep and goat numbers in Gabon between 1975 and 1984.

Table 3. Changes in cattle, sheep and goat numbers.

Year	Cattle	Sheep and goats
1975 (1)	2 427	47 000
1976 (2)	2 852	112 000
1981 (3)	6 180	136 225
1985 (4)	17 391	186 000

Source: 1. FAO study 20/2, 1980.
 2, 3 Direction de l'Élevage, 1981 and UDEAC, 1982.
 4. Direction Générale de l'Élevage, 1985.

16.3 CATTLE

16.3.1 BREED DESCRIPTION

In 1985, the cattle population consisted of 16 000 N'Dama imported mainly from Zaire and Senegal, 500 Baoulé, 500 Lagune and 400 crossbreds.

16.3.1.1 N'DAMA PRODUCTION TRAITS

Data on the production traits of N'Dama raised on ranches were not available for publication in volume II. Data were collected at Okouma and South Lekedi ranches in 1983 and 1984 by OGAPROV (OGAPROV, 1985) on local Okouma N'Dama (O) imported from Zaire, which have adapted well to local conditions and Senegal N'Dama (S) imported from Senegal in 1981. Table 4 gives fertility rates for these two breeds.

Table 4. Fertility rate of O and S N'Dama.

Breed	Numbers	Number of calves born	Fertility rate
N'Dama (O)	365	243	66.5
N'Dama (S)	152	103	67.7

Source: OGAPROV (1985).

For all breeds maintained in Okouma and South Lekedi ranches (Okouma and Senegal N'Dama, Nguni and Nguni x N'Dama crossbreds), survival rate to weaning is 84% (274 calves surviving to weaning out of 326 calves born). Overall mortality rate is 4.27% (82 deaths out of 1922 head) (OGAPROV, 1985). Data on N'Dama mortality rate between 1982 and 1985 were collected by ILCA (1986). They are given in Table 5.

Table 5. Mortality rate (%).

Breeds	Adult	Prewaning
N'Dama (O)	2.9	8.9
N'Dama (S)	3.9	

Source: ILCA (1986).

Note: The results given in this Table were obtained without chemoprophylaxis treatment against trypanosomiasis. Okouma and N'Dama mortality rates were 2.2% lower with chemoprophylaxis. Adjusted female calf weight based on weight at 250 days is given in Table 6.

Table 6. Weight of female calves (based on weight at 250 days).

Breed	Weight (kg)	Indices
N'Dama (O)	83	100
N'Dama (S)	76	91.9

Source: OGAPROV (1985).

The indices indicate that (O) N'Dama growth weight is superior to that of (S) N'Dama due to the fact that (O) N'Dama has adapted better to local conditions. Average daily weight gain (ADG) between weaning and 24 months was calculated. The results are given in Table 7.

Table 7. Average daily weight gain between weaning and 24 months.

Breed	Weight(kg)	Indices (kg)	ADG kg/d	Indices
N'Dama (O)	187	100	0.156	100
N'Dama (S)	183	97.9	0.152	97.4

Source: OGAPROV (1985).

Table 7 shows no marked difference between (O) N'Dama and (S) N'Dama with regard to growth between weaning and 24 months. Adult cow weight for (O) N'Dama was 196 kg and for (S) N'Dama 175 kg (OGAPROV, 1985).

16.3.1.1.1 Productivity index

Table 8 summarises estimates for the main production parameters required to calculate a productivity index giving the total weight of one-year-old calves produced per 100 kg of cow maintained per year. This productivity index is based on data collected in Okouma and South Lekedi ranches for Okouma N'Dama under average trypanosomiasis risk.

Table 8. Okouma N'Dama productivity index.

Cow viability (%)	97.1
Calving rate (%)	66.5
Calf viability to 1 year (%)	91.3
Weight of 1-year-old calves (kg)	130 (a)
Productivity index per cow per year (kg)	80
Adult cow weight (kg)	196
Productivity index per 100 kg of cow maintained per year (kg)	40.8

(a) Estimates.

Source: Indices calculated by authors.

Data on the production traits of trypanosusceptible Nguni and Nguni x Okouma N'Dama and Nguni and Senegal N'Dama crosses were also collected on Okouma and South Lekedi ranches. The numbers involved were relatively small and do not allow a valid comparison with the data obtained for the N'Dama breed. However, it should be noted that, although the mean performances of Nguni are superior to those of N'Dama, the number of Nguni on Okouma and South Lekedi ranches is declining. Mortality rate for Nguni unprotected with trypanocidal chemoprophylaxis is significantly higher than for N'Dama (OGAPROV, 1985).

16.3.2 DISEASES

High mortality rates due to a viral epidemic, the Rift Valley Fever and trypanosomiasis were recorded in ranches in 1982. Leptospirosis was responsible for abortions, stillbirths and deaths among young calves. Streptothricosis cases were also recorded in some ranches (BDPA, 1984).

16.3.3 HERD MANAGEMENT

Animal husbandry is practised in three forms in Gabon:

- the remainders of the sharecropping schemes;
- extensive ranching : Nyanga, Lekabi, Ngounié (Agrogabon);
- intensive ranching : Okouma, South Lekedi (OGAPROV) and Franceville.

A new approach to livestock production is currently being tried. Under this scheme, ranch-trained livestock producers (former herdsmen) are provided with assistance in the form of low rents, loans for the purchase of their seed-stock and with adequate facilities in an effort to encourage the establishment of local stocks. Intensive training is also provided. The OGAPROV programme aims to establish seven 70-ha farms in North Lekedi ranch. Three producers have already commenced operations and the financial results are encouraging.

The objective of the Agrogabon programme is to establish village seed herds in the vicinity of La Ngounié ranch, as part of a regional Integrated Operation.

The Lebamba Agro-pastoral Project has conducted studies on the socio-economic aspects of livestock production in the zone. The slaughter of animals is normally forbidden by social taboos. However, with new animal species such as cattle, these taboos may become irrelevant (Rochez, 1985).

Animal traction was introduced in the Lebamba groundnut producing zone in 1961 and technical assistance was provided until 1970. It is to be reintroduced in the region through the Lebamba Agro-pastoral Project, which aims to distribute 30 teams of oxen within the next four years, after a proper socio-economic study has been carried out (Rochez, 1985).

16.4 SHEEP AND GOATS

16.4.1 BREED DESCRIPTION

Although development programmes do not often include small ruminants, the Directorate of Livestock Production has established a sheep farm in the south-east which will subsequently be taken over by OGAPROV.

The farm was initially designed to provide technical support to sheep production development in this part of the country. It was subsequently converted into a Kirdi x Dorper crossbred lamb production farm. These animals are referred to as "Okouma", the name of the plateau on which the farm is located. Okouma sheep are white with a black head. Adult males weigh between 45 and 60 kg and ewes between 45 and 50 kg.

The flock currently consists of an estimated 300 sheep. Breeding stocks have been distributed to potential breeders with adequate facilities since 1982 (UDEAC, 1985).

16.4.2 DISEASES

Units of the Directorate of Livestock Production are currently implementing a comprehensive health programme (deworming ectoparasites treatment and distribution of mineral salts).

OGAPROV farm is also carrying out a prophylaxis programme which includes trypanosomiasis and parasitic control and distribution of mineral salts, vaccination against anthrax, brucellosis, Rift Valley Fever and enterotoxaemia (UDEAC, 1985).

16.4.3 HERD MANAGEMENT

The traditional management system is still the most common. Sheep and goats are kept in small herds and slaughtered during traditional feasts for family consumption.

The only example of improved livestock production is the sheep farm established on Okouma Plateau by the Directorate of Livestock Production.

16.5 RESEARCH AND DEVELOPMENT ACTIVITIES

16.5.1 RESEARCH CENTRES

In collaboration with the International Livestock Centre for Africa (ILCA) and the International Laboratory for Research on Animal Diseases (ILRAD), OGP/ROV has extended its research activities over the past few years, within the framework of the African Animal Trypanosomiasis Network.

16.5.2 MULTIPLICATION HERDS

The current situation regarding multiplication herds is shown in Table 9.

Work on Lekedi and Nyanga ranches facilities construction begun in 1980 and in 1981, respectively (J. Van Lancker Company, 1982).

Table 9. Multiplication herds.

Name	Franceville Presidential ranch
Location	Upper Ogoué Region
Organisation responsible	Office of the President, Libreville
Size	8000 ha
Breeds and numbers	1300 N'Dama in 1985
Objectives	Production of beef cattle and breeding stock.
Name	OGAPROV-Okouma and South Lekedi
Location	Upper Ogoué Region
Organisation responsible	OGAPROV, P O Box 245, Moanda
Size	1000 ha in use. To be extended to 1500 ha
Breeds and numbers	658 head in Okouma and 930 head in South Lekedi in 1985 including 1360 N'Dama, 150 N'Dama x Tuli and 48 Ngar'
Objectives	Crossbreeding programme, production of breeding stock and beef cattle. Training of producers in North Lekedi which currently has three units of 300 head.
Name	Nyanga ranch
Location	Nyanga Region, near Tehibanga
Organisation responsible	Agrogabon, P O Box 2248, Libreville
Size	18 000 ha. Could be extended to 95 000 ha
Breeds and numbers	8259 N'Dama. Cattle number should reach 30 000 head in 1992
Objectives	Beef production and N'Dama multiplication
Name	Lekabi ranch
Location	Upper Ogoué region, north-west of Franceville
Organisation responsible	Agrogabon, P O Box 2248, Libreville
Size	65 000 ha
Breeds and numbers	3372 N'Dama in 1985. A herd of 12 000 head is envisaged by 1992
Objectives	Beef production and N'Dama multiplication.
Name	La Ngounié ranch
Location	La Ngounié Region, 10 km south of N'dende village
Organisation responsible	Agrogabon, P O Box 2248, Libreville
Size	40 000 ha
Breeds and numbers	1081 N'Dama in 1985, expected to reach 5000 head in 1999. Out of this number 3500 head will be placed in 240 nucleus herds under traditional management
Objectives	Beef production and N'Dama multiplication Distribution of 15 breeding stock per village unit to 240 units which comes to about 3500 head N'Dama.

Source: OGP/ROV (1985); Agrogabon (1985); Assogbakpe (1985).

No recent data on the other farms and production stations mentioned in Volume II were available.

16.5.3 DEVELOPMENT PROJECTS

In 1981, Gabon received UNDP funding for a project entitled Agro-pastoral Development of Lebamba Zone. The objectives of the five-year project are to study the socio-economic aspects of livestock production in this region with a view to developing model structures and introducing animal traction.

Agrogabon, in collaboration with Ngounié ranch, plans to establish 240 nucleus herds with a herd expected to reach 3500 head by 1993 with a view to developing village production. In this respect, a feasibility study was conducted in 1983 by J. Van Lancker (Compagnie J. Van Lancker, 1983) and the first seed-stock were distributed in 1985.

In 1985, a project entitled Identification of the Needs of the Livestock Production Department was supported by FAO funds. It was aimed at determining the veterinary facilities (laboratories) to be set up, evaluating staffing requirements and identifying the nature and amount of the external aid required.

An FAO consultation mission visited Gabon in 1985 to conduct a study on the establishment of an inter-states multiplication and distribution centre of trypanotolerant breeds in UDEAC-member countries (Hoste, 1985). A feasibility study was carried out in 1986.

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16.7 MAJOR CHANGES SINCE 1977

The results presented in this study are an indication of the priority accorded livestock production in Gabon. In 1975, the cattle population was an estimated 2500 head. In 1985/86 the number had increased to 17 400 head, 16 000 of which were N'Dama. The sheep and goat populations increased by almost 100% during the same period.

An estimated 10 000 N'Dama were imported during the 1980's with a view to developing national livestock production. The cattle importation programme has, in theory being completed. The ranches involved should now implement the multiplication aspect of the programme in the shortest possible time in order to meet the high demand of village producers for stock.

A new communal ranch for UDEAC member countries will be established shortly in Gabon. The feasibility study on the project has just been completed and funds are being sought.

CHAPTER 17

CONGO

17.1 BACKGROUND

The Directorate of Livestock Production created in 1981, is under the Ministry of Agriculture and Livestock Production which is responsible for almost all state companies concerned with agriculture.

The Directorate comprises the following five divisions:

- Cattle, Sheep and Goat Production Division
- Poultry Farming Division
- Pig Production Division
- Animal Health Division
- Veterinary Inspection Division.

Data on human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of the Congo, 1983/1984.

Human population (1984)	
- number	1 900 000
- density	5.5/km ²
Animal population (1983)	
- cattle	65 000
- sheep	85 000
- goats	180 000

Source: For human population: Assogbakpe (1985).

For animal population: Direction de l'Elevage (1983) quoted by Assogbakpe (1985).

According to Frez. and Eouzan (FAO, 1982) *G. morsitans* is not found in the Congo. Distribution and infestation rate of *G. palpalis* and *G. fusca* is uneven. The riverine gallery forests of Upper Likouala, Djoué valley (tributary of the Congo upstream from Brazzaville), Niari and its main tributaries, are infested with *G. palpalis palpalis* and *G. fuscipes quanzensis*.

The dominant species may vary depending on the area. *G. palpalis palpalis* is rare around Makoua; *G. fuscipes quanzensis* seems to be the most common species in Moukomo. This species is also common in villages located at the foothills of the Batéké land.

G. fuscipes species are not very common in the country and *G. tabaniformis* is more frequent than *G. fusca*. The latter was not found south of latitude 2° north until 1953. *G. tabaniformis* is found along the Congo River as far south as Brazzaville and even farther (Louboulou Ranch).

Tsetse control using traps was introduced in 1979 in the two main infestation areas:

- Niari area located along the Brazzaville-Pointe noire axis (*G. palpalis palpalis* vector),
- The "Couloir" area on Congo River upstream from Brazzaville (*G. fuscipes quanzensis* Vector). The main objective of the programme was to control human trypanosomiasis (EOUZAN, 1986).

17.2 CATTLE NUMBERS AND DISTRIBUTION

Cattle distribution in the different ranches in 1982/83 is shown in Table 2. N'Dama is the main breed raised in ranches.

Table 2. Distribution of cattle in the different ranches, 1983.

Ranches	Numbers
Dihesse	12 111
Louila	5 732
Louboulou	3 549
Massangui	7 537
Louamba	6 701
Total	35 630

Source: BDPA (1984).

Table 3 shows the distribution of cattle under traditional management in 1982/83. Some 16 000 N'Dama are maintained under this system, the remainder being Lagune breeds and some crossbreds.

Table 3. Distribution of cattle under traditional management, 1982/83.

Region	Number
Kouilou	10
Niari	3 513
Lekoumou	481
Bouenza	10 953
Pool-Braz.	10 789
Plateaux	70
Cuvette	455
Sangha	99
Private schemes	3 000
Total	29 370

Source: Direction de l'Elevage (1982).

The cattle population of the Congo is 65 000 head, including some 54 000 N'Dama and 10 600 Lagune.

Between 1977 and 1983, the number of cattle increased from 43 000 head to 65 000 head through importation of large numbers of N'Dama (1985 head) from Zaire.

17.3 CATTLE

17.3.1 BREED DESCRIPTION

17.3.1.1 N'DAMA

Ranches or production stations account for 65.5% of the N'Dama population. Only 34.5% are under traditional management.

17.3.1.1.1 Production traits

Production parameters for N'Dama raised on the Dihéssé ranch were recorded in 1979 and 1981. The data collected are presented in Table 4.

Table 4. N'Dama production traits in Dihéssé ranch, 1979 and 1981.

	1979	1981
Age at first calving (months)		33
Calving rate (%)	72.9	75
Calf mortality rate (%)	4.5	4
Adult mortality rate (%)	1.25	1.25
Birthweight (kg)	20	20
Weaning weight at 8 months (kg)	104	100
Weight of 2-3 year old heifers (kg)	180-200	
Adult cow weight (kg)	250	250
Hull weight (kg)	320	350
Carcass yield (%)		
- bulls	53	
- mature cows	48-50	

Source: Ministry of Planning (Ministère du Plan) (1981).

The highest fecundity rate was recorded at Dihéssé ranch. Performances on ranches established earlier, such as Masangui ranch, established in 1952, are lower. Fecundity and mortality rates for 1983 for the different ranches are given in Table 5.

Table 5. Fecundity and mortality rates for the different ranches, 1983.

Ranch	Calving rate (%)	Overall mortality rate (%)
Dihesse	67	2.5
Louila	47	1.8
Louboulou	46	4
Massangui	25.4	0.9
Louamba	27	0.9

Source: BDPA (1984).

17.3.1.1.2 Productivity index

Estimates of the main production parameters required to compute a productivity index based on total weight of a 1-year-old calves produced per 100 kg of cow maintained per year are given in Table 6. This productivity index is based on data collected at Dihéssé ranch in 1979 and 1981.

Table 6. N'Dama productivity estimates.

	1979	1981
Adult female viability (%)	98.7	98.7
Calving rate (%)	72.9	75
Calf viability to 1 year (%)	95.5	96
Calf weight at 1 year (kg)	120(a)	120(a)
Productivity estimates per cow per year (kg)	84	86.9
Cow weight (kg)	250	250
Productivity estimate per 100-kg cow maintained per year (kg)	33.6	34.8

(a) Estimates.

Source: Indices calculated by authors.

17.3.1.2 LAGUNE

No recent data on the production parameters of this breed are available.

17.3.2 DISEASES

The health situation in the country remains satisfactory. No case of rinderpest has been reported and streptothricosis remains a marginal problem.

A few outbreaks of bovine pleuropneumonia were reported in herds maintained in the vicinity of Djambala. The disease seems to be under control. Brucellosis is widespread (37% of positive-testing in some ranches in 1977) and vaccination has been recommended to prevent abortions. Tuberculosis is often mentioned. However, the confirmed cases are few. Cases of otitis, the aetiology of which has not been indicated, have also been reported on some ranches. Trypanosomiasis vectors are *T. vivax*, *T. congolense* and *T. brucei*. Mortality rate is 25% (FAO, 1982; 1985).

17.3.3 MANAGEMENT SYSTEMS

The two management systems used in the Congo are the village and ranching systems. BDPA (1984) gives a detailed description of both systems.

17.3.3.1 VILLAGE MANAGEMENT

The village-management system (share-tenancy) smallholder herds are found mainly in the southern part of the country with the greatest concentration in Bouenza, Pool and Niari Regions.

A total of 954 Lagune were imported from Benin between 1953 and 1959 under individual sharecropping schemes mainly in Kimango District. Beneficiaries were required to repay the loan with an equal number of cattle of the same age as that provided plus half the herd natural growth, at the end of the contract. At the same time, the M'Passa N'Dama Multiplication Station was providing competent producers with N'Dama on a loan basis. Here, the sharecropping repayment of the loan on contract only provided natural growth.

Since 1963, the government has been trying to establish large herds through collective sharecropping. A total of 100 heifers and five bulls were loaned to cooperatives of 20 members. Members committed themselves and raised a working capital through the payment of a contribution. The four collective herds established in 1963 were a failure due to the following reasons:

- misunderstanding between members
- unequal distribution of contributions as some members contributed land and other labour. The relative value of these services could not be easily evaluated
- the misconception of the populations which regarded the associations solely as a means of obtaining cattle and lacked a spirit of cooperation.

Consequently, conditions for participating in sharecropping operations have been slightly modified. Participation is now limited to members of pre-cooperatives or family units.

The operations have been temporarily discontinued due to a shortage of distribution stock at M'passa Station and of lack of resources to recover government cattle detained by sharecroppers. Smallholder cattle owners or sharecroppers are to be found in all provinces except Likouala.

17.3.3.2 RANCHING

The Government is the biggest cattle producer with some 40 000 head maintained under extensive ranching by the "Office du Gros Bétail" (OGB). Government-owned livestock are maintained in

- six main units: M'passa, Louila, Massangui, Louamba, Louboulou and Dihesse
- an agropastoral society at Madingou
- other small regional or research stations located in
- Pool (km Rouge Cattle Research Centre, Mankoussou, Kinpala and Kilebe-Moussa farms)
- the highlands (Etoro farm)
- the Basin (Etumbi farm)
- Sangha and Likouala.

Cattle on all Government farms are of the N'Dama breed except for those at the km Rouge Cattle Research Station which takes up research already conducted on the acclimatisation of 295 head of zebu and Frison imported from Cuba.

Since 1948, N'Dama have been imported from Guinea, Senegal and Zaire for Louila, Louboulou and Dihesse ranches. Zebu cattle were also imported from Cameroon and Central African Republic but died from trypanosomiasis, streptothricosis or piroplasmiasis in spite of treatment. Management of these ranches have proved difficult. The farm hands have no tradition of livestock management. The N'Dama, normally docile in its original habitat, rapidly becomes wild in these vast expanses of rangelands where it loses all contact with man (Crouail, 1984).

17.4 SHEEP AND GOATS

17.4.1 BREED DESCRIPTION

17.4.1.1 SHEEP

In 1981, the Ministry of Planning conducted a survey to estimate the main production parameters for sheep under village conditions. The productivity index showing the total weight of five-month-old lambs per 10 kg of ewe per year was calculated from data collected during this survey and is given in Table 7.

Table 7. Productivity estimates for West African dwarf sheep.

Ewe viability (%)	90
Lambing rate (%)	78
Lamb viability to one year (%)	67
Lamb weight at five months (kg)	13(a)
Productivity index per ewe per year (kg)	7.15
Ewe weight (kg)	25
Productivity index per 10-kg ewe maintained per year (kg)	2.8

(a) Estimates.

Source: Indices calculated by authors.

17.4.1.2 GOATS

Estimates for the main production parameters required to calculate a productivity index giving the total weight of five-month-old kids produced per 10 kg of dam per year are given in Table 8. The index is based on data collected under village conditions (Ministère du Plan, 1984).

Table 8. Productivity estimates for West African Dwarf goat.

She-goat viability (%)	90
Kidding rate (%)	70
Kid viability to one year (%)	67
Kid weight at five months (kg)	13(a)
Productivity index per goat per year (kg)	6.4
Adult goat weight (kg)	18
Productivity index per 10 kg of goat maintained per year	3.55

(a) Estimates.

Source: Indices calculated by authors.

17.4.2 HERD MANAGEMENT

In 1982, sheep management systems took these three forms (FAO, 1982):

- Village sheep management system where sheep are allowed to graze freely
- Urban sheep management system, practised in some urban areas by individuals who are mainly traders: the animals are kept in an enclosure in the compound and are raised for sale during major religious feasts and for home consumption
- Organised sheep breeding practised by individuals and missions in urban areas: sheep graze in controlled (fenced) pastures and on sheep farms. Supplementary feeding in the form of maize and salt licks is normally provided. Regular health care is provided (drenching for gastro-intestinal parasites) and young males castrated.

17.5 RESEARCH AND DEVELOPMENT ACTIVITIES

17.5.1 RESEARCH CENTRES

The Brazzaville Veterinary Laboratory continues its work on the identification of diseases on State farms.

17.5.2 MULTIPLICATION HERDS

The largest multiplication herds in the country are listed in Table 9. There are also smaller government livestock production centres at Etoro, Plateaux region (17 head), Mankoussou, Pool Region, Etumbi, Cuvette region (27 head), Sangha (22 head) and Likouala (12 head). These figures are for 1985. Recent data on Odziba sheep farm are unavailable.

Table 9. Multiplication herds.

Name	Mpassa farm
Location	Pool region, 2 km from Mindouli
Organisation responsible	Office de Gros Bétail (OGB)
Size	16 000 ha available, 2000 ha in use
Breeds and numbers	500 N'Dama (1985)
Objectives	Should be converted into a livestock research centre (CRZ)
Remarks	Lack of funds to launch the CRZ.
Name	APN farm
Location	Pool Region, 20 km from Kindamba
Organisation responsible	National People's Army
Size	500 ha
Breeds and numbers	476 N'Dama and 250 sheep (1985)
Objectives	Beef production
Remarks	Supplies the Army.
Name	Louila Ranch
Location	Pool Region, 30 km from Mindouli
Organisation responsible	OGB
Size	Ministry of Agriculture and Livestock Production
Breeds and numbers	13 000 ha of fenced pastures
Objectives	5732 N'Dama (1983 and 1985)
Remarks	Beef production and stock breeding Projected herd size of 6000 head.
Name	Louboulou Ranch
Location	Bouenza, 30 km from Loudima
Organisation responsible	OGB
Size	Ministry of Agriculture and Livestock Production
Breeds and numbers	16 000 ha including 12 000 ha of fenced pastures
Objectives	3543 N'Dama (1983 and 1985)
Remarks	Production of beef cattle and breeding stock Projected herd size of between 6 000 and 8000 head
Name	Dihesse ranch
Location	Bouenza, 45 km from Loudima
Organisation responsible	OGB
Size	Ministry of Agriculture and Livestock Production
Breeds and numbers	64 000 ha including 30 000 ha of fenced pastures
Objectives	12 111 N'Dama in 1983 and 13 000 in 1985
Remarks	Beef production and stock breeding Projected herd size of 16 000 with possibilities for expansion.
Name	Louamba ranch
Location	Bouenza, 25 km from Nkayi
Organisation responsible	OGB
Size	Ministry of Agriculture and Livestock Production
Breeds and numbers	12 000 ha of which 7251 ha in use
Objectives	6071 N'Dama in 1983 and 7143 in 1985
Remarks	Beef production and stock breeding Projected herd size of 8000 head.
Name	Massangui Ranch
Location	Bouenza, Mouyondzi District
Organisation responsible	OGB
Size	Ministry of Agriculture and Livestock Production
Breeds and numbers	30 000 ha available, 12 200 ha in use
Objectives	7537 N'Dama in 1983; 7691 in 1985
Remarks	Production of beef cattle and breeding stock Projected herd size of 9000 head.
Name	Madingou Agro-pastoral Company
Location	Bouenza, 15 km from Madingou
Organisation responsible	Congolo-Romania Company Ministry of Agriculture and Livestock Production
Size	-
Breeds and numbers	1867 N'Dama in 1985
Objectives	Production of beef cattle
Remarks	-

Source: BDPA (1984); FAO (1985).

Plans for the establishment of two new ranches are under consideration. Data on the ranches are given on Table 10.

Table 10. Planned new ranches.

Name	Cuvette Ranch
Location	Makoua, Cuvette Region
Organisation responsible	OGB Ministry of Agriculture and Livestock Production
Size	-
Breeds and numbers	Projected herd size of 5000 N'Dama
Objectives	Establishment of a breeding herd
Remarks	Funds are still being sought.
Name	Plateau Ranch
Location	Plateau Region
Organisation responsible	OGB Ministry of Agriculture and Livestock Production
Size	-
Breeds and numbers	Projected herd size of 2000 N'Dama
Objectives	Establishment of a breeding herd
Remarks	Funds are still being sought.

Source : FAO (1985).

17.5.3 DEVELOPMENT PROGRAMMES

As part of the African Animal Trypanosomiasis Control and Development of infested areas programme, an FAO mission visited the country in 1981 (FAO, 1982) and identified the following projects:

- Establishment of N'Dama cattle production centre in Makoua, Cuvette Region
- Identification of cattle production projects in the Plateaux Region
- Assistance for the operation of Technical Support Centres for Small Ruminant Production
- Trypanosome control in the People's Republic of Congo
- Planning of a National Work Oxen Development Project.

In 1985, Congo received UNDP assistance for three months as part of the implementation of a project entitled Assistance au Programme des Villages Centres-Developpement rural Intégré. The project also plans to develop sheep production under village conditions.

In 1982, FAO provided assistance to the Congo for a period of four years under a project entitled "Assistance to the Ministry of Agriculture and Livestock Production for the Development of Food Crop and Livestock Production in Rural Areas.

Technical Support Centres (CAT) for the development of small ruminant production were recently established in Makoua, Cuvette, Region, Impfomdo, Likouala Region and at Mpouya, Plateaux region with a view to boosting small ruminant production.

These centre programmes will include several aspects: animal health, pasture improvement, mass selection, herding and night shelters. The Centres, in collaboration with village smallholders, will develop production methods easy to disseminate and to master by all small ruminant owners.

Funds for the project are entirely provided by the Government. Technical assistance for Phase I (1982–1985) and Phase II (1985–1987) will be provided by FAO under the project entitled Technical Support Centre for Small Ruminants Production.

Another small ruminant project was launched in 1984, i.e. the Inoni-Falaises Sheep Production Unit to be established in the Pool Region, north of Brazzaville. The objectives of the two-year project are lamb meat production, the introduction of forage grasses and legumes into rural areas, training of village sheep producers distribution of breeding stock to smallholders, development of a health monitoring system and training of extension workers specialised in sheep production.

Technical assistance is provided by FAO under the "Inoni-Falaises Sheep Production Centre Project".

From the end of 1986, FAO will provide assistance to Congo, mainly in the form of materials, equipment and staff for 26 months, as part of a programme to develop livestock production in Boundji District (*Marchés Tropicaux*, 1986).

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17.7 MAJOR CHANGES SINCE 1977

Significant developments have occurred with regard to cattle production. The cattle population, which numbered 43 300 head in 1977 is currently estimated at 65 000 head. Importation of almost 2000 N'Dama and an estimated annual herd growth rate of 10% account for the increase in

numbers during this period. Figures given are for cattle maintained both under traditional management and on ranches (Hoste and Shaw, 1987).

The country is also focusing its efforts on small ruminants production. The small ruminant population increased by almost 100% during this period. With the establishment of Small Ruminants Technical Support Centres (CAT) and the technical assistance provided, a rapid increase in sheep and goat production rate is expected.

CHAPTER 18

ZAIRE

18.1 BACKGROUND

The Ministry of Agriculture and Rural Development (DADR) now consists of 8 Directorates. The Directorate of Livestock Production and Animal Health (DPSA) formulates and proposes a livestock development policy for Zaire and monitors the implementation of such a policy by its regional and subregional departments as well as by private and statal producers.

The Directorate is also responsible for the implementation of livestock production support and extension projects such as the Ituri Project Office (BPI), North Kivu Project, and the Veterinary Laboratories in Kinshasa and Lumumbashi. The technical aspects of these projects are supervised by DPSA and the administrative and financial aspects by the General Directorate for Projects Management (DAGP).

The Ministry is also in charge of The National Office for the Development of Livestock Production (ONDE), a parastatal which operates some government ranches (FAO, 1985). Data on human and animal populations of the country are given in Table 1.

Table 1. Human and animal populations of Zaire, 1983 and 1984.

	For the country	For the study area
Human population (1984)		
– number	29 671 407	10 334 524
– density	12.65/km ²	13.5/km ²
Animal population (1983)		
– cattle	1 461 000	358 823
– sheep	964 200	231 408
– goats	4 501 700	1 395 527

Source: For human population: projections (+ 2.5%) based on 1982 census. National Statistics Institute (1984).
For animal population: DADR (1984) (estimates).

Zaire does not have a government body responsible for tsetse and animal trypanosomiasis control. This falls under the normal responsibilities of DPSA.

18.2 CATTLE NUMBERS AND DISTRIBUTION

Table 2 gives cattle numbers and distribution in Zaire for 1983. The study area comprises the three regions of Kinshasa and Lower Zaire, Bandundu and Equator. The boundaries are based on the geographical distribution of trypanotolerant cattle. More than 85% of the cattle population of about 358 823 head in the study area are trypanotolerant.

Table 2. Livestock numbers and distribution in Zaire, 1983.

Region	Area	Cattle	Sheep	Goats
Kinshasa and Lower Zaire	63 885	129 644	77 136	270 102
Bandundu	295 658	175 100	115 704	630 238
Equator	403 793	54 079	38 568	495 187
Upper Zaire	503 239	349 469	67 494	675 255
Kivu	256 662	310 882	221 766	716 572
Shaba	496 965	269 519	154 272	405 153
East Kasai	168 216	38 440	125 346	723 972
West Kasai	156 967	134 467	163 914	585 221
Total	2 344 885	1 461 600	964 200	4 501 700

Source: DADR (1984).

Table 3 shows cattle distribution by breed. An estimated 90% of the 451 100 trypanotolerant cattle in Zaire are of the N'Dama breed.

Table 3. Cattle numbers and distribution by breed.

Breeds	Numbers
N'Dama	350 000-450 000
Lagune	15 000-20 000
Afrikander	620 000
Anchole	350 000
Exotic breeds(*) + crossbreeds	45 000
Mateba and crossbreeds	16 000-22 000
Total	1 461 000

(*) = Imported breeds: Brown Swiss, Sahiwal.

Source: DADR (1984).

18.3 CATTLE

18.3.1 BREED DESCRIPTION

18.3.1.1 LAGUNE

No recent data on this breed are available.

18.3.1.2 N'DAMA PRODUCTION TRAITS

N'Dama fecundity rates on Kolo and Mushie ranches were between 75 and 85%. Mortality rate for 15 days-to-1-year-old calves was between 5 and 8%. Overall mortality rate was 1 to 2%. Breeding cow weight recorded at Kolo ranch was 308 kg and 273 kg at Mushie ranch (ILCA, 1986).

18.3.1.2.1 Productivity index

Table 4 summarises the estimates of the main production parameters required to calculate a productivity index showing the total weight of 1-year-old calves produced per 100 kg of cow maintained per year. This index is based on data collected at Kolo ranch for production of beef cattle under moderate trypanosomiasis risk.

Table 4. N'Dama productivity estimates under moderate trypanosomiasis risk at Kolo ranch.

Adult females viability (%)	98.5
Calving rate (%)	80
Calf viability to 1 year (%)	95
Calf weight at 1 year (kg)	134(a)
Productivity index per cow per year (kg)	102.6
Adult females weight (kg)	308
Productivity index per 100-kg cow maintained per year(kg)	33.3

(a) Estimates.

Source: Indices calculated by author.

18.3.2 DISEASES

Animal trypanosomiasis is still a major problem in Zaire. Rinderpest is believed in the Northern, North-eastern and Eastern Regions, and Zaire has received FAO assistance as part of the implementation of a project entitled "Emergency Rinderpest Vaccination Campaign". Foot-and-mouth disease allegedly affects 3% of the cattle population and in northeastern Zaire, 24% of cattle are said to be affected by contagious bovine pleuropneumonia. Tuberculosis, brucellosis, anthrax, blackquarter and lumpy skin diseases are reported to be endemic and theileriosis is found mainly in the north and north-eastern part of the country (FAO, 1985).

18.3.3 HERD MANAGEMENT

Table 5 gives the distribution by breed of 194 775 head of cattle in Lower Zaire, East Kasai and Equator Regions. The data were obtained from a survey conducted in 1985 in these regions.

Table 5. Cattle distribution by livestock management systems in Lower Zaire, East Kasai, Equator and Bandudu Regions.

	Numbers	Number of herds	Average herd size
State farms	20 584	6	3431
Religious organisations	32 096	14	2293
Large individual herds (> 1000 head)	130 239	14	9303
Small individual herds (< 1000 head)	11 856	100	119
Total	194 775	134	1454

Source: N'lemba quoted by Shaw (1985).

18.4 SHEEP AND GOATS

No recent data on small ruminant production parameters are available.

18.5 RESEARCH AND DEVELOPMENT ACTIVITIES

18.5.1 RESEARCH CENTRES

Belgian assistance to the Kinshasa Veterinary Laboratory was extended to cover the period 1984–1986. The laboratory continues to produce vaccines and conduct research on trypanosomiasis.

Lumumbashi Veterinary Institute conducts research on trypanosomiasis in collaboration with the Faculty of Veterinary Medicine of Lumumbashi University.

The National Institute for Agricultural Research (INERA) focuses mainly on agricultural research. However, it maintains several herds, mainly in Mvuazi, Lower River subdivision, Lower Zaire (552 head in 1985) and in Gandajika, Kabinda subregion, in East Kasai (187 head in 1985).

Certain national structures are currently conducting research within the framework of the African Trypanotolerant Livestock Network co-ordinated by the International Livestock Center for Africa (ILCA). Research programmes were launched in 1983 in Kolo and Mushie ranches and in 1985 in the rural areas (ILCA, 1986).

18.5.2 MULTIPLICATION HERDS

The Rural Economy Grouping was privatised in 1983–84. A mission from the Ministry of Agriculture and Rural Development is expected to visit Lower Zaire to determine the number of cattle owned by sharecroppers.

Data on the main sharecropping centres are given in Table 6.

Table 6. Sharecropping centres.

Name	Idiofa People's Progress and Development	Diocesan Office (BDD)
Location	Diocese of Idiofa	Kitwit, Kwilu subregion, Bandudu
Organisation responsible	DPP P O Box 8251 Kinshasa	Kitwit P.O.Box 144, Kwilu
Size	—	
Breeds and numbers	10 000 head in the diocese (in 1986)	3000 N'Dama Lagune, Afrikander and Angolan crossbreeds (1984)
Objectives	Livestock development, veterinary assistance. Sharecropping operations. Research on productivity and trypanosomiasis in collaboration with ILCA	Production of beef and breeding stock. Sharecropping operations.
External Aid	Belgian Government	

Source: Shaw (1985).

Recent data on other sharecropping centres covered in Volume II are unavailable. Current data on the main multiplication herds are given in Table 7.

Table 7. Multiplication herds.

Name	Lola ranch
Location	Equator Region, North Ubangui subregion, Bosoboko
Organisation responsible	Agricultural Development Centre
Size	60 000 ha
Breeds and numbers	6500 N'Dama (1984)
Objectives	production of beef cattle and breeding stock
External aid	Between 1978 and 1983, Belgian Government State ranch.
Name	Kolo ranch
Location	Kolo-Fuma, Lower Zaire subregion.
Organisation responsible	J. Van Lacker Company, P.O.Box 199, Kinshasa
Size	50 000 ha
Breeds and numbers	Between 23 000 and 25 000 N'Dama (1984)
Objectives	Commercial ranch. Production of breeding stock for the local market and export. Productivity and trypanosomiasis research by ILCA
External aid	Private ranch.
Name	Mushie ranch
Location	Bandudu region, Mai-Ndombe subregion
Organisation responsible	J. Van Lacker Company, P.O. Box 199, Kinshasa
Size	30 000 ha in use
Breeds and numbers	17 000 N'Dama in 1984. Projected herd size of 23 500 N'Dama by 1989/90
Objectives	Commercial ranch, production of breeding stock for the local market and export. Productivity and trypanosomiasis research by ILCA
External aid	Private ranch.
Name	Kitomessa Farms and Plantations (PEK)
Location	Lovo and Sanzikwa, Lower Zaire
Organisation responsible	PEK
Size	20 000 ha
Breeds and numbers	7329 N'Dama in 1984
Objectives	Production of beef cattle and breeding stock
External aid	Private ranch
Name	Mateba ranches : – Mateba and Kanga sector – Kiasunda sector – Yuku sector
Location	Mateba and Kanga sector are located on Mateba Island and the banks of the Congo River near Boma, in Lower Zaire – Kiasunda sector, located in Malangua, Lower Zaire – Yuku sector, located in Yuku, Lower Zaire.
Organisation responsible	Société des Grands Elevages du Bas Zaire (SGE)
Size	– Mateba and Kanga sector: 7000 ha on the Island and 20 000 ha on either bank of the river – Kiasunda sector: 35 000 ha – Yuku sector: 20 000 ha
Breeds and numbers	Total for all the ranches: 21 300 N'Dama x Mateba crossbreds in 1984
Objectives	Commercial ranch
External aid	Private ranch
Name	Ndongo Zola ranch
Location	Moanda, Lower Zaire Region and Lower River subregion
Organisation responsible	Private
Size	2500 ha
Breeds and numbers	1420 N'Dama x Lagune crossbreds in 1984
Objectives	Commercial ranch
External aid	–

Table 7. (Cont'd)	
Name	Kalombi farm
Size	Near Feshi, Bandundu Region, Kwango subregion
Organisation responsible	Kitwit, P O Box 69
Size	5000 ha
Objectives	4000 N'Dama x zebu crossbreds in 1984
External aid	Commercial ranch
Name	Mpaka ranch
Location	Equator Region, North Ubangui subregion in Bosobolo zone
Organisation responsible	Agricultural Development Centre (CDA)
Size	75 000 ha of which 25 000 in use
Breeds and numbers	10 000 N'Dama x Ituru Afrikander in 1984
Objectives	Production of beef cattle
External aid	State ranch.
Name	Fiwa ranch
Location	Equator region, North Ubangui subregion, Bosobolo zone
Organisation responsible	Agricultural Development Centre (CDA)
Size	-
Breeds and numbers	3000 N'Dama in 1984
Objectives	Production of beef cattle
External aid	State farm.
Name	Lombo, Bosondjo and Lusana ranches
Location	Lombo and Bosondjo are located in Equator Region, North Ubangui. Lusana is located in Kwilo subregion Bandudu
Organisation responsible	Lever Plantations, Zaire (PLZ) P O Box 8611, Kinshasa
Size	20 000 ha for Lombo
Breeds and numbers	Mostly N'Dama. Some zebu and zebu x N'Dama. 3000 head in Lombo, 2000 in Bosondjo and 10 000 in Lusana in 1984.
Objectives	Production of beef cattle
External aid	Private ranch.

Source: Shaw (1985).

There are no data available on the other ranches mentioned in the previous study. Furthermore, it is likely that the Directorate of Livestock Production and Animal Health (DPSA) holds no records of several other large ranches.

18.5.3 DEVELOPMENT PROJECTS

The Department of Agriculture and Rural Development has studied and submitted a project entitled CODAIK or the Kwango-Kwilo Integrated Agricultural Development Project (Company) in southern Bandudu Region.

The following activities, funded by IDA, FRG and FAO have been carried out: refresher course for field staff, adaptation trials on improved maize varieties and establishment of a 200 ha multiplication centre for improved seed varieties. The project is concentrating on agricultural production with a weak livestock production component.

A project to provide producers with veterinary assistance is to be launched in Mbanza-Ngungu Region, Lower Zaire. It will be funded by the Government of Belgium and will cover between 5000 and 10 000 head of cattle in the study area. The Belgian Government will also fund the following projects, which include a livestock production component (FAO, 1985):

- improvement of livestock production in Kasongo
- production of anaplasmosis vaccines

- livestock production in the Idiofa area
- assistance to livestock producers and fishermen in Mbandaka.

Several projects to train work oxen are in progress:

- Nkata Project based in Masuika, West Kasai and Mbuji-mayi Rural Project based in East Kasai. Both projects are funded by the Oxford Committee for Famine Relief (OXFAM) and train an estimated 30–40 pairs of work oxen annually
- The Integrated Rural Development Project in Luala Valley, funded by the Government of Italy, which provides about 10 work oxen annually.

The World Bank plans to introduce a work oxen training programme as part of the West Kasai Project (Starkey, 1984).

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18.7 MAJOR DEVELOPMENTS SINCE 1977

The trypanotolerant cattle population in Zaire continues to increase at a regular rate. In 1977, there were only 274 000 head. The number is currently estimated at 450 000 head, an increase due solely to the growth in the N'Dama population. The number of Lagune and zebu x Shorthorn has remained static.

The N'Dama population is estimated at 415 000 head and accounts for over 70% of the cattle on large private ranches.

Over 3000 head of selected N'Dama were exported in the 1980's, mainly to Gabon (Hoste and Shaw, 1987).

With the launching of a research programme under the ILCA/ILRAD Network, very important and useful data on N'Dama performances under ranch and village conditions should become available.

CHAPTER 19

EQUATORIAL GUINEA

19.1 BACKGROUND

Equatorial Guinea was not included in Volumes I and II of the original FAO/ILCA/UNDP study. Detailed general background information concerning this country is, therefore, given below.

The Republic of Equatorial Guinea is partly situated on mainland West Africa, and partly on Bioko, Annobon, Corisco, Elobey Grande and Elobey Chico islands, in the Gulf of Guinea, off the West African coast.

Mainland Equatorial Guinea, formerly known as Rio Muni, is bounded on the North by Cameroon and on the South by Gabon.

The country comprises seven provinces and 18 districts. The capital, Malabo, is situated on Bioko island.

The Ministry of Agriculture, Livestock and Rural Development comprises three Directorates: a Directorate of Agriculture, a Directorate of Livestock and a Directorate of Agricultural Extension Service (SEA). The latter is responsible for 12 offices throughout the country, each consisting of three departments: Animal Health and Production, Agricultural Extension and Domestic Economy.

Background data for the country are given in Table 1. Equatorial Guinea has a typical tropical climate influenced by the south-west monsoon winds and the warm waters of the Gulf of Guinea.

Bioko island experiences two seasons: a dry season between November and April and a rainy season between April and October. There are four seasons on the mainland: a dry season lasting from June to August, a rainy season between September and November, a short dry season between December and March and a short rainy season in April–May. The climate is generally extremely humid (relative humidity is between 80 and 95%). Average rainfall is between 2000 and 2500 mm and mean temperature 26°C depending on the altitude.

Mainland Equatorial Guinea is relatively mountainous with altitude increasing from the coast to the hinterland. The coastline plain is 20 km wide and borders on several mountain ranges (Siete hills 600 m, Mounts Mitra and Biyemeyeme 1200 m, Sierra de Cristal 1200 m, Mounts Chocolate and Alen 1200 m), interspersed with peneplains usable for livestock production.

Bioko island is of volcanic origin. Its peak is 3007 m above sea level. It harbours a wide plain of about 15 000 ha (Moka Valley) located at an altitude of between 1200 and 1500 m. The OAU tsetse distribution map published by Ford and Katondo (1976) shows that the entire country, including Bioko island, is infested by *G. palpalis*. The *fusca* group is allegedly confined to the mainland. Infestation rate varies with altitude and plains such as Moka Plain in Bioko Island are considered tsetse-free.

Table 1. Background data on Equatorial Guinea.

Total area distributed		28 051.5 km ²
of which:	mainland	26 000 km ²
	Bioko island	2 017 km ²
	Annobon island	17 km ²
	Corisco island	15 km ²
	Elobey Grande island	2.3 km ²
	Elobey Chico island	0.2 km ²
Latitude	3°48'N - 1°27'S	} mainland and islands
Longitude	5°37'E - 11°19'E	
Human population (1983)		
- number	300 060 in habitants	
- density	10/km ²	
Animal population (1983)		
- cattle	320	
- sheep	5 000	
- goats	20 000	

Source: For human population, provisional figures for 1983 pre-census; for animal population, FAO (1985).

19.2 LIVESTOCK NUMBERS AND DISTRIBUTION

Estimates of livestock numbers by species and region are given in Table 2.

Table 2. Livestock distribution by species, 1983.

	Cattle	Sheep	Goats
Bioko	220	1000	5000
Continent	100	4000	15000
Total	320	5000	20000

Source: FAO data (1985), revised by experts from the Ministry of Agriculture and Livestock and Rural Development (Ministère de l'agriculture, de l'élevage et du développement rural), 1985.

Thus, village smallholders possess very few ruminants. In comparison, the population of short-growth-cycle animals is large. Average herd composition in Niefang District on the mainland is given as an example in Table 3.

Table 3. Herd composition in Niefang District.

	% of farms with animals	Number of head/farm with species	Number of head for 1000 farms in district
Cattle	-	-	-
Sheep	15	1.6	240
Goats	39	3.1	1209
Pigs	21	3.9	819
Chickens	63	7.8	4914
Ducks	39	2.7	1053

Source: BDPA (1983) quoted by Hoste (1985).

19.3 CATTLE

There is an estimated 100 head of trypanotolerant cattle in Equatorial Guinea.

The 207 head counted on Bioko island in 1983 in high altitude Moka valley are all owned by a single company. The herd consists of European breeds and comprises 69 Charolais, 113 Andalusian and 25 crossbreds.

Weight of 4-year-old males is 400 kg for Charolais, 360 kg for crossbreds and 300 kg for Andalusian Retinto.

Cattle on the mainland consists of the Savannah Shorthorn breed from Cameroon. Average adult weight is between 200 and 230 kg. No data is available on production parameters for this breed. The private producer with a herd of about 40 head near BATA reported the presence in his herd of two Shorthorn x Jersey cows whose origins could not be traced back. No study on diseases has been carried out and the few existing herds are maintained under a highly traditional management system (FAO, 1985).

19.4 SHEEP AND GOATS

19.4.1 BREED DESCRIPTION

Sheep and goats on both the island and mainland are all of the West African Dwarf breeds. Surveys on the production parameters of these breeds are under way (GTZ project).

As is the case with cattle, there is little information on the disease status of small ruminants. The management system is mainly traditional, i.e. animals are allowed to graze freely except during the farming season.

19.5 RESEARCH AND DEVELOPMENT ACTIVITIES

Research and development activities focus mainly on agriculture in an effort to boost cocoa and coffee exports and increase food production in the rural areas. The few existing research stations and farms are mainly concerned with poultry and pig production. A United Nations project to develop rabbit production is also being implemented.

Some of these centres were formerly involved with small ruminants and still maintain a few head. The main ones are:

- Evinanyong Station (125 ha and 30 goats)
- Musola Research Centre (on Bioko island) which still has 12 head of cattle and about 20 head of small ruminants
- The Aconibé complex of 30 ha which currently maintains only a few small ruminants but previously had some cattle
- Mongomo complex which maintains some goats
- Bata Nfunga Station which maintains some goats

The private project in Moka Valley on Bioko island which has great potential for expansion and in collaboration with which the government intends to launch a national cattle production project, is not included in this list.

The only current effort in the field of small ruminant production is a goat's milk production project on Bioko island, launched with German cooperation assistance (GTZ). The project covers two aspects. The first deals with surveys on various production parameters which will be conducted under village conditions. The second will focus mainly on the milk production and technological aspects on stations.

Major efforts are also being made to provide training and equipment to animal production and health departments in the country. In this connection, the German Agency for Technical Cooperation (GTZ), awarded 36 scholarships for a one-year training course for national staff in the following fields: diagnosis, treatment and border health control and in laboratory analyses.

The World Bank also plans to construct three veterinary clinics, two diagnostic laboratories and two veterinary products stores.

The following four integrated rural development projects do not have a separate livestock production component:

- Niefang, funded by FAC
- Bata/Nfunga funded by FED
- North Mougomo funded by IFAD
- Nsork-Nsomo funded by Euro-action accord.

The only livestock production activities envisaged in the Niefang project, the most ambitious of all projects in terms of animal production, are:

- poultry vaccination
- yearly drenching and spraying of pigs
- twice-yearly drenching and spraying of sheep and goats.

An FAO mission visited Equatorial Guinea in 1983 as part of the International Programme for the Development of the Meat Sector and the International Dairy Products Development Coordination Programme and identified the following livestock development projects: Development of Cattle production in Moka Valley, Improvement of Goat Production on continental Equatorial Guinea and Pilot Cattle Breeding Scheme in Rio Muni (FAO, 1983). Funds for these projects are still being sought.

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19.7 MAJOR CHANGES SINCE 1977

In view of the fact that Equatorial Guinea was not included in the previous studies, a comparative analysis of the data obtained cannot be made.

However, two major events which occurred during the period covered and have a major impact in the livestock production sector should be noted. They are:

- Equatorial Guinea's entry into the Customs Union of Central African States (UDEAC). When the community's centre for N'Dama improvement and multiplication becomes operational, Equatorial Guinea will gain access to a supply of high grade breeding stock to launch cattle production and livestock breeding operation.
- the entry of Equatorial Guinea into the franc zone in 1985, an event which will obviously affect the national economy and consequently, the price of livestock products.

Various development projects, some of which are currently being implemented, have been formulated. However, it should be emphasised that relatively little importance is given to the livestock component in existing projects.

SUMMARY

In 1985, there were 9.8 million (estimated) head of trypanotolerant cattle in the 19 West and central African countries of the study area. The trypanotolerant sheep and goat population was estimated at 12 and 20 million, respectively. The trypanotolerant cattle population consists of 4.9 million N'Dama, 2 million Savannah Shorthorn, 0.1 million Dwarf Shorthorn and 2.8 million zebu x Shorthorn crossbreeds.

The trypanotolerant cattle population increased at an annual rate of 3.2% over the last eight years due mainly to a substantial increase of 4.5% in the number of N'Dama. The small ruminant population on the other hand, apparently remained static or increased very slightly. These figures should, however, be treated with caution, as national statistics on small ruminants are often unreliable.

A further and unexpected result of this study is the relatively slow rate of crossbreeding increase between zebu and Shorthorn cattle despite the fears expressed with regard to possible dilution of pure breeds. This, of course, varies with the countries concerned. However, efforts in protecting pure breeds should, in any way, be relaxed.

In recent years, the governments of the 19 countries covered have started to become aware of the value of their trypanotolerant livestock population. Consequently, national research policies have focused on the development of pure breeds and traditional livestock production systems, in open collaboration with regional and international organisations operating in the same field. These countries have also made significant efforts in the planning and coordination of their activities aimed at developing trypanotolerant livestock production.

Major progress has also been made in research activities on trypanotolerant cattle and trypanotolerance since the publication of the first two volumes of this study.

More concrete results were evidently obtained on knowledge of the productivity of trypanotolerant species than on the mechanisms of trypanotolerance. This was closely linked to the establishment by ILCA and ILRAD of "The African Trypanotolerant Livestock Network". However, achievements in the field of basic research, and more particularly, in other potential areas of research opened up by research results on the genetics of trypanotolerance should not be overlooked. They may have practical applications in animal selections in the not-too-distant future.

Finally, as regards the development of livestock production through the use of trypanotolerant breeds efforts have mainly focused on developing national strategies for livestock production development in almost all the countries covered. Furthermore, potential donor and executing agencies have very often been involved in the formulation of these strategies. This should facilitate the search for funding and regional coordination. FAO has registered significant results through its Programme for the Control of African Animal Trypanosomiasis and Developments of Infested Areas particularly in the fields of training, project formulation and coordination.

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Obviously, a number of trypanotolerant livestock multiplication and development projects were discontinued during the study period. At the same time, some new projects were attracting funding. Efforts made during the past years have not all achieved their goals yet. One can, therefore, reasonably hope for harmonious and rapid development in the field of trypanotolerant livestock production in the next 10 years.

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